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TRADE SURVEYS.

THE newspapers have already announced the death of M. Alfred-August Durand-Claye, Chief Engineer of the corps of Ponts-et-Chaussées, Professor at the School of Ponts-et-Chaussées and at the School of Fine Arts, Officer of the Legion of Honor. Although so very distinguished in his profession, M. Durand-Claye was still a young man, having been born in 1842. He was educated at the semi-military college of Sainte-Barbe and at the Polytechnic School, from which he graduated with high honor in 1863. Three years later he was commissioned as engineer in the service of the city of Paris, and began those studies of drainage and sewage-disposal which have made his name famous. His earnest wish was to accomplish the drainage of Paris by sewers, after the model of London, abandoning the fosses, or vaults, which nearly every house in Paris still contains, and which, in the opinion of most sanitarians, constantly threaten the health of the city. Through his experiments, the change has begun, and it will not long before a large part, at least, of the better Paris houses will be drained in the English manner, to the great comfort of their inhabitants. As increased drainage involves increased facilities for sewage-disposal, M. Durand-Claye devoted much time to the study of this part of the problem. Fortunately for the people who live in the present valley, the idea of allowing the sewage of Paris to run directly into the river is now regarded as inadmissible. The present sewers, which carry little except street-wash, discharge upon the irrigation-fields at Gennevilliers, and M. Durand-Claye, who was an ardent believer in sewage-irrigation, planned to extend the system to a larger territory at Saint-Germain. His scheme, although opposed by what the French papers called the almost overwhelming influence of the retail liquor-dealers, has, we believe, been adopted, at least in part, and the experience of Gennevilliers, the most interesting example of sewage-irrigation now in operation, is to be greatly increased in scale.

A CURIOUS trouble has come upon the occupants of the buildings in the lower part of Broadway, in New York, through the operations of the New York Steam Company. This Company, when its main pipes were first laid in the streets, used an expansion-joint packed with putty. Naturally, the putty has, in the course of years, lost its consistency, and it is now found necessary to replace the joints, one by one, with new ones packed with copper. The change seems to be made in a very leisurely manner, and as the hot steam leaks out meanwhile, the ground in the vicinity is raised to an uncomfortably high temperature. In the present case, a joint having to be made in the Broadway main, the street was opened, and for some time the steam in the street was allowed to pour out of the opening, frightening horses, and heating the basements of the adjoining buildings, before some newspaper reporter called the attention of the officials of the Company to the trouble, only to be coolly told that the repairs would take another week, and that if any person brought suit or injunction against the Company on account of the nuisance, the work would be suspended, and the steam allowed to escape indefinitely. In the good old days of Governor Hoffman, a reply like this would have been met by the summary occupation of the Company's premises by a company of soldiers, with orders to keep steam shut off until the leak was repaired; but modern governors are not made of such stern stuff, and the unfortunate abutters have to bear their fate at least they may. According to the reporters, the thermometers in the basements of the neighboring stores range from one hundred and thirty to one hundred and seventy-five Fahrenheit, and the goods stored in them are rajiately spoiling. Moreover, the water in the neighboring mains is so heated that it cannot be pumped in pumps depending on atmospheric pressure, for the reason that steam forms in the pumps, and pressure is lowered by the exhaust; and the water will not rise after the piston. This is rather a serious matter for buildings depending on pumping to get water to the upper stories, and at last accounts some of the property-owners have become desperate, and were about to try whether the courts could not help them.

OUR German brethren have just adopted a new schedule of charges, which supersedes those previously in use, and proclaims some peculiarities. Like most German ordinances of the sort, it is rather too long and complicated for the English or American taste, and it is still further complicated by being adapted to the use of engineers, who, in Germany, are always very intimately associated with architects. The most striking peculiarity about the new schedule is the separation of building into six classes, the first two classes, for plain storehouses and the simplest kind of factories; and, in engineering work, simple embankments of streams, laying out simple systems of water-supply, and roads of ordinary character. The fees to be paid for full professional service in relation to these, including sketches and working-drawings, estimates, general supervision and passing accounts, vary from two per cent on the cost for works involving an outlay of one hundred and fifty-thousand dollars or more, to five per cent for those where the expenditure is less than twelve hundred and fifty dollars. The second class comprises the better sort of farm-houses, town-houses of the planer sort, simple school-houses, almshouses, baths, barracks, prisons, custom-houses, plain railroad-stations, ordinary greenhouses, storehouses for heavy weights, manufactories of a more important kind, and so on; and, for engineering work, simple harbor improvements, canals, exclusive of locks or bridges, drainage and water-supply where no machinery is to be employed, plain, straight-up, thirty-five-thousand feet span, and railways in level country. For full professional service in these undertakings the fees range, in inverse proportion to the cost, from three to six and one-half per cent.

The third class includes all town and country houses requiring a certain amount of architect's skill in design, such as those with ornamental vestibules or staircases, those with stores in the first story, and country-houses with verandas, together with conservatories or decorative greenhouses, handsome stables, temporary exhibition or festival buildings, structures for parks or zoological gardens, high-school and university buildings, libraries, concert-halls and ball-rooms, theatres, banks, large railroad-stations and other public buildings; and, in engineering, foundations, important harbor works, locks and weirs, water-supply for power, drainage and water-supply in general where tunnelling or sinking of shafts is required, pump-teas, works for the cleaning and purification and the distribution of water or gas, or for the production and distribution of electricity for lighting, building-construction for structures subject to vibration or heavy loads, or requiring roofs of wide span, bridges from thirty-three to one hundred and twenty-five feet span, seventeen and one-half foot, hilly, or marshy or peaty lands, rope railways, and difficult highway construction. The designing and supervision of these is to be paid for by fees ranging from four to eight per cent on the cost, the fee for everything costing less than twenty-five thousand dollars being reckoned at more than five per cent.

This last class is by far the largest and seems to be regarded as comprising the greater part of the architect's or engineer's commissions. The fourth class includes, for architects, rich city and country dwellings, palaces, churches and
chaplés, club-houses, ball-rooms, theatres, town-halls, and other public buildings of a costly character, and for engineers, compressed-air and refrigerating works, docks, slips, dry-docks, dams, and the overloading of one hundred, and nineteen feet span, high aqueducts, drawbridges and bridges of monumental character, long tunnels, mountain railways, and important iron construction for buildings. These demand fees varying from five to nine and one-half per cent, inversely according to cost. The fifth class is only for architects, and includes interior decorators, furniture, fountains, and monuments of all kinds, which are charged for at percentages varying from six to eleven per cent on the cost. The sixth class is only for engineers, and includes the installation of machinery and mechanical works, the fee varying from four and one-half to fifteen per cent.

An awful explosion occurred last summer at Friedenschutte, in Silesia, the cause of which is still under discussion. Friedenschutte is a town in the mining district, containing great smelting establishments. In the one where the accident occurred, twenty-two large boilers, each about forty feet long, were used to furnish power for driving the blowing-machines, stamp-mills and other apparatus. For the sake of economy, the heated gases from the blast-furnaces were conveyed to the boilers by large tubes, but in order to insure the combustion of the inflammable portion of these gases, the grates of the boilers were kept supplied with burning coal, throughout the duration of the blast. The boilers communicated by means of a large steam drum, and there was a certain amount of communication between the fire-boxes through the branches of the gas supply-pipe. Just after midnight, on the twenty-fifth of July, all the boilers blew up at once, being torn into small pieces. It is calculated that they were blown to an enormous distance. Twenty-one out of the twenty-two boilers had been tested a year previously, and, although they were old, having been in service for fourteen years, they were proving capable of sustaining a far greater pressure than that indicated by the gauge just before the accident, and strangely, still, four out of the twenty-two were not in service, and had no fire under them, yet these were blown up like the rest. The request failed to throw much light on the matter, and a commission of experts was appointed, which has just published a curious report, quoted to the Revue Industrielle. All the evidence showed that the steam-pressure was not excessive, and that the water-gauges had been looked after, so the commission decided that the catastrophe could not be attributed either to steam-pressure or low water. It appeared, however, that just before the explosion several of the boilers had been fed with coal, moistened, as much coal often is, by sprinkling with water, by the adjustment of several grates at once with cold, moist coal, had had the effect of cooling the furnace gas temporarily below the point of combustion, leaving it, however, at a temperature high enough to distil the coal. In consequence of this, an immense volume of uncombusted carbonic oxide from the blast-furnaces, mixed with hydro-carbonic fumes, the grates were poured into the fire-boxes and fuses of some of the boilers, spreading by diffusion into the others, and mixing everywhere with air enough to form a dangerously explosive compound. As soon as it found its way to the boilers where the fire was still bright, detonation took place, with a velocity and destructiveness characteristic of gas-explosions.

A NEW idea has been developed in Germany, in the shape of the manufacture of mortar, to be sold at retail to small builders and private individuals. The business requires very little capital, and is most effective, which is material, as quality, and of excellent quality, finds a ready sale, something like two million barrels having been disposed of last year in Berlin alone. It is rapidly becoming usual for city builders, here as elsewhere, instead of maintaining large yards, at enormous rents, for the storage of materials, to keep only an office, contracting the making of the products, doors, lattices, glass and so on, to be delivered at the building where they are to be used. This involves the manufacture of mortar on the ground, under unfavorable circumstances, and at an unnecessary expense; and a provision by which, on dropping a card into a box, or speaking a word through a telephone, a suitable quantity of first-rate mortar for any purpose, ready for use, could be delivered at an hour's notice where required, seems likely to be very useful. We use mortar containing a portion of cement with a freedom unknown abroad, and of course this could not be kept long on hand; but there would be no difficulty in doing this in the southern parts, where in the summer months the deposit would be many times greater than is the ambition of the smallest won, adding the desired dose of cement, and running the mixture through a mill, turning it out in excellent condition. For householders, plasterers, carpenters, steam-fitters, furnace-men, and others who have occasion to use small quantities of mortar or cement, this would be a great convenience, to be dispensed with in this way, and kept in stock, would be far superior in quality to that now generally employed in building.

The Builder gives some statistics of the rate of wages in New South Wales, quoted from a report of the Immigration Agent at Sydney, which are worth comparing with similar statistics for our own country. In many respects the famous road has advanced with a rapidity which obscures the achievements even of the Canadian Pacific engineers, and the Russians, not content with a railway extending through fifty degrees of longitude from St. Petersburg, already talk of building through sixty degrees more, to Vladivostock, on the Pacific Ocean. As there would be a difference of seven hours in time between the ends of the line, it would be interesting to know, in this case, what would be taken as the meridian for setting the railroad clocks. So far, according to M. Barré, who writes occasional notes on the subject to La Semaine des Constructeurs, the line is exclusively military, but it will probably soon be opened to the public, and the tourist or the merchant will then be able to leave Paris or London on Monday morning, and by the following Monday night be in China or in India, after passing through a succession of the most curious countries in the world. With the railway and the Russian immigration, there remains but one great obstacle to the Asiatic plains, which have been continually ravaged by bands of robbers since the time of Xenophon. Merv, which was lately a walled citadel, containing about three thousand turbulent inhabitants, in the middle of a desert in which no one but a robber could live, is already an important town, surrounded by a vast area of gardens, fields and pastures, effectually and we may hope, permanently defended by Russian rifles and tranquilized by Russian administration.
SAFE BUILDING.—XXVII.

Example VI.

Uniform Load. A wrought-iron beam of 25-foot span (Figure 156) carries a uniform load of 800 pounds per running foot of beam, including weight of beam. The beam is thoroughly braced sideways. What beam should be used?

We draw $A B = 300$" at scale, and then divide our uniform load into a number of equal sections, say eight, each

$$i = \frac{300}{8} = 37.5\text{" long.}$$

The total load on beam is

$$\frac{8 \times 20000 = 160000 \text{ pounds}}{8} = 20000 \text{ pounds}.$$  

Each section therefore carries

$$u = 20000 = 2500 \text{ pounds.}$$

We place our arrows $w, w', w''$, etc., at the centre of each section, which will bring the end ones at $37.5"$ distant from each support, so that these same verticals will answer when obtaining deflection figure.

We now make $u a = 20000$ pounds at scale point, and divide it into eight equal parts, each equal $w, w', w''$, etc., $= 2500$ pounds. We make $x y = 12000$ pounds, which is the ($\frac{k}{k}$) for wrought-iron, see Table IV. We draw $x, k, x', x''$, etc., and construct figure $C E G$, which will approach a parabola in outline. The more parts we take the nearer will it be to a parabola.

We draw $x y$ parallel $C G$ and find it bisects $b a$, or each reaction is one-half the load or $= 16000$ pounds. This we know is the case.

The longest vertical will, of course, lie at the centre $D$ of $C G$, or greatest bending-moment will be at the centre, this we know is the case. $D E$ scales (inch scale) $62\frac{1}{2}$" which will be the required $r$ or moment of resistance (Formula 92). The bending-moment at the centre will be, Formula (93).

$$m = \frac{62\times12000}{2} = 75000$$

Had we used Formula (21) we should have had

$$m = \frac{20000 \times 300}{8} = 750000 \text{ or some result, and from Formula (18) for}$$

$$r = \frac{75000}{12000}$$

Table XIX we find the nearest $r$ to our required $r (62.5)$ is $63.8$ which calls for a 15"—150 pounds beam; as the beam is braced sideways this will do, if sufficiently stiff.

In regard to shearing, we draw the figure $O, H J F K L M N P$ $R S O$ and find shearing on both sides of beam similar, increasing gradually from the centre to ends.

It would be

Cross shearing from $A$ to $w'$ = $O H \times 10000$ pounds.

Cross shearing from $w$ to $w''$ = $T I \times 75000$ pounds.

Cross shearing from $w'$ to $w''$ = $V J \times 5000$ pounds.

Cross shearing from $w$, to $w''$, to $w'$ = $L K \times 2500$ pounds.

Cross shearing from $w$, to $w'$ = $O \times 0$ pounds.

Cross shearing from $w''$, to $w'$ = $M N \times 2500$ pounds.

Cross shearing from $w''$, to $w'$ = $P \times 5000$ pounds.

Cross shearing from $w'$, to $w''$, to $w'$ = $R K \times 75000$ pounds.

The area of web of a 15"—150 pounds beam (Table XIX) is 7.59 square inches; the safe resistance of wrought-iron to cross-shearing per square inch being ($\frac{7.59}{8000}$) pounds, we need not worry any further on that score.

To find the deflection we now make the lower load line $g$ equal to the sum of the lengths of verticals $w, w', w''$, etc., through parabola $C E G$, beginning at top $g$ with length of right vertical $w'$. We select $x$ at random, scale $x y = 216"$ (inch scale), draw $x g, x c, x$, etc., and figure $C F G$. We now draw $x z$ parallel to $g$, and find it bisects $g, g'$, or greatest deflection will be at centre of beam, which we know is the case. We scale $f z = 62"$ (inch scale); find from Table XIX for our 15"—150 pounds beam $l = 529, 5$ and from Table IV for wrought-iron $r = 27000000$, therefore, Formula (32):

$$\delta = \frac{62.37 \times 5.246 \times 12000}{27000000} = 0.486"$$

Had we figured arithmetically, Formula (39), we should have had

$$\delta = \frac{5.2 \times 20000 \times 689\times 784.27000000}{27000000} = 0.497"$$

or practically the same result.

The safe deflection for plastering should not exceed (28)

$$\delta = 25, 0.03, 0.57\"$$

so that we are perfectly safe, providing our beam is well braced sideways.

Example VII.

Uniform and Concentrated Load. A wrought-iron beam, braced sideways, of 30-foot span, Figure 157, carries a uniform load of 260 pounds per foot, including weight of beam. It carries also a concentrated load $w'$ = 10000 pounds ten feet from the right-hand support. What beam should be used?

We draw beam $A B = 360$" at scale, we divide uniform load into six equal parts, each $5"$, or $l = 60"$. The total uniform load will be $u = 260 \times 20 = 6000$ pounds, therefore each part $u = 666$ = 1000 pounds. We draw arrows at the centre of each uniform part, so that the end arrows will be one-half part from supports. These arrows will therefore answer for our verticals, when drawing deflection figure.

At 120" from right hand support we locate the load $w' = 10000$ pounds.

We now make load line $a = 16000$ pounds the total load and divide it, so that

$$b = w'' = 10000 \text{ pounds}$$

$$t = w' = 10000 \text{ pounds}$$

Had we taken more parts, the slope in shearing figure would become smaller and smaller till they would finally assume the straight line $b o$, which is the real outline of shearing figure.
etc. And construct figure C E G. Draw a parallel C G and we find a (or reaction A) scales = 6200 pounds, and b (or reaction B) scales = 5677 pounds.

The longest vertical is D E = 1617" (inch scale) therefore greatest bending-moment is at w, and from Formula (48)

\[ w_1 = 161,500 \times 104,500 \]

For the highest moment of resistance we have from Formula (18)

\[ 104,500 \times 12,000 = 97.7 \]

The cheapest or most economical nearest section we find — to this required r (8.75) is the 20'-200 pounds beam of which the moment of resistance is r = 123.8.

Had we combined the formulae for uniform and concentrated loads and worked out the problem arithmetically it would have been tedious, but we should have had similar results.

We can safely overlook shearing, but note that the real shearing figure would not be the shaded figure, but dotted figure D, HJIKG.

For finding the deflection we now draw lower load line g e = the sum of the verticals through C E G, beginning at top with length \( w_1 \), then \( w_2 \), \( w_3 \), \( w_4 \), \( w_5 \), and \( w_6 \), in their order. We take no notice of verticals at \( w_1 \) as it does not fall in one of the even divisions of C G or A B into lengths \( l \). We select pole \( x \) distant \( z \) = 288" from load line, draw \( z \), \( g \), \( c \), etc., and then figure c, f, g. We now draw a parallel c, g, it divides \( g \) in so that \( g \) = 298" and \( a \), \( c \) = 249", we divide \( c \), \( g \), in same proportion at \( f \), and carry this up to \( F \) at beam, which is the point of greatest deflection of beam, and is distant 165" from \( B \), and 197" from \( A \). We scale \( f, f = 106" \) (inch scale) and have from Formula (91)

\[ \delta = \frac{106,60,288,6500}{27,000,000,1288} = 0.357" \]

1288 being \( i \), the moment of inertia of beam as found in Table XIX. The beam is therefore nearly stiff enough to carry plastering.

**Irregular Crosses**

The graphical method lends itself very readily to sections finding centres of gravity and neutral axes, as explained in the chapter on arches, and also for finding the moments of inertia of difficult cross-sections.

If we have an irregular figure \( A B C D E \) (Figure 158) we divide it into simple parts I, II, III, and IV. We find the centres of gravity \( g_1, g_2, g_3, \) and \( g_4 \). To find Neutral points of each part and Axial, draw their respective horizontal neutral axes through these. Anywhere make a line \( a e \) area of whole figure and divide it so that:

\[ a b = \text{area of I} \]
\[ b c = \text{area of II} \]
\[ c d = \text{area of III} \]
\[ d e = \text{area of IV} \]

Select pole \( x \) at random, draw \( x a, x b, x c, x d, \) and \( x e \).

From any point of horizontal \( g \), draw \( f k \) parallel \( b \) to it in- sects horizontal \( g \), then draw \( k j \) parallel \( c \) to horizontal \( g \); then \( j k \) parallel \( d \) to horizontal, and finally \( k o \) parallel \( e \); and so parallel \( d \) to horizontal \( e \) and through \( g \). A horizontal through \( o \) is the neutral axis of the whole. If we multiply the figure /0 and \( k j \) by the area of the figure \( A B C D E \) (both in square inches) we have the value of moment of inertia of A B C D E in inches, around its horizontal neutral axis.

**To find area of inertia**

A simple way of obtaining the area of the figure \( f o k \) would be to draw horizontal lines through it at equal distances, beginning with half distances at top and bottom, and to multiply the sum of these horizontal lengths by the distance between any two horizontal, all measurements in inches. This will approximate quite closely both the area and moment of inertia. Of course the more parts we take in all of the processes, the closer will be our result.

A practical example will more fully illustrate the above.

**Example VIII.**

**Rolled Deck.** Find horizontal neutral axis and the corresponding part moment of inertia of a 27" by 55 pounds per yard deck beam, resting on its flat flange (Figure 159).

We will take the roll as one part, divide the web into four equal parts, the flange into two parts, one the base which will be practically rectangular, and its upper part which will be practically triangular. The whole area we know in inches is for wrought-iron:

\[ a = \frac{10}{10} \]

The bottom rectangular part of flange will be

\[ a_n = 4.8 = 1.4 \] square inches

next triangular part

\[ a_n = 4.8 = 0.9 \]

The web parts

\[ a_n = \frac{16}{2} \] square inches each.

Leaving for the roll at top \( a = 1.3 \)

We now make the horizontal line \( a = 5" \) and divide it so that \( a b = 1.3" \)

\[ c d = e = f = 0.4 \] inches.

1This point of intersection of this line with a main neutral axis, found similarly, in any other direction, would be the centre of gravity of the whole figure.
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The heaviest producing the necessary est of reducing clearness.

Reducing Flanges, Girder, much material can be saved by making the flanges heaviest at the point of greatest bending-moment, and gradually reducing the flanges towards the supports.

This is accomplished by making each flange at the point of greatest bending-moment of several thicknesses or layers of iron, the outer layer being the shortest, the next a little longer, etc. Of course the angles, which form part of the flange, are kept of uniform size the whole length, as it would be awkward to attempt to use different sized angles. Generally (though not necessarily) the inner or first layer of the flange plate, is also run the entire length. Of course, where the flanges are gradually reduced in this way, it becomes necessary to figure the bending-moment and moment of resistance at many points along the plate girder to find what the plates can be reduced. This would be a war-some job. By using the graphical method, however, it can be easily accomplished. Referring back to Figure 131, we take the point of greatest bending-moment (at c,) of the beam A B. The required moment of resistance at this point, it will be remembered was the length (inch scale) of vertical E through

Do not pass C D E F G. We now decide what size angles we propose using and select the necessary thickness of the flanges by Formula (56), inserting for the value of $r$, the length (inch scale) of $v$ or vertical at $E$. Further $a$, will of course, be the sum of the area of two angles, the total depth of girder in inches and $b$ the breadth of flange, in inches, less rivet holes. The above is on the assumption that the distance $x y$ of pole x from load line $d a$ was equal to the safe modulus of rupture $t$ of steel or wrought-iron according to whichever material we were using, or we should have:

$$v = -a$$

Thickness of Flanges.

Where $z$ is the thickness, in inches, of each flange of a plate girder at any point of its length.

Where $v$ is the length, vertical inch scale, through upper or resistance figure, providing we have assumed the distance of pole from load line (pound scale) $= f$ of the material.

Where $d$ is the total depth, in inches, of the plate girder.

Where $b$ is the width, less rivet holes, in inches, of the flange.

Where $a$ is the sum of the areas of cross-section, in square inches, of two of the angles used.

We now calculate as above, the thickness $x$ of flange at point of greatest bending-moment and then deduct where many layers or thicknesses we will divide the flanges. Say, in our case we decided to make the flange of four layers of plates, each $z$ or one quarter $x$ in thickness. Then make

$$E, E_2 = -a$$

Where $E, E_2$ is the amount to be subtracted (inch scale) from moment of resistance or vertical $v$ and representing the work of two angles.

Where $a_2$ is the sum of the area of cross-section, in square inches, of the two angles.

Where $d$ is the total depth, in inches, of the girder.

Where to drop. Now draw through $E_1$ a parallel to base of figure

off Plates. G, divide $E_1$ into as many parts as we decide to use thicknesses of plates (four in our case) and draw parallel lines to base $G$ through these parts. Vertically parallel to the point from these lines intersect the curve or outline of figure $C D E F G$ will be the points at which to break off plates, as illustrated in drawing. This method, of course, is approximate, but it will be found sufficiently accurate for all practical purposes. It is not necessary that $x$ or $E_1$, be divided into equal parts. Had we decided to use plates of varying thicknesses we should simply divide $E_1$, in proportions to correspond to thicknesses of plates in their proper order, beginning at $E_1$, with plate immediately next to angles and ending at $E$, with

extreme central outside plate. An example, more fully illustrating the above, will be given in the chapter on plate girders.

EARLY SETTLEi MEMORIALS. — XIV.

Van Wart Monument.

In 1829, the citizens of Westchester County, N. Y., erected, in the graveyard attached to the Presbyterian church at Greenburgh, a monument to the memory of Van Wart. It is inscribed as follows:

"Here reposes the mortal remains of Isaac Van Wart, an elder in the Greenburgh Church, who died on the 23d of May, 1829, in the 65th year of his age. Having lived the life, he died the death of the Christian. "The citizens of the County of Westchester erected this tomb in testimony of the high sense they entertained for the virtuous and patriotic conduct of their fellow-citizen, a memorial sacred to public gratitude."

"Victor Amor Patriae. Nearly half a century before this monument was built, the coursers of America had, in the Senate Chamber, voted that Isaac Van Wart was a faithful patriot, one in whom the love of country was invincible, and this tomb bears testimony that the record is true."

"Fidelity. On the 23d of September, 1789, Isaac Van Wart, accompanied by John Paulding and David Williams, all farmers of the County of Westchester, intercepted Jacob VanWart on his return from the American lines in the character of a spy, notwithstanding the large bribes offered them for his release, nobly disdained to sacrifice their country for gold, secured and carried him to the commanding officer of the district, whereby the dangerous and traitorous conspiracy of Arnold was brought to light, the insidious designs of the enemy baffled, the Americans army saved and our beloved country free."

Old Paulding Monument at Tarrytown.

In May, 1853, a public meeting was held in Tarrytown, N. Y., "for the purpose of considering the propriety of erecting a monument commemorative of the capture of Andre." This meeting grew out of a fear that the actual ground where the event took place would become a matter of dispute, because of the natural and artificial changes in the topography of the locality incident to improvements, as well as "the very proper desire to put up in what was the

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1 Continued from No. 630, page 264.
most beautiful region on the river some work of art that would embellish and commemorate an historic spot." Besides, the capture of André had become the common property of the world in poetry, history and art, the subject of romances and the favored theme of orators and statesmen. The locality itself had become atrying place, a kind of Mecca for English visitors.

The purpose of the above meeting was apparently to accept the proposition of the Inspectors of State Prisons, "to furnish a suitable monument for the commemoration of the capture of André, properly inscribed, provided the citizens of Tarrytown and the County of Westchester shoulder the same and keep it in repair," made by Mr. Taylor, "who agreed to give the necessary hand for the site of the monument, a plot of twenty feet square." After accepting these gifts, the meeting appointed a committee of twentyseven members, whose first duties were to collect money "to build a firm and desirable base or foundation for the monument, to enclose the same with an iron railing, and to pay the expenses attending the laying of the cornerstone and the dedication.

The corner-stone was laid on the 4th of July following and the dedication of the structure took place on the 7th of October. Both occasions were attended by large and distinguished citizens of the State. On the first occasion, the oration was delivered by Hon. James T. Brady. On the second, the opening address was made by Governor Horatio Seymour, who, in his speech, in his dedication of the monument and declared that his interest in the subject that brought them together, did not even mention the names of André's captors. The oration was delivered by Hon. Horatio J. Raymond and was in every respect a splendid and noble effort. In it he spoke of Nathan Hale, and, for the first time since this noble martyr went to his unknown grave, was the voice of one of his countrymen first raised in his behalf.

The monument marbled. On one side of the die are cut these words: "Their conduct merits our warmest esteem. They have prevented, in all probability, the issue of one of the severest strokes that could have been meditated against us."—Waukeela.

On the other side is the following: "On this spot, the 23d day of September, 1780, the spy, Major John André, Adjutant-General of the British Army, was captured by John Paulding, David Williams, and Isaac Van Wart, all natives of this county. History has told the rest. The people of Westchester County have erected this monument in order to commemorate a great event as to testify their high estimation of that integrity and patriotism which, rejecting every temptation, rescued the United States from most imminent peril, by baffling the arts of a spy and the plots of a traitor. Dedicated October 7, 1853."

MONUMENT TO DAVID WILLIAMS.

David Williams moved from Westchester County to the town of Livingstonville, Schuylerville, in 1806, and died there in 1831. He was buried with military honors and followed to his grave by a large concourse of people. For several successive years Judge Murphy, his godson, visited Washington and urged Congress to erect a monument to the captors of André, but he had nothing to show for his efforts.

On the 4th of March, 1876, the remains of Williams were removed to the cemetery of Rensselaerville, and on the 19th of July of the same year they were again removed to the old Stone Fort at Schuylerville, owned by Major André, and erected by a large procession.

On the 1st of May, 1876, the Legislature of the State of New York appropriated the sum of two thousand dollars for the purpose of erecting a monument in honor of the capture of André. A committee of the Revolutionary Stone Fort at Schuylerville was appointed to commemorate the virtues and memory of David Williams, one of the captors of Major André, to be expended under the direction of Daniel Knowler, Ralph Brewster and Judge Charles Holmes. This appropriation was opposed by a member who gave the same reasons for his action that were used by Major Tallmage in Congress in 1817.

These commissioners issued the following inviting appeal, "to any county, city, association, literary club, or individual, who may subscribe not less than two hundred or more than eighteen hundred dollars, as a monument and suitable to the two thousand appropriated by the State, shall have their names inscribed on one of the faces of the monument or on a marble tablet to be erected in the Fort, as the artists who design the monument may think most appropriate. It is proposed to appoint one or more of the most distinguished artists and sculptors in the State to design the monument and make it a work of art appropriate to the event. This tempting statement of the purposes of the people of Schuylerville, and the commissioners erected a plain monument."

The ceremonies of laying the corner-stone took place on September 13th, the actual capture of André being the 13th of July. They were attended by the usual presence of military and civic organizations, many distinguished citizens, two grandsons of Williams, and many of his descendants. The oration was delivered by Mr. Orlando P. Potter, then a student at Harvard.

A book, called the "Centennial Celebrations of the State of New York," for which the State appropriated five thousand dollars, contains the following description of the monument, furnished by Mr. Knowler: "It is a fine block of Massachusetts marble, and the work is artistically executed. The height of the monument is twenty-three feet and nine inches. The following inscriptions, the production of Mr. Knowler himself, are engraved on the monument:

"HERE REST THE REMAINS OF
DAVID WILLIAMS
DIED IN THE SERVICE OF THE
UNITED STATES
AUG 23d 1781
AGED 76 YEARS, 6 MOS., 8 DAYS.

"He with his companions, John Paulding and Isaac Van Wart, on the 23d of September, 1780, arrested Major John André and found on this person treasonable papers and handwriting of General Benedict Arnold, who sought by treachery to surrender the military Post of West Point into the hands of the enemy. In resisting the great tribes of their prince for his liberty, they showed their inexpressible patriotism. The American army was saved and our beloved country became free."

"PILGRIMAGE OF
ANDRE.
"On authority of Congress, 1789, a silver medal was voted to them, and presented to the captors by General Inspectors of State Prisons, as a dinner to which he invited them while the army was encamped near Verplanck's Point."

"VICTORS AMOR PATRIAE.
"General Washington's letter to the President of Congress, October, 1780: 'The party that took Major André acted in such a manner as does them the highest honor and proves them to be men of great virtue.'"

"NANCY BENEDICT WIFE
OF
DAVID WILLIAMS
DIED AUG. 5, 1844, AGED 87 YRS. 6 MS. 8 DS.

"This monument was erected by the State of New York from an appropriation made in the Great Centennial Celebration, 1876, by a bill introduced by Senator W. C. Lamont, under the following State Commissioners: Daniel Knowler, Ralph Brewster and Charles Holmes." And thus the memory of David Williams goes down to posterity in the Stone Fort at Schuylerville.

In the fall of 1830, the corporation of the city of New York invited Williams, the survivor of the three, by special messenger, to be present in that city for the celebration of the French Revolution. He was drawn, with other heroes of 1776, in a carriage at the head of the procession and attracted much attention. At one of the schools he visited he was presented with a silver cup, and at another with a silver-headed cane, the stem of which was made out of a chéreau de frise used at West Point during the Revolution.

NEW PAULDING MONUMENT AT TARRYTOWN.

The public meeting, before mentioned, that was held in Tarrytown in May, 1853, for the purpose of accepting the proposed gift of a monument to John Paulding and to provide means for the expense of laying the corner-stone and dedicating the monument, was the first effort towards the organization of the "Monument Association of the Capture of André." It was incorporated in November, 1873, agreeably to the laws of the State of New York. In the early part of 1875, the Association determined to celebrate the one hundredth anniversary of the capture of André, and to erect a monument appropriately, because the "original plan" of a monument to Paulding, "was felt to be inadequate at the end of twenty-seven years." To accomplish this object, the Association procured money to effect the efforts of Hon. D. O. Braddy, the sum of one thousand dollars, and two hundred and seventy persons, gave five thousand four hundred and fifty-four dollars more.

The Association went seriously to work to provide for the success of the dedicatory ceremonies, by appointing eighty-six vice-presidents, forty-seven committee-men, and twenty secretaries. It inducted, by the thousands, the most distinguished citizens of the United States to be present on the occasion, besides a large number of military and civic organizations. An immense procession preceded the exercises, and all thousands thus gathered together, met on Mount André, under a grand tent, at a meeting of the 23d of September, 1880, to do honor to the three captors and unveil a statue of Paulding.

They were made happy and patriotic by music from Gilmore's band; by a "brilliant floral display, consisting of geraniums, tuberoses and other flowering plants;" by the cool breeze from the majestic Hudson, and burning words of grateful tribute to the virtuous dead.

The exercises were opened by an address from the President of the day, Hon. Samuel J. Tilden, followed by a prayer by Rev. Alex. H. Botter, and an address by Rev. Wm. J. Raymond, of Albany.

Mr. Orlando P. Potter then read an historical paper.

The oration was delivered by Hon. Chauncey M. Depew. If not as brilliant and inspiring as that delivered twenty-seven years before, it was, as the work of a man who had been deeply interested in the subject, an extremely interesting and valuable contribution to the literature of the event. Nor did the orator neglect the forgotten life and deeds of Nathan Hale.

The new monument, thus imposingly dedicated is a "rejuvenation and elaboration of the old one," with the addition of a bronze statue
FIRST PRESBYTERIAN CHURCH.
PEORIA, ILL.
WARREN H. HAYES, ARCHIT.
MONUMENT MUN.
At the exhibition of a monument to the captors of André, was a monument of Nathaniel Hale. At Yale College. He was a fine student and a capable officer in the Revolutionary war, emerging from it with the title of Colonel. On a particular direction of Washington he was ordered to report to North Castle on the evening of the very day on which André was brought to this military post by Paulding, Williams and Van Wart. He was the first, from observing the department of the prisoner, from watching the manner in which he walked to and fro on the small space of the yard, to take his steps, to suspect that he was bred to arms, and was an important British officer.

The matter moved, and the execution of Major, Tapparata de Paulding was charged with his custody, and was almost constantly with him. He commanded the escort that conducted him to Lower Salem. It was into his hands that Andre then placed, for personal his first letter to General Washington, written under his true character. It was under his charge again, with a strong guard, that Andre was removed to Botelho's House, and there sent to West Point, where he was put under arrest in Tony Point, and there to Tapparata, where the court-martial took place. From the Stone House, where Andre was confined, Paulding "walked very industriously, and insisted with him under the graves," "overwhelmed with grief," he says, "so that gallicant an officer and so accomplished a gentleman should come to such an ignominious end." In his narrative of his interview with Andre, he refers to Hale as follows: "Before we reached the House Android showed very inquisitive to know my opinion as to the result of his capture. In other words, he wished me to give him candidly my opinion, as to the result in which he would have been tried by General Washington military tribunal, if one should be ordered. This was the most unpleasant question that had be presented to me, and I endeavored to evade it, unwilling to give him a true answer. When I could no longer evade its importunity or put off a full reply, I answered it as follows: 'I had a month before the end of the American war, by the name of Nathaniel Hale, who entered the army in the year 1775. Im mediately after the first Washington, was brought from the courts of jus tice respecting the strength, position, and probable movements of the enemy. Captain Hale ordered his services, went over to Brooklyn and was taken just as he was passing the outpost of the enemy on his return.' Said I with emphasis, 'Let us remember the sequel of this story.' "Yes," said Andre, "it was hanged as a spy. But you are not to consider his crime and mine alike, as though he was, exactly, precisely similar, and similar will be your fate." He endeavored to answer my remarks, but it was manifest he was more troubled in spirit than I had ever seen him before.

At the close of the war, the Paulding lived in Litchfield, Conn., and was a member of Congress for sixteen successive years. No one friend could speak of another with more indifference and appreciation than Paulding did of André. He cried over the sorrow of Andre's conversation. "I am sure he will go to the galley less fearful of his fate, and with less concern than I shall behold the tragedy. Had he been tried by a court of ladies, he is so gentle, handsome and polite a young gentleman that I am confident they would have acquiesced him."
DROUGHT IN TIMBER.

Warnings.

Wood which is liable to damp, or which at any time absorbs moisture, and is in contact with stagnant air, so that the moisture causes 'incipient rot,' can be conserved safe from the attacks of dry rot (1, 3, 4, 5, 7, 9, 10, 17).

Any impervious substance applied to wood, which is not thoroughly dry, tends to encourage decay: floors covered with kraftpaper and laid over brick masonry (8, 14); cement dado to wood partition (1), the water expelled from dado in setting and absorbed by the wood had no means of evaporation.

Woodwork coated with paint or varnish prevents the moisture from evaporating into the room.

Skirtings and wall panelling occupy the same subject to dry rot (4, 9, 17), and especially window-boards (4, 17), for the space between the woodwork and the wall is occupied by stagnant air, which the former absorbs moisture from the wall (especially if it has been fixed before the wall was made dry); beams and other members of the building, for the outside being in contact with the air becomes drier than the interior.

It is well, therefore, to saw and reverse all large scantlings (14).

The ends of all timber, and especially of large beams, should be left free (for it is through the ends that the moisture chiefly evaporates). They should not be embedded in mortar (8).

Inferior and ill-seasoned timber is evidently to be avoided (7, 17).

Whatever ensures dampness and lack of evaporation is conducive to dry-rot, that is to say:

Dampness arising from soil (3, 4, 7).

Dampness arising from wells, especially if the damp-proof course has been omitted (15).

Dampness arising from use of salt sand (15).

Dampness arising from drying of mortar and cement (1, 8, 16).

Stagnation of air resulting from arrangement of wood with dirt (4), or being purposely blocked through ignorance. Stagnation may exist under a floor although there are grills in the opposite walls, for it is difficult to induce the air to move in a horizontal direction without some special means of suction (2, 6). Corners of stagnant air are to be guarded against (7, 12).

Darkness assists the development of fungus; whatever increases the temperature of the wood and stagnant air (within limits) also assists (1, 2, 5).

Hot-water pipes are especially prejudicial, for they heat the woodwork, etc., by conduction, and are liable to leak (3).

The levelling of chips, sawdust, etc., under boarded floors is a most reprehensible practice, for the chips are very liable to attack, lying as they often do, on the damp ground (3, 12).

SUGGESTIONS.

All ground under boarded floors should be covered by an impervious substance—concrete, blue-lias lime (3), asphalt (4), Portland cement (9).

For churches, solid wood-block flooring is preferable to joists and boards (3).

To ensure the thorough dryness of a boarded floor the boards may be laid three-eighths of an inch apart (2), or small gratings may be inserted at intervals (1).

NOTES ON THE FORGOGING.

ERECRANUSIS.—In several of the above cases there has been complete decay yet no signs of fungus. This may have resulted from erecranusis, which may be considered as "wet-rot." The eremocausas of woody fibre is due to the gradual oxidation of its lignin and other chemical constituents in presence of atmospheric oxygen and water, the O ultimately taking the C to form CO, and the H to form H₂O. The II, however, becomes more rapidly oxidized than the C, and the formation of a brown snuff-colored powder or husus (similar to that produced by fungi) which is richer in O than the woody fibre. Moisture is a necessary condition of the process, and the most suitable temperature is about 60° F.

The case is referred to in the account in which the mycelium of the fungus had disrupted a layer of concrete.

I think a more likely explanation is as follows:—The foundations have settled, the concrete under the boarded floor has become cracked, and the timber cracks have been the direction of greatest moisture, and so over the concrete and down the crack to the damp soil beneath.

FUNGUS PASSING before Later and Growing in the Soil.—The mycelium of the fungus has the power of passing its nitrogenous and nutrient substances from the older to the younger growing parts. It thus has the power of growing in, and on the surface of the substances which it affords in the majority of cases normal energy. This may be brickwork, plaster, and even glass and iron, and thus reach woodwork at some distance. This growth is generally assisted if the surfaces over which it spreads are themselves damp. In this way it may pass through the interstices of the wall and ramify in the soil. It is also able to convey its moisture from a distance, so that it is necessary that everything in the neighborhood of woodwork should be avoided, and that soil under boarded floors should be covered by an impervious layer.

FUNGUS GROWING IN AIR-SprATING.—In 6 and 12 the fungus is said to have been growing in "the ventilating opening," and "in a draught." With regard to the first, it may be remarked that ventilation is not at all a necessary consequence of the insertion of an air grid, inasmuch as there must be a want of equilibrium resulting from difference of pressure in the outside, and the inside of the building. The fungus may therefore have found the air in the ventilating opening as moist and stagnant as elsewhere; and the case shows that it is necessary to introduce some method of suction to ventilate under floors.

FUNGUS GROWING IN A DRAUGHT.—Secondly, it is not the mere movement of the air, but the evaporation which usually results, that is detrimental to the fungus; if, therefore, the locality is a very damp one and the incoming air is damp at the outset, the fungus may quite possibly flourish in a "draught." Moreover, it must be remembered that the fungus is able to transport moisture, and also convey it from one part of a wall to another.

STAGNANT AIR BETWEEN JOISTS.—Case 2 seems to indicate that there was ventilation under the church floor, and yet the air was sufficiently stagnant to allow the undersurfaces of the boards to remain damp. It is evident that the current of fresh air should be made to move in the direction of the joints, and not across them, for it is quite possible that in the latter case the air between the joints may stagnate.

DEHYDRATION AT DIFFERENT TIMES.—In case 8 A is a case of peculiarity sometimes observed, that when pieces of two different kinds of wood are placed in contact, the harder is more liable to decay.

DURABILITY OF LARCH.—It is to be noticed in case 11 that the joints of larch remained sound. Larch is better able to withstand the effects of moisture than fir and pine.

GERMS IN WOOL AND FROM DEAD BODIES.—In case 2 it was concluded that the germs of the fungus were in the air, and that the air was likely to have been buried in the ground. Spores carried hither and thither by a variety of means may have settled on the walls, but it is not probable that the dead bodies could direct any association with their presence. Bacteria they very likely would produce, but the "dry-rot" spore is far more highly organized.

SPONTANEOUS GENERATION.—In one instance the origin of the germs is attributed to spontaneous generation. This, of course, is a theory now discarded.

WOOD BLEDDED IN MORTAR.—Wood bledded in mortar is liable to decay, for the water of the mortar is absorbed by the wood; and, in the process of setting, the mortar takes up some of the organic substances of the fibre, especially if the lime has not been thoroughly slaked, as it then tends to absorb the elements of water from the substances near it.

REMOVAL OF INFECTED TIMBER.—It is safest to remove all infected timber, and burn it. Merely scraping away the fungus, and then coating the timber with an impervious substance will frequently assist the growth of internal disease, and thus increase the moisture.

SEASONED AND UNSEASONED WOOD.—Under favorable conditions of temperature and dryness, seasoned wood may stand as well as seasoned; but it is far more liable to decay in a warm damp atmosphere, as it contains more free water and is thus a more favorable medium for a far more luxuriant growth of fungi. When, however, the wood is too coarse-grained, the sap-wood is better than the heart-wood, as it is more porous and air is more freely communicated through its fibres.

SPECIES OF FUNGUS.—It is dangerous to identify a fungus by such very meagre descriptions as are given in the MSS; especially when no reference is made to the form of its fructification. Still I think it probable that we are enabled to distinguish between the dry-rot fungus and the other 8 species of fungi without danger, in cases 7 and 14 it may have been polyergus cuporarius. The effects on the wood are the same in the case of nuculas and polyergus, except that with the latter the decayed wood becomes quite dark, the interior texture of the wood being more open than usual.
(1) **Architect.** - Boulton, J., Esq. **Locality.** - Liverpool and London. **Foundation.** - Scaffolding to height of 4 feet above cellar beneath. **Circumstances.** - Wood partitions dividing office finished with cement dado, 4 feet high. All timber above dado sound. **Ventilation.** - Floors fireproof, hence lower part of partitions air-proof, but not kept warm. New partitions with 2 small pieces of perforated zinc inserted between each pair of quarters, near floor on one side and ceiling on the other. **Result.** - Quite satisfactory. **Notes.** - Water expelled from dado. Sun-dried wood has means of escape. No fungus. Decay due probably to eumaeosis.

(2) **Architect.** - Ferrey, R. E., Esq., F. S. A. **Locality.** - Old Church, Worsley. **Foundation.** - 12 inches clear space below joints. **Timber.** - Appeared well seasoned. **Position.** - Floor. **Circumstances.** - Rose appeared five years after restoration and repeating. Small moisture on underside of boards. Oak joists fairly dry. **Ventilation.** - No signs of dry rot in walls, air pipes and earthWare pipes under passages. **Heating.** - Hot air with gratings in passages.

(3) **Architect.** - Ferrey, R. E., Esq., F. S. A. **Locality.** - Old Church in Somersethire. **Position.** - Floor and block of ceiling. **Circumstances.** - Possible leakage from hot-water pipes. Shaving left under floor; on them the fungus was especially luxuriant. Floor of long gallery. **Notes.** - Stone floor of cement inserted, but only perforated half through thickness of wall. **Heating.** - Hot water pipes. **Treatment.** - Shavings removed, pipes repaired, ground covered with layer of blue lime, timbers soaked with solution and 3-pound copper oxide with 4 gallons of boiling water. **Notes.** - In some parts there was a little, though insufficient ventilation; here the fungus was not much developed.

(4) **Architect.** - Holden, J., Esq. **Locality.** - Warehouses, New Brown St, Manchester. **Foundation.** - 2 feet to 2 feet 6 inches space under boards. **Position.** - Basement floor, sills, shutters, etc., and stairs. **Circumstances.** - Floor 3 inches trenched and grooved. Sills and shutters attacked to 3 feet 6 inches high, and where stairs were connected with floor; fungus passing upwards in the strings. **Ventilation.** - Space under floor ventilated by vertical air shafts from bottom of room up through centre of floor. **Treatment.** - Ground covered with asphalt; walls washed with solution of sulphuric acid; ventilating openings altered so as to prevent their being stopped up. **Result.** - Successful. **Notes.** - Under boards a mass of fungus, beautifully white in parts; timber sound near fireplace, where there was slight ventilation. Timber in adjoining warehouse sound, although there was no ventilation, but the ground had, in this case, been covered with asphalt.

(5) **Architect.** - Holden, J., Esq. **Locality.** - House, Park Place. **Timber.** - Red deal. **Position.** - Beam carrying wall over opening in basement. **Circumstances.** - Ill-ventilated corner. **Notes.** - Hence iron girders substituted.

(6) **Architect.** - Holden, J. Esq. **Locality.** - Mill, Salford. **Position.** - Under ground floor. **Ventilation.** - Air openings on each side of building, and through sleeper walls. **Notes.** - Strongest growth of dry rot near the ground, but the ground beneath was full of threads of fungus continuous with that above.

(7) **Architect.** - Mathews, J. D., Esq. **Locality.** - House. **Position.** - Landings of cellar stairs. **Circumstances.** - House "jerry-built," with 3 feet 6 inches to 4 feet 4 inches floor. Steps, ground of loose soil left, not having been flagged; wood landing over attacked by fungus, which spread along wall to cellar. **Ventilation.** - Corner of stagnant air. Collars only ventilated occasionally by window. **Notes.** - Wood assumed brownish-red color thickly covered with sickly-whitish fungus, very luxuriant, often of stalactite form. Sickle smell.

(8) **Architect.** - Pauli, H. J., Esq. **Locality.** - Sir F. Crossley's Orphan Home, Shirkcote Moor, Halifax. **Timber.** - Crown mellow and oak. **Position.** - Floors, beams, etc. **Circumstances.** - Scaffolding put up to first and second floors then left four years unprotected from the weather. Bottom floor, edge, are placed at an angle of 30 degrees, extending from 6 to 7 feet outside of the columns. They are enveloped in sharp being placed with care to guard against oxidation and also to secure further rigidity. Over 120 tons of cornice is required for the foundations alone of this building. They were adopted in preference to steel beams, because their aggregate cost is about one-third less, as several tiers of steel rails would have to be used to provide the stiffness of the beams, thus more than covering the difference in the cost per ton. - Iron Age.
I consenting to write the biography of Henry Holton Richardson,1 Mrs. Van Rensselaer entered on her task with the apprehension that the instigation of friends presupposes that the work must be approached from that point of view which is likely to be pleasant. It is easy to see the pleasant illusion that the biography, his good points and weaknesses, the advocate of the man, might be brought out with stressfulness, his indifferent ones merely hinted at, and his bad ones, if he had any, passed over in silence. His personal character, however, in the course of the present apparatus and self-righteous acts must go without comment. In point of fact, though in a less degree, the friendly biographer feels impelled to dilute in warmest phrases on the successes and slip on his career. The in the next place, the present work is not only a biography of the man, but it is intended to be a critical consideration of his works and their architectural value, while the present time is a very common feeling that it is not possible to value properly an artist's work in his own day and time—particularly the works of an architect. If the appreciation of architecture rests upon real canons of criticism, if there are any absolute laws to which we may appeal in our endeavor to decide between good work and bad, we are surely as able to apply the tests to buildings finished yesterday as to works which have received the good or bad stamp of time. It is currently the case that the world applies to older work. It is, then, a book with a compound motive, it is addressed to a double public, one interested in his work, and to the architect who is only interested from a professional point of view in what he accomplished and his reasons for doing what he did.

Mrs. Van Rensselaer is too conscientious a person and too good a critic not to be conscious of the pitfalls that surround such a devious path, but, too skilled a writer not to be able to give her readers the impressions that after all she has said pretty much what she really wanted to say. In one respect, at least, the task has been unusually easy. In dealing with the works of artists, the biographer usually feels called on to attempt the analysis of motives which he had long been interested in his work, and to the architect who is only interested from a professional point of view in what he accomplished and his reasons for doing what he did.

Richardson had very emphatic motives for what he did, to which he was brought by very logical trains of reasoning. It would not always be easy for a biographer to reproduce them; but fortunately for us there was one thing that Richardson liked to do more than anything else—to talk about himself and his work, rarely able to resist the numerous invitations to do so. He was so ingrained a part of his work that he could not, when talking about it, avoid talking about him too, and at the end of a chat it was difficult for the listener who could hardly be called a collector to determine whether he had learned more about the work or the man who was doing it. The lauding apology that Richardson always made when he found he was working into one of his enthusiasms and wrote an unnecessary apology for any seeming egotism, and if the idea had not been suggested by the speaker, the undeniable fact that the discourse was somewhat one-sided would have suggested a desire to be heard with the enthusiasm of a real enthusiast and in the vague wondering why nature had not endowed other people with the same all-powerful supporter. It was, then, unusually easy for one who had listened so long to many of these expressions lay before her readers the logical development of the work that Richardson accomplished and to point with some certainty to the goal toward which his work in the future would have tended.2

Ibid.


2This opinion is only strengthened. There is a ponderous and
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rejoiced at some of whom which cause people feel that though it may be worth while that they should exist, it is particularly fortunate that more clients were not found who were willing to seclude themselves behind dungeon walls. In the house for Mr. Clow, the sleeves are cut out of the wall, and as the windows are, upon, and one which seems more likely to have really interested the designer than the houses for Mr. McVeagh or Colonel Hay, and though he saw the beauty, by a slight, but an interesting one, although like many of Richardson's plans it can hardly be considered a thoroughly good one. Indeed, we are disposed to disagree with Mrs. Van Rensselaer and with Richardson simulated by the Duchess of Kent's, as it would be particularly good, for instance, Austin-Hall, at Cambridge, is found by those who use it anything but convenient, whereas at North Easton the arrangement and size of the main stables are without the least doubt. This is not very old compared with those in other cities of Europe (even London has two or three which have seen a couple of centuries) but then one must not forget the revolu- tions. It would seem that Paris, though a centre of the arts has not so many statues as London, who outnumber hers by one-half. Of course we are speaking only of detached portrait statues in the open space reckoning a room forming part of the architectural scheme of such buildings as the Louvre or the many real ones to be found in the Tuilleries and Luxembourg gardens and elsewhere. Lutetia's "counterfeit presentments" can be seen, however, while many of the statues are "the most beautiful and noble" of our time. of soot and grime, and in artistic merit the Parian memorials would doubtless bear away the palm, though some of them are poor enough. It is curious to find that New York has almost as many statues as are catalogued in Marmottan's book.

The Architectural and Building News.

COMMUNICATIONS.

RUSTLESS-IRON HARDWARE.

Stamford, Conn., June 29, 1888.

To the Editors of the American Architect:

Dear Sirs,—We note with much interest the editorial remarks in your issue of the 22d inst, on the subject of new materials for builders' hardware, from which it is evident that your attention has not been called to a product which has been on the market for 24 years.

This, although not literally a new material, is practically such, by reason of the new effects and new qualities which have been produced by it. We refer to "rustless-iron." A 24-year-old piece of iron, both cast and wrought, of the surface of which, after decoration and finish and in any desired manner, is converted into a permanent and rustless oxide by treatment in the Bower-Barf furnace. You are doubtless familiar with the discovery of Messrs. Bower and Barf of Chicago, by means of which they have given the world with articles of wrought and cast iron are exposed at high temperature to the action of certain gases, the effect of which is to place the chemical composition of the metal on its surface, and to a considerable depth, converting it into the black or magnetic oxide of iron. This is a deep, lustrous black, beautiful both in tone and texture, and having the remarkable quality of being entirely unaffected by exposure either to the atmosphere or to handling. It requires no protection by lacquer or varnish of any kind, and is permanent and unchangeable.

Under license from the owners of the American patents covering the Bower-Barf process, we are able to supply this beautiful variety of ironwork, both wrought and cast, adapted to this treatment. It has been furnished for many large buildings, such as for example the "Ford" Building, Chicago, as well as for private houses of the most expensive kind. The effect of metal treated in this iron is especially pleasing in combination with natural wood of almost any variety. Its beauty cannot be reproduced by any process of illustration, nor fully appreciated without actually seeing samples of the work. We send you herewith one or two small samples for your perusal. We are sure that the admiration for which we wish to place a market will be general. We are prepared to give to the proper test the quality of which we are sure that the attention of the building trade of the United States will be attracted and that many of our friends will be surprised to find that such an article exists at all. We are prepared to supply promptly any order, and shall be pleased to furnish samples and special quotations.

Yale & Towne Mfg. Co.

[When we first saw some plate-furnishings finished in magnetic oxide of iron, we made up our minds that when presented in properly finished "real" or cast iron, we should consider the work done. We have followed the work of Mr. E. W. Rouse of Barre, who has been engaged in this line for a number of years. We are not aware of any other manufacturer supplying architects with iron work of this description. We are sure that many architects have been surprised to find the work done in this manner. As a result, the work has been accepted with great approval in the best work in this country.]

ARTESIAN WELLS IN NEW YORK CITY.

In a paper on the geology of Manhattan Island, read by Mr. James F. Kemp, before the New-York Academy of Sciences, two years ago, it was stated that artesian wells have been made since the beginning of the century to obtain water from three, surface and artesian. Dr. Edwy Waller informs me that over a thousand exist at present. Within the last ten or fifteen years, very many artesian wells have been sunk by oil-well methods and used for the supply of water. Many of the large breweries, malt houses and manufactories demand an abundant supply of water, and have found it advantageous to sink wells in preference to paying the city water-rate.
Sometimes they are successful in striking a wet spot and a good supply is obtained, but at others, with no certain pattern, by accident, they have a good spot, and their next discovery, they quite as often yield very little. Still, the strata of sand, and the small, hand-headed showmen have greatly quickened the well industry. Drilling is carried out by the patch-beaters to the petroleum districts, and, indeed, one can hardly journey very far among the oil regions without seeing the patch-beater and hearing the crack of the bull wheel and the thud of the drill. The wells are sunk at a cost of $9 to $12 per foot, the contractor fixing his price on his own risk, and the chances are the well is sunk to a depth where no petroleum is found. Much difficulty is experienced on account of this varying hardness, as the drill tends to grind itself down to a crooked hole. Ordinarily the promptness is 20 feet in 24 hours. The drillers say they are obliged to go down from 400 to 1,000 feet to strike water. The following facts have been obtained by inquiring of the drillers, and may not be very exact:

<table>
<thead>
<tr>
<th>Feet.</th>
<th>Daily.</th>
</tr>
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<tbody>
<tr>
<td>Schaefers' brewery.</td>
<td>540</td>
</tr>
<tr>
<td>First Avenue and 85th Street</td>
<td>414</td>
</tr>
<tr>
<td>Second Avenue and 39th Street</td>
<td>1,250</td>
</tr>
<tr>
<td>79th Avenue and 15th Street</td>
<td>730</td>
</tr>
<tr>
<td>Field's building, 1 Broadway</td>
<td>900</td>
</tr>
<tr>
<td>21st Avenue, 72nd Street</td>
<td>790</td>
</tr>
<tr>
<td>Municipal Gas Co., 11th and 45th, 2 wells</td>
<td>500 each</td>
</tr>
<tr>
<td>West 41st Street, No. 529</td>
<td>585</td>
</tr>
<tr>
<td>East 39th Street, 400</td>
<td>600</td>
</tr>
<tr>
<td>23rd Avenue and 44th Street</td>
<td>600</td>
</tr>
<tr>
<td>79th and 2nd Avenue, 7 wells, 38 feet each in drill, total of 210,000 gal. per day.</td>
<td></td>
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</tbody>
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**The Sanitary Panopticon**

**Why Building Operations halted.-** Mr. Corliss (the famous engine builder of Providence, not very long before his death, had occasion to visit and talk with a manufacturer—a high-priced man who had added additional machinery. To prepare the foundation for this L, it was necessary to move a ledge of rock by blasting. The men to do the work had been employed and put on with the materials that had been purchased and brought to the building, and the work of blasting had begun. The next morning Mr. Corliss passed by the works proceeded to the foreman in charge knowing his interest in pretty things, called him.

"Corliss," he said, "here's a bird's nest that we've found, and that's got to go.

He showed the manufacturer a robin sitting upon a nest that had been built in the ledge of the rock, among some bushes that grew there. The bird flew off her nest as the man came near, and showed five blue eggs that looked as if they had just been laid.

"Can we move that nest, then, and put it somewhere else?" asked Mr. Corliss.

"I'm afraid not, sir. We'd tear it to pieces in blasting, and it isn't at all likely that you could get the bird to go to sitting again anywhere...

"But we've got to go on, so we may as well rip it out and throw the eggs away.,"

"No," said Corliss, "we won't disturb her. Let her bring out her brood and sit in the ledge."

"But we've got to stop the work on the building.

"Let it stop then."

And the work to which he was given that operations on the addition should be suspended. They were suspended; and the hands stood still, drawing their pay for doing nothing, or next to nothing, while the robin sat on her nest with her air of great consequence and zealous attention to business, and had her food brought by her mate, and last hatched her brood. And then there were three weeks more to go by, at the least, before the ledge was to be blasted, and they were not with any uneasiness or impatience to have the robin and the young ones out of the way, but with a genuine interest in their growth. The old birds had been gone a week before, and when at last Corliss sternly helped the clumsy, reluctant youngsters over the edge of the ledge, and they showed themselves able to get about on their own book, ordering them from 'down here,' they were a fine sight, and the gunpowder mongers of the gampower tearing the rocks apart was heard where the birds had peeped. —Boston Transcript.

**Automatic Accident Insurance.** — The Employers Liability Company is about to introduce automatic ticket boxes for supplying accident insurance to the multitude. They are on the principle of the automatic weighing machines now so current; do away with the slot and out pops an accident insurance ticket that insures the holder for $10 a year against accidents, in the maximum sum of $50; ten nickels will yield ten tickets, aggregating $500 indemnity, which is the limit taken upon any one person. Suppose the chief engineer of a railroad company falls and breaks his leg. He runs himself up a list of these tickets, which are in blank; Some or all of the ticket-takers fall overboard, or shoots out an eye, or breaks a leg; the chief engineer is presented with 39 tickets, which, in their total, collect the money from the company and divides with the individual or the family of the person drowned. Great speculation for the chief engineer. An investment of $2 a day by a speculator in accidents ought to yield "big money" in the course of a season. Possibly the company has surround the scheme with safeguards to prevent such speculation, and send the metal pieces so that they come in contact, thus closing the electric circuit, which rings the bell. This is not all however, that Mr. Moquin requires of the sun; he forces it to wind up its clock in his pocket, and speeds it up, whereupon it is wound up, and his clock at the same moment, and, for instance. The action of the sun's rays in melting the metal pieces so that they come in contact, thus closing the electric circuit, which rings the bell.

**S. J. Parker & Co., Printers, Boston.**
What are the Best Sanitary Appliances?

A DISCUSSION. (CONTINUED.)

Architect: The same standpipe waste that is used for the Puro washbowl is, when lengthened, applied to a recessed bath tub, and you have the Puro Bath Tub.

Client: As a bath tub is only a big washbowl, I suppose the same reasonings have equal effect in both cases.

Architect: Precisely.

The DECECO COMPANY is located at NEWPORT, R. I.
The exterior of this house is stained with CABOT'S CREOSOTE STAIN for Shingles, Fences, Clapboards, etc.

These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply.

Our Stains contain no water and are the only exterior Stains that do not contain kerosene.

PRICES ARE 30, 50, AND 75 CENTS PER GALLON ACCORDING TO COLOR. SEND FOR SAMPLES ON WOOD, AND (CIRCULAR)

SAMUEL CABOT, 70 KILBY ST., BOSTON, MASS.
JULY 14, 1888.

Entered at the Post-Office at Boston as second-class matter.

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WE have this week to record the deaths of two architects, one belonging to the younger generation, while the other was perhaps the oldest practitioner in the country.

The younger man, who died in the latter part of last month, was Mr. Henry Paruff, of Brooklyn, N. Y. Mr. Paruff was an Englishman, one of three brothers, who came to this country about fifteen years ago, and by their talent and careful administration of their business built up a large practice. Mr. Henry Paruff was at first the designer of the firm, but on the arrival from England of his younger brother this part of the work was shared between them, and to the skill of one or both of the brothers the firm owes a considerable number of its finest buildings. For some reason, the practice of architecture seems to be particularly trying to young men, and an unusually large proportion of members of our profession succumb to the toil and anxiety through which they must gain a foothold in the world; and like so many others, Mr. Paruff, just as his position and reputation had become firmly established, fell a victim to the attack of organic disease, which his brave resistance could not overcome. The older architect of whose death we have to speak was the venerable Jonathan Preston, of Boston, who died recently in that city, at the age of nearly eighty-seven years. Mr. Preston was born in Beverly, in 1801, and practised his profession in Boston for more than half a century, erecting many of the principal buildings of the period preceding the great fire. For the last fifteen years or so he had been out of active practice, but until within a short time he retained his desk in the business quarter of the city, and was constantly consulted on building matters by his old friends, as well as by official persons. He was one of the most successful architects of his time, and his contributions to Boston are numerous and well. As a critic, Mr. Jarves was intelligent and zealous, but critics of art have but a thankless office in this country, and he will be remembered longest for his clever and earnest books of travel, and for the incalculable service which he has rendered his native country in collecting for it treasures, while the opportunity remained, whose value will be every year better understood.

A GREAT lockout has just occurred in the iron mills, and about one hundred thousand men are out of employment. According to the newspapers, the lockout seems to have been a concerted plan of the employers' association, and to have been purposely arranged to take the men by surprise. At a certain time in each year, it has been customary for the representatives of the masters and men to meet and agree upon a scale of prices for the year. This season, as we understand it, the scale of last year was again presented by the men, who were astonished at being told that it was rejected, and that a scale had been prepared by the manufacturers, which must be the basis of negotiation. The men, who expected to have it, and well, took the manufacturers' scale into consideration, and after a few days' deliberation decided not to sign it. The manufacturers then informed them that if it was not signed within three days, all the mills of the association would shut down; and at the appointed time, neither side having shown any disposition to alter the scale that the men had established, Boston is, perhaps, the pair of buildings erected for the Boston Society of Natural History and the Massachusetts Institute of Technology, which are treated in the classic style considered proper for such buildings at the time they were designed, but show dignity and elegance of proportion, with an effectiveness not often combined with classic design. As a citizen Mr. Preston was greatly esteemed for his energy as well as his perfect integrity, and was many times elected to municipal and State offices.

ANOTHER recent death of importance is that of Mr. James Jackson Jarves, which occurred at Tarasp, in Switzerland, last week. Mr. Jarves was born in Boston, in 1818, and always retained a strong affection for the home of his youth, although ill health compelled him to live away from it for fifty years. His first foreign residence was in the Sandwich Islands, where he spent ten years, occupying himself by publishing a periodical, editing a newspaper, which acquired great influence in the country. Soon after his return to the United States, in 1849, he received a signal proof of the appreciation which his work had gained for him with the Hawaiian Government by an appointment as Commissioner from King of Hawaii to the Governments of the United States, France and Great Britain, with power to negotiate treaties with all those powers. His duties as the holder of this appointment took him to Europe, where he found so much interest in him that most of the remainder of his life was spent there. Like a true American, however, he viewed the life which surrounded him rather as an object to be studied by the light of the maxims in which he had been trained than as something by which those maxims might be superseded; and his two books, "Parian Sights and French Principles," and "Italian Sights and Papal Principles, seen through American Spectacles," are particularly pleasant reading on this account. On taking up his residence in Italy in 1852 or 1855, he became, like most amateurs of that time, an enthusiastic collector of the works of art of various kinds then so abundant there. With the help of assiduous study of the best examples, and untiring industry in searching for authentic, but little-known specimens, he succeeded in forming a most beautiful and interesting collection of works by the old masters, including a series of pre-Raphaelite paintings which, by the credit to which they were brought, and which being rich enough to keep the collection for himself, it was sold here, and unfortunately scattered, the larger portion of the pictures, however, falling into the hands of the authorities of Yale College, who made of them the nucleus of the celebrated collection now belonging to the college. Continuing his researches, he added to the treasures of his own collection, and would be remembered longest for his clever and earnest books of travel, and for the incalculable service which he has rendered his native country in collecting for it treasures, while the opportunity remained, whose value will be every year better understood.

HUNTER
The Prince Consort of England once said, "If you send for an architect to undertake some unusual work, he debates, hesitates, trifles; if you send for an engineer, he does it.

On this text the British Architect founds an excellent little sermon upon the various and multifarious aspects and varieties of architectural work, as well as the misfortune of the profession that its members are to be once at artists, business men, and scientific experts, and that they cannot choose to be either of great benefit, and perhaps, with a small improvement of their usefulness and success. There is a common notion among architectural associations, that to be an artist is a much superior thing to being a business man, or a skilful constructor; and that it is beyond human capacity to excel in design and in anything else at the same time.

The conclusion which they draw from this convenient theory is that if they can learn to make picturesque designs and show them by taking sketches, they need waste no time in studying the draughtsmanship of quantities and prices, or in compelling their brains to grapple with mathematical problems; and, as a consequence, they degenerate into mere clever draughtsmen, driftings, usually at a good salary, from office to office, but becoming constantly less and less fitted to practice successfully on their own account. The man who would avoid this tendency should never forget, in the pleasure which he takes in exercising a well-earned facility in design, the importance of making constant efforts to keep himself familiar with details of construction, prices and specifications. Let him imagine himself a young lawyer or merchant, with a limited income, and a family to earn by work which he has been employed in money earning processes, to build himself a house, and then reflect whether he would be likely to apply for designs and supervision to the dashing A., whose captivating sketches, made off-hand with a burnished, are hardly more the talk of the clubs than his reckless Bohemianism and financial incapacity, or to the industrious, sober B., whose sketches have the advantage over A.'s of looking something like the buildings constructed from them, and who is known to respect conscientiously his employer's wishes in regard to expense. The young architect must bear in mind that his first clients will generally be his personal friends, poor but hungry, who have already paid for draughtsmen or ignorant supervision, or impossible plans, may bring debt and bitter disappointment to them, and to him an unfavorable reputation from which he will suffer through his whole professional life.

There is nothing so very difficult about any of the circle of sciences which constitute the architect's education. Architect tells of a distinguished architect and masterly designer, who, probably through injudicious training, or mischievous associations during his life as a draughtsmen, began his career with an unconcealed loathing for what he called the "office petit-fougerie" of specifications, supervision, quantities and estimates. He was intelligent enough, however, to see the necessity of conquering these, and devoted himself to the task, until he became as thorough an adept in these as in the artistic details of his work, and now, as the British Architect says, "his bills of extras are magnificently short; he is ready for grappling with every contingency which ever arises, big or small; and, mightiest of all proofs of an architect's success, his clients come to him a second time."

The Providence Journal publishes an article in regard to the action of the House of Representatives about the Congressional Library, which condescends into a small compass the facts in regard to the abuses which have been going on in connection with it. As those who read the newspapers know, the work on the library has been carried on, like that of other public buildings, by a large corps of salaried officials. Instead of compensating the architect by a percentage on the cost, as is done in all other civilized countries, or, let us say, in all countries where skill and talent are considered to be worth paying for, the ignorant penuriousness of the Government, fearful of offering anything like encouragement to the "aristocracy of collection," about which we have known a voter comment, confers upon the architect of its principal building a salary equal to that of a senator's cook, and congratulates itself upon the business talent which can secure the best architect applying for the commission at about one-tenth the compensation which private individuals would pay him for the same work and responsibility. Extending this wise system still further, all the secrets of the trade, and by the same token, all the trouble averted, if any one had ventured to propose them.

The Providence Journal says that the House has not put a check to this sort of business a moment too soon. We trust that its action may result in "checking" this sort of "driving," which has been an unpardonable abuse of the field of Government work for many years, but, so far as we can see, and as experience indicates, it seems to be simply intended to turn out indignantly one set of salaried superfluities, and put in another, to be in turn unscrupulously ejected later; and, in our opinion, if the people of the country wish to see the public forests and railroads themselves, instead of being driven by hangers-on, of inspectors who do not inspect, deputy inspectors to watch the others, "experts," "computer," and so on, it must consult, not with Congressmen who have constituents to please with places, but with the citizens who have spent their lives in such, as to how to conduct building operations properly and economically, and have a right to be allowed to express justly on the same terms, and under the same responsibility, as their private clients. There is no single argument, so far as we can see, to be urged in favor of the present system of Government building. With respect to the architectural work upon them, which is the most important part, it simply secures very imperfect service at a very high price. To take the case of the Congressional Library, the architect-in-chief, at a salary of four thousand dollars a year, is "assisted" by a large number of independent officials, and has his office rent, and the cost of keeping a carriage, paid by the Treasury, at the usual expense of twenty-five thousand dollars more, making twenty-five or thirty thousand dollars a year expended upon the architect's office, but not on him. If he were paid by commission in the usual way, his annual fees, averaged over the period which would generally be consumed in erecting such a building, would be much less than this, and he would not only assist, but he would be, not only the architect, but coachman's wages, and salaries of draughtsmen, "computers," and "experts," but would be much better served by them, and would make a decent income out of what was left. This example is one of many, and, as has been often shown, the country, instead of spending in sums so enormous the men, at meagre wages, design mean and ugly buildings for it, may, if it chooses to insist upon it, have, at a less price, all its public work the best and most beautiful that the ablest architect can produce. If it wishes to bring about this change, the present occasion would be a favorable one for making its desire known.
THE HORSE IN SCULPTURE.

EXT to man, the horse has been the most frequent subject in sculpture, perhaps it may be said in all arts, but in sculpture more especially, as the horse is the noblest and noblest, and embossing in which it may be seen as great advantage, perhaps as on his own feet. To "witch the world of noblest horsemanship," there has been a favor on his left, the active, and the fearless in all times and places when equitation was possible, and some tribes and nations, notably the Persians, in the olden time, may be said almost to live on horseback.

I am not aware whether the evolution theorists have attempted to indicate the time in which the horse entered into prehistoric. The horse as a genus and became acquainted, but assuredly it appears to have been prehistoric.

The horse must be the man's first friend, we must think of the trust, of the fidelity, of the superior intellect to the larger animal, but is not so directly useful. The astride position of a well-made man exactly fits on a well-made horse, just as if they were adjusted for each other. And so doubt so were they, for such a perfect coincidence of relative forms could not have taken place fortuitously. We need not marvel therefore at the frequent association of form, in more especially in sculpture, an art which is so peculiar, that we should specifically in art that it is the best horseman, who rides a cavalcade, the speed and strength of his four legs to man who has but two, which occurs in the Holy Scriptures, speaks of him as already in habitual use for riding by the human race.

The first mention of a horse in the Bible may be said to be in the path, that bithet the horsebeads, so that his rider shall fall backward. — Genesis 49: 17. The second notice is in Exodus 15: 21. "The horse and his rider hath been thrown into the sea." And here again they are associated as the lord and the minion, the master and his servant.

With the exception however of these two passages, there is not much mention of horse in the Bible of Solomon, who, it is true, an extensive soul of them. He had forty thousand stalls of horses for his chariots, and twelve thousand horsemen distributed in his fortified places; but it appears that he had his horses from Egypt. A great part of the horses of the world have been reared in Egypt, or have been forbidden to breed them. Before this, however, David, having won a great battle over Hadadezer, King of Zobah, took seventeen hundred horses, and had all of them bestowed on the king of Edom for a hundred chariots. The passage in the 39th chapter of Job, verses from 19 to 25, descriptive of the war-horse, is so fine, that, although well-known, the introduction of it may be pardonable, as affording an epic glorification of the creature.

"Hast thou given the horse strength? Hast thou clothed his neck with thunder? Canst thou make him afraid as a grasshopper? His glory of his nostrils is terrible. He paweth in the valley, and rejoiceth in all the fields. He calleth together the 'thunder of the thunder' with the top of his head. He maketh the rain to descend upon the earth: he lighteth not his lamp for darkness. He knoweth not that which he doth; his eyes are in the paths: he forceth not his step, nor runneth he back from the sword. The quiver rattles against him, the glittering spear and the shield: he revealeth the ground with his feet, and his honor is in the martinet which neither believeth he that it is the sound of the trumpet. He saith among the trumpets, Ha! Ha! and he shallsmell the battle afar off, the thunder of the chariots and the shouting. What a grand image of a horse this is! and how admirably is the charioteer compared to it!" This is the passage as it stands in the book of the seer.

The story in the Bible of the Holy Writ we may turn to of Classic story, Pegasi, was so fleet that he was fabled to have wings, the famous Greek prototype of the "Flying Childers" of the English turf. What a career he had, and what a record of sections and triumphs was he? He took part in the races according to Herodot, near "the source of the ocean," wherever that may have been. He was broken in by Neptune, and put through his paces by Minerva. He was lent to Helios, who had, among other modes of gymnastics, a horse race, and the sea-monster who was about to devour Andromeda. He was a fortunate horse in every respect, and was a favorite with the Muses on Parnassus, where no doubt he was well stalled on the mountain top and he rejoiced half in the stars, and slept nestled within the neighboring height of Helicon, another country-seat of the divine Nine, by striking the rock with his foot, and raising the perennial fountain of Hippocrene, which has been the spring of poetry ever since. Well worthy therefore does he appear to be of his annals in the pages of literature. He does not, however, seem to have been frequently a subject of Art; the reason for which probably may be that he is more fitted for depiction by himself, than with a rider on him who would be apt to be concealed by his wings rising from his shoulders, a matter which would have been a problem to the poet, and the sculptor, and other authors of him as a courier for their heroes. However, by himself, as a wild steed, his idea presents a very superior image, and in sculpture, stamping his foot on the ground, might form a classic and appropriate subject for the springer in which a horse runs down a fountain in some ornamental grounds where fancy is the leading feature. On the whole, perhaps, he is the most celebrated horse on record, his wings being, of course, only a mythical addition to indicate his velocity.

There are, however, in ancient story many other mentions of famous horses, among whom not the least renowned was the favorite charger of Bellerophon, Bucephalus. He was a powerful horse, of what a short and thick, like that of a bull. He was refractory and untameable in the hands of others, but so meek and subservient to his master that it is said that he used to kneel down for him to mount. He was known in various forms in Ancient Greece, on his death at the advanced age, for a horse, of thirty years. As a token of regard, and in gratitude for his services, the great Macedonian king might go over his horse, Bucephalus, which he called after him Bucephalus. In India there have been several other memorials in the way of records and tombs erected by the great people and invaders of that country over the remains of favorite steeds that had carried them, some of which are still in existence. Doubtless, however, from their eminent use in war, the Macedonian regal hero was the most remarkable for his estimation of horses and of their images in sculpture, as in respect of the shields, which were engraved for him by Rhysippus under the superintendence of his favorite sculptor Lyssippus. They were all equestrian, but alas not one of them in existence.

Memorials of heroes are often most interesting in the Parthene sculptures which were executed about a hundred years previously, we have reason to suppose that those of Lyssippus were very fine, for he was an admirable sculptor, especially in respect to the grace of proportion with which he endowed his works. The most perfect examples in Greek art which we now possess are in the cavelade of the frieze of the Parthenon in the British Museum. They represent a small breed compared with our present English horses, and have their proportions so admirably in the justness of their anatomy and their beauty of form. The sculptors of these did not stray into the anomalies of structure which are to be seen in so much modern art. To produce the full effect of the Greeks studied anatomy by means of actual dissection seems to be a doubtful point, and it has been suggested that a great prejudice existed against it with regard to the human race, which, however, could not have been applied to animals, and that the anatomical justice and precision of the Phidian School, displayed in their sculptures both of men and horses, is remarkable. The structure of their horses is as perfect as that of their human beings.

In later medieval times, judging from various of the representations of horses of that period, comparative anatomy was not so well comprehended as it is now; a relic of which may be recognized in the fierce representations of the horse in the story of the Trojan Horse, and in consonance with the anatomy of man, would be called the wrist, it being in the fore-quarter, and formed of a closely compacted company of bones like the wrists of our own arm; while in the horse he is considered the true knee, and is held between the hind leg, where the true knee-cap, or patella, exists, which in oxen is called by butchers in England the cramp-bone. This relation and the analogy of bone structure and structure of the human body, indeed pervades in degree that of all vertebrated animals may be further illustrated by causing the skeleton of a horse to be placed erect on his hind leg by the side of that of a man, or, on the other hand, the skeleton of a man on all fours, resting on the tips of its toes and fingers, beside that of a horse in his usual standing position, when the identity of the relative general principle of structure is perplexed at once. There is nothing in the least new in this statement of fact, although uninstructed people are apt to overlook it. Several of the medieval artists appear also to have overlooked it. The ancient Greeks, however, were keen-eyed-sighted and more familiar with the anatomy of animals than modern representations. They appear to have at once discerned that the true theory of structure of form in a horse was, at least in its principal facts, closely analogous to that of man, and the only shade of difference that I would venture to assign to the two is the reason why they so readily arrived at this conclusion.

The Greeks, as we know, regarded the human form as the most perfect thing in nature, and when they desired to represent everything about them, and portrayed even their mountains, woods and rivers under the likeness of human beings. They incarnated even the powers of air, sea and infernal regions, and the stars and the sun, and the elements; and looking on his form as the same nature, they were led to seek for the same theory of structure as his, in whatever animal they un- dertook to represent in the frieze of the Parthenon. In this case it conducted them to a logical fact, and shielded them from errors into which some other artists have fallen. The perfection of the horses in the Parthene frieze is an evidence of the comprehension of the true theory of their structure. Whether their being somewhat small arose from the breed then in use being so, or from the artistic purposes of their position and relative composition, may
The sculptor of these, Lysippus, was famed for the elegance of his works and a saying of his is recorded, that he sought to represent man, not as he is, but as he should be. Thus, we may infer that he sought to convey a quality in his horses, and the coincidence of their theory of structure having been fully recognized long before his time, he may be assumed to have gained grace in the horse by means analogous to those by which he had been successful in man.

The Greek sculptors all made the heads of their statues somewhat smaller in reference to the rest of the figure than is found in real nature, especially in respect to the features, and this proportion has been accepted ever since as being essential to beauty in a statue. If he adopted a corresponding treatment in his horses, Arabia was not so far off that he may have readily obtained his types from that region. In the Arab horse, although the brow is broad and ample, the muzzle is small and delicate, which adds eminently to the beauty of the creature. And further may be submitted the question, what is the good of a great head to a horse? It requires a strong neck with ample development of the neck muscles, and the neck cannot be long enough to make the horse so much the more for the forequarters to sustain. On the other hand, if the head be light, the crest may continue high and well set back, but the neck may also be light and somewhat thin across, with advantage. When the horse has a rider on him, as in an equestrian statue, in the front view the horse’s head is nearer to the spectator than that of the rider, and is thus the more apt to interfere with it, if it be large. Thus a degree of comparative lightness in these parts not only conduces to the grace of the horse, but also to the satisfactory effect of an equestrian statue.

In a man a wide wrist is an essential factor of strength, and so also is it in the horse in the corresponding joint which we call the knee. In both cases it should be wide and flat, so as to give it with endurance as well as force, as also it is the joint at which the horse usually first breaks down. In respect to the barrel, it should be wide and ample, with the withers well set back, and the shoulders sloping, and the chest deep if not wide, so as to afford ample room for the belly. The legs which are large, and take in some eight or ten times as much air as those of a man, and therefore, also, although the muzzle may be delicate the nostrils which greatly supply and free them in inspiration and expiration should be large and ample. In these, short not only the length of the horse, but the capacity of the lungs to be touched on, and therefore I would conclude them by only a general remark in respect to the hind-quarters, which should be strong, and long, so as to be well bent without raising the rear too high, and not straight-up-and-down as in some ponies, as it must be held in mind that it is from the hind-quarters that nearly all the propulsive force of the animal is derived, which the front legs comparatively only require. The above considerations are some of those which led to the sculptor’s art in the representation of a horse, separate and apart by himself, or when he becomes the pedestal of a hero in an equestrian statue.

When is a Church a Church? — Bishop Loughlin of Brooklyn has been suit in the Court of Nativity in the city from collectin- ing $900, levied upon the property of the Church of St. Augustine, in Sixth Avenue, now in course of construction. The Bishop claims that it is already entitled to exemption from taxation under the church clause. The city authorities claim that it is not exempt until the edifice has been completed.—_ N. Y. Commercial Advertiser.

MEXICAN BURIAL PLACES.

In connection with the attention which the American Architect is giving this year to American monuments, and the marked and unmarked burial places of some of the heroes of American history, a brief paper upon Mexican burying-grounds may be interesting to the reader. It cannot be claimed, however, that most of the cities of the dead scattered throughout the sister republic would be found fruitful in suggestions to the architect, or to those having the care of cemeteries in our country, save in one respect, that is "how not to do it." One of the things to shock the visitor in Mexico is the prevalence of customs regarding the disposal of the dead, totally at variance with what one would expect to find in a Roman Catholic country, differing widely from the customs of the United States, and by no means comparing favorably with the latter.

During my sojourn in Mexico I was greatly surprised to find that there were no old tombs there. It was very natural for me to look about the old churches in such a country as Mexico for historic relics of that character, but I looked in vain. I never saw but one tomb belonging to the eighteenth century: that was the tomb of Antonio Maria de Bocanegra who was Viceroy from 1771 to 1779, and whose burial place in the Colegio Church of Guadalope is marked by a bronze tablet in the floor containing a long inscription. I found perhaps half a dozen tombs belonging to the early half of the present century, and these were scattered throughout the country, in churches, not in burying-grounds. This is easily explained as I found when I began to inquire into the reason of things. It is only recently that the custom of providing a permanent burial place for the dead has come up in Mexico. It is a right obtained by purchase, and when so obtained it is expressed upon the tomb. That is the meaning of the words to perpetually clearly inscribed upon the tombs of the wealthier classes in some of the cemeteries of Mexico. The occupants of these tombs are to rest undisturbed. All others are transient lodgers only. The time allotted to them varies according to the price paid. For the very poor it is very brief. I once saw an inscription upon a tomb in a large cemetery in the suburbs of the capital, which read as if a sarcasm upon this custom were intended:

"HERE LIES BURIED, FOR TEN (10) YEARS, THE BODY OF — — "

What becomes of bodies when the leases of their tombs expire, I have only heard through vague rumors. But these rumors suggested that it would not be wise for me to push my inquiries very far in that direction lest something should be revealed to me too revolting to be remembered without discomfort. The rural burial places of Mexico are not generally of an attrac-
tive appearance. I shall never forget those which I saw in Northern Mexico. They were of such a forbidding aspect as to add a new terror to death. No attention was given to their adornment except on el Dia de los Muertos — the Day of the Dead, or All Souls' Day (November 1st) when graves are generally decorated throughout the land and special masses are said for the repose of the dead. The best burying-ground I ever saw in Northern Mexico might easily be mistaken for the Potter's Field. Apparently the most barren spot was selected for it, and when in one case a railway was built directly across a burying-ground in a town of some size, it excited no interest whatever. Black wooden crosses are generally used to mark the temporary lodgings-houses of the dead. Adobe tombs are sometimes constructed, and these are more forbidding in appearance than the crosses.

The cemeteries of the larger towns of the interior are great improvements upon what I saw in Northern Mexico, though these generally give evidence of the recent introduction of less barbarous customs in regard to the disposition of the dead. I visited cemeteries in Vera Cruz, Jalapa, Puebla, Toluca, Queretaro and other towns, besides all those of the city of Mexico. They all possessed certain features in common, which might be regarded as the distinctive traits of Mexican burial places. One would be conscious of the existence of these features upon entering one of these cemeteries without being able to discover and localize them, or to precisely define them. It may have been in the general air of neglect — of carelessness as to what disposition was made of the dead. In the city burial place in Jalapa there were some buildings of pretentious appearance, but they were constructed of cheap materials, were suggestive of speedy decay, and were found upon inspection to contain mural tombs for rest. It was in the city of Mexico that the most satisfactory of my observations were made upon the subject of burying places. The influence of a large foreign population has evidently been felt there in this matter. The English and the American residents have cemeteries of their own, adjoining each other at Tlaxpana, just outside the city. There is a French cemetery also at La Piedad. Probably it was originated by the French residents, but it has become a favorite with the wealthier Mexicans, especially those who have imbibed French ideas by long residence in France. It might still be entitled to the name of "French Cemetery," were it wholly given up to Mexicans, by reason of the French taste displayed in it. It is worth a visit. It seems to represent all that now remains in Mexico of loyalty to the Church of Rome. I think that one feels in La Piedad Cemetery, as nowhere else in Mexico, the existence of a religious atmosphere. A religious sentiment is expressed upon the gateway, "Blessed are the dead who die in the Lord," and that sentiment seems to pervade the whole cemetery. There is a little row of graves of Sisters of Charity, and here and there one finds the grave of a priest. Neither are to be found in any of the other burying places — even those which nestle closely up under the shadows of the great churches; and the handsome mausoleums to be found in this cemetery (some of them quite as artistic in design as any I have seen in Greenwood or Mount Auburn) belong to families who have remained loyal to the Church of Rome at the sacrifice of political power under a Government inimical to the Church.

I found in the city of Mexico two names in use to denote burying places. Both may be generic, but cementario seemed to be applied more generally to the suburban cemeteries — those which I have mentioned and also Dolores, which is thoroughly Mexican, though more after the pattern of the foreign cemeteries. Panteon, on the other hand, is in general use throughout the country, and seems to include any kind of a burying place, though in the capital it is more generally applied to the narrow, compact, overcrowded burying-grounds within the city walls, and commonly attached to churches.

The panteons present the most interesting phase of this subject for our consideration. The panteon of Tepeyac, on the hill back of Guadalajara, is a good example. It shows some of the elegance, as well as some of the bad taste, to be found in Mexican burial places. Graceful canopies of cast-iron, massive tombs of stone, elegant mausoleums decorated with Mexican onyx; all crowded together, the whole surrounded by an adobe wall. This panteon contains one notable tomb. It is that of General Antonio Lopez de Santa Ana, whose name is better known to Americans than that of any other Mexican. The most notable of all the panteons of the capital is that of San Fernando — almost in the heart of the city. It is the Santa Croce of Mexico. It contains the dust of the most illustrious persons of the last half century of Mexican history. There are greater men reposing here than in La Piedad, yet one does not feel oneself in such a refined company in San Fernando as in La Piedad. Although the panteon is actually within the walls of the Church of San Fernando, the great men who repose here, were, for the most part, the enemies of the Church. Their greatness was acquired in the politics of Mexico. The tombs of President Juarez, President Guerrero and President

Panteon de San Francisco, Puebla.

Panteon Municipal, Jalapa.

Panteon Santa Clara, Toluca.

Panteon del Tepeyac, Guadalajara.
In this panteon may be seen to good advantage the mural tombs in general use in panteons throughout the country. There are the same reasons for their existence here as there are in New Orleans, where underground tombs are impossible, viz., a wet, spongy soil. Probably all the tombs of San Fernando are above ground. Cremation is not, so far as I know, practised in Mexico, but I once discovered, in a dark passageway leading from the panteon into the Church of San Fernando, a shelf upon which were uras containing the ashes of the dead. Probably ashes produced by the natural process of decay.

While San Fernando possesses the most beautiful specimen of monumental statuary I ever saw—the tomb of Juarez—the tombs generally do not compare favourably with those of the better class of cemeteries. They are generally of conventional designs, and San Fernando has the appearance of neglect. But in most respects it is the best example of a Mexican burial place.

Arthur Howard Noll.

[Illustrations]

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

BANK-BUILDING ON WALL STREET, NEW YORK, N. Y. MR. W. WHEELER SMITH, ARCHITECT, NEW YORK, N. Y.

[Delatino Print, issued only with the Imperial Edition.]

HOUSE FOR FLETCHER COWHEER, ESQ., KANSAS CITY, MO. MR. A. VAN BRUNT, ARCHITECT, KANSAS CITY, MO.

The house is faced with stock bricks trimmed with light-brown Ochre Portland sandstone. Hall and staircase finished with white oak; remainder of interior finish, red cypress. Plate-glass windows in principal rooms. Total cost, including mantels and hot-water heating, about $18,000.

OFFICES OF THE MUTUAL INSURANCE COMPANY, FREDERICK, MD. MR. J. A. DEMPFWOL, ARCHITECT, YORK, PA.

HOTEL AT LITTLE FALLS, MINN. MESSRS. GILBERT & TAYLOR, ARCHITECTS, ST. PAUL, MINN.

BLUEFIELD INN, BLUEFIELD, VA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

HOUSE OF E. O. SCHUYLER, ESQ., BERGEN POINT, N. J. MR. CHARLES EDWARDS, ARCHITECT, PATERNON, N. J.

THE ARMSTRONG HOUSE, ROME, GA. MR. G. L. NORMAN, ARCHITECT, ATLANTA, GA.

A Scheme to Bridge the English Channel.—The scheme of constructing a bridge over the English Channel has just been completed. It has been worked out by the Creusot engineers and M. Herencourt, ex-President of the Society of Civil Engineers. The progress of metal-lurgy has enabled them to construct an immense bridge thirty kilometres long, with a platform at the height of fifty metres above the sea at full tide, and supported by piles at distances of five hundred metres. The height allowed for the bridge over the Channel would allow large steamers and sailing vessels to pass freely. It would support four railway lines, besides a road for carriages and foot-passes. This will be satisfactory for those who dread seasickness. The only trouble left will be that of choosing their mode of locomotion—whether by railway-carriage, omnibus, cab or velocipede. Places of refuge, watch-houses and alarm bells will be placed on each pile, with a powerful light. The authors of the gigantic scheme believe that the foundations may be constructed by means of compressed-air diving-bells, the depth of the strait between Calais and Dover not being on an average more than from twenty-five to thirty-nine metres, and in few places exceeding fifty metres. The bridge will cost 800,000,000 francs, its metallic weight will amount to 2,000,000 tons and it might be constructed in six years. The scheme will shortly be submitted for an examination to an international tribunal committee. When this examination has been completed, the Channel Bridge Society will apply for a concession to the French and English Governments from which it will ask no subsidy. Under these conditions the concession might be easily granted and the works immediately begun. In a few years the commerce of the two Nations would benefit from the simplifications introduced into their relations by the execution of a work which might be considered as one of the most important of the century.—Paris Temps.

PAPYRI AND PORTRAITS FOUND IN THE FAYIUM.3

But little more than ten years have elapsed since discoveries of greatest interest began to be made on the site of the ancient city of Arsinoë in Central Egypt. The fertile province El Fayium, lying between the twenty-ninth and thirtieth degrees north latitude, a garden of Egypt, is an oasis watered by numerous arms of the Nile and famous for its plantations of sugar, fruits, olives, vegetables and roses. Its capital, Medinhel el Fayium, lies not far from the ruins of ancient Crocodilopolis which received under the Ptolemies the name, Arsinoë. These ancient seats of empire have now at last been raised from the dead, as it were, by the bringing to light of countless thousands of fragments of papyrus and parchments, the source of the supply being, as yet, far from exhausted. The unwearyed patience and keen insight of scholars engaged in the task of deciphering these venerable witnesses to the centuries of the past have compelled them to break their silence and tell us of the daily life of old. From the time of the Macedonian Ptolemies, down through the period of the imperial Cæsars and extending far into that when victorious Islam imposed another civilization on the submissive people, we have here preserved for us, by the favorable conditions of Egyptian climate, continuous documents filling up the gap of hundreds of years. A century had elapsed since the first papyrus in Greek cursive writing from Egypt came to light, since which time a great quantity of similar documents from the most varied sites had wandered to the European museums and a new branch of historical science had been established. But the sources were apparently drying up and the Arabs seem to have lost sight of the treasure. This, however, can be regarded as a fortunate circumstance, for nothing could exceed their barbarity and stupidity in the treatment of these discoveries. Of the fifty papyrus rolls found with the one brought to light a hundred years ago, it is reported that they were burned by the Arabs, that they might regale themselves in the fragrance of the burning pumis. The lost site coming to light again in our more enlightened age, such treatment of the treasure is no longer possible even by the Arabs.

The documents which have found their way to the museums of Berlin, Vienna, Paris, London, etc., are not from one spot alone, but from most widely-scattered parts of the field of ruins of Arsinoë, mostly the accidental discovery of treasure-hunting Arabs. Occasionally large parts of one manuscript have been found near together, so that the difficulty of adjustment proved slight. But the greater part of the fragments are found belated between the clods of upheaved earth, scattered over the ancient sites as the wind has happened to strew them or the hand of man has thrown them aside. Further, being arbitrarily plundered by ignorant dealers, these treasures have suffered the fate of many other valuable antiquities in

3 A letter by Mr. Samuel S. Mitchell to the New York Times.
our museums. In some cases fragments of the same whole would be which the history of great cities, or the growth of the commerce of a third to a Berlin. A whole series of fragments from the Bodleian Library at Oxford were found to fit exactly into the papyri of Lon- don, and the same description of hands on both sides, as if they would still be in the possession of the finder. Of the more recent acquisi-
tions of the Berlin Museum, which had already a collection amount-
ing to 3,500 numbers, it may be said that the greatest care has been taken in the process of collation and examination, as the first years of the first centuries of the Christian era, the Byzantine period, and down to the period of the occupation by the Arabs. Many names of em-
perors occur. These are authentic witnesses of days long gone by. But the whole of recent research into the history of art, philology, and the theories and reflections of historians upon their times, but the pro-
clamations of Government, the expressions of subjects, plain, un-
varnished, and unequivocal, are found in these records, as well as those in the other museums, the hope is awakened that much light will be thrown upon the details of the ad-
ministration of Egypt as a Roman province, especially as concerning the juridical administration, and the relations of the Graeco-Ro-
man relations doubtless served as a model for the other provinces.

There are preserved many reports of tax-gatherers to the emperors, concerning taxes collected on property and crops, as well as many admonitions of the authorities to the peasant to be diligent in their labors that they may be able to meet their obligations to the State. We find accurate reports of the personal possessions of the tax-payers, besides those relating to the census and the income and disburse-
ment of the temples.

From the time of the Ptolemies was found a valuable fragment, dating from the year of Ptolemy III., 177-6 B.C., accord-
ingly one of the oldest preserved Greek papyri. Fragments from the first centuries of our era are also largely represented. An interest-
ing procession to the temple of Aphrodite has been preserved and splendidly-written contract from the fifth century B.C. Diceliotan stipulates for the purchase of a male Arabian camel. One fragment describes us in the full titles of the Palmyrene King Val-
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letters full of Christian exhortations. In some cases biblical inscriptions, demotic and Greek, were found upon the ostracon. The receipts for taxes, which go to make up a large part, are of interest as showing various forms of inscriptions in the hieratic and the ancient world in general. To give a clear conception of these receipts the following interpretation by Dr. Wilkins may be of service: "Valerian and the other pederast, known as 'Paralyzer,' by name, daughter of A. of Hermopolis, son of Paphnius, by name, Tachmuthis, has paid the trade tax for the second year of Hadrian, our Lord, with twelve drachmas — 15 dr. Anno 3 of Hadrian, our Lord." 

The recent discoveries in a necropolis, not far from Arsinoe, have thrown unknown light on old Greek portrait painting. These portraits, which were taken from the remains of the rock dwellings of the ancient and the vicinities of Alexandria, and the ancient world in general. To give a clear conception of these remains of the rock dwellings of the ancient and the vicinities of Alexandria, and the ancient world in general. To give a clear conception of these remains of the rock dwellings of the ancient and the vicinities of Alexandria, and the ancient world in general. To give a clear conception of these remains of the rock dwellings of the ancient and the vicinities of Alexandria, and the ancient world in general. To give a clear conception of these remains of the rock dwellings of the ancient and the vicinities of Alexandria, and the ancient world in general. 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effort to represent life as faithfully and convincingly as possible in art reached not merely after the outward form, but the whole inner life and disposition of the one portrayed. We may well wonder to find works like these coming from Egypt, the land in which the fine arts were so bound by types and canonical rules, and that also from mummy shrouds. But this wonder will disappear as soon as we remember that here, too, Hellenic art, both in sculpture and painting, was able to supply all national art and that the cultivated classes associated themselves with the more advanced civilization in everything that related to the higher intellectual life. Greek had become the language of the educated, and even the native tongue was perverted with Greek words. The Egyptians sought to be distinguished as little as possible from the Greek immigrants in scientific and aesthetic matters and thus became absorbed in the all-pervading spirit of the times.

Buttress and Pilaster.

The study of a subject which happens to be novel to us may be approached in two ways. Each has its special advantages, and neither therefore can be wisely left entirely aside. But it may make no little difference which we commence with. We may, if we please, plunge at once into the examination of all that has been done and the study of all that has been written,—let us say, respecting buttresses and pilasters. Or, we may take our stand in the first instance at an independent point of view of our own and look at the conditions of the subject in the abstract. By the subject of the pilaster in the abstract, nothing more is meant than a notion of it under the very simplest conditions which will leave it a pilaster still and nothing else. When this notion has been successfully seized, we have mastered a primary definition,—the value of which it was the great service of Socrates to first impress upon the world. We may then advance to a notice of less blank simplicity, and so on to others less and less simple, and to the concrete examples. Sets of concrete instances are thus taken up in the way of an actual study, and only will be found imperative if we are to treat the matter exhaustively, to make sure that at least no important variety escapes the axes of the logical net.

The best chance of arresting such futilities is to check our theoretical definitions by comparisons of the scheme with the series of instances, and for this the projection of such a member appropriately less than its breadth, as it is in effect only so much of the whole emphasized. The determinations of proportions within this limit remains within the tropes of taste and judgment. Something depends on the materials which are employed. A pilaster may therefore in some degree and under some circumstances be responsible for that resistance to thrust which is more properly the function of the buttress,—even as the buttress will in some degree be frequently charged with some of the duty of a pilaster.

Still the primary and essential characteristics of the two members are distinct, and it is appropriate, when artistic expression is in question, that each should have its own specifically and decisively pronounced.

The simplest development of the pilaster is a partial advance of the wall from space to space, beyond the plane of the intermediate and general certain. The projection of such a member appropriately less than its breadth, as it is in effect only so much of the whole emphasized. The determinations of proportions within this limit remains within the tropes of taste and judgment. Something depends on the materials which are employed. A pilaster may therefore in some degree and under some circumstances be responsible for that resistance to thrust which is more properly the function of the buttress,—even as the buttress will in some degree be frequently charged with some of the duty of a pilaster.

The obviou remedy is to increase the thickness of the wall absolutely, and its breadth relatively to its height. But this may be applied by either a uniform increase of mass or by stiffening the construction by increased thickness at intervals. Sufficient strength may possibly be imparted by dividing up the wall this manner, while material is at the same time economized. The effect of any direct lateral push will be thus limited, and the danger avoided of a weaker part being exposed to an excessive leverage.

It is seldom that such a push as a wall is caused to resist is a purely lateral pressure; even a heavy gust of wind will usually impinge obliquely from above downwards, and thus to exert what is actually a thrust. A pilaster is therefore in some degree and under some circumstances be responsible for that resistance to thrust which is more properly the function of the buttress,—even as the buttress will in some degree be frequently charged with some of the duty of a pilaster.

Still the primary and essential characteristics of the two members are distinct, and it is appropriate, when artistic expression is in question, that each should have its own specifically and decisively pronounced.

Another application of the pilaster proper, is as strengthening the free end of a wall. It is in this position that we meet with it in the ennobled form of the Greek anta. Here we at once observe the care which the Greek took to preserve its characteristic relation to the wall as its immediate development. He gave it a capital which harmonizes with that of the associated column but is most distinctly distinct from it as a whole, while its proportions are dependent on the column to which it is opposed, is its outline and articulation the elementary of the wall, and it is further united with it by continuous base-

Restaurant et Donnach, Austria. From Architektonische Rundschau.

When we start from the most general definitions that we can construct it is easy so advertise the subject, or to make it appear that it is

The buttress is an architectural member specifically adapted to resist oblique pressure from above. On the other hand, a pilaster is an architectural member intended and adapted to contribute to the stability of a wall as subject to be affected by direct down press or by transverse lateral pressure.

The stability of a wall is in the first instance in danger from causes of a direct or to a wall leaning by direct pressure which is inadequate to support its own weight. There is a limit to the bending to which a wall of a certain thickness, whatever the solidity of its construction, can be safely carried up. The lower part may be crushed at last by the unsparing accumulation of superincumbent weight.

A wall is further responsible for resistance to whatever lateral pressure it is likely to be exposed to by various causes acting by diverse forces. Thus a thin wall may give way evry by a man leaning his back against it; a lofty, thin wall may be unable to resist the impact of a high wind. It is therefore necessary to provide for this last end, that is to say, a buttress or pilaster, and by means that will make for true artistic effect, in the one case the buttress, and in the other the pilaster, in which the member is to be treated as a character in its turn, and to be considered as affected by influences of a distinctive sort. Though the buttress and pilaster may be thus viewed as different classes, so that the member is to be treated as a character in its turn, and to be considered as affected by influences of a distinctive sort.
The angle of the north porch of the Echternach supplies an example of how the simple pilaster is naturally developed into a compound pier. The existence of the appearance of being a pier is clearly one of the required terminations of a wall. There is but one step from this combination to the free component pier, — but this step the Greeks seem never to have made or indeed to have seriously entertained. Even windows on the west front of the Echternach are appropriately treated as columns, not like the members which answer to them in the interior as pilasters. The transitional pillar is not a member above the window; and it indicates that the function of the intermediate wall with large opening is here subordinate.

Some Roman architects lost touch of the true idea of the pilaster; they gave them capitals, bases and profiles and frequently fluted like true columns from which they were only distinguished by being flat. The unfortunate consequence was that the superincumbent weight of the arches and the height at which windows above them were placed upon it. This type is before our eyes commonly enough in London, — a heritage of the days when Pope at least could recognize its falsity: —

Then clay four silice of pilasters on.

Which jacked with bits of rustic makes a front.

True pilaster treatment is exemplified on the exterior of S. Apollinaire in Classe at Ravenna, where the entire length of the wall is occupied by a series of flat brick pilasters. They are uniform from the ground to the roof, excepting only the gable which is connected by brickwork of a like section under the cornice. This is the treatment which reappears in the Romanesque churches of Spire, Worms, and elsewhere, and the distance at which it becomes less satisfactory. In Corbie and others the architraves are fluted along their whole length, and the pilasters are based on a column, with proper squinches above, and with the architraves of the pier or of the window springing upon the columns of the pilaster. In Corbie the pilaster is connected with the external pier on the side of the aisle, and in the transept is connected with the external pier on the opposite side.

In the same way the tall pilasters in the nave of the cathedral at Lincoln are connected with external pilasters, and the architraves are fluted throughout round-arch architecture and through all stages of its subsidence into pure monument. An intermediate pilaster is omitted and the arch which it would answer to stretches on a solid wall; the whole effect is then the same as at Corbie. In the Church of St. Michael at Huy, in Belgium, the outside pilaster of the nave is connected with the external pier on the side of the aisle, and in the transept is connected with the external pier on the opposite side.

The general tendency of an advancing art to press simplicity to elaboration told with full effect. The Cathedral of Pisa exemplifies how engaged columns were substituted for pilasters on the side walls and how the superincumbent arcing in relief developed into open galleries of small arches resting on a multitudinous series of pilasters. Considering the early date of this vast and elaborate cathedral, 1099 A.D., we must credit the architect with a certain amount of originality, or we must refer the introduction of the pilaster to the influence of such contemporaneous structures as the Hagia Sophia, to the influence of the rich Romanesque architecture, or to the desire for a better solution of the problem.

In the interior of the cathedral at Pisa the floor is somewhat elevated, and the large nave, with its solid pillars, is divided by a row of more or less elongated columns, each bearing a corbel or cornice. The columns are arranged in two lines, and the space between them is occupied by a series of pilasters, which are connected at the top with the cornices. The columns are of varying height, and the pilasters are of a much smaller size. The pilasters are divided by a row of small pilasters, which are connected at the top with the cornices. The columns are of varying height, and the pilasters are of a much smaller size. The pilasters are divided by a row of small pilasters, which are connected at the top with the cornices. The columns are of varying height, and the pilasters are of a much smaller size. The pilasters are divided by a row of small pilasters, which are connected at the top with the cornices.

The essential and primary characteristic of the constructional mass which forms a proper buttress, is its disposal in a manner to secure stability by affording resistance to pressure acting obliquely. The first condition of this is that it shall be erected in the plane of the line of thrust. The resistance to such thrust is ultimately the solid earth, and the very simplest form of buttress would be a sufficiently rigid prop conducting this pressure in a direct line to the earth as its abutment.

The wide spread which this would necessitate, may be dispensed with in many ways. Thrust may be opposed by counter-thrust, as at the building of the Romanesque bridges; by giving the adjacent arches of the nave of a cathedral, balance each other and rest in common on the vertical pier or shaft below, and the last adopted and adopted as the most natural and the best.

Some of the most ingenious and beautiful combinations of the Gothic architects are worked out by reliance on this principle.

Otherwise the thrust may be conducted to a wall which shall be sufficiently solid to resist the pressure which is thrown upon it and to form a positive abutment. The efficiency of such an abutment is much better than an element which merely resists the displacing power of the whole or at least a portion of the thrust; — as might be the case if this were received by a firmly fixed vertical iron rod, and then by the downward pressure of a mass acting transversely to the thrust and causing a resolution of forces which deflect it to the solid earth. Such is the effect of loddin a pier above the point at which it is subjected to an oblique thrust which tends to push it over. The superincumbent weight supplied in this manner may be so predominant and the mass of the resisting pier also so considerable, that the force of the particular thrust is lost in comparison.

When the component pier is of a rectangular section, and the displacement of the whole or at least a portion of the thrust is resisted by the whole of the solid earth, the effect of thrust might be such as to cause the pier to deflect or to force it downward. It is not this, however, that is important in the present case. The important consideration is the magnitude of the thrust which may be resisted by the pier, and the effect of this on the stability of the edifice. The thrust is calculated on the assumption that the pier is in a vertical position, and that the earth acting on it is uniformly distributed over the area of the base. The thrust is then the product of the weight of the pier and the difference in the pressure of the earth at the two sides of the pier. The effect of this thrust is to cause the pier to deflect, and this deflection is increased by the resistance of the earth to the movement. The deflection is therefore a function of the weight of the pier, the area of the base, and the difference in the pressure of the earth at the two sides of the pier.

One of the most important factors in the design of a pier is the selection of the material which shall be used for its construction. The material must be strong enough to withstand the load, and it must also be durable. The best materials for the purpose are stone and brick, which are both strong and durable. The stone must be carefully cut to fit, and the joints must be carefully made to be as strong as the stone itself. The brick must be carefully laid to be as strong as the stone and the mortar must be carefully mixed. The thickness of the pier is also an important factor in the design of a pier. The thickness of the pier must be great enough to resist the thrust, and it must also be great enough to give the pier a sufficient weight to resist the wind. The thickness of the pier is determined by the weight of the pier, the area of the base, and the difference in the pressure of the earth at the two sides of the pier. The thickness of the pier is therefore a function of the weight of the pier, the area of the base, and the difference in the pressure of the earth at the two sides of the pier.
The buttress never attained and probably is not susceptible of the same independent beauty as the Greek column. It was this beauty which caused the column to be introduced so frequently as a purely ornamental and not as a constructive device. Hence the principle underlying the work of the Roman architect was to use as little as possible of these large elements of decoration in such a way that it was not so employed in a combination which suggested to the mind that it was degraded from its proper character and reduced to idleness. A majestic column is an anomaly when it merely supports a superstructure, while the same principle does not apply when the wall itself is exhibiting itself. There is not the same objection to the employment of smaller columns in trivial but graceful combinations; and architectural columns can produce many effects of composition in which columns and architraves and even pediments are treated very unceremoniously if we regard their original proprieties, but with a free grace approaching to playfulness which is not always out of place in an ornamental building.

The nearest approach to such purely ornamental employment of the buttress is also in works of reduced general dimensions, as in the entrance does to churches and the like. Where the buttress is employed and viewed in considerable masses, as in cathedral bridges and the like, it is only in the case of those buttresses which are the result of natural stress, or which are the natural effect of those forces that have been accumulated and combined with interesting ingenuity and what may be called picturesque effect, even when incongruously applied to the screen the selection is masked by diminutiveness. But the buttress in the column has unfortunately been too often evoked upon as a conspicuous feature available for giving the relief of a certain variety in places it has no structural justification for appearing at all. In other cases so much attention has been engrossed by the chance of introducing some variety, that a true structural relation has been ignored and covered up out of view. A buttress perfectly in place has an effect with quite unmeaning, another which is absolutely gratuitous; treatment which goes far to degrade it to the position of one which is manifestly in a useless or in a false position.

If we may justify a buttress in the plane of an unpeered wall? Not easily, it would seem. Even if the wall is weak, it is in no danger of falling to ruin in this direction; the utmost that it requires is what we may call a plain solidification, not a buttress, but an angle if it is returned. The buttress in this position is applied to no thrust, nor is there anything to suggest the notion of such a thrust. Yet we have not to travel far among Gothic designs, earlier as well as later, to find buttresses officiously alloying. The walls of a porch or a short transept, and even presenting their sides at right angles to the wall in which the inserted arch of a window or an entrance was made to support a thrust in this or another direction. Surely this circumstance is aggravated — duplicated — when another buttress is associated with the first at the angle, in the planes of the transverse and equally unpeered wall. It is only a repetition of such a buttress when set at right angles to each other, where the walls in their respective planes are really pierced with arches, and a double suggestion of thrust is indeed not wanting.

It is impossible not to feel that the provisions against thrust are here literally at cross purposes. Any thrust of an arch in a front wall only would be delivered to its proper buttress, through and across the buttress provided for the thrust on flanks, and vice versa. In neither wall has the arch any true, nor any apparent and expressed, relation to the buttress which is nearest to it; or, if it has any at all, it is a remnant of the earlier days when set at right angles to each other, where the walls in their respective planes are really pierced with arches, and a double suggestion of thrust is indeed not wanting.

The spread of a buttress has a natural relation to the angle of thrust which an arch exerts, or, what is equally important, suggests to us the idea of exciting. The higher the arch relatively to its width, the more nearly will its thrust appear to approach the vertical and the more easily to be resolved into pure down press. The more nearly then may the buttress approximate to the character of a plainer wall. This may be even expressed, which was the case with the very acute spire of Salisbury, and the acute windows of its tower are buttressed quite satisfactorily to the apprehension of a character, by the strengthened polygonal and pointed angles. What is required in this case is solidity and mass; and the buttress angle to be manifestly responsible for the double pressure. This sufficiency may be emphasized by important pinnacles and by the angles of the polygonal building changes, as in the towers of Salisbury and central towers of Salisbury and Canterbury. By such treatment not only are we at ease as to lateral thrust, but the sentiment is precluded that the diagonal thrusts of internal vaulting may not be carried.

There is a not unnatural temptation which is too often weakly yielded to, to make use of the buttress as a convenient feature, so to speak, as a background to any variety to be attempted. However attractive the aiming of such buttresses, at the same time, as they are sufficiently to cover the window by contrast, an appearance of lassiness. Nay, even advanced porches have been put up with accessories which, if they mean anything in such a position, imply construction too faulty to be left, as construction so little adventurous should be, to its own combinations and coherence.

The motive to obtain the very utmost space for the glittered lights of the cathedral aisle had, at one period, the effect of compelling the buttresses to certain incongruities. Their very considerable projection has an appearance of intersecting with the light of the windows when these are brought very close up to them; and the excessive reduction of the wall deprives the window itself as seen from without, of its due support; the thrust which its arch implies to the architectural sentiment being thrown incongruously on the side of a buttress where it is not needed.

Archd windows involve the presumption of an arced and thence of a vaulted interior, which in turn demands expression on the exterior. Such a demand renders the solution of pairs of but- tresses in the plan and in the wall of the entrance an impossibility. The diagonal buttress or the strengthened angle becomes imperative if the composition is to have an air of organic vigor and consistency. The necessity of design of the great cathedrals and more elaborate Gothic churches will guard assurance of the force of the observation.

The implication of a vaulted interior in nave and aisles is given decisively by arched west windows and literally expanded window lights generally, whether with round or pointed arches. The implica- tion is no doubt frequently unverified upon entrance, and not only aisles but naves also whether in pointed or round arch style are found unverified and never to have been intended to be vaulted. This, however, does not affect the theory, unless so far as theory may protest against a false precedent being made an authority.

Theory may protest still more loudly against an aggravation of offence by useless buttresses being set slyly against the walls of an aisle which is roofed as a lean-to, while the compliment is not paid to critical eyes, by at least indicating a relation of the buttress to the vault of the broader nave beyond which has a conspicuous claim to more important assistance.

In the chapter-house, as a semi-circular covering a chamber has no right to exist unless it is so conceived, and the existence of such a vault seems to be bound to be acknowledged by the directions of its thrust being seen to have modified the treatment of the encasing wall. Buttresses at these points are in the place if ever anywhere. If their places lack them and we see only an undifferentiated wall, we may fairly turn away disappointed, or even and not improbably indignant. It is much the same when buttresses appropriate in position are the interior walls, much too often the walls below an unaffected and unbroken parapet. We may be certain enough that they have gone on their way to fulfill their function of meeting a line of thrust, but more by the skin of their teeth. The organic architect has a lesson to learn from the Classical. Let him take it to heart and the style which he loves will escape the oppression of advancing with narrowed expression to the stringcourse of the parapet and there deserting him suddenly and completely. The bird which descends well at the rear of a parapet, is offensive in itself and ought not to have been, ought not to be — beyond possibility of harmonized combination; a defect less important but more easily dealt with would be a certain definition on roofing and ridge line of the same lines of force which are constantly so adequately and ad- mirably arranged over and proclaimed in the most logically distributed buttresses.

W. WATKINS LLOYD.

GENERAL MEIGS AND THE NATIONAL MUSEUM BUILDING.

July 4, 1888.

To the Editors of the American Architect:

New York, Your newspaper correspondent is not entirely informed on the history of the National Museum Building. I have not now within easy reference the papers and records in the case relating to the other conception and completion of the plans finally executed, and I do not possess the data of any interest to the public though they are brought before your readers in the issue of the 23d in June in such a way as to unjustly upon my name and as if I had a hand in that matter. This matter was taken up on this subject dated 18th January, 1877, that Professor Baird had called on me the previous evening and requested me to give him the
Village on the White Sea destroyed by Ice. — Advice from the fishing village of Korchakazno, in Kola, a peninsula on the northwest side of the Arctic annals, which took place on January 5th last. At 4 o’clock in the morning the inhabitants were awakened by a series of heavy groanings, followed by a crash of wood and iron artillery. Shortly afterward a great ice wall rose to the Northeast, several hundred feet high, was seen to be moving toward the village, doubling in consequence of the pressure of the ocean of ice outside. The ice hills caused slowly but irresistibly onward, and passed over the village, which they completely crushed, and kept on for a mile inland. The village was completely levelled and a half in the river. The villagers saved their lives, but little else. — Philadelphia Press.

A Large Clock. — A new clock weighing 2,130 tons has just been placed in the tower of the Glasgow University, similar to the great clock at Westminster. The frame of the tower is of iron and of cast-iron placed. It is 0-2 feet long, 2 feet wide, and 1-1 feet wide. The clock is 18 feet high, has 20 feet of clock-diameter, and is 15 feet inside it; the whole roofed with wood and tin or slate, and lighted by clear crystal glass at the eaves of each section of roof could be erected for $100,000 to $120,000, and that the design seems to me to have worked out from the idea I had given Professor Baird, such a clock, with more elaboration, which I did not think improved it, and with a good deal of brick and stone and metal and colored decoration could probably be put up for the architects’ estimate of $400,000 including heating, water and gas pipes and drains, and a plain concrete floor over which wagons could bring into the basement. The Smithsonian Institution had adopted similar plans and while it underwent some modifications during the two or three years before the House of Representatives concurred with the Senate in making appropriation for it, it was finally built and is a splendid structure. I do not see that it has any claim. Principal divisions a marble and tile floor and the rest of the interior lower floor was covered with matched boards on joists let into concrete, against my advice, and these floors have of course rotted away.

I remember that Professor Baird explained to me that he had got plans for an extension of the Smithsonian, south, but nothing large enough for the purpose, at least as a million an acre, as a sum he despised of getting Congress to vote. He said he wanted something of sufficient capacity at a cost which he could hope to secure. This has been accomplished, but not this year, and while not as imposing as I proposed, is more decorated both outside and inside in detail, and has a fireproof roof, which I did not propose. The cost of the building with me, was the Rotondo, an available building in Rome, being far superior to any in Rome, better part of the interior. I fixed upon a square, as wasting less of the site with the same diameter. This is the true history of the National Museum Building, a building which none of those concerned in its erection have cause to be ashamed of, and in regard to whose history and design, as far as I know, they have never had any such controversy as your article infers.

For the other buildings with which I have had to do; they can answer for themselves. An exhaustive treatise would not change them, and would not interest your readers; nobody cares who desig- nated the purpose for the purpose, as less than a million acres, mony, and civil engineers and architects employed or not employed by this Government are not likely to be content that a few out of the thousands of public and private works and buildings of the country should be more than a thousandth of the Federal building, or to the United States Corps of Military and Civil Engineers. The other side is careful to sink the title of Civil and to insist upon designating them as a public work, of which the engineer can never live, and every public work of which either the architect, or the engineer, or the architect of the United States service, do on the whole continent in the same time. But still the constitutional grumblers continue and will still continue their attacks, on those so unfortunate as to be in Public Service, just so long as the quarel between gree and tur- key, ducks and chickens is not finally settled.

M. C. Merri.

Trade Situation.

Trade situation, whether commercial, manufacturing or financial, present very little that is deserving of notice. Flourmills are keeping a sharp eye on prices, and not only at Chicago, but in nearly all the market towns, and especially all places where there are industries, as these interests are not satisfied with the restricted volume of business and rules summing it up. The Commercial Agency reports are written in a spirit of commercialism; the railroad people, as a rule, are most sanguine, worse houses breathe the spirit of confidence in better conditions in the near future. This confidence seems well founded, so far as the factories are at present, and the existence of a great deal which can be turned into profit, and its spread activity is probable. The conservative management that has prevailed hitherto continues. The restriction of production will be kept up until demand proves itself strong enough to absorb the present surplus. We shall not bring about a change in this direction, and probably will not on account of the enormous working capital. The large numbers of money lenders, now always reliable, but at present, facts and conditions warrant the views they take and in fact, are useless. The West is not as busy as the East. The West has forged ahead. Reports this week from Chicago, St. Paul, Duluth and Omaha in the Northwest, from Little Rock, Memphis, and a few interior towns in the West, mention an increase of trade. Sales of iron, steel, lumber and brick, as heavy constructions as last year. The work is different in many respects, and last year, Lumber and improvements take a great deal more material this year. The firmness of prices is in or nearly all material show that building has been active. True, there are stocks large, but the industry is under control of combinations. The price competition on saws, doors, sails and blind began to recede, not because of enormous stocks, but because members wanted to be at liberty to cut prices for the fall trade if they wish. Chicago is as busy as last year, this year; more business is being done than before; yellow-lobe manufacturers naturally have, there is no competition. The use of iron has increased, and the tendency of both to stay at a low rate. The demand is not as strong as last year, but the fall is not as strong as the fall last year. The structural mills are as busy, All the brick-makers of the mountains are as busy, Small machinery makers turned out as much machinery for the farmer as for last year. Coal has had a hard year, but is coming up. All the yards on the Detroit are crowded. The Pacific Coast yards are busy. Lake-craft builders have a full season’s work on hand. Water-way competition is steadily increasing, and it is giving the railroads companies lots of trouble, along the lines, “Soo” which is creating unrest among the trunk lines. As fast as older channels of activity become gorged with producing and distributing facilities, just so fast does enterprise break over the old track and dig for new. Our experience shows that there is no defensible limit to the new channels that can be opened, and yet the competition is not quite the case. New unknown industries can be established and built up. The young men connected with manufacturing interests are making strong efforts to get into this field, and we are but little effort away from this. The largest, the boiler and general machinery makers are now contracting for a great deal of work. and the tool and mold makers are busy. The new iron making is taking place everywhere on account of the competition at work. Margins are narrow everywhere, and a machine that will do more business and use less coal, drives, or threatens to drive those out who do not get the best types and products of mechanical ingenuity; hence much of the visible in competition in the present products is due to an actual increase in capacity, but to the necessity for providing better machinery to do the work at present prices. The four or railroad doors. The reports for the last month. The coal-producers are mining and selling more coal, but using more coke and coal as fertilizer and as substituting for the iron. Hardware, especially for building purposes, is in active demand. Wagon and carriage makers have as many employers as three months ago. This shows that building is 50 per cent as lively as it has been for some time, and that the trade is really in a year, and they are not in dull in wool. Boer and shoe manufacturers are maintaining last year’s prices. There is no pronounced fall in price of labor during the first six months of the year, according to clearing-house reports, show a decline of a fifteen per cent against first six months, reports are not up. There is an increase of 4 per cent in the practical postponement of the tariff agitation until next winter. Industrial reductions in freight rates, have cut the cost of transportation, and the loss of high or low duties will result in a verdict in favor of high duties.

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SAMUEL CABOT
70 Kilby St. Boston, Mass.
The competition for the municipal buildings to be erected in the City Hall Park, New York, has been decided by the award of the third prize of three thousand dollars, to Mr. B. N. Crawford, of Brooklyn, the fourth prize, of two thousand dollars, to Mr. Appleton P. Clark, of Washington, D. C., and the fifth prize, of one thousand dollars, to Mr. Joseph H. Stark, of York, Pa. In addition to these, a special prize of one thousand dollars was given to Messrs. Weston and Tuckerman, of New York, and another of two thousand dollars to Mr. Charles B. Atwood, of New York, whose design had been placed first by the judges, but was technically ruled out for failure to comply with all the requirements. It is understood that Mr. Atwood may be further engaged to revise his design so as to adapt it to a smaller building. The conduct of the competition seems to have been as fair as possible, under the objectionable limitations imposed by the programme, and the Commissioners evidently intended to do their part in a liberal spirit, although in our opinion the withholding of the highest prizes is a thing which can rarely, if ever, be justified. As the law now forbid the erection of the intended structures, it remains to be seen what will be the next step.

COMMITTEE of the United States House of Representatives has reported favorably a bill for the appropriation of one hundred and fifty thousand dollars to add Dr. A. de Bousset in constructing an airship of a very novel sort. According to the patentee's claims, the lifting portion of the new balloon is to consist of a cylinder one hundred feet in diameter, having a thickness of one forty-fourth of an inch, or about that of good tin-plate, six hundred and forty-four feet long, and one hundred and thirty-eight feet in diameter. The ends are to be made conical, and it is hardly necessary to say that the interior is intended to be braced in some way to keep the thin cuirass from collapsing by its own weight. In order to make the structure float in the atmosphere, it is intended, instead of filling it with hydrogen, to exhaust the air contained in it. It is calculated that the cylinder, with its bracing and weight, would weigh about two hundred and sixty thousand pounds, and it will displace a volume of air which at the sea-level, and under the standard conditions, will weigh seven hundred and twenty thousand pounds, so that the net lifting-power, provided a perfect vacuum existed in the interior, would be about four hundred and sixty thousand pounds. As it would, however, be next to impossible to make an entirely airtight cylinder, the actual floating capacity is taken at only one hundred and fifty tons. From the cylinder is to be hung a platform, on which it is intended to mount the machinery for driving the structure through the atmosphere, and for exhausting the air in the cylinder as to raise the depress the weight as well as a one hundred horse-power electric motor, and storage-batteries for supplying the electricity to the motor.

Here, as it seems to us, is the weak part of the scheme. We cannot see the advantage of using an exhausted cylinder, unless the vacuum were perfect, have to resist a crushing effort, due to the external pressure of the atmosphere, of nearly thirteen hundred million pounds, or six hundred and fifty thousand tons, when, by filling it with hydrogen, a floating power equal to fourteen-fifteenths that of a perfect vacuum, with be obtained, which not be entirely eliminated, and an immense weight of bracing being saved, without exposing the cylinder to bursting through any probable expansion of the hydrogen in it; but, even supposing that a tolerable vacuum were maintained, and that the tin cylinder was strong enough not to collapse by atmospheric pressure, the buoyancy obtained seems obviously too small to support the weight intended to be placed on the platform. The platform itself, hanging from a cylinder one hundred and thirty-eight feet wide and six hundred and fifty-four feet long, could not well be less than fifty feet wide and one hundred and fifty feet long. This would only be about one-eighth of the horizontal projection of the cylinder, yet a platform, with the suspending ropes would have to be of very slender construction not to weigh ten pounds per square foot, or fifty tons in all, out of the one hundred and fifty tons which form the limit of floating capacity at the sea-level. The one hundred tons remaining must, therefore, carry storage-batteries, motors, air-pumps, propelling-fans, freight, passengers, crew, cabins and furniture. The motive force to be used is, according to the description, to air from one hundred horse-power, a mere bagatelle, as compared with the ten or twelve thousand horse-power allotted to a fast ocean steamer of one tenth the size of this aerial ship, and out of this a portion only is available for propulsion, while the rest is to be employed in exhausting the air from the cylinder, by which it is intended to maintain the interior of the cylinder below atmospheric pressure, so that the burden of the machines alone must, as it seems to us, nearly equal the remaining lifting force. The weight of a power air-pump of large size would be difficult to estimate, but a pump with a cylinder six inches in diameter and two feet long, making one thousand strokes per minute, would require twenty days to exhaust the cylinder once, if there were no leakage, and would need twenty-five horse-power not, or perhaps forty supplied from the storage-battery, to keep it in motion at that speed toward the end of the exhaust. Such a machine as this, we are told, could only be made by a hardly weigh less than five tons, and the motor to operate it would weigh nearly as much more, and two sets of apparatus, which, working together, would exhaust the cylinder, independent of leakage, in ten days, seems to be the smallest number that would have any effect in raising or lowering the structure during an actual trip; so that fifteen tons is not, perhaps, too much to allow for the pumping machinery alone. We have left the propelling apparatus and the storage-battery to provide for. Beginning with the latter, we can perhaps form an approximate notion of the weight which would be required of the storage-batteries used to furnish current for electric lights in railway trains. In these, speaking roughly, about a thousand pounds of battery is required to furnish the equivalent of one horse-power in electrical force during a single night, and the battery must then be recharged. At this rate, a storage-battery of the ordinary kind, capable of supplying one hundred horse-power for twenty-four hours, weigh from fifty to seventy-five tons, and the duration of the trip would be absolutely limited by its capacity. Taking the most favorable view possible, we reduce the weight of batteries, motors and pumps at sixty-five tons, which leaves us thirty-five tons at sea-level for propelling machinery. The latter is to be connected with the exhausting apparatus, the pumps which draw from the cylinder forcing it out again in such a way as to propel the structure in the desired direction. The weight of extra weight in bol-plates and connections would thus be saved, but it could hardly be safe to reckon the propelling apparatus at less than ten tons; leaving twenty-five tons floating capacity, for cables, furniture, rigging and so on, boxes, passengers, crew, and supplies of the trip, provided it does not exceed about which it took place at or near the sea-level. Any attempt to rise above the earth would be accompanied with a rapid diminution of floating-power. The displacement of air by the cylinder being equivalent to a weight of seven hundred and twenty thousand pounds at the sea-level, an apparent reduction of the barometer one inch lower than at the sea-level would involve the displacement, at this attitude, of a volume of air weighing one-thirtieth, or twelve tons, less than before, and as the barometer falls, roughly, an inch for each thousand feet of elevation, the air-ship could not ascend to a
height of two thousand feet without first throwing overboard all its passengers, crew, furniture, fittings, and so on.

ALTHOUGH we cannot see much probability that a metallic cylinder, on any scale, can be so steamed as to resist the full external pressures as to resist the atmosphere, and yet so light, as when wholly or partially exhausted of air, to float in the atmosphere, and lift other objects with it, we are quite ready to commend the idea of appropriating public money for well-directed experiments in the art of aerial navigation. With the exception of the successful Kielbock dirigible balloons, there have been but very limited essays in military ballooning which have been made in France, Italy and Russia. No energetic effort has ever yet been made to solve this great problem. We spend millions of dollars, and lavish enormous power, on steamships to cross the ocean, yet we calmly take our wheels of clouds of birds, which dash by us through the air at a rate surpassing, in the case of some swallows, a hundred miles an hour, without seriously reflecting whether man cannot follow them in the atmosphere, as he has the fishes in the sea. To our mind, the science of aerostation has tardily paid sufficient attention as yet to the ways in which power can be produced on land, and stored up for voyages through the air. The name of an electrical storage-battery appears to have fascinated recent experimenters, including even the Captains; yet, a storage-battery is a very heavy and inconvenient means for transporting mechanical force, and Dr. de Bousset's scheme for carrying a large apparatus of the kind, to be employed indirectly by means of motors, exhausting and condensing pumps, in compressing and sustaining the air in such a vessel. Arranged as to drive the structure forward, suggests the immense economy of weight, and saving in friction, leakage and loss in transmission, to be gained by leaving the storage-battery, motor, exhausting and condensing pumps on the ground, and taking up a supply of air or other gas already prepared in cylinders, and ready to be liberated, under proper control, in the same way, and with the same propelling effect as the blast produced on the spot by the burdensome compressing-pumps. Moreover, in case this mode of propulsion should prove wanting, no bed-plate and no fly-wheel, but the group of cylinders itself revolves about the shaft which it drives. These machines are said to work easily at the rate of twelve thousand revolutions of the shaft per minute, and the form seems not only admirably adapted for direct attachment to the shaft of a propeller, particularly an aerial one, where the shaft would be valuable, but suited to the principles of the gas-engine; and a few thousand feet of hydrogen condensed in aluminium cylinders would supply it for a long time. This arrangement would not provide for raising or lowering the balloon itself, by exhausting or refilling the buoyant part of it, but, as we have seen, so much power and time would be consumed in this work, that it might be better to trust to the position of the shaft of the machinery for overcoming whatever grades might have to be ascended or descended after starting on an aerial trip.

THE most readily available, however, of all means of locomotion in the air, is that which serves the eagle, the seagull and the swallow. So far as we can understand their flight, they progress by simply raising themselves in the air, either by taking advantage of a current, or flapping their wings, and then, when the former is insufficient, or the second unfeasible, which they know how to regulate perfectly by means of their wings and tail. To imitate this with Dr. de Bousset's balloon, we should have to fit it with wings on each side, whose inclination could be nicely regulated. Then, leaving behind all other machinery, we should ascend, with exhausted cylinder, high into the air. By a pull of the valve, we could then be admirably ended to the second, and in proportion we should have, not a structure of uncertain buoyancy, feebly pushing itself along with little puffs of condensed air, but a mass weighing, with its cargo, seven hundred and twenty thousand pounds, drawn downward by the tremendous force of gravity, and restored, by the upstrokes and downstrokes of the wings. It is not easy to reckon the exact amount of this force, but supposing gravitation to be pulling the balloon toward the earth with a vigor which would cause it to descend, if the tendency were unresisted, at the rate of sixteen feet to the second, we may fairly say that it would fall so very forcibly with a force of twenty-one thousand horse-power. This, then, is the power of the navigator of such a balloon, relieved of its burden of machinery and storage-batteries, may command at a touch, in place of the paltry twenty or thirty horse-power which Dr. de Bousset alleges for it. It is true that the effect of gravitation in driving the balloon forward would diminish with the angle which its course made with the earth's surface, but not in a direct ratio; and it may perhaps be safe to say that a balloon like this, rising first in New York in the neighborhood, would travel thence to Liverpool by gravitation with an average force greater than that which Dr. de Bousset's storage-battery would yield him for a single day.

M. CACHUEX, the hero, we might almost call him, of the most thoughtful and carefully studied attempts at improving the dwellings of the laboring classes that have, perhaps ever been made, presented a paper at the recent Congress of learned societies in Paris, on the subject of aerial navigation and accidents, which is reported in Le Generale Civil. Few people realize how many accidents occur every year. In France about thirteen thousand persons are killed by accidents every year, and the number of those maimed or otherwise injured must be far greater. In Great Britain, it is said that there have been two hundred and twenty-nine thousand fatal accidents, twenty thousand persons having been killed on railways, thirty thousand at sea, nineteen thousand in mines, and one hundred and sixty thousand by casualties of other kinds. Against this great loss of life M. Cachoux, like all the sciences, desires to provide safe guards. Although cyclones and earthquakes will always have their victims, the casualties due to inundations, which were once very numerous in France and England, and are so still in less civilized countries, have been greatly reduced by engineering; whereas diseases incident to unfavorable topography have been much ameliorated. In industrial employments there are still far too many avoidable accidents. In Germany, which seems to be rather behind in respect to mechanical improvements, the annual mortality from the different accidents varies from six to thirteen per hundred, while the average in France is only twenty-two. As an offset to this, the German law compels masters and workmen to pay for insurance against accidents, but, according to M. Cachoux, this compulsory accident insurance is very costly in comparison with the use of combustible materials in dwellings-houses is absolutely forbidden, even wooden stair-cases being prohibited; and he commends the American system of requiring fire-escapes to be placed on hotels and tenement-houses. As to the means of extinguishing fires, great different methods are employed in different countries. Although the German houses are so incombustible, much attention is paid to fire service. In Wurtemberg every male citizen must belong to a fire company and be ready for service when called upon; while in Vienna a great volunteer company not only provides service for the ten thousand engines, mostly students, to rescue persons from the burning buildings, ambulances to carry them, if injured, to the hospitals, and physicians to attend them, and flying kitchens, which, after an extensive conflagration, appear upon the spot with provisions, ready to cook and serve the large number of emergency arrangements may have been broken up by the fire. The same company looks after persons seized with contagious disorders, thousands of whom are taken to the hospitals in special ambulances, conducted by paid and experienced men.
THE CONGRESSIONAL LIBRARY BUILDING.

It is several correspondents have asked us for more information concerning the threatened section of Congress in regard to the Congressional Library building, we give below the portions of the debate in Congress, which bear on the question.

SESSION OF JUNE 12.

The Clerk read as follows:

Building for the Library of Congress: For continuing, from any funds at the disposal of the Secretary of the Interior, the construction of the building for the Library of Congress, including the appointment of all persons employed in connection therewith at the rates of compensation, as follows: architect, $3,000; assistant architect, $3,000; superintendence of construction, $4,000; one chief clerk, who shall act as disbursing agent, and who shall give bond in such sum as the Secretary of the Interior may direct, $2,000; and the service of skilled laborers, as well as stands, with Power to arrange it, and such other services as the Secretary of the Interior may deem necessary and specially order, may be employed in the office of the architect and superintendence of construction, together with such mechanics and laborers as may be necessary to carry into effect the appropriation herein made for construction of said Library building; to bid from such appropriation; for the construction of the western front of the building, the reading-room, and the book repositories connected therewith; $90,000; in all, $314,250; and in addition thereto, it is hereby authorized to contract for any portion of the said western front of the building, reading-room, and book repositories.

Mr. Holman. I move to strike out the last word in order to say a few words on the subject of the building. The bill which has been lately moved into the subject of this Library building tend to raise a doubt as to whether upon the present plan the work should proceed. I hold in my hand the report of the House Committee on the Congressional Library at the first session of the last Congress, and I ask the Clerk to read the paragraph which I have marked.

The Clerk read as follows:

The measurements of these architects, together with the figures of the study growth of the collections reported by the Librarian, demonstrates that the plan proposed to it, and the estimated cost of the Capitol which of the Library which agreed to as feasible could possibly afford accommodation for more than a few years' increase, after which we should be confronted at last by the necessity of a separate building, after incurring all the cost of building on to the Capitol a costly annex of stone and iron, unfitted for any other purpose. Any enlargement of the Capitol which would accommodate another Library of Congress would cost much more than a separate building, because it must necessarily be made for the convenience of the present, with care, labor, and expense. Mr. Walter, the former Architect of the Capitol, estimated the cost of an extension of the west front at $1,500,000. The present Architect, Mr. Waddill, estimated the cost of a building adopted by the committee to be only $3,250,000.

I wish to call attention to the fact that according to the report of the committee the House the cost of the building was to be $3,250,000, as opposed to the present plan, and the enlargement of the present Library will cost. On that statement, as I think it was understood by the House, on the motion to suspend the rules and pass the bill on a yeas and nays, there were 40 ayes and 68. Eighteen months have passed since that time, before that time passed the Senate but had always been defeated, or at least been postponed, in the House. I take it for granted that the gentlemen were deceived. The House was certainly deceived as to what kind of a measure it was entering upon. It is not the question now whether the House would have been upon the building of a Library at all, or two or three millions more; that is not the question. The question is, whether the House of Representatives can consent that legislation shall stand which has been the result of clear misapprehension.

We were told then that here is a structure which can be cheaper than you can enlarge the present Library; for almost half what the enlargement of the present Library will cost. On that statement, I wish to add further, that this new Library building movement has been largely from the beginning under the control of the Senate. The Senate organized the committee on the subject, as far as perhaps the Forty-sixth or Forty-seventh Congress, and a joint committee on additional accommodations for the public Library was appointed. It remained a joint committee until the beginning of the Forty-eighth Congress, when the House declined to appoint before stated, the fees from the copyright system, to put in shelving, etc., to meet the growing wants of the Library.

Mr. Holman. — The three successive appropriations stated in the remarks of Mr. Singleton, as just real, amounted to $2,525,600. The estimate, I am informed, did not include any sum which $350,000 was appropriated. The site ultimately cost $390,000, which, so far as I am able to learn, was reasonable enough. I do not know that there was no appropriation, or that there was not a competition for that sum an immense tract of land, over 2 acres, I think, in the heart of the city, and with a vast body of solid substantial buildings.

The question now is, what ought to be done in the present state of things? It is now known that the lowest estimate for this building is $7,000,000. The House some months ago directed a committee of five to inquire into these matters, and some inquiry has been made. The committee finds that the lowest sum named by any architect as the probable cost of this building, instead of being $2,525,600, is $5,795,000.

Mr. Weaver. — What is the highest estimate?

Mr. Holman. — The lowest estimate is $2,500,000, for a building before the Forty-seventh larger than the great structure known as the State, War and Navy Department building; and this is to accommodate a Library containing a collection of books which, I believe, is valued at $750,000.

Mr. Chairman, I do not wish to throw the slightest reflection upon the gentleman from Mississippi, Mr. Singleton, who reported this bill to the House originally. The bill was frequently before the House previous to this time. The gentlemen who reported the bill did not act in believing the truth of it. They did not give this report in the speech which he made to the House. It was authorized by the best information which could be obtained on the subject. And I do not desire to disparage any man for the slightest imputation on his motive. He is not a member of House, but I simply call the attention of the committee to the fact that the House of Representatives was deceived or misled in reference to this matter, whether such was the intention or not.

There can be no question, Mr. Chairman, that this House was deceived in the passage of the bill in reference to this Congressional Library. That mistake had been defeated when we first made this appeal, and the large expenditure now shown to be inerrable was suggested as the probable cost, for the original sum suggested was $3,000,000. As far as I know it, as it is at present, and at any rate, neither a majority of the House. Whenever it was attempted to be passed on that basis it always failed. It came in the Forty-seventh Congress, and again in the Forty-eighth Congress, and finally it was brought before the Forty-ninth Congress, with the report to which I have called attention.

We were told then that here is a structure which can be cheaper than you can enlarge the present Library; for almost half what the enlargement of the present Library will cost. On that statement, as I think it was understood by the House, on the motion to suspend the rules and pass the bill on a yeas and nays, there were 40 ayes and 68. Eighteen months have passed since that time passed the Senate but had always been defeated, or at least been postponed, in the House. I take it for granted that the gentlemen were deceived. The House was certainly deceived as to what kind of a measure it was entering upon. It is not the question now whether the House would have been upon the building of a Library at all, or two or three millions more; that is not the question. The question is, whether the House of Representatives can consent that legislation shall stand which has been the result of clear misapprehension.

I do not care whether fraud was intended or not, I care but whether the truth was known, and whether the House of Representatives can consent that legislation shall stand which has been the result of clear misapprehension. But Mr. Chairman, I want to suggest this — [Mr. Holman here pro-
its part of the committee. But it still remained as a Senate commit-
tee and under the provisions of it, the Library has been almost exclusively this whole measure has been carried out from beginning.

The measure was prompted by the Senate, was inaugurated by the Senate, and was passed over and over again by the Senate, and always objected to by the House until the House was informed of the necessity of the sum necessary to carry the money into effect, the plan as it came from the Senate involving practically as was alleged but a small expenditure, compared with the original esti-
mate of $8,000,000, and greatly less than the enlargement of the old library.

On that argument that bill was passed. The question is whether this House will feel it consistent with the duty that Congress owes to the American people, and a measure of legislation that was the result of misapprehension when the real facts are discovered early enough to prevent any material loss or embarrassment.

Mr. Hooker. — I would like to ask whether there has not been a

plan adopted.

Mr. Randall. — The plan was incorporated in the act.

Mr. Hooker. — In the act that passed both Houses? Do you pro-
pose to suspend the work and vary that plan now?

Mr. Randall. — The same power that made the act can change it.

Mr. Hooker. — After you have made your contracts.

Mr. Holman. — Very few contracts have been made.

Mr. Holman. — You have adopted a plan.

Mr. Randall. — Yes; but we can change it by law.

Mr. Ryan was recognized.

Mr. Holman. — If the gentleman will yield to me, I desire to move that the committee now rise.

Mr. Ryan. — I will yield for that purpose.

Mr. Randall. — Mr. Chairman, I move that the committee do now rise.

The motion was agreed to.

Session of June 20.

Mr. Natting. — Mr. Chairman, I had the honor to be one of the members of the Committee on the Library in the Forty-eighth Congres-
s. The whole subject of the erection of a suitable Library build-
ing for the United States of America was investigated by me.

The gentleman from Indiana [Mr. Holman] said yesterday he had been deceived in regard to the amount of money which was needed to finish the new Library building.

That may be true so far as the gentleman is concerned. I was not deceived, at any rate, and if the gentleman was, it was perhaps his fault. I examined this subject with the assistance of Mr. Smithmeyer, with the assistance of the Librarian of Congress, and with the assis-
tance of all the reports which had been made by committees of the Senate and House prior to that time in regard to the cost of the Library building as it was to be, and I had the plans before me; and I say hereinafter that the defect in the Forty-ninth Congres-
s show, I believe, that when the act providing for this build-
ing was passed the estimates were not $2,500,000 for the building complete, including all costs arising from the plans given in my hand; the front part and the central part of the building, called the reading-room. I say that at no time and in no place will it be found that any person authorized by any committee or upon any committee of the Senate or House of Representatives, by the architect employed for the purpose ever stated that this building would cost $2,500,000 and no more, complete.

Now, Mr. Chairman, you very well know that whenever an act has been passed for the erection of a public building, post-office, court-
house, or custom-house, or for any other public purposes, even though the act itself provides that the building should not cost more than $100,000, or $100,000, or $200,000, almost universally that building has cost from 33 to 50 and sometimes even 100 per cent more than the estimate and more than the bill provided for. You know, Mr. Chairman, that ever and over again this Congress and other Congresses have passed bills for the building complete, as stated by the plans given in my hand; the front part and the central part of the building, called the reading-room. I say that at no time and in no place will it be found that any person authorized by any committee or upon any committee of the Senate or House of Representatives, by the architect employed for the purpose ever stated that this building would cost $2,500,000 and no more, complete.

Now, Mr. Chairman, I do desire here to emphasize in one other little statement my idea of resistance to an attempt to lay hands on this Capitol and Congressional grounds for the Library.

What those gentlemen who are attacking this plan want to is to break it up, and then come to this Capitol and erect a building upon the western or the original site of it for the purpose of the Library.

As soon as you give them a foothold that will be and is the plan.

Why, Mr. Chairman, in one sense the Capitol building itself illustrates and is the beauty of the strength of this Government. This may be sentimental view, sir, but sentiment sometimes comes very near to principle.

Mr. Hooker. — I wish that the gentleman before he sit down would tell us what was the character and the cost of the edifice pro-

provided for in the act passed by the Forty-ninth Congress.

Mr. Natting. — I will answer the gentleman's question and then

proceed with my argument. I have here a design of the building which I will send to the gentleman. The plan adopted was almost entirely for

the disposal which the act of the Forty-ninth Congress was passed to erect was intended to cover 2.9 acres, and it was designed to accommodate

what was to be a complete and larger volume of books. One million volumes, and our library stands fifth in the whole world so far as its extent is concerned. The $2,800,000 which has been mentioned as the estimated cost of the building was simply the amount required to build the front part of the building—the reading-

room and the front part of the building. It did not cover and never attempted to cover cost of the building when complete and finished.

In answer to the gentleman from Indiana [Mr. Holman] that he is

of the building which the $2,800,000 was intended to pay for was this portion here [illustrating by diagram], and not even to finish all the rooms in that, but to finish this portion. In the reports of the committees of the Forty-sixth and Forty-seventh Congress it was asserted that the whole building would cost $5,000,000.

The reports—three or four of them—show that the estimates were about that sum. The estimate of $2,800,000, to which the gentleman from Indiana [Mr. Holman] has referred, was simply for about half the building, and even then it was not intended to finish on the in-

side.

Mr. Ryan.—I desire to offer a substitute for the pending para-
ger.

The clerk read as follows:

That the Committee on Public Buildings and Grounds of the Senate and House of Representatives, acting conjointly, shall, within thirty days after the passage of this act, invite from eminent architects, not exceeding five in number, designated by the Clerk of the Senate, to submit plans for the Library of Congress, to be erected on the site purchased for that purpose in the city of Washington, the cost of the building not to exceed $3,000,000; and the sum of $1,000,000 shall be expended under the direction of the above-named committees, to pay for the said designs and general specifications. The said committee shall, jointly with the Congress, accept the plans which are due by the 26th day of December, 1888. That the work now in progress on the building of the Library of Congress shall be suspended and re-

employed for the purpose of the act of Congress approved April 15, 1886, be, and the same is hereby, dissolved. That the property purchased for a site for the Library of Congress, including buildings thereon, together with all plans, records, and other property of the United States connected with the building for said Library of Congress, be, and the same is hereby transferred to the care and custody of the Interior Department; the expenses of such care and custody shall be paid out of any money already appropriated for the construction of the building for the Library of Congress.

Mr. Holman.—Mr. Chairman, I am anxious that at this time at least there shall be no misapprehension of what is being done or what has been done. In order to avoid any possible mistake as to the state-
ments which induced the House to pass the Library bill, I desire that enough of the act authorizing the construction of the Congressional Library building be read to show exactly the plan intended to be adopted.

The Clerk read as follows from page 12 of the Acts of the First Ses-
sion of Forty-ninth Congress:

The construction of said building substantially according to the plan submitted to the Joint Select Committee on Additional Funds for the Library of Congress by July 1, 1886, and in the Italian style of architecture, with such modifications as may be found necessary or advantageous with materials available in the United States.

Mr. Holman.—I ask the Clerk to read also a statement I have marked in the report of the Committee on the Library at the first ses-

sion of the Forty-ninth Congress in support of the Library bill.

The first and last of the three paragraphs which I send up cover the entire ground, first, as to the plan, and secondly, as to the ex-

pense of the whole structure when absolutely completed. I ask the clerk to read those three paragraphs.

The Clerk read as follows:

It remains to consider briefly the plan for a Library building and the site proposed by the bill which has been adopted by your committee. It proposes a building of ample dimensions, to hold ultimately three mil-

lion volumes, measuring 400 feet by 200, and covering about 2 acres of ground. The style of architecture is that of the Italian renaissance order, carefully and economically adapted in all its parts to the purpose of a government Library, and with interior details befitting a national li-

erarian. The building is designed to be of stone on the exterior and of iron and concrete on the interior. It is 2.9 acres of ground.

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COTTAGES NEAR BOSTON.
Residence of
Mr. Percival Knauth
West Seventy-Sixth Street, New York
Lamb and Rich—Architects
FREEMAN COLLEGE OF APPLIED SCIENCES
INGLEWOOD, CAL.

CURLETT, EISEN & CUTHBERTSON, Architects, San Francisco & Los Angeles

Helotype Printing Co., Boston
$80,000, the third, which will complete the building for occupancy in all its parts, sufficient for shelving one million books, and leaving space for the construction of a Congressional Library building, for the use of the Library of Congress. In thirty-five years, the ultimate gross cost of which will not exceed $700,000, or an average of less than $14,000 a year. When it is considered that the estimated gross cost is $1,900,000, and that the pecuniary value of copyright publications received annually is very much greater than this the expenditure will appear moderate in comparison with the great resulting benefits and the national importance of the work.

I wish to call the attention of my friend from New York [Mr. Nutting] to this report as a result. It states the cost of the entire building to be $2,300,000. It states the entire cost of the building for occupancy in all its parts, sufficient for shelving one million books, and leaving space for the construction of a Congressional Library building, for the use of the Library of Congress. In thirty-five years, the ultimate gross cost of which will not exceed $700,000, or an average of less than $14,000 a year. When it is considered that the estimated gross cost is $1,900,000, and that the pecuniary value of copyright publications received annually is very much greater than this the expenditure will appear moderate in comparison with the great resulting benefits and the national importance of the work.

Mr. Nutting.—In the report for the Forty-sixth Congress you found something to the effect that it was estimated that the entire building would be held something over 10,165,000 volumes, exclusive of the wall-room in the corridors, which may, in case of necessity, be lined with book-cases.

Mr. Faust.—The estimated cost of the entire structure is within five million dollars ($4,296,743).

The cost of the central portion, with the two connecting wings for offices of administration, is estimated to be within one and a half million dollars ($1,825,000).

In 1892, the same statement was made precisely.

Mr. Sawyer.—My idea, Mr. Chairman, is this: It is not to build the building I object, and I shall not object if it costs $7,000,000, but I do object to any architect or any committee which will present a report that we are to spend $500,000 to $1,000,000 for the purpose of putting up a building which is to cost but three or four millions of dollars, and then at the very next opportunity we shall find it will cost from ten to twelve millions of dollars. It is not the fault of the thing, but the way it is planned.

Mr. McCracken.—Mr. Chairman, I am in favor of a building for the Library of Congress that will meet all reasonable demands and be connected in the dignity, the character, and the size of this Republic; but when we start out to construct that building we should proceed in a business-like manner. We should know in the construction of a public building for the United States what each one of us would wish to know when we start to build an edifice for ourselves—we should know what the cost will be.

I remember well that in the Forty-sixth Congress, when the bill was introduced providing for the construction of a Congressional Library building, the chairman of the committee was asked what the cost would be. The chairman said on that occasion the appropriation asked for would be $500,000 to begin the work, $1,000,000 at the next season, and $325,000 at the succeeding session to complete it; which made the sum of $2,325,000. This is what the chairman of the committee stated when he reported the bill to the House. There was a report filed at the same time by the Library Committee, in which it was stated that the most carefully guarded estimates contemplated an expenditure of only $500,000 the first year, $1,000,000 the second, and $900,000 the third, which will complete the building for occupancy in all its parts, sufficient for shelving one million books, leaving a space for additional iron alcoves, the whole cost of which would not exceed $2,325,000. It appears, therefore, that by the statement of the chairman of the committee and by the report of the committee this building was to cost $2,325,000.

Now, what is the situation to-day. We have bought the site for the building at a cost of $385,000, and we have expended about $200,000 up to this time, and we are told that this edifice is to cost between $7,000,000 and $12,000,000. That is quite a wide margin of difference, and I ask if that is a business-like way of proceeding?

Is that the way we should proceed as members of Congress of the United States in dealing with a public trust?

Mr. Hooker.—I do not know how far members of this House may have been imposed upon, to use the language of the gentleman from Indiana [Mr. Faust], yesterday. I am not a member of the House, but if I am wrong I would like to be corrected. I care nothing about who is the architect of this building. I would like to have a suitable building constructed, suitable not only in its interior architecture, and the building of a building whose exterior finish shall be such as to challenge the admiration of every citizen whose eye rests upon it...

If I am wrong I would like to be informed by some gentleman who was here in the Forty-ninth Congress. I understand that the little plan which I hold in my hand, and which I saw for the first time this morning, which is shown on the map which was presented for the consideration of this House and put on exhibition at the Clerk's desk for the inspection of members at the time the House passed the bill in the Forty-ninth Congress.

I understand this (exhibiting another plan) is the extended plan, comprising the whole. I understand the plan which was referred to by Mr. Buchanan, is a plan of some character peculiar to the site and which has been consulted with the architectural, the building and the committee, to which the plan is submitted, and I believe it is honestly prepared. I do not believe that it is highly probable that the Committee on the Library relied wholly on the architect whose plans and specifications they adopted.

It is not such a thing as is indicated by the gentleman from Mississippi [Mr. Hooker]; no such proposition as is indicated by the gentleman from New York [Mr. Nutting]. It was a proposition to complete the building, the plans of which were before us at the time, for the sum of $2,300,000. In support of what I say, I call special attention to the language of the report of the committee that reported the bill of Mark Nutting.

It is not designed to fit up the whole interior at once with iron shelve, but to introduce it gradually, finishing off the central portions of the rotunda, the connecting rooms, and the entire exterior structure.

The "entire exterior structure"—mark the language.

This report goes on:

The chief element of cost is in the iron alcoves of the interior, and in a building so extensive this may be finished in successive years as was wanted for the increase of books. The most carefully guarded estimates of contemplated expenditure of only $500,000 the first year, about $1,000,000 the second year, and $900,000 the third, which will complete the building for occupancy in all its parts, sufficient for shelving one million books, and leaving space for the gradual introduction of additional iron alcoves in the coming fifty years, the ultimate gross cost of which will not exceed $700,000, or an average of less than $14,000 a year.

Mr. Milliken.—I want to ask the gentleman this question: Do you expect to get a building 20 per cent larger than the War, State and Navy Department building for that amount of money? Do you deem it possible?

Mr. Ryan.—When I voted for the bill I relied upon the committee, the official organ of this House. They declared what the cost would be upon the "most carefully guarded estimates." We are presented to here at that time the plan and specifications accompanied by those estimates.

Mr. Buchanan.—And did not that plan include the whole quadrangle?

Mr. Ryan.—The whole. Now, what will be the cost of this building?

A few days ago the chairman of the present commission, the Honorable Secretary of the Interior, who is an accomplished officer and a thorough business man, came before the Committee on Appropriations and said:

"Gentlemen, I will not permit you to be deceived any longer in regard to the cost of this building. It can not cost less than $10,000,000, and may cost more."

What I want to say is this. I doubt not that the committee acted in good faith. The honorable chairman of that committee, Mr. Buchanan, of Mississippi, is the very soul of honor. He would not more mislead this House than he would commit the crime of arsen.

He is as high above that conduct as it is possible for humanity to be. But somebody misled him; somebody misled the gentleman from New York; somebody grossly misled that committee, and through them the people's representatives on the floor of this House, and in that way $8,000,000 of the people's money will be taken from the Treasury by deception. If I carry this bill on out to its completion.

Mr. Ostes.—If the gentleman will permit me to interrupt him a moment, I quite agree with his statement of what took place. I remember the facts precisely as he does, and I voted for the bill upon that hypothesis; and I thought it might perhaps be expedient in the construction of this building, and in the expenditure of the money for the construction of the Library, to make sure that the money was used wisely, and I do not think the committee should be misdirected in this respect.

Mr. Ryan.—I am told by the architect of the Capitol that the work can be suspended without any loss whatever, whether the specifications shall be used or not. There are all the plans for the construction of the room and the Library or whether the whole be devoted to the Library.

Mr. Milliken.—Does not the gentleman know that there is a contention between the Architect of the Capitol and the architect of the building, and that therefore the information which he cites may not be reliable?

Mr. Ryan.—I do not know about that; I do not care to inquire into those details. I believe the gentleman from Mississippi is correct, and I believe that it is highly probable that the Committee on the Library relied wholly on the architect whose plans and specifications they adopted.
Now one or two things is morally certain. The architect who made the estimate of $8,000,000 for a ten-story building is either incompetent or dishonest. He can take either horn of the dilemma he pleases.

Mr. Milliken. — Has he made the error?

Mr. Ryan. — Certainly he has made it.

Mr. Milliken. — That is disputed very seriously.

Mr. Ryan. — He has made the error. When building will cost ten million, and Mr. Chapman, if the honorable Secretary of the Interior can at this distance of time see a cost of $10,000,000 for that building, I have no doubt that it will cost at least $15,000,000, judging by the present cost of public-building construction.

Nobody denies now that the cost will be at least seven or eight million dollars. That is the minimum estimate of even the parties interested in this architect, according to the admission on all sides, must have been mistaken to the extent of at least $5,000,000 on a building which was estimated to cost a little over $2,000,000.

Mr. Milliken. — But the plan has been changed; and the building is not yet built.

Mr. Ryan. — No authority to change the plan was given. The plan was provided for by law. The law declared that the building about a matter of that kind. There was no warrant whatever for departing from the plan.

Now, the question is simply this: Whether, because the work has been begun, and although it is ascertained that a suspension of the work can be had without loss, the people’s representatives shall stand here coerced to ratify a deception and a fraud. So far as my vote is concerned, while I might be willing to vote $8,000,000 for such a building, but I am being deceived I wore satisfied of the propriety of the measure, I will not stand here and ratify a fraud and deception upon the people of the country to the amount of $2,000,000.

Mr. Hooker. — Who is it that has authorized an extension of the building beyond the plan agreed upon originally?

Mr. Ryan. — It is agreed that it has not been extended.

Mr. Hooker. — Has the architect done it?

Mr. Ryan. — I do not know that anybody has done it.

Mr. Hooker. — Then why is the gentlemania charging him with it?

Mr. Ryan. — I am not charging him with it; but I am saying that the plan and specifications upon which Congress acted were based upon an estimated cost of $2,000,000 for a building which is now assessed at $8,000,000.

Mr. Hooker. — Who ascertains it?

Mr. Ryan. — It is admitted that it will not cost less than $7,000,000.

Mr. Hooker. — Who admits it?

Mr. Ryan. — The Secretary of the Interior.

Mr. Hooker. — We want somebody who is an architect to speak about this thing.

Mr. Milliken. — Have not all those plans and specifications been changed?

Mr. Ryan. — I do not know whether they have or not. The gentleman has asked me that question repeatedly. I do not know how they could be changed. The law provides that the building shall be constructed substantially in accordance with the plans which were before the Congress.

Mr. Milliken. — I do not understand how you were deceived; because if a man had never seen an architect in his life, his common sense would have told him that a building of such dimensions could not be built for $3,000,000.

Mr. Ryan. — Although these representations were made by the official organ of the House — setting honestly no doubt, having been deceived by somebody — the answer now comes, “You ought to have been too intelligent to have been deceived in a matter of that kind.”

Mr. Milliken. — Why, of course.

Mr. Ryan. — The answer made to us is that we ought not to have believed the architect; we ought not to have relied on those estimations, we ought not to have placed confidence in the official organ of the House.

Mr. Randall. — I think it proper that my colleague, who was a member of the Library Committee, should have an opportunity to be heard.

Mr. O’Neill, of Pennsylvania. — What I intended was to say what I knew of the recommendation of the committee when the House adopted the plan of Smithmeyer for the building of this Congressional Library. We labored for years in this House to get an appropriation to erect a Library building. Every one of my colleagues, I am sure, felt there was not accommodation for the books in the Library or for the increase of books which every day was growing larger. There was no more money in the plan than the Library Committee had agreed to. It was supposed the estimate covered sufficient money to go on and build a Library to accommodate the present number of volumes and to provide for the increase which would occur in the next five or six years; it was supposed would cover that expense.

Mr. Blount. — Did my friend understand the building was to cost from seven to ten millions of dollars?

Mr. O’Neill, of Pennsylvania. — I had no other idea.

Mr. Blount. — Mr. Chairman, is this a question as to whether or not the plan of this building is what it should be; or is it, sir, a matter for us to inquire into as to what France has done, or England has done, or some other great and cultivated country?

We are confronted with a monstrous imposition, and the honor of this body requires that it should pause and inquire into that imposition. In the Forty-ninth Congress the House was asked to vote a
Library building according to the plan then submitted. It was estimated that the cost of that building would be about $8,000,000.

Not one line in the report of the distinguished gentleman from Minnesota [Mr. McMillen] was devoted to the subject of this building. Not a word about it was spoken in the debate in the House or in the Senate, suggesting the thought that the amount was to pass beyond $3,000,000. To-day a Cabinet officer discovering the imposture, after careful, intelligent, delicate digestion, surprised him with a bill of over $30,000,000. Under the influence of the great man, Mr. Milliken, when a leader of the progressive wing of the party, he felt impelled to go before a leading committee of this House and communicate the astounding fact that notwithstanding what has been done in the past the building is likely to cost from seven to ten millions of dollars; more than twice the original estimate, possibly three times the original estimate. Will this House hear it? He tells you at an hour when you have been discussing this building, when you only the first wing is proposed to be commenced, that you may have fair notice that you are leaping into a terrible job. Why, sir, if we do not stop here in the midst of these facts, if we do not suspend this building here, the country will have a right to think this is a fatal flaw for the lobby at—

Mr. Milliken. — Does the gentleman say there is a job in this? Mr. Blount. — The gentleman has had his time and ought not to take mine. I decline to yield to the gentleman. I have only five minutes. I think there are two sides to this question.

Mr. Blount. — Do not get excited over it.

Mr. Blount. — I hope my friend will not interrupt me. There is no propriety in that. Mr. Milliken. — I have asked a simple question, which I think the gentleman has no right to ask.

Mr. Blount. — I say when it appears that a joint committee has made five reports in several Congresses, that there has been one persistent error, that the building is about to cost $3,000,000 which turns out to be $10,000,000, it is time for this House to know what the building is about to cost. It is never known to the public what "what sort of Library are we to have? Let us first determine upon the plan and then determine upon the appropriation." There is but one course left to this House. The last Congress was miserably deceived. Mr. Milliken says, "Let the building stand as a denunciation of this Capitol; one persistent plan for a building to cost $3,000,000 which turns out to be $10,000,000, it is time for this House to know what the building is about to cost. It is never known to the public what kind of building is standing there." I never liked the persistent pursuit that no piece of ground except one should be selected. I never liked the persistent claim that no plan but one was satisfactory and should be selected. I never liked the persistent claim that no plan but one was satisfactory and should be selected. I never liked the persistent claim that this was in the interest of his old house, that it was to be surrounded by the solicitude of his old house. I never liked the persistent pursuit that no piece of ground except one should be selected. I never liked the persistent claim that this was in the interest of his old house, that it was to be surrounded by the solicitude of his old house.

Mr. Gay. — I hope, Mr. Chairman, that that amendment will not pass, for the reason that it proposes a new scheme, whereas I believe we have a foundation already laid which will serve every purpose, and I think I can offer an amendment which will meet the occasion as it will be satisfactory to the House. I offer the amendment which I send to the desk.

The amendment was read, as follows:

That hereafter, until further authorized by Congress, all further expenditures of the Congressional Library Building shall be restricted to the erection and completion of that portion of said building to be erected on the plan represented by plan No. 1, heretofore submitted.

Mr. Gay. — Mr. Chairman, I think, as I said before, that this plan is satisfactory to Congress and the country, and if we restrict further appropriations for construction to the foundation already laid, that will keep the work for the building within the limit which the gentleman from Kansas proposes, and at the same time will leave an opportunity for Congress, if it chooses, to add other structures at either end, or to carry out any other plan at its leisure.

Mr. Gay. — Not to exceed the sum mentioned in the original estimate, was $8,000,000.

Mr. Chairman, I felt disgusted and outraged at the idea which was prevalent in the minds of some gentlemen that the adoption of the plan for this Library building had fixed upon the work and upon Congress an architect who might consider it a lifelong job, but when I examined the matter I found that it was not the case, and that it was merely his plan that was adopted. I will state further that the building was adopted by the present House, and the gentleman from Kansas proposes, and at the same time will leave an opportunity for Congress, if it chooses, to add other structures at either end, or to carry out any other plan at its leisure.

Mr. Gay. — The gentleman from Kansas states what the cost of the building would be on this plan?

Mr. Gay. — Not to exceed the sum mentioned in the original estimate, was $8,000,000.

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custody shall be paid out of any money already appropriated for the
construction of said Library building.

Mr. Holman. — I move to amend the substitute by adding what I
shall read from the desk.

The Clerk read as follows: —

The said committee shall also inquire into the practicability of
securing proper Library accommodations for Congress and the District
of Columbia by constructing a library building and for a public library
on one of the hills of the city of Washington, at a cost not
exceeding $2,000,000, in which shall be deposited from time to time
the surplus books accumulated in the Congressional Library, or that shall
be deposited thereat, as may not be required for use in the congressional
library. When the public library shall be open to all the citizens of the United
States, and shall be free.

Mr. Holman. — Although that expresses my views I will with-
draw it.

The question recurred on Mr. Ryan’s substitute for the paragraph
of the bill.

Mr. Nutting demanded a division.

The committee divided; and there were — ayes 68, noes 34.

Mr. Nutting. — No. — Mr. Nutting has voted.

The Chairman appointed as tellers Mr. Ryan and Mr. Nutting.

The committee again divided; and the tellers reported — ayes 114, noes 50.

So the substitute was agreed to.

STATEMENT OF THE ARCHITECT OF THE CON-
GRESSIONAL LIBRARY BUILDING.

[As unsigned and undated printed document under the caption above.

The author made the following extracts:]

By the terms of the Sundry Civil Bill passed by the House of
Representatives June 22, the Act of 1886, authorizing the con-
struction of a Congressional Library building, is abrogated, and in
lieu thereof, a bill for a Library building, and for the preparation of
which six months are to be allowed. This really means a postponement of the
work for twelve months, if not longer, without gaining anything by it, and
not extricating the relief to the existing Library in its overcrowded condition, which necessitates the most speedy action. It is
obvious that no satisfactory plan can be made for a Congressional Library building without at least one which can, under
any circumstances, be favorably compared with a plan which has been per-
fecting for twelve years.

Nor is it to be presumed that five architects, however eminent, can produce better results in six months than those
forty in twelve years.

Considerable stress has been laid upon the supposed ultimate cost
of the building, and inferences have been made that Congress was
decreed in this matter. It is certainly not to be presumed that a
building of the magnitude and character of the contemplated Library
building could be erected in three years, and for the sum of $2,300,000.
This edifice will cover 11,000 square feet of area, or about 21,000
square feet more than the State, War, and Navy Department build-
ing, and about 40,000 square feet more than the Post-office building
in New York City. It will be absolutely fireproof, and constructed of
the best building materials.

In the course of debate in the Forty-eighth Congress, a request
was made by the Committee on Additional Accommodations for the
Congress, to indicate from Librarians on Grand plans of Library (as
"A") what portion of the adopted plan should be pushed ahead to
speedily accommodate the present collection of books, pamphlets,
charts, engravings, etc., and to furnish an allowable for the accredited
future, for a few years to come, the remaining portion of the building to be
created in whole or in parts, as rendered necessary by the rapid
increase of the collection, and as Congress shall elect. The cost
of the portion referred to (marked "A") was approximately esti-
mated at $2,300,000 in three years, or $3,000,000 as the ultimate
cost of that portion. . .

The house received this information from the committee, and de-
noted the matter, but no action was taken upon it.

It is not fair to regard an estimate made eight years ago as of
value now, its accuracy being entirely destroyed by the fluctua-
tions in the cost of materials since that time. Neither is it fair to
presume that an accurate estimate of the quantity of material required
can be made from hastily-prepared sketch-plans. Nor is it possible to
subscribe for an estimate without the present outlook showing the
quality of materials required and their kind, whether marble, granite,
sand-stone, or brick. The estimate made for Plan "A" in 1880 was based
on the best market prices at that time, and the estimate that that time regarded as a very suitable material for public structures,
as is evidenced by its use in the construction of the Pension Building.
This is but a limit of an accurate estimate in apparent from a glance at the bids for stone and drain-pipes for the Congress-
ional Library building, made by highly-responsible contractors within the last six months. These bids vary from forty to one
hundred per cent above the price of materials made from the present drawings and without specifications, while the estimate just referred to was made upon a
general sketch-plan without details.

It is impossible to estimate for $2,300,000 above referred to
would not vary very considerably from the actual cost of the building
shown on Plan "A" if constructed of brick and finished correspond-
ingly on the inside.

In view of the fact that stability is one of the chief requirements
of public edifices, special care is necessary to secure that requirement
by the introduction of a system of uniform foundations. Practical tests
developed the fact that the soil upon which the building is to stand is
not the subject of extreme compaction, and in order to secure a uniform
strength for every part of the structure (as it will finally be built) and to guard against cracks and breaks in the
superstructure (which occur at juntas of walls built at different
times, caused by the uneven settlements of these respective walls) it was thought to be a wise precaution to establish at once a
suitable and continuous bed in the shape of a concrete foundation for all the external walls and for laying the internal under-
lying rock stratum, upon which the whole building can be placed at
once, or in part, without producing any cracks or breaks. It would,
in fact, be impracticable to make the foundation for the whole structure now, and cover them up until the superstructure may be
built upon them. A massive building like the Congressional Library, with long and long continuous walls, requires special care
and precaution in construction.

Finally, in 1886 (Fortieth Congress), the committee recom-
manded, and Congress adopted, the plan in question for the Con-
gressional Library building, and $3,000,000 was appropriated for
commencing its construction. The Act appointed a commission for
constructing the building, which took possession of the property
acquired by the United States. They appointed the architect whose
plan was adopted by Congress, and commenced operations. The
site was cleared of buildings, stone-yards, etc. Contracts were
entered for laying the sewerage and drainage, for excavating the cellar and
drying the trenches, and for laying the internal foundations. A controversy arose over the quality of cement fur-
ished for the foundations, but this matter was finally settled by the
Commissioners, at the cost of a large portion of the Committee’s
requirements, and the question about the cementing was from
then on put forward energetically, and in accordance with
Plan No. 1. To stop the work now, after two years of preliminary
work, would be a fatal error, and possibly lead to all the irritating delays of extensive litigation.

The plan adopted by Congress in 1886 contemplates the erection
declared Library building which will mean the removal of the exist-
ing Library and its accretions for a few years to come, as well as
(ultimately) the extreme demands of the future. Such a portion of
this comprehensive plan as is shown in Plan XIX is in progress,
and the pressing necessities of the Library should be speedily erected.
This would furnish at once the requisite space for the overflowing collec-
tions of books now suffering injury, while the final completion of the building
will not be required for many years. The plan, for the execution of
which the Forty-ninth Congress made the first appropriation, requires
the construction of a building which will be, when completed, abundant-
ly capacious, to accommodate eight million volumes of books, and
the great multitude of charts, maps, engravings, manuscripts, works
of graphic art, and the numerous productions received by copyright.
The Dececo Water-Closet is the only siphon closet which is complete in itself. The above outline of a middle section shows "all that there is to it." A little water poured into the bowl, whether from a tank or by hand, starts the siphon and discharges the contents. Less than two quarts of water will do this, but the best effect is secured with the use of two gallons or more.

Water overflowing into the weir below rises up until it seals the outlet limb and the continuing flow removes air from the siphon and induces a strong siphonage, emptying the closet with a rush.

The usual method of securing siphonic action, as by exhausting the air between the two traps, is objectionable, as the foul confined space cannot be ventilated. The second trap is usually "back-vented" and two pipes from the tank are required, all of which entails no small outlay in setting and the increased care due to the multiplication of parts.

The cheapness at which the Dececo can be set (for it is never back-vented*) is an argument which will appeal to the house owner.

* In Philadelphia the Dececo is the only closet allowed by the authorities to be set without such ventilation.

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**SAMUEL CABOT**

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THE AMERICAN ARCHITECT and BUILDING NEWS.

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JULY 28, 1868.

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NOTICES AND CIRCULATIONS. 

TRADE SURVEYS. 

THE British Architect has received from Mr. Fox, of Boston, a copy of the new Building-Law of that city. Mr. Fox, in the note accompanying the book, is too modest to mention fearfully; he says: "I have made the whole the most prolific of the passage of the statute, and the author of many of the best provisions in it, but this should make the warm, and evidently sincere congratulation with which it is received all the more gratifying to him. Although far from what its promoters with it to be, it is one of the best codex for the regulation of building yet established, and the British Architect well says that "such disasters as that in the Edgeware Road" (the fall of a building) "where defective construction played such a prominent part in the destruction of human life, would be practically impossible in Boston," and, further, that "in comparison with the by-laws of many of our English towns, Boston ought to be an exceptionally well-built city." It should be borne in mind, in estimating the value of this praise, that the ordinary methods of construction in this country are far more hazardous than they are in England. Few English houses have any sort of wood furring on the inside of their brick walls, and many of them have not even wooden window or door frames, while the stud partitions, especially in the older houses, are very frequently "brick-negged," or, as we should say, filled in with brick between the studs. Compared with such a structure, the ordinary New England brick building, with its walls furred with spruce strips from cellar to roof, its chimney encased in a cage of studding, wood-lined exterior cornices, its "airs-spaces" in the attic, and hot-air pipes everywhere, and its framing "employed in the basement, is a mere tinder-box, yet we may confidently say that Mr. Fox and his associates, by the ingenuity with which the perils of so light a construction are met, have, while retaining all its undoubted advantages of dryness, reduced the risk from fire in it below that in the average Lowell house, while in other respects the construction which the new law enforces is much better than that often seen in England, where, as our readers know, it is not unusual to hear of the arrest of a builder for laying bricks in "road-scrappings," instead of mortar, or for some similar enormity.

It is not that the speculative builders of Boston have no disposition to use a cheaper material than mortar, if they think they can do so with impunity — their exploit in the way of South End plumbing a few years ago would make that clear — but under the present administration of the statute they have little chance of committing any flagrant violation of it without being caught and punished, and they do not try. Unlike the English laws, under which the inspectors devote their principal attention to the plans, our American statutes provide for a more or less efficient supervision of the actual operations, and the office appointed for this work exercise almost despotic authority. With the small official force employed, such authority is recognized as necessary to efficiency, and, although an appeal lies from the deputy-inspectors to their chief, and from him to a commission of experts, an order from a deputy to remove a tier of floor-beams too light, in his judgment, for their work, to take a corner out of and rebuild a doubtful piece of wall, to cart away a lot of damaged cement, or dirty sand, is rarely resisted. This sort of administration is really the essence of an efficient law, and, as the British Architect remarks, another important merit of the Boston law, which it shares with that of other American cities, is the strictness with which it requires that minor alterations shall be subject to its provisions, as well as more important building operations. In the familiar phrase, "any change or addition in, or upon any building, affecting an external, party or partition wall, chimney, floor or stairway," in a Boston or New York house, must be approved by the Chief Inspector of Buildings, and carried out under the supervision of his deputies, and the disasters which, under different asseases, have so often followed the attempts of amateurs or ignorant builders to "knock out a window" in a wall, or "degrade" the floor, or a little digging about the foundations of their own dwellings, or those of other people, are here almost unheard of.

Mr. H. W. Fabian, of New York, publishes in the regular Proceedings of the Technische Verein of that city a discussion upon the action of forces in arches which presents some novel points. He applies the principles which he deduces from his reasoning to the vaulted ceiling of the Assembly-Chamber at Albany, and concludes that, while its construction was incorrect, and sure to fail under the loading which was put upon it, certain modifications might have been made in it which would render it perfectly secure, and he is rather disappointed, we judge, that this should not have been done. We are not sure that we agree with him. Although a bold and startling piece of construction has a certain interest, it is not an artistic interest, and the admiration we feel for it should be carefully distinguished from that with which we regard a beautiful object. At present we need, more than anything else, the path of purification, that is, the abandonment of anything more than that of startling novelty. The Americans have amazed the world by their temerity long enough to be satisfied with the reputation they have gained; and they may now safely try to make their buildings attractive in some other way.

THE great interest taken by Americans in the sales of the Demidoff, Hamilton and other famous European collections, leads us to suppose that a similar interest will be felt in the approaching sale of a similar collection which is to take place early in the coming autumn. For one reason or another, Portugal is a little off the regular line of American travel in Europe, and few probably know that high up on the mountain side in Cintra, a few miles from Lisbon, lies the Castle of Penafiel, which should be familiar to English leaders from the reference to it in Byron's "Childe Harold." But the town below is somewhat affected by the inhabitants of the neighboring capital as a summer resort, and was probably made more popular still by the selection of the castle by the late King Dom Fernando as his favorite place of residence. Much money has been spent, and still more being spent, in converting this picturesque spot, which bears the picturesque name of "Pena," into a national royal residence, and more money still in collecting together the specimens of paintings, sculpture, and the like, which now form one of the choicest and most carefully selected collections in Europe. These collections are colossal in extent, so that they were largely gathered by going in person, who was himself an artist of no slight pretensions, painting, modelling and etching with no little assiduity. The castle and collections were the personal property of the late king, and as his successor has no desire to acquire them personally, and as the royal exchequer is too empty to allow...
the government to buy them for public use, they are to be thrown on the market and disposed of to the highest bidder. A castle in Portugal may not be as attractive as one in Spain, but the collections are transportable, and American gold would find ready acceptance at Chin a if any of our collectors should send agents to attend the sale.

Contractors, and others, who use horses for heavy draught, may find it useful to know of certain experiments which have been made in lightening the work of the animals by the use of elastic trusses. Some time ago, a Mr. M. Celler, Chief Engineer of Roads and Bridges in France, expressed a doubt whether the traces of leather or rope, or the iron chains, by which horses pull their load, could not advantageously be replaced by more elastic appliances, which would not only distribute the weight, but at the same time overcome the inertia of a heavy cart or omnibus. Every one has noticed that a dray-horse is often obliged to use all his weight and strength to start a vehicle which moves along easily enough when once set in motion, and it is quite conceivable that springs in the harness might make the work easier by distributing the movement of starting over a longer period of time. Acting on Mr. Celler's suggestion, the directors of the Eastern Railway of France began six years ago to harness all the horses employed in shifting freight cars at their Paris station with elastic traces, and have found them so strong and reliable as to be inserted in them. A large number of horses is employed in this service at the station, and the effect of the change has been very satisfactory. A considerable gain has been made in the durability of the harness, and the regularity of the work, through the elimination of the number of collapses, or broken traces; whilst the horses have done their work better, and with less fatigue. The blow of the collar on the shoulders at starting is far less violent, and less injurious to the animal, than under the old system, and the horses, finding that a strong, continued pressure will effect as much as the jerk which was former cause of the fall, were enabled to begin steadily and directly, instead of wasting their strength in ineffectual plunges. During the six years of trial, the directors of the Company have become so convinced of the superiority of the new mode of harnassing that it has been adopted in all portions of the vast network of lines under their control.

Rival of Mr. Baudensieck seems to have met his reward in Germany, to judge from an account in the Bauachtsche Zeitung of April 1868, which had been nearly completed by the contractor, Brümmel, fell, while the workmen were in it, killing three of them, and seriously injuring four more. Two experts, an architect and the official inspector of buildings, examined the ruins, and decided that the immediate cause of the fall was the giving way of a bay-window, which was partly built, and, by its collapse, had shaken the neighboring walls so much as to overthrow them. It was ascertained that the bay was to have been supported on projecting iron beams, or cantilevers, and that these were in; but the walls had not been built up on the inner ends, so as to keep them from being overbalanced by the weight of the bay, and a temporary support, which seems to have been inadequate, had been set up under the bay. In any case, it appears to have been rather doubtful if the iron construction, even when completed, would have held the bay secure. The bay-window showed that the materials used in the building were generally poor, and the workmanship hurried and bad. The mortar, particularly, had little cohesion, and the bricks seemed to have been laid without wetting them. The contractor denied that either the workmanship or the materials were faulty. He said that he was a regularly trained mason, had acted three years as foreman, and had been a contractor on his own account for eight years. It was very unlikely that he would be ignorant or neglectful of the rules of his art, and his materials were of good quality. He computed the fall of the bay to the removal of the temporary support by some unauthorized person, and thought it possible also that the carpenters might have pushed the wall out of its place in setting the floor-beams. In regard to the responsibility for the accident, he claimed that if the iron-work, or any other part of the construction, was defective, the architect who had furnished him with the plans was the one to blame; if the carpenters had pushed the wall over, they were accountable. The architect testified that he had made the drawings for the ironwork by the direction of the contractor, and according to his instructions; and, to make sure they were understood, he had furnished a model, showing how the cantilevers were to be set. He thought that the weight of the bay had been allowed to come on the projecting ends of the cantilevers before the inner ends were made ready, the contractor denied this, and said that he gave directions to have the masonry built on the inner ends, but no one was produced who had heard the directions. Several experts were examined, one of whom testified that the carpenter-work was not very good, and that the iron was not very well fixed; the other ruling out the man who did it. A third thought that the catastrophe was due to the insufficient anchoring of the floor-beams, while a fourth laid it on the ironwork again, and exhibited a model to show that it was inevitable with such construction. A fifth thought the defects, both in the plan of construction and the execution, had combined to cause the accident. In answer to questions, however, he said that he thought the mason was the person responsible, and that, although bricks were often laid dry, he regarded this as a violation of the well-known rules of the art of building. How the court could have formed any opinion from such conflicting testimony it is difficult to see, but it decided that the mason, Brümmel, was the person at fault, and ordered him to pay the costs of the trial, and to be imprisoned for three years, and on appeal this judgment was confirmed.

The Engineering and Building Record describes an "hydraulic shovel," which has been used in the work on the Forth Bridge with good effect. In sinking the caissons for this huge structure a stratum of bedder clay was found, so hard that the pick would remove only pieces about as large as a man's fist, and the labor of excavation was very costly and fatiguing in consequence, the more so as it was necessarily carried on in an atmosphere under considerable pressure. Under these circumstances, Mr. A. K. Archibald, superintending engineer of the bridge, exhibited on the spot many useful appliances for the work, that the iron roof of the caisson might be made to serve as a resisting point, the reaction of which would help to drive a shovel into the clay. To make this available, large shovels were made, with handles consisting of hollow cylinders, in which moved pistons carrying the blade of the shovel. The handles were long enough to reach nearly to the ceiling of the caisson, and were furnished with supply-pipes and valves. The working face in the clay was about fifteen inches deep, and the spades, exhausted of their contents, would be fitted with a large hollow cylinder, the valve of which was opened, and the water, when turning a valve, water under pressure was admitted to the cylinders above the piston, pushing the cylinders upwards until they struck the caisson roof. Continued pressure then forced the shovel blades into the clay, to a depth regulated by the height of the cylinder. The next step was to release the water, which flowed out of the cylinders, allowing them to descend. The workmen then seized the handles, and using them as levers, threw out the shovelfuls of clay, to be broken up and removed by other men, while the blades were reset for another operation. The cost of excavation in this way was about one-half that of removing by hand-picks, and the work was done much more rapidly, and with less fatigue to the men. The exhaust water which accumulated in the caisson was disposed of in a way hardly less ingenious. To avoid disturbing the men, the pressure of the air in the caisson, after it was made tight against the entrance of the water around it by the weight of the clay, was allowed to fall to a point much below the hydrostatic pressure due to the head of water above it. As the clay was hard enough to resist the effort of the water to burst through it, there was no danger in reducing the pressure, but it became doubtfull whether the pressure could be reduced and the water, working in an atmosphere relatively so attentive, would lift it through the sixty or eighty feet hoist necessary to reach the surface. This question was solved by the bold and simple expedient of setting the suction-pipe as so to draw in air with the water. In passing through the valves together and around the water were churned into a sort of emulsion, much lighter than pure water, a column of which was easily kept pouring out of the upper end of a discharge-pipe eighty feet high, without resorting to force-pumps or air-chambers. Of course, there was a certain expenditure of power in pumping the air, but this was of no importance.
EQUESTRIAN MONUMENTS. — I.

"Raising forth the horse! " — the horse was brought; 
In truth, he was a noble steed. — " Masagor."

I shall not attempt to dwell at length upon the subject of the Monuments erected to the memory of the great conquerors who have flourished in all ages, and who are remembered with the greatest interest not merely by the nations they subjugated, but by the whole human race. The interest with which we regard them is not limited to the period of their actual life or to the epoch of their reign. It extends to an indefinite period both forwards and backwards; in one sense, even to eternity. The reasons that make us regard them with such reverence are many and various; but we may roughly divide them into two classes — first, those various acts of all ages of invasion and conquest must have done invaluable service to art, for it may be taken for granted that in time of siege, for instance, it was the poor bronze statues that were first melted for use as projectiles or armor of one kind or another, just as the marble carvings of contemporary or former worthies must have been the ones first broken into fragments of convenient size for the catapult or of proper weight to drop handily on the heads of the besiegers. For the concealment of works of real art there were generally to be found enough amanti artium to interest themselves to some advantage to their own immediate posterity, and our more remote selves. Many a curious adventure must have had the works of art of antiquity which have survived to our day, and as one passes through the museums of modern Europe he ought not to forget his obligation to some group of panic-stricken wretches who in spite of fear and haste succeeded in hiding the masterpiece which now delights him. When one recalls how many of the most highly appreciated works of sculpture in our museums were preserved to us in this way, he cannot wonder at the enthusiasm of explorers or those governments are willing to spend large sums on excavations in the hope that now and then a Venus of Milo or its equivalent may be brought to light.

The equestrian statues that descend to us from antiquity are not many, and how most of them came to be preserved is matter for conjecture, but in the preparation of these we must seek to the forces of Nature aided in a very unusual way. In 1719 the site and history of Herculaneum were brought to mind through the discovery of a broken column of marble, made in the time of Augustus,

and marble yields but slowly. In passed ages invasion

Bronze Head in the Museum, Naples.

Bibulus the Younger, in the Museum, Naples.

Marcus Nonius Balbus, in the Museum, Naples.

would not be found enough amanti artium to interest themselves to some advantage to their own immediate posterity, and our more remote selves. Many a curious adventure must have had the works of art of antiquity which have survived to our day, and as one passes through the museums of modern Europe he ought not to forget his obligation to some group of panic-stricken wretches who in spite of fear and haste succeeded in hiding the masterpiece which now delights him. When one recalls how many of the most highly appreciated works of sculpture in our museums were preserved to us in this way, he cannot wonder at the enthusiasm of explorers or those governments are willing to spend large sums on excavations in the hope that now and then a Venus of Milo or its equivalent may be brought to light.

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digging of a well, the excavation for which, penetrating the crust of lava and ashes which five or six eruptions subsequent to the original one had accumulated over the unfortunate city to the depth of nearly one hundred feet, brought to light traces of the buried city of promise and interest enough to encourage explorations at different times; the first serious work being begun in 1738. It must be remembered that the excavations at Herculanum and Pompeii are wholly different in character; in the latter case the city was buried in volcanic ashes over which no lava flowed, so that exploration there is carried on in open trenches and excavations, while at Herculanum the work is true mining-work with shafts, drifts and galleries entirely below the crust of lava mud. One of the most important structures examined at Herculanum is the theatre—one capable of seating eight thousand persons—and here were discovered and removed to the Museum at Naples (with the exception of one daughter, now in the Museum at Dresden) nine statues of the family of Balbus, two of which are equestrian statues,—the proconsul Marcus Nonius Balbus and his son. These statues are interesting not only because of the place of their discovery, but because of the unusual attitude of the horses' legs, the two legs on the same side of the body being advanced, so that the horses amble or pace. This attitude was once said to have no earlier prototypes save in the case of the Assyrian bas-reliefs where the same peculiarity exists, but a closer examination of the frieze of the Parthenon shows that the assumption was a mistaken one. Of course, like all imperishable things recovered from these buried cities, these statues were in excellent state of preservation, but, unfortunately, during an attack on Portici in 1799, the head of the younger Balbus, which was at that time stored in the town, was smashed by a bullet, so that the head the statue now bears is a restoration, after a cast made from the fragments. These statues are of marble, and are now in the Museum at Naples.

We Americans to whom it is still a matter of much pride to have within the boundaries of the neighboring city even a single public statue, afoot or on horseback, that we can go and gaze upon, cannot imagine the surroundings of a Greek or Roman citizen of even the lower class who was as free as the highest patrician to derive pleasure from the hundreds of statues in the

__POMPEII._—Destroyed in 79. In ancient times excavations were made, owing to which many valuable relics are probably lost to us, but during the Middle Ages Pompeii was entirely consigned to children. In 1542 the architect Fontana constructed a subterranean water-conduit in order to supply Torre dell'Annunziata from the same, actually intersecting the ruins, and to this day in use; yet no further investigations were then attempted. In 1748 the discovery of statues and bronze utensils by a peasant attracted the attention of Charles III, King of Naples, who caused excavations to be made. The amphitheatre, and other parts were then disinterred. The Forum, the

__Number of Ancient Statues._—"How feeble is the effort of the imagination to conceive the number and magnificence of the public edifices which shot up from Roman soil after the conquest of the Greeks! Here statues singly and

in groups adorned the niches, intercolumniations and roofs, filled the pediments and lined temple-steps, theatres, basilicas, baths, gateways, bridges, balustrades and arches of all kinds. Like Rome itself, all the provincial cities had their forums, crowded with temples and colonnades, their capitols crowned by the

__Alexander, in the Museum, Naples._ Street of Tombs, etc., were uncovered to the reign of Mursa. Excavations, after being for many years occasional, are now carried on systematically with highly satisfactory results.

__Amazon, in the Museum, Naples._
public places of his native town, and much less can we picture the contents of those villa gardens of Imperial Rome where the descendants of the army contractors of earlier days had collected the artistic wreckage brought by the camp-followers from the many enlightened and art-loving countries that had felt the Roman arms. If we may believe the records many a private collection in those days would outshine the average public collections of to-day.

Goth and Hun and Vandul and Saracen and other barbarians visited on the arrogant Roman the violence and robbery that had been served out to those of their kind in other countries, but it is a question whether art suffered more at their hands than it did at the hands of the early Christians when they first began to feed their growing power, and began to war openly against the false gods and their images. Being yielded by enthusiasts, extremists, bigots, the beam of destruction was likely to do more thorough work than would be accomplished by the wanton and purposeless mischief of a victorious barbarian who might, indeed, tip a statue on a pedestal or break off a leg or an arm in passing, but was little likely to sit down beside it with a maul and pound it into such small fragments as to be quite beyond the skill of the most painstaking of réparateurs.

What might have come to us if it had not been for these enthusiasts, who may be pictured as stern and ascetic as the most consistent of the early Roundheads, is betokened by the existence of the statue of Marcus Aurelius, which is said to be but one out of the twenty-two equestrian statues which even in the fifth century of our era still adorned the public places of Rome. The others have vanished, some, perhaps, to which temples of Jupiter, Juno and Minerva, as well as their theatres, amphitheatres, baths, circuses—all adorned with sculpture. In 58 B.C. Sealkus, it is said, used for his temporary wooden theatre in Rome three hundred and sixty columns of foreign marble from Athens and Macedon, beside three thousand bronze statues. Agrippa, while still, 33 B.C., adorned his extensive water-works with four hundred marble columns and three hundred marble and bronze statues, his work to be continued by others. Bonnet built in many passages and triumphal arches crowded with groups of Antinous, quadrigins, and insatiable of art that he became the object of ridicule. — *Michel’s History of Ancient Sculpture.*

1 Invasions of Rome.— In 562 A.D. Rome was taken by the Goths under Renumus and in 408-10 by the Visigoths under Alaric. The Vandals under Genseric plundered Rome in 455 and the Goths under Totila in 546. Its environs were devastated at different times by the Huns under Attila (447) and by the Lombards (731) and the Saracens (846 and 876) and the Magyars, 10th century. In 1268 Guzelmem burned the city, and it was sacked by the Constable de Bourbon in 1227. It was also besieged at various times by the Germans and was burnt by intestine civic feuds.

2 Telesman.—*From the darkest period of the Middle Age, or even from the days of antiquity many cities have had and keep the remembrance of the construction of their gates with certain buildings, statues, or other material objects. The anecdote has left records of consecrating priests or Teleres, who were present at the building foundation of cities, and solemnly guaranteed their prosperity by creating certain monuments or by burying certain objects (Telesman).*. The Phroreneans were convinced that the temple of Mars, afterward transformed into the Basilica S. Maria Maggiore, stood to the end of time, according to the constitution under which it had been built, if it, as Christians, removed from it the marble equestrian statue of Mars (?). But since the destruction of the latter would have brought some great calamity on the city—in accord with a constitution—they set it up a tower by the Arno. When Totila conquered Florence (in the sixth century), the statue fell into the river, and was not restored until 1138. Charles the Great refounded the city. It was then placed on a pillar at the entrance to the Ponte Vecchio, on the right bank of the river, and held aloft in 1258. The origin of the great feast between Tuscany and Umbria was thus associated with the flanked hill. During the inundation of 1258 the statue vanished for ever. But the same Teleres reappears elsewhere. Guido Bonatto, not satisfied at the refounding of the walls of Forli—十四五 requiring certain symbolic acts of consecration from the two parties (Guelphs and Ghibellines), by burying a bronze or stone equestrian statue, which he had produced by astrological or magical acts, he believed that he had defended the city from ruin, and even from invasion by the Hungarians and the Magyars,阿尔布雷希特·多特谢尔 (Albrecht Dürer) 在他的《The History of the City of Rome》中提到，这些雕像被赋予了多种目的，包括为罗马帝国的独立和胜利而牺牲的士兵们，以及为那些因信仰而牺牲的人们。然而，这些雕像也成为了帝国衰落的象征。在中世纪的混乱中，除了一些重要的雕像得以保存外，大部分雕像都遭到了破坏，甚至被当作建筑材料使用。然而，这些雕像仍然在一定程度上保留了帝国时期的风格和精神。
Totila, King of the Goths, possibly believing the statue was of pure gold, made off with it, and it was almost ready for shipment when Belisarius overtook him, gave battle, and as one of the consequences of his victory redeemed the statue.

More peaceful and joyous scenes have passed under the sightless eyes of the Roman emperor, as when all plebeian Rome rejoiced when the equestrian statue of Marcus Aurelius was erected. In 148 B.C. it was allowed to make himself tribune; then the great bronze horse was made to take a part in the festivities, and from one nostril discharged wine and from the other water, so that all who could reach it might drink and be merry. Traces of the gilding which once covered, it is thought, both horse and rider, still remain, and local tradition has it that this gilding is not disappearing, but rather on the increase, and when the coating is complete the world will have reached its end. A companion tradition also declares that when the Colosseum falls the world will be annihilated.

In the bronze statue of the emperor Nero, now in the Museum at Naples, we have another statue preserved by the volcanic ashes that covered the forum at Pompeii. There is something laughable about this trumpeting personage—who was not much given to causing laughter in his day and time—in the way he sits his horse. He seems to be trying to ride as the initiated easter rides his donkey, who sits as far aft as possible and in spite of its unnatural position— the severed neck supporting the head upright on a columnar pedestal—attracts admiration. It is from the gilding which originally covered the statue that the statue gets its real glory, and that its image is the emblem of the city. In reality it is all that remains of a statue that stood in the vestibule of the temple of Neptune—in what other place could the statue of a horse be so fitly placed?—where it attracted so much attention, even worship, that the priests finally themselves destroyed it. How the story goes, but fortunately their ungracious task but ill done and the head remains to us. Another story ascribes its destruction to a later date, and the vandal who gave the order for destruction is there said to be an archbishop who needed the greater part of the bronze for a new bell he wished to have cast for his church.

Marcus Aurelius Antoninus, the noblest of the Pagan, the crown and flower of Stoicism. Born at Rome A.D. 121, of noble blood. His father died when he was an infant and he was adopted by his grandfather, who educated him in the most perfect manner. The noble qualities of the child attracted the attention of the Emperor Hadrian, who adopted him as his successor Titus Antoninus Pius, the uncle of Marcus Aurelius, on condition that he in turn adopted his nephew and Lucius Commodus. After the death of Hadrian the accession of Antoninus Pius, Marcus Aurelius had the title of Caesar conferred upon him, and 160 was made Caesar and entered fully upon public life. In 161 Antoninus Pius died and Marcus Aurelius, then forty years old, became his successor ruling jointly with Commodus, commonly called Lucius Sextius Verus, who died in 180. Lucius, the son of Antoninus Pius, Marcus Aurelius, the daughter of Antoninus Pius. Many misfortunes occurred in the reign of Marcus Aurelius—an inundation of the Tiber which caused great damage and caused a famine, earthquakes, fire, plagues of insects and a fearful pestilence. Besides, during his reign, the Empire was involved in a series of wars; fighting with the barbarians, Marcus Aurelius died in 180, after a short illness and was deified. His son Commodus (afterwards emperor) erected to his memory the Antoninus Column now in the Piazza Colonna at Rome. He early embraced and throughout his life adhered to the Stoic philosophy. This great philosopher had but one bone of contention with the Christians. His life was in keeping with his precepts. His philosophy is contained in his "Meditations" or "Reflections," a famous work.

A cast of the equestrian statue of Marcus Aurelius, which Catherine de Medici ordered, was set up in the court-yard of the palace at Fontainebleau (thenceforward called Le Louvre du Chavot Blanc), under a roof raised upon four pillars to protect it from the rain, where it remained until the year 1837. It was made by the French, J. L. Cochin, about 1809, who had the task of equaling Colnaghi's, the artist who had purchased antique marbles and had moulds taken of some famous masterpieces of sculpture that they might be cast in bronze. There was a cast of this statue in the court-yard of the Constanza degli Omerni housed in the Cast Auranii, at Milan. This house was given by Charles V to Leone Leoni, the sculptor.

Nero—Lucius Domitius Aenobarbus, called Nero after his mother's marriage to the Emperor Claudius, by whom he was adopted; born Dec. 15, A. D. 37; proclaimed emperor, 54; his first years of rule were marked by kindness and justice, and his last by a series of atrocities, which led to a conspiracy, on the discovery of which and the deflection of the Praetorian guards, Nero killed himself, A. D. 68.

Commodus—Lucius Aurelius Commodus (161-192). Emperor of Rome, 180 to 192. Born at Laurium. Son of Marcus Aurelius and Faustina. Carefully educated but chose the society of prostitutes and gladiators. Blind to his faults, however, his father gave him the title of Caesar when he was but fifteen, and adopted him as his heir, and gave him power in every department, except the chief postfices. On the death of Aurelius, whom he had accompanied in war against the Germans, Commodus, hating the peace and returning back to Rome (180), since then, he had never left it, took to himself unbounded power, and round about him gathered a circle of murderers and conspirators, and there gave himself up to unbounded license, at first, however, in private. He was a voluptuous and cowardly man, but displayed his skill in the arena by shooting hundreds of wild animals and meeting in flight hundreds of gladiators. He called himself the Roman Hercules and consigned to death that he should be worshipped as such. As a child he was reared by the empress, who was extremely fond of him, and was strongly attached to the emperor, who, upon learning of his death, was greatly afflicted by the news.

[To be continued.]

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

NEW WING OF THE WESTERN DEPARTMENT—BUILDING, OTTAWA, CAN. 
BY MR. THOMAS K. CONRIDGE.

[Galvanized Print based only with Galantine and Imperial editions.]

STORE, CORNER OF TREMONT AND WINTER STS., BOSTON, MASS. 
BY MR. A. FOX, ARCHITECT, BOSTON, MASS.

NEW WING OF THE MUSEUM OF FINE ARTS, BOSTON, MASS. 
BY MR. THOMAS K. CONRIDGE.


The new wing on Dartmouth Street will cover a slightly larger area than the portion already built but will cost less, the difference being $186,000 to $260,000. This difference is owing partly to the difference in market prices and partly to a change in the materials, the venetian blinds of the portion being replaced in the new with buff brick and Ohio stone.

MONUMENT TO ST. ALFDUSSE DE LICOURI, CALVARY CEMETERY, BOSTON, MASS. 
BY MR. T. O'GRADY, ARCHITECT, BOSTON, MASS.

"This horse is a personage; ours are machinists." — Italy, Rome and Naples.
BUILDING ON CORNER OF TREMONT AND WINTER STS BOSTON.  JOHN A. FOX ARCHT.
ACCEPTED DESIGN FOR
CAMBRIDGE CITY HALL
NEW WING OF THE WESTERN DEPARTMENT-BUILDING, OTTAWA, CANADA.

THOMAS S. SCOTT, Architect.
MONUMENT TO
ST ALPHONSUS
DE LIGUORI
ON THE REDEMPTORISTS' ORDER

CALVARY CEMETERY, BOSTON, MASS.

THOMAS O'GRADY, JR. ARCHT.
THE series of articles which it is our intention to publish under this title, embraces a subject which has a direct bearing upon the work of the architect, and is, at the same time, of vital interest to the builder. The articles are, however, written primarily for the architect. Most builders, we fancy, are already pretty well posted on the subject of the hardware which they are called upon to use in the construction and finish of a house; but our experience has led us to believe that architects, as a rule, seldom go any deeper into the subject than is necessary to decide whether knobs shall be of one material or another, or whether some particular pattern of sash-lock will be satisfactory to the owner. It is needless to say that a more extended acquaintance with the subject would do no one any harm, and might even be conducive to much good, if only in the way of providing more fittingly for the needs of the client. These articles are not intended, however, to be over-critical in their nature, nor necessarily so exhaustive as to embrace all the inventions and arrangements comprised in the general term of builders’ hardware, though an attempt will be made to discriminate between what is merely novel and what is really suitable, and so far as possible the best of everything will be noticed under various heads, and an effort will be made to represent as nearly as possible the conditions and limitations of the builders’ market, as well as to show what is valuable for the uses of the architect.

It must be remembered that the statements are made from an architect’s standpoint rather than from that of the builder or the manufacturer. The object in view is to show what can be obtained for special cases, and how it is necessary to be specified in order that there shall be no doubt in the minds of both builder and client as to what is called for. It is not intended to present abstracts of trade-catalogues, and if the series fails to represent all the wares in their proper light, or at times seems to ignore some valuable inventions or inventions of the place undue stress will be laid upon articles that do not receive the heartiest commendation from those who use them, we can only plead in extenuation the difficulty of finding out everything that is in the market. Many of our best appliances have only a local and limited fame; and as they are advertised sparingly, it is often quite difficult to say exactly that such and such an appliance is absolutely the best.

For example, some Boston dealers consider that the best locks in the country are the hand-made goods turned out by such firms as Enos Robinson’s Sons. Without discussing the peculiar merits of the Robinson locks at this point, the assertion may safely be ventured that any one studying the subject in San Francisco would have as much difficulty in an investigation of Boston hand-made goods as we have had in our enquires to deal with hundreds of valuable inventions which are hardly known at all in this part of the country. The hope is, therefore, expressed that this publication may call out facts concerning many articles of builders’ hardware which at present are unknown to the ordinary trade. Any notes or suggestions relating thereto will be gladly considered by us, for future publication.

It can only be hoped that the series may suggest to architects the possibility of more definite specification, and of some better way of selecting and defining the necessary hardware than to merely insert a clause in the specification to the effect that a certain sum per door and a certain price per dozen is to be allowed in the contract for fixtures. We know is a very common method of disposing of the question, and is, no doubt, the easiest way out of the difficulty, relieving the architect entirely from any necessity for exhaustive explanations in regard to subjects upon which he generally is not over-well posted. With an honest builder, or with one who has the fear of the inspector before his eyes and that all will be scrutinized, this may be a method sufficiently exact to suit most cases; but where the market is so full and there are so many really excellent appliances to choose from, if would seem certainly as if more exact specifications ought to be prepared. How many architects, for instance, ever insist upon a particular style of lock; and how many architects, even after many years experience with the best work, are able to tell a client what is the best sash-lock or what is the best style of hinge, without referring to a trade-catalogue? We cannot hope to meet all emergencies, but it is believed that a better selection of hardware than is generally possible can be stimulated.

In these articles the term “builders’ hardware” is assumed to include, generally speaking, metal-work of every description entering into the construction and finish of a house, from the nails and bolts used in the rough work to the door furniture, and brass lock and plate work of the finish.

The illustrations, which include nearly every article referred to have been prepared as simply as possible. A great deal of care has also been taken in collecting the prices. The ordinary trade-catalogues are very unsatisfactory in this latter respect: many of them give no prices at all, and when the cost is stated it is always subject to discounts so uncertain and varying as to give absolutely no real information of value to the architect or to the purchaser. The series will represent the retail cost of the articles in the Boston market, as nearly as we are able to ascertain it. These prices are, of course, somewhat fluctuating in their nature, but will, at least, serve as a means of comparison even if not exact for all localities and seasons.

In the collection of the subject matter which is to follow, the writer has had the heartiest cooperation from the leading dealers and manufacturers, and desires to especially acknowledge the courtesies of Messrs. Burditt & Williams, and Nichols & Bellows, of Boston, the Hopkins & Dickson Manufacturing Co., and the Yale & Towne Manufacturing Co.; without whose technical assistance any such papers would lack the value which it is hoped these will possess.

C. H. BLACKALL.

(To be continued.)
Washington, D.C.

The Catholic University. — The Congregational Library.

The Catholic authorities determined some years ago to locate their University in the District of Columbia. In 1862 the act of Congress was passed which granted 300 acres for that object, and the Catholic University was founded. It is now a flourishing institution, with a large number of students, and a library of considerable size. The Congregational Library is also located in the District of Columbia, and is a well-known institution of learning.

The building of the Congregational Library is a magnificent structure, and is considered one of the finest libraries in the country. It is a large, octagonal structure, with a dome and a tower, and is situated on a hill overlooking the Potomac River. The library is well-known for its fine architecture, and is considered one of the finest libraries in the country.

The Congregational Library is a fine example of the influence of art in the construction of public buildings. It is a beautiful example of the union of form and function, and is an excellent example of the skill and talent of the architects who designed it. It is a fine example of the way in which art can be used to create public spaces that are beautiful and functional.

The Congregational Library is an example of the way in which art can be used to create public spaces that are beautiful and functional. It is a fine example of the union of form and function, and is considered one of the finest libraries in the country. It is a large, octagonal structure, with a dome and a tower, and is situated on a hill overlooking the Potomac River. The library is well-known for its fine architecture, and is considered one of the finest libraries in the country.
connected with a large library building. He has made sketches or studies in many varieties of Gothic, Romanesque and Classic architecture, variations in plans, etc., for the instruction of the committees of Congress, through the years from 1872 to the present time, besides having made a special trip across the ocean to study the European libraries. In 1882, his plans were again adopted against forty-old competitors. An examination into the whole case, made with him, when he receives such treatment only because he was very careful to procure cement of an extra quality for the foundations of the Library Building and because the House think that they see an opportunity to please their constituents.

Even if the bill did call for a building to cost $5,000,000 complete, which is affirmed on the one side and denied on the other, it has become so much of a matter of policy on the part of the street, before objected to by Congress, so far as I know, to pass a bill for a public building, placing the estimate at one-half or one-third its actual cost, is no reason why we should regard this special building as a mark for its honest indignation. But the cement contractors were active and influential, and the presidential election is at hand.

The railway station is larger than any building in this city, except the Capitol, fronting on all four streets, and built of stone. By comparison with the other buildings, it would not be reasonable to expect it to cost so little as $3,000,000. The excavations for the entire building have been made and the concrete foundation is already in

The contracts are let, I think, for the stonework on the western front and rotundas. It is intended to limit the erection to this portion at present. The building is to be quadrangular, 163 feet on the east and west fronts and 332 feet on the north and south fronts. At the corners are pinnacles and the central portion is emphasized by an additional story. The interior of the quadrangle is occupied by the reading-room, galleries for books and ten open courts. When entirely complete it is intended to hold ten million books and have show-rooms for copyrighted engravings and other art subjects, a large collection of such matter having already accumulated, and it is well suited for clerical, packing, binding and executive purposes. The reading-room is the principal feature of the building being one hundred feet in diameter and ninety feet from floor to top of dome. It is lighted by eight large semicircular windows, thirty-six feet in diameter, placed above the book repositories and by a lantern thirty feet in diameter in the centre of the rotunda. This gives about one square foot of light to each cubic foot of space which is about twice as much light as the Paris Library, and about four times as much as the Library of the British Museum. The gallery for visitors who are not readers will be about fifty feet from the floor, directly under the semi-circular windows. The soil is well drained to prevent dampness and the rear or eastern entrance will be used for receiving and shipping goods. The cellar is given up entirely to heating and ventilating; the boiler being placed outside, the heated air is to be let in near the top and drawn out by exhaust fans near the floor. Mr. Smithmeyer expects by this method to prevent the accumulation of hot air at the top of the rooms where it would be very injurious to book-bindings.

The soil is well drained to prevent dampness and the rear or eastern entrance will be used for receiving and shipping goods.

The design is Italian Renaissance, the masses being well-handled, simple, classical and refined in treatment. Mr. Smithmeyer is well known as a master of the system of Sectional Geometry, and his design shows the influence of his studies at the Imperial Academy at St. Petersburg.

The reason for the lack of skilled American architects in many of the arts connected with building is generally attributed to the apprentice system. The contractor (who, by the way, is always a carpenter with us, and not a mason, as is often the case farther North) is, to be sure, nearly certain to be an American; so the curricula of the various schools are more important than the apprentice system. The contractor (who, by the way, is always a carpenter with us, and not a mason, as is often the case farther North) is, to be sure, nearly certain to be an American; so the curricula of the various schools are more important than the apprentice system. The contractor (who, by the way, is always a carpenter with us, and not a mason, as is often the case farther North) is, to be sure, nearly certain to be an American; so the curricula of the various schools are more important than the apprentice system. The contractor (who, by the way, is always a carpenter with us, and not a mason, as is often the case farther North) is, to be sure, nearly certain to be an American; so the curricula of the various schools are more important than the apprentice system. The contractor (who, by the way, is always a carpenter with us, and not a mason, as is often the case farther North) is, to be sure, nearly certain to be an American; so the curricula of the various schools are more important than the apprentice system.
The American Architect and Building News. [Vol. XXIV. - No. 657.]

The standard of excellence in design necessary for admission has been raised or has raised itself by a natural growth, to a far higher level than formerly.

The New Art Club of Philadelphia, with Prof. Wm. R. Ware as its professional adviser, has just brought forth another of the most satisfactory competition ever held in this city. I might almost say the only satisfactory one, for extraordinary as it may seem this is the first of the numberless recent competitions to have the award based upon equals, that is, for forty dollars each, peculiarly composed of artists and lovers of art thought best to call in Mr. Ware's advice is both significant and encouraging. The fourteen architect-members of the club, just brought together in departmental style, the result was the choice of Mr. Frank Miles Day as architect of the building. It will be an immense boon to local architecture if this Art-Club competition can be made to serve as a precedent.

OTTAWA AND HULL — THE JUGGIN'S LUMBER-R AFT. — COMPETITION FOR THE TORONTO BOARD OF TRADE BUILDING. — AUSTRALIAN LAW SUIT. — UNAVAILING SUIT FOR SELLING EXPENSES. — NEW PLUMBLING LAW. — NEW BUILDINGS AT MONTREAL.

The initial illustration is a view of the very pretty Library Building in connection with the Dominion Houses of Parliament at Ottawa. It is a library erected for the use of the members, but of which citizens are allowed to make free use. This view of the building, from the northwest, is taken from the Parliament Hill, at a distance of approximately two miles which flows as the Ottawa River a couple of hundred feet below. Looking to the north and west, a very fine view is obtained of the well-wooded undulating country, streaked here and there by sparkling rivers. The immediate foreground is entirely spoiled by the lumber town of Hull, and the picturesque scenes of the river is lost in the masses of sawdust floating on its surface. From this hill four fearful conflagrations in Hull have been witnessed by thousands of people, the last one occurring a month or so ago, raising almost unchecked through street after street. Four times it has been partially destroyed, and four times it has been rebuilt in wood, ready for the next accident that shall set it alight. There are piles of lumber five, six and seven hundred feet long, but not one brick cottage has resulted from the repeated outbreaks of fire.

Of Ottawa itself as a city, there is not much to be said. Were it not that it is the seat of the Government, Ottawa would hardly be in existence. The better class of its inhabitants are all more or less connected with the Government Offices. They have their houses, differing in no way from the houses of other places; the principal buildings are Governmental — the three blocks of the Houses of Parliament, the Postal-Department Building, the Geological Museum, etc. Churches there are, but none particularly striking; second-rate shops; bad roads and break-fast sidewalks; the climate very severe, extremes of cold and heat consequent upon the sandy soil and the distance from any sheet of water — this is the sum and substance of Ottawa. Hull is the bugbear of Ottawa, spoiling the scenery, ruining the river, presenting piles of lumber in every direction which extend for miles into the country, and create the chilly blizzards caused by the refrigerating properties of piled wood; to these defects must be added those with hitherto unknown, which cause daily accidents of more or less horrible description.

Mr. Robertson, of the "Juggin's Raft," has recently been to Ottawa about the duties on the logs and the wing-ropes used in its construction, and as the former raft which was lost was particularly noticed in this journal, it may interest readers to know about this second venture. It is to be launched1 at the full-moon tide in July. Its length will be fifty feet, its bread thirty feet, breadth, thirty-eight feet high in centre, drawing twenty-two feet of water. It contains twenty-two thousand logs, averaging three feet in diameter and six inches long. No less than thirty-three tons of chain are required for the wing-decks together, and the whole is valued at $33,900.

The competition for the New Board of Trade Building, Toronto, is now open. The member of architects responsible for the dissatisfaction has been expressed at the arrangement of paying four architects for their designs instead of offering premiums for the

1 This raft was launched successfully July 21. — Edn.
a doubt. It is taken for granted that the city has done its duty with the mains and outlet, before it calls on plumbers and owners to do theirs. Let us hope for the day when there will be examinations in every trade that affects the health or comfort of those liable to be affected, and that incompetent work will not be done under a trade only, but every profession also, with special reference to the one we are interested in. Such measures as this by-law would do much to break up the power of the unscrupulous merchant.

Nothing further has taken place with reference to the Queen’s Park Lease and its forfeiture. The matter has been before the courts but has been relegated to September after the vacation.

A local paper reports the case of Mr. Nowlan being erected on St. James Street, Montreal (the principal street) as far as their “beauty and stability” are concerned “would throw discredit upon the capitalists of Europe or any great cities of the United States.” Although Canadian and American and therefore not likely to be like the Dickinsonian Yankee in my opinion of things in the States, I venture to differ from our local friend’s dictum. The New York Life Assurance of the above corporation was taken in by the American Union. But it seems that the premiums were not deposited in the general deposit account of the American Union. Thus it stands that the Union, which was probably sure to bring money, would not be a failure.

The Corporation’s building will tower considerablv over and dwarf the good proportions of the Bank, and the two monster buildings will entirely spoil the appearance of the little square. But for that, proprietors of the banks will not pay any more for the property they pay little for. A considerable sum of money is represented by these buildings, $100,000 for the New York Life, $300,000 for the Imperial, and probably another $300,000 for the Bank of Montreal—$800,000 were recently spent on the alterations of the larger of the latter building. Farther down the street is to be a new building, also seven stories high, at a probable cost of $175,000. This is being built for the corporation of a Methodist church which has just been pulled down on this same site. The ruined appearance of St. James Street is rapidly disappearing and a new street springing up in its stead. The architecture of the commercial building of the present day is a study in itself. Although the style is modern, we seem to be borrowing and ideas for the worship of Mammon from the Assyrian worship of the heavenly bodies. Seven-story temples seem to be the rage. Personally, I think we might do more in the way of borrowing from them and take more from their coloring propensities. We use more color in our buildings than we did a few years ago, but we might use more with advantage, considering the many colors of the materials at hand. As an investment in his office-building an overliving itself. Only a year ago there were more offices than necessary for the business of the place. Rents for rooms in new buildings were very high, blocks of offices that were expected to bring $100 a month and office-buildings of this size were sought for.

Now, at the same time, three enormous blocks will be let.

CREOSOTED TIMBER.

Baltimore, Md., July 14, 1888. To the Editors of the American Architect:—

Dear Sirs,—Will you kindly inform us of the process of creosoting such as is used in your city by the most of the builders, and very much obliged,

Yours respectfully,

O. DUKER & Co.

[Originally writing, this is creosoted by enclosing it in a straight tank, first, exhausting the air so as to drive air and gas, if any, from the pores and then filling the tank with creosote oil under pressure. In less than ten minutes a uniform product is simply put back in its case in a tank. We use creosoting works nearest to you at Norfolk, Va., Perth Amboy, N. J., and Wilmington, N. C.—Eds. American Architect.]

READY-MIXED MORTAR.

Philadelphia, Pa., July 11, 1888. To the Editors of the American Architect:—

Dear Sirs,—Will you kindly advise us the name and address of the ready mixed mortar at retina in Germany? O. Bowen is in Germany now and we would like him to call on this firm and see how their method works. Your early reply will oblige,

S. WEEKS & CO.

[There are, we believe, fourteen retailers of mortar in Berlin alone, whose addresses can easily be found in the Berlin directory.—Eds. American Architect.]

A COMPEITION TO AVOID.

Toronto, June 23, 1888. To the Editors of the American Architect:—

Dear Sirs,—Since writing in relation to the California Courthouse, I have received the enclosed “notice to architects” from that point. From information previously received from Redding, it appears that the requirements of the bond is, that the successful competitor is to bind himself that if no bidder is found willing to execute

1 Simply because it is anonymous we are not able to publish a communication on Toronto Parks received recently.—Ets.
SEARCH FOR RILICS OF THE INCA.—The British consul at Mollendo, in Peru, in his last report states that a limited liability company has been formed with a capital of $60,000, with an object of exploring for antiquities and valuable minerals in the region of the ancient Inca empire. The company has been granted to the government by the government for this purpose. The consul says there is no doubt that many valuable objects, probably deposits of silver and silver, exist in these ancient tombs; but it remains to be seen whether they will pay the cost and trouble of finding. — Exchange.

A RAISED CITY IN TEXAS.—The surveys at present being made for the Kansas City, El Paso and Mexican Railroad, at a point north latitude 31° 31', longitude 106° 05', have revealed a lava flow which by the local population is called the Mulpais. It consists of a sea of molten black glass, agitated at the moment of cooling in ragged waves, with a covering of fumes. These lava waves sometimes run from ten to twelve feet high with combing crests. This lava flow is about forty miles long from northeast to southwest and from one to ten miles wide, and is so thick that the surveyors have come upon the ruins of Gran Guvera, known already to the early Spanish explorers, but which have been visited by white men less often than the mysterious ruins of Falconc in Central America. Only a few people at Socorro and White Oaks have been at Gran Guvera, because it is at present forty miles from water. The surveyors following the course of the high ground see to be of gigantic stone buildings made in the most substantial manner and of grand proportions. Of one of them was four acres in area, and was one hundred feet high in some places. These indications of the existence of Gran Guvera was in existence and abundantly supplied with water at the time the terrific volcanic eruption took place. — Engineering and Mining Journal.

THE ROUND TUNNEL.—The question of a tunnel between Sealand and Scania has not been abandoned, and not so long ago as some time ago the other day the Royal Swedish Commissioners, who were examining M. Declan's application for a concession, sent in their report to the Swedish government. This exhaustive document winds up with the following conclusions: "That a submarine railway between Sealand and Scania would no doubt involve several advantages to the international trade of the countries, but that the expenses would be so great that it would be inexpedient to undertake the work under present circumstances. The governments of the two countries, in addition to the profits of the traffic, which would be inadequate for this purpose, the proposal for this new way of communication should be abandoned for the present that should ever, under altered circumstances, the want or the desirability of a submarine railway come into prominence, it ought to be built on account of the state, either with its own money or by the aid of capital borrowed for that purpose, and the works should be carried out under the superintendence of special commissioners or be contracted away to some accepted company. This arrangement is consistent and necessary in order to give to the authorities of these State railways, with which the tunnel would have connection, a proper control of the traffic independent of foreign companies. In the style of the way this has been arranged in the trans-Alpine and trans-Andalasian line, it is not thought to be any question of altogether handing over the undertaking to foreign capital, and that the Government, under no circumstances, under no circumstances, under the continual contract with proprietors or persons before personal plans were forthcoming, and the question of cost fully solved. The Commissioners submit, in conclusion, that M. Declane's application be not granted. The Government has not yet taken any further steps in the matter. — Engineering.

WELDING BY ELECTRICITY.—The Thomson system of electric welding, which we described on page 22 of Vol. xiii., is now in operation at the Glass, Edinborough, and the opinions of practice amongst engineers and electricians. The essentials of welding by this means are (1) a source of electric energy, and (2) a means of transforming the energy into heat at the point where the welding is to be done. In order to ordinary practice an alternating dynamo is used. It gives a small current at a high pressure. In the case of the apparatus in operation at Glass, which is large enough to be induced by the power of the largest pressures. In the apparatus in use in the secondary coil, may be reduced to half a volt. Attached to the ends of this copper bar, or other two charges can be operated on pieces of metal to be welded. One of the clamps is movable along a set of racks, and the other is fixed to a rod, which is pointed and held firmly in that position by the pinion; on the application of the current to the secondary coil, the clamp becomes heated, and when sufficient heat is developed, the operator has to work the iron at a source of heat as well as a source of pressure easily regulated, so that any metal which will bear the heat necessary can be easily and effectually welded. M. Declan, who is vice-president of the company, has many of the Boston, and it is shown in the dynamo in the space occupied by Mr. Richard Miller, agent of the Thomson-Houston Company in London.

A MOVING TALE.—In the laying out of Franklin Park a great many houses and buildings were taken up with the result that thousands of dollars were sold to the highest bidder. One of those was secured by a shrewd son of the Emerald Isle, who immediately bought a piece of land in the city limit. This was accomplished by a pathetic story to the neighbors of his plan they become alarmed, and immediately took measures to prevent it from being carried out. They bought the land at a high price, and they obtained another lot in an adjacent street, and put it up for sale at $20,000. The son proposed to pay the $40,000 in cash, to which the rest of the neighborhood assented. The son then bought a beautiful old house for $5,000, and proceeded to repair it. Before the work was completed, the houses on the hill were sold out, and the breaking up or down of any manufacturing interest whose existence is necessary to the country.

What are the Best Plumbing Appliances?

In 1886, Mr. J. Pickering Putnam* said, speaking of the Dececo Water-Closet: "This is a simple and effective apparatus, and works on the principle of the Field's Flush-Tank . . . . This closet is an ingenious one; it is simple and durable, and the later and better forms seem to produce invariably the syphonic action in the manner described, giving the requisite flushing without spattering or waste of water. It should not be used as an ash-barrel or receptacle for all kinds of rubbish. When properly used it is a closet that never needs repair."

"Compared with the 'wash-out' closet, these points of advantage are to be noted here: (1) The depth of water in the bowl is much greater where depth is needed to receive and deodorize the soil. (2) The trap is in sight and the walls of the outlet are under water and are odorless instead of the reverse, as in the 'wash-out' closet. (3) The water-seal in the trap is twice as deep and therefore better able to resist the influence of siphonage, etc."

*The inventor of the well-known and admirable Sanitas Trap.

THE DECECO COMPANY, NEWPORT, R. I.
The exterior of this house is stained with **Gabot's Creosote Stain** for Shingles, Fences, clapboards, etc.

*G. Edward Cooper Jr.*

*Villa 4W*

**These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply:**

*Our Stains contain no water and are the only exterior stains that do not contain kerosene:*

**Prices are $0.50, $0.75, and $1.00 per gallon according to color.**

**Send for samples on wood, and circular.**

*SAMUEL CABOT*

*70 Kilby St. Boston, Mass.*
WELL CURB FROM MURANO
19TH CENTURY

FONT FROM MURANO
19TH CENTURY

FONT IN THE CRYPT
OF Chartres Cathedral.

FONT.

Barnack Church, Eng.
After sketch by T. C. Bowden.

WELL CURB FROM MURANO
AFTER L'ABBÉ.
price is enormous, while strenuous efforts are made to conceal it from architects and their clients. We once had a bill to certify which we knew was too large. We went to the dealer, who, at heart as an honest man, and without influence, gave a regular discount on those goods of sixty per cent. We asked him to make a note of the deduction on the bill, so that it could be certified; but he refused, saying that the dealers never allowed the discount to appear on the bill, but that if we would get him a check for the difference of the face of the bill, he would receive the bill in full. In this case, as in most others, the discount was strictly confined to dealers and architects, and could only be allowed to them, persons outside the trade being, in theory, always required to pay the full price.

In many instances, where the discounts are very large, the rule in this country is not to allow them on a bill sent to an architect to certify, unless he will consent to have the bill made out to himself; the explanation usually given being that the dealer is bound to "protect" his agents, or customers who buy to sell again, by selling nothing to "outsiders" below the list-price, and that in order to escape the penalties attached to an infrac-

T he British Architect has, as we believe, done a serious injustice in commenting on the correspondence published in this column some weeks ago, under the heading of "Charges for the Morally Infirm." Our readers will remember that the correspondent sent to us for publication a number of letters from manufacturers and dealers, offering discounts, commissions or perquisites to architects who might specify or order their goods. As an offset to this another firm published a letter from the original correspondent, inquiring its "lowest possible discount to architects." The British Architect says that "There is, of course, only one construction to be put on such a letter," and goes on to argue that the fact that dealers offer unlawful inducements to architects to use their goods is a proof that such inducements are not only "readily accepted," but "even annually, and with no scruple, and regarded by the dyers and upholsterers as a right full perquisite." Now, without referring to the particular case in question, we must express our conviction that the British Architect is wrong in supposing that "only one construction" can be put on a letter like that quoted; and that just such letters are sent every day by architects, not only with the purest intentions, but from a conviction that their duty to their clients obliges them to do so. In the first place, we are sure that the great majority of decent architects regard the whole system of concealed discounts and commissions as an unseemly nuisance, and regard with loathing and contempt the ideas of business which permit manufacturers to offer them, and to try to allure as customers the creatures whom they accept. Nevertheless, the system exists, and architects must do best they can with it. The easiest way would be to certify the "list," or "long," price for everything which their clients have ordered, by comparing the printed price-list with the charge on the bill, and washing their hands of all endeavor to inquire whether this is the real value of the article. Unfortunately for the conscientious and pains-taking architects, they soon discover that the list-price and the real selling-price of the goods used in building are two very different affairs, and that, while the amount of discount is stolidly concealed from persons not connected with the business, the architect who does not contrive to discover it, and who pays the "long price," for what he buys, or orders for his client, is looked upon by the dealers as a fool, while, even if his client does not discover that the goods might have been had cheaper, and reproach him, he is troubled by his conscience for not having made due effort to save his employer's money.

BOSTON has long been afflicted with a very tyrannical and arbitrary society of a trade which is noted for its domineer-

hanging habits,—that of the freestonecutters. For many years the freestonecutters' Union has interfered with the business of contractors, interrupted the progress of buildings, and has prevented non-Union men having the contracts, where enough to resist its dictates. Early last year, however, one of the oldest and best contractors in the city, Mr. Carew, happened to take into his shop a printer, who wished to try his
hand at stone-cutting. He was slow and awkward at first, but Mr. Carew paid him what his work was worth, and the man was not only satisfied, but grateful. The managers of the Union, however, saw a chance to make trouble, and gave notice that the prize must be paid full stone-cutter's wages. This obliged Mr. Carew and Young, but more than half of which neither of them thought fair, or to turn him off altogether, which might be fair, but was an injury to the man which Mr. Carew disliked to inflict. He accordingly declined to accept the managers' commands, and his men were called out.

Being a person of considerable wealth, and fortified also by a thorough knowledge of his business, and a high reputation for honesty and skill, Mr. Carew resolved not to yield, and began immediately to take measures for filling his shop with non-Union men. The Union fought hard, but he availed himself of the fact that the apprentices as usual, did not know where to go. One of his competitors, Mr. Poole's shop was broken into, and all his tools taken to the edge of the harbor and thrown into the bay. Then followed libellous attacks in the newspapers, which were persuaded to say that Mr. Carew had put bad work into the stone furnished for one of the city buildings, and that his reputation was suffering a great deal. He was invited to laugh at these attempts to injure him, and accordingly, instead of retorting, he abandoned the shop.

The next step was to get workmen from abroad, and by the end of a year from the time of the strike he found himself with a full equipment of excellent men, working at good wages, and not bound by oath to try to destroy his business at a signal from a scheming demagogue. On finding that their bullying had not worked as they thought it would, the Union managers next resorted, as usual, to small talk. One night Mr. Carew's shop was broken into, and all his tools taken to the edge of the harbor and thrown into the bay. Then followed libellous attacks in the newspapers, which were persuaded to say that Mr. Carew had put bad work into the stone furnished for one of the city buildings, and that his reputation was suffering a great deal. He was invited to laugh at these attempts to injure him, and accordingly, instead of retorting, he abandoned the shop.

In another column will be found some account of the curriculum followed in the architectural department of the Massachusetts Institute of Technology which was prepared some weeks ago and consequently has not been brought down to date. Since it was written Professor Clark only has retired and has been succeeded by Mr. F. W. Chandler, the first-named gentleman resuming the practice of his profession which had been partly interrupted by the demands made on him by the work at the Institute, while Mr. Chandler on the other hand abandons——for the present at least——all architectural practice to devote himself entirely to his new work. For ten years more Mr. Chandler has been associated with Mr. E. C. Cabot, passing to that office from the office of the Supervising Architect at Washington where he was for some time head-draftsman during the incumbency of Mr. Mullet. Before this he had been for several years in the office of Ware and Brant, and during this time he spent at least one year as assistant to Professor Ware in the early years of the evolution of the department at the Institute. So he takes up the work not only as an architect of thorough training and much practical experience but also as one who has already had experience in the task of training adolescent architects. In deciding against making the attempt to “ride two horses” as both his predecessors have done, Mr. Chandler decides most wisely. There is enough to be done in such a place to occupy a man’s full time, and the character of the work at the Institute being such a school of real architecture, the times demand a greatly increased interest in that department.

No other person has been thus far employed in this work. The work is one of the profoundest, and most useful, and the character of the Institute is such that it is impossible to make the work agreeably. It is not possible to study a subject thoroughly and at the same time to make it agreeable.

The San Francisco Chapter of the American Institute of Architects has now in hand the subject of Competition. The man of the hands of a special committee, which has not yet made its report, but, as we learn from the California Architect, an informal discussion took place upon it at the last meeting of the Chapter, and some curious facts were mentioned. One member described a case where competitive designs were invited for a large public building. Eleven sets of drawings, comprising seven sheets each, were received, and opened by the committee. Weighing the plans, and after the plans were open, the award was made. As the narrator pointed out, it was impossible that seventy-seven drawings should have been examined, even hurriedly, in one hour by a committee, and the decision could only be that the “successful” competitor had been decided upon without a contest.

We have heard of a committee-man who, in a similar case, was to have received the plans and judged them, and then the architect was to be paid for the work and be made to do the work; and this is very often the sole object of the so-called competitions managed by laymen. According to the San Francisco architects, at least ninety per cent of the public competitions which take place on the Pacific Coast are of this character, but, as the best part of the profession there has taken the subject up, the competition will be brought about before long.
ARCHITECTURAL EDUCATION IN THE UNITED STATES.

I.
The Massachusetts Institute of Technology.

THE Institute of Technology was the first school in the country to open a regularly established department of architecture, which has been sufficiently prosperous to maintain itself. The charter of the institution was granted by the legislature in an act dated April 10th, 1861. The School of Industrial Science was opened in January, 1865, and the Department of Architecture was created in 1866, though there were no regular graduates until 1875. William R. Ware, an architect of Boston and a native of R. M. Hunt of New York, was placed in charge of the department, and continued as its head until 1881, the high position of the Institute being largely due to Prof. Ware's personal influence, and his untiring and enthusiastic work.

He raised the department from nothing to the first rank in the country. On being called to Columbia College, New York, he was succeeded for a time by W. F. P. Longfellow and T. M. Clark as associate professors. Prof. Longfellow, however, retired from the department at the end of a year. Prof. Clark had studied or worked with Mr. Richardson for some seven years and was employed in the building of Trinity Church, Boston, and several of Mr. Richardson's — or more properly Gambrell & Richardson's large works. Both Prof. Ware and Prof. Clark have been seconded in their efforts by the work of an assistant, Prof. Eugene Létang, who was brought over from Paris in 1872, through the efforts of Prof. Ware and has practically had control of the architectural designing and drawing courses, and has contributed very largely to the popularity and success of the department. Prof. Clark has also two assistants, Mr. Homer and Mr. Perkins, who give lectures and supervise the drawing classes.

The courses of study in the Institute are very strictly laid down in the curriculum, and students are not allowed to depart from them. The regular course extends through four years; but, as in nearly all of the architectural schools in the country, it has been found that a great many students are not willing to give so much time to the study of architecture, and a special course has been provided, extending through two years. A large majority of the architectural students content themselves with this course instead of following the more extended one.

The special course as laid down in the catalogue is as follows:

FIRST YEAR.
The Orders and Elements of Architecture.
Sketching and Water-Color.
Mechanical and Free-hand Drawing.
Materials.
Elementary Mechanics.
Architectural History.

SECOND YEAR.
The Orders and Elements of Architecture.
Sketching and Water-Color.
Mechanical and Free-hand Drawing.
Materials.
Elementary Mechanics.
Architectural History.

First Term.
Original Design.
Sketching and Water-Color.
Mechanical and Free-hand Drawing.
Materials.
Elementary Mechanics.
Architectural History.

Second Term.
Original Design.
Sketching and Water-Color.
Mechanical and Free-hand Drawing.
Materials.
Elementary Mechanics.
Architectural History.

The regular course is the same for all departments of the Institute during the first year, and is continued to general studies, with the single exception of a large amount of mechanical and free-hand drawing. No one is allowed to continue in the department of architecture unless he has been in mechanical drawing, including geometrical drawing, shades and shadows and descriptive geometry.

The regular course is as follows:

FIRST YEAR.
Solid Geometry.
Algebra.
General Chemistry.
Chemical Laboratory.
History of the English Language.
English Composition.
French.
German.
Mechanical and Free-hand Drawing.
Military Drill.

SECOND YEAR.
Algebra.
Plane Trigonometry.
General Science.
Chemical Laboratory.
Political History since 1812.
French (or German).
Mechanical and Free-hand Drawing.
Military Drill.

FIRST TERM.
Original Design.
Sketching and Water-Color.
Mechanical and Free-hand Drawing.
Materials.
Elementary Mechanics.
Architectural History.

Second Term.
Original Design.
Sketching and Water-Color.
Mechanical and Free-hand Drawing.
Materials.
Elementary Mechanics.
Architectural History.

FOURTH YEAR.
Advanced Original Design.
Advanced Sketching and Water-Color.
Advanced Mechanical and Free-hand Drawing.
Advanced Materials.
Advanced Elementary Mechanics.
Advanced Architectural History.

FIRST TERM.
Advanced Original Design.
Advanced Sketching and Water-Color.
Advanced Mechanical and Free-hand Drawing.
Advanced Materials.
Advanced Elementary Mechanics.
Advanced Architectural History.

SECOND TERM.
Advanced Original Design.
Advanced Sketching and Water-Color.
Advanced Mechanical and Free-hand Drawing.
Advanced Materials.
Advanced Elementary Mechanics.
Advanced Architectural History.

The two-year special course thus includes the mechanical and free-hand drawing of the first year of the regular course, the drawing and design of the regular second and third year, and the more strictly professional lectures of the second, third and fourth years, with a practical course of its own in trigonometry and graphical studies, without the higher mathematics, which are pursued quite extensively during the four years' course. Prof. Clark does not altogether approve of the idea of having separate courses, but the majority of students now prefer them so that it is doubtful if any decided change will be made at present.

It should be seen that the course comprises, practically, quite an extended university education in addition to the technical studies directly related to architecture. The school begins in the morning at nine o'clock and last until about five, giving, on an average, seven hours daily devoted to study and drawing. Of the total time during the whole course, 269 hours are given to pure mathematics; 110 to applied mathematics; 429 to languages; 530 to miscellaneous studies, such as geology, history, physics, etc.; 326 to lectures upon the theory of architecture; 165 to construction; and the balance of 3269 hours to drawing and designing. In other words, general university studies occupy 1513 hours or 25 per cent; the theory of architecture 496 hours or 10 per cent; and the classes being so large it is difficult to get the utmost good from such opportunities. In the lecture on working-drawings Prof. Clark has insisted that a well-organized foundation in the use of the tools and designing, and 3269 hours or 65 per cent of the time for the entire course. It should be said, however, in regard to this classification, that it is somewhat arbitrary and the student is required to take a course of study every year extended 87

The study of construction is included under the various heads of materials, working-drawings, iron-structure, etc. These topics are handled entirely by Prof. Clark in the shape of lectures. In addition to the lectures, the classes are taken out to inspect buildings in progress of erection, although these excursions are purely voluntary, and the classes being so large it is difficult to get the utmost good from such opportunities. In the lecture on working-drawings Prof. Clark has insisted that a well-organized foundation in the use of the tools and designing, which have been prepared for the purpose, illustrating the general principles of ordinary wood and masonry construction. The students are required to prepare one drawing a week illustrating definite and practical problems, and, in addition, there is one lecture a week on variations in local practice. Besides this, the class, as a whole, is required to prepare and draw out an entire set of framing plans for some rather extended building. The subject of piling, foundations, etc., is taken up in the form of lectures, with two or three hours a week devoted to architectural problems and calculations.

It will be seen that, with the single exception of mechanical drawing in the first year, there is no drawing, as such, taught in the architectural department. There is, however, considerable practice in drawing, which, of necessity, forms a part of the other studies. The drawing mentioned in the study of the second year is that connected with the study of the orders. All of the students are required to have a copy of Vignola and the orders are drawn out using it as a reference, the size of the module being given by the professor. A set of detailed studies of rooms is required to prepare one or two plates every week, and are given a pretty thorough drill in the orders. The "elements of architecture" refer to the studies of proportions of building, generally involving also studies of the orders, and the drawings are made of the study of shades, shadow, and perspective is also properly drawing, although only incidentally so, the theory and practice of perspective being considered purely with architectural drawings. Sketching, noted during the second term of the second year, is optional with the student, and is designed to be entirely outdoor work. During the third and fourth year the student has considerable practice in sketching and water-color drawing. The classes are under the direction of Mr. Ross Turner, and are allowed two hours each week, this being supplemented by occasional sketching trips during pleasant weather. Another study, which implies considerable
drawing, is classified in the catalogue as "lectures on fine art." This is merely a name to designate a number of different features introduced into the department from year to year. At present, it consists of exercises in rendering in pen-and-ink. Each student is given a blank sheet of paper, a pencil, and a supply of pen-and-ink, an outline of some simple building, and one or two hours, according to the problem, is allowed for simply rendering the drawing. After a second or third visit to the class, under the direction of Mr. D. A. Gregory, extends through the year.

Original designing is begun in the second term of the second year. The first lesson is to make a sketch simple in outline, generally limited to portions of buildings, such as a porch, a portico, dormers, etc. The practice in designing is continued through all the course of the year, the nature of the problems being gradually increased to meet the possibilities of the work. This work is judged by various architects from Boston and vicinity, who are appointed by a regular committee of the Boston Society of Architecture, to develop the talent of the student. The student, the same system is used at the Institute that is in vogue at the School of Fine Arts in Paris. Every month three days are given to the preparation of a sketch in accordance with a programme which is posted up in the drawing-room. All students are allowed one month in which to develop the sketch into finished drawings, adherence to the original scheme being obligatory. The final drawings are required to be handed in very promptly. If the student is behind time he is allowed twenty-four hours in which to make up, but is only allowed half the credits he might have gained on that particular problem. A few of the actual problems may be of interest. The plan was illustrated the style of work which the students are required to follow.

A Park Entrance. — "The principal entrance into a large park located on a high point, is to be the northern end of the street. The building over the entrance is not more than ten or fifteen feet deep, and consists of three equal arches ten feet wide in clear for carriages, with rooms on each side for keepers, police, etc. The principal line of the arches is the same as the distance between centres of the arches, thus making five equal divisions of the building. The surface above the arches is treated with an attic and suitable figures of a good sky-line. On each side of the main building are entrances for people on foot, these entrances to be covered or not as chosen. All the entrances are to be closed with iron gates, and an iron fence or stone wall placed around the park. The entrance is to be chosen as close to the building, and elevation ½ inch scale. Finished design the same, 1 inch scale."

This problem was for the second year. The following was for the third.

A Gardener's Cottage. — "This little, one-story stone house, is supposed to be built by a gentleman, for his gardener, in the neighborhood of his garden. It will contain, below stairs, veranda on one side of the house, vestibule, stairs, two rooms, viz., sitting-room and kitchen, supplied with closets. The front door opens into the sitting-room, the back door into kitchen. Also an open shed for washing, with tool-room and water-closet. Up stairs are to be managed in such a way as not to be a disadvantage to the family. The other rooms are to be lighted by large dormers. Required: 2 elevation ½ inch scale, 2 plans ½ inch scale."

The history of architecture, Ferguson is used as text-book. The recitations are from about one-third of the chapters in the book and are supplemented by lectures and illustrations or lantern slides. The history of architecture is at present, taught by Mr. H. M. Turner, and Mr. Horace W. Walker. The following subjects are covered: Greek architecture, Roman architecture, Gothic architecture, and Renaissance. This is all illustrated by inspection of actual examples in the city theatres and school-houses. Stereotomy is also an outside study comprising drawing the different architectural parts of buildings.

The architectural department occupies the greater portion of the second floor of the new building of the Institute, at the corner of Clarendon and Boylston streets. There is a large drawing-room with space for about seventy desks. There is also another drawing-room, fitted up with fourteen desks which are reserved for advanced students and those working for a degree. Opening directly from the main drawing-room is the department library comprising six hundred volumes, fifty volumes, in three languages, which are borrowed from books. The library and photographs are entirely free to the students, who are encouraged to use the collections very freely. There is also, quarterly collection of casts and models of architectural objects, and a very fine lot of French school drawings, including some of the "Envois de Rome," which were secured by Professor Ware, some years since, in Paris. In addition to the special library, several thousand photographs, prints, drawings, and casts have been collected to form a nucleus for an architectural museum, by means of a special fund raised for the purpose. This includes many of the most beautiful and popular architectural objects, many of them acquired by purchases or gifts. Models and illustrations of architectural detail and materials are arranged in the rooms of the department, but the chief collection is to be found in the collection of casts and architectural sculptures, and detail, belonging to the department has been, for want of space in the Institute buildings, deposited in the Museum of Fine Arts, together with the architectural collections belonging to the Museum. The students of the department have free access, or at all times, and as the Museum building is close at hand, no inconvenience results from the change.

To be admitted as a regular student in the first-year class, the applicant must have attained the age of seventeen years, and must pass a satisfactory examination in arithmetic, algebra, plane geometry, French, English grammar and composition, and history and geography. To be admitted to the second or third regular student who is to be admitted for the school, third or fourth year, the applicant for this advanced standing must have attained the proper age (eighteen, nineteen, and twenty years respectively), must have satisfied the requirements for admission to the first-year class, and examinations on all of the subjects given in the earlier years of the course which he desires to enter. Graduates of colleges are admitted to the Institute without examination, and are permitted to enroll for such courses as such point as their previous range of studies shall allow.

The number of regular students last year in the department of architecture was seventeen, and in the second year student, numbered forty, and as the Museum building is close at hand, no inconvenience results from the change.

The degree of Bachelor of Science is conferred upon the students in the regular course who pass a satisfactory examination in the prescribed subjects and in addition presents a satisfactory original design accomplished by an explanatory memorandum.

Every student is required, on entering the school, to file with the treasurer a bond in the sum of one hundred dollars, signed by two responsible sureties, one of whom must be a citizen of the United States, as security for the payment of all the bills of the Massachusetts Institute of Technology, and any of the books and materials furnished, and a deposit of fifty dollars, as security, will be accepted. No officer of instruction, or student of the Institute will be received as surety.

The tuition-fee for regular students is $200 per year, and must be paid in advance at the Institute on the 1st of September. If the student does not pay the fee by the 15th of September, $50 will be deducted from the fee, and if the student does not pay the $50 or before February 10. For one-half or any fraction of a year, the fee is $125. Payment is also required of the cost of the apparatus injured in the laboratory, books, and all materials used in the Institute during any year is, therefore, as follows, exclusive of expenses during vacation, and all personal expenses:—

<table>
<thead>
<tr>
<th>Item</th>
<th>Fee</th>
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<tbody>
<tr>
<td>Tuition</td>
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</tr>
<tr>
<td>Books and material</td>
<td></td>
</tr>
<tr>
<td>Board and Room at $8 per week</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$200</td>
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</tbody>
</table>

It would be difficult to accomplish the course at less cost than this, and we fancy the majority of students will find the cost very reasonable. The Boston Society of Architects has founded two prizes of $500 -
ON ARCHITECTURAL MATTERS IN SWEDEN.

When a country is developing under generally good conditions of social ease and peace, and in the building industry terms with its neighbors there is every prospect of progress in art generally and in the art of architecture especially. This is at present the case with Sweden. This country, however, is by its remote situation and its small size generally only little known to the outside world. It is off the ordinary route of commerce and far from the political centre of Europe, but yet a country that has for seventy years been at perfect peace. It has therefore had time to develop all its natural forces and pay all possible attention to domestic matters, to industry, agriculture and building. It is more and more visited by strangers, which shows that the country arrogates from the outside world is increasing and that people want not only to know the country by hearsay, but to see it and make their own investigations. As proof of progress it may be mentioned that it has, during the window-decade, enlarged and beautified its cities to a good extent, especially its capital, where a great building boom has prevailed these several years.

Sweden has not always been of its present size. There was a time when it deserved a place at the side of the great powers. It had defeated Germany and other powers after many and long-lasting wars, and from the beginning of the seventeenth century it held possession of the Baltic Sea from some northern parts of Prussia up to and including Finland. During that century immense wealth was brought into the country, which led to an amount of building and ornamentation, which outshone any other time in the history of the country. Strongholds, castles and churches were erected in a most solid way, and many fine examples of architecture of this past time worthy of attention are still left.

There is a little island in the Baltic Sea called Gotland, which, singularly enough, was at that time quite inundated with new buildings of all kinds. The cause was this: its abundance of building materials, its splendid soother climatic, which is rather different from that of the continent, and its location, as all the merchandise from the East had to pass this way over to the Continent, and so kept up business and made the small place progressive. The architects of the place, although slow making changes, are used to an extent that has acquired a character of its own, and consequently this is the only part of the country that has in marked degree been the object of special studies by foreign experts, and hence, the limit of which is that a country building must generally be of a character different from that of a country house. It gets a character of calmness, earnestness and regularity, while the country house, the big castle or the small cottage, do not know any law of that which is lived in, but are given a lively and somewhat attractive impression merely by their well-detailed masses, even if the architecture be defective.

Sweden has one building-law common to all cities and towns, giving rules of general character, besides an especial law for each on account of differing wants, while the capital has one still more specific and detailed. The present building-laws of Sweden, though, leave much to desire and are likely to be submitted in the near future to some changes to better meet the demands of the present time. For instance, the height of all buildings is very limited, so that the height of the street, but never exceeds five stories. Still, allowance can be made for important private or public buildings which are to be built free on all sides.

The town ordinance is very well provided for. For instance, large yards are prescribed and building is not allowed on more than two-thirds of the whole site, the surface of the yard must not be less than 1900 square feet, and the main part of the same less than forty feet by sixty. The law mentions of any shape or size whatever in the new part of the city, but can, under certain circumstances, be allowed in some of the old parts. Concerning the roof and its construction, it is regulated by the law. The pitch of the roof is not allowed to be more than two-fifths of the width of the part of the building it covers, and the massed roof is not allowed on dwellings houses. All drawings must be submitted to a purpose department, and all building is supervised by inspectors from this department.

Stockholm the building-lots are generally very expensive, and that causes the owners always to erect their buildings as high as the law allows. Consequently, the cornices of all buildings form almost one continuous line, which is almost as bad looking as the too great differences in height of buildings to be seen in New York and other cities of this country. An owner of a building or a tenant never occupies the whole house for himself, but merely one story, consisting of six to twelve rooms according to different circumstances. The tenement-houses are generally well arranged, at least those erected during the last decade, and give in many cases real comfort to the lower class of people, who have been benefited greatly by the progress in building.

The tenement-houses are generally well arranged, at least those erected during the last decade, and give in many cases real comfort to the lower class of people, who have been benefited greatly by the progress in building. The rooms are generally two or three windows, which seem almost to be the regular width of the American city dwellings-houses.

The buildings are generally erected in a careful and solid way with especial regard to keeping the houses warm and comfortable during the cold season. Still, during the winter time it is very seldom, if ever, so cold as it is here. The windows are well planned to keep the cold out. So-called French windows are always used, with a post in the middle, and the both halves opening outwards. In winter time two sets of window-sashes are used, put about three inches apart, so constructed as to make it easy to fix a loose sash to the inner side of the frame. It was very much the fashion some time ago to have all the rooms in one line in order to give a new perspective view of the rooms from one end to the other, but now the idea has been more and more abandoned, and the fashion is to have the rooms arranged around the hall, from which it is desirable to have entrance to as many rooms as possible.

A special feature of each room is the brick stove, which has nearly the same height as the room itself. They are built up of bricks of a certain size and of plain or moulded pieces of burnt clay of a special kind, which are polished and glazed on the surface, and also of many small square bricks of burnt clay, used for decoration, and therefore those stoves are often found very costly, but are also truly considered as a real ornament in the room.

The chimney is as much a part of the house as the stairs, and as elevators are with few exceptions not used, but instead the stairs are constructed with a considerable width, and much attention is generally paid to the arrangement of the hall and staircase together to give it plenty of light and air.

Nature favors builders with an abundant supply of the best of building stones, good clay for artificial stone and terra-cotta, while the large forests furnish the best kinds of timber, of any desirable size. Granite is exclusively used for foundations and main doorways, and also, although seldom, as face-stone. Limestone and sandstone are more used as facing for buildings, as mouldings, ornaments, and window-frames. The Island of Gotland is almost entirely one big rock of sand and lime stone.

The country does not supply the whole amount of face-brick, which is required for building in the cities and large towns. The face-brick is only sparsely used strange to say — strange, because there is an abundance of good clay over the whole country but the activity in raising that industry has as yet been very slow.

The face-brick is used in building almost exclusively. The building of which has been greatly improved during the last years. Not only for mouldings and ornaments, but for floors, window-frames, steps and stairs, made in whole house but is also used in common use and is very often ornamented in color and polished, which gives a smooth and nice-looking surface.

The cost of common brick is eight dollars and upwards per thousand and, of course, of face-brick, twice as much. The average contractor usually counts for common good brickwork, laid in lime-mortar, twenty cents per cubic foot. The workman is paid both by the contractor by contract, or by the week, and there is to be taken especial care in the erection of a building. A good bricklayer then earns about $1.75 a day. In making contract he usually gets from $6.00 to $7.00 for the work of putting 1000 brick into the wall.

Tower at Leyden. From Architektonische Rundschau.
The architectural training in Sweden is on a good standing. Most of the architects are thoroughly trained, not only having spent many years at the schools and university of architecture at home but abroad in Italy, France or Germany, and are generally well-prepared for their practice before starting. At the schools more stress is generally laid on teaching of matters of style and the aesthetic part of architecture than to matters of construction.

The charges of the architect are generally different for different kinds of work, but on an average three per cent of the cost of building.

In speaking of architectural matters we ought to mention the King's palace at Stockholm, although begun in the last century, and completed in the beginning of this century. It was built by Tessin, undoubtedly one of the most prominent artists of his age, even compared with those of other countries. The vast structure makes a rich and grand impression, and is considered one of the most beautiful, in the world, by its situation with plenty of surrounding water, its majestic extent, and by the harmony of all its different parts.

During this decade building has been carried out on a great scale in all the larger cities, and especially in Stockholm, and in all buildings have generally been used all improvements of our time in order to make structures solid and life comfortable, while the elevations show good and carefully-studied work. **Martin Borstad**.

### Illustrations

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

**HOUSE OF N. Y. B. THAYER, ESQ., LANCASTER, MASS. MESSRS. ANDREWS & JAQUES, ARCHITECTS, BOSTON, MASS.**

**Gelatine Prints, Issued only with the Imperial Edition.**

**LADIES' HALL, LAWRENCE UNIVERSITY, APPLETON, WIS. MR. WARREN H. HAYES, ARCHITECT, MINNEAPOLIS, MINN.**

This building is to cost $25,000.

**ENTRANCE TO BISHOP'S PALACE, SENS, FRANCE.—DETAILS OF CEILINGS AT BOURGES AND EYREUX, FRANCE. DRAWN BY MR. J. A. SCHWEINFURTH, ARCHITECT, BOSTON, MASS.**

These illustrations are reproduced from "Sixtuses Abond."

**MAIN HALL, IN "ROCKWOOD HALL," TARRYTOWN-ON-HUDSON, FOR W. ROCKFELLER, ESQ., N. Y. MESSRS. CAREBRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.**

Hall in quartered oak, marble mosaic floor, modelled ceiling and marble stairs. This work in a slightly modified form is now being built.

**THE ROYAL LIBRARY.—THE OLD HOUSE OF LORDS.—THE NATIONAL MUSEUM AND ST. CATHARINES CHURCH, STOCKHOLM, SWEDEN.**

**HOUSE BUILT IN CONNECTICUT, IN 1880. MR. C. E. CASSELL, ARCHITECT, BALTIMORE, MD.**


These experiments consisted of observing the changes in weights of a number of samples of kiln-dried woods which took place upon their exposure to comparatively slight changes in atmospheric conditions.

The following kinds of woods were used:

<table>
<thead>
<tr>
<th>Wood</th>
<th>Dimension</th>
<th>Weight</th>
<th>Specific Gravity</th>
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<tbody>
<tr>
<td>Whitewood</td>
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<tr>
<td>Lebanese mahogany</td>
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</tr>
<tr>
<td>White pine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black walnut</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherry</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Several weeks prior to weighing the samples were kept in a dry, well-ventilated building.

The air of the room in which the samples had been kept was evidently somewhat dryer than in the balance-room, which is shown by the cherry sample immediately gaining in weight as soon as placed upon the balances. The other samples were not examined in so great detail, although the same behavior was shown by each after a greater interval of time had elapsed.

### Details of the Weighings.

#### Whitewood.

<table>
<thead>
<tr>
<th>No.</th>
<th>Interval of time, in hours.</th>
<th>Successive gains, in grams.</th>
<th>Total gain, in grams.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>H. M.</td>
<td></td>
<td>1.10</td>
</tr>
<tr>
<td>2</td>
<td>42</td>
<td>0.068</td>
<td>0.068</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>-0.008</td>
<td>-0.008</td>
</tr>
<tr>
<td>4</td>
<td>46</td>
<td>0.062</td>
<td>0.062</td>
</tr>
<tr>
<td>5</td>
<td>54</td>
<td>0.062</td>
<td>0.062</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>0.062</td>
<td>0.062</td>
</tr>
</tbody>
</table>

After weighing over night.

#### White Pine.

<table>
<thead>
<tr>
<th>No.</th>
<th>Interval of time, in hours.</th>
<th>Successive gains, in grams.</th>
<th>Total gain, in grams.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>H. M.</td>
<td></td>
<td>1.01</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>3</td>
<td>42</td>
<td>0.008</td>
<td>0.008</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
<td>-0.006</td>
<td>-0.006</td>
</tr>
<tr>
<td>5</td>
<td>78</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>7</td>
<td>12</td>
<td>0.006</td>
<td>0.006</td>
</tr>
</tbody>
</table>

After weighing over night.

#### Black Walnut.

<table>
<thead>
<tr>
<th>No.</th>
<th>Interval of time, in hours.</th>
<th>Successive gains, in grams.</th>
<th>Total gain, in grams.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>H. M.</td>
<td></td>
<td>1.03</td>
</tr>
<tr>
<td>9</td>
<td>20</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>-0.006</td>
<td>-0.006</td>
</tr>
<tr>
<td>11</td>
<td>7</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>12</td>
<td>10</td>
<td>0.006</td>
<td>0.006</td>
</tr>
</tbody>
</table>

One hour on ground floor.

#### Cherry.

<table>
<thead>
<tr>
<th>No.</th>
<th>Interval of time, in hours.</th>
<th>Successive gains, in grams.</th>
<th>Total gain, in grams.</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>H. M.</td>
<td></td>
<td>1.05</td>
</tr>
<tr>
<td>14</td>
<td>20</td>
<td>0.008</td>
<td>0.008</td>
</tr>
<tr>
<td>15</td>
<td>10</td>
<td>0.008</td>
<td>0.008</td>
</tr>
<tr>
<td>16</td>
<td>19</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>17</td>
<td>20</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>18</td>
<td>21</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>19</td>
<td>22</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>0.207</td>
<td>0.207</td>
</tr>
</tbody>
</table>

One day on ground floor.

In the first table the dimensions are given in the order of width, thickness and length for each sample: their weights as first taken and specific gravities computed therefrom.

In the tabulations of the details of the weighings are given the intervals of time between each weighing and the gain or loss in weight. Losses are indicated by minus signs, and in the column of remarks, what treatment the samples had been subjected to. It will be understood that the samples remained in the balance-room after weighing began, unless stated otherwise.

The treatment of the cherry wood was, after the fourteenth weighing, substantially the same as of the others after the second weighing.
St. Catherine's Church, Stockholm.

"The Old House of Lords, Stockholm."
During the interval between the last two weighings, the samples
were submerged in boiling water where they kept twenty
minutes, the water was then cooled to about eighty degrees Fahrenheit,
the samples removed and immediately weighted.
The first three samples behaved very much alike in the early
weighings, also the cherry for corresponding weighings, but the
several woods differed in the degree to which they were affecting
The whitewood, white pine and black walnut at first gained in
weight, then lost slightly, gained over night and during the following
day. The loss occurred in the afternoon. Taken to the ground-
floor of the same building and there kept one day, and there was a
great increase than before.
Up to this time the greatest gain was about the same in each sample,
although in per cent the walnut had gained the least, on account of
its higher specific gravity.
After submersion a radical difference was found, the walnut
 gained the least, the whitewood had gained nearly twice as much as
the walnut, and the pine gained nearly twice as much as the white-
wood.
This was explained when the samples were split longitudinally, the
water had penetrated the walnut endwise to a depth of only .25", the
 whitewood to a depth of .22", and the pine to a depth of .46".
The cherry sample was weighed at frequent intervals when first
placed on the balances. It gained rapidly in weight, but at a dimin-
ishing rate as it approached the limit of saturation in that atmos-
phere, but when, however, it was removed to the ground-floor of the
building, a somewhat drier atmosphere prevailing, it again gained
rapidly. Returned to the balance-room and there was loss in weight.
Exposed to the sun's rays and a dry brisk wind and there was a
larger loss of the total gain thus far observed. A thin chipping
in location were then made, each producing results in accordance
with previous experience. So sensitive was this wood to change in
weight that it would seem quite possible to accurately tell where the
sawn was taken off from the balance-room to other parts of the building,
or to the outside air and returned again to the balance-room. In some buildings the difference in the relative damp-
ness of the several floors might be shown.
After the twelfth weighing the cherry sample was taken to the
building in which originally kept, and there remained over night,
within which time there was a loss of .350 mg.
Notwithstanding there was a shower of rain in the meantime, the
relative humidity of the atmosphere ranged from 59 to 64 per cent,
the thermometer indicating from 70 to 84 degrees Fahrenheit during
the time the experiments were in progress.
After submersion this sample was found to have gained the total of
35.8621 grammes, or more than its original weight. It is seen that
the present weight exceeds an equal volume of water.
When split longitudinally every part of the wood seemed to have
been wet, the penetration or moisture was apparently complete.
The description of these tests have been given somewhat minutely,
in order to clearly indicate what changes go on in a brief space of
time, and without large changes of atmospheric conditions. Were
the observations extended over a longer period, or from season to
season, greater differences in weights would be expected.
19784 per square inch under ordinary circumstances seems to be
affected by the amount of surface accessible to the air, of which
surface the outside parts of the sample form only a limited propor-
tion.
A specimen might have low specific gravity, and actually contain
only a small amount of woody fibre, yet its structure be such as to
prevent the free circulation of air through it, and, therefore, not ex-
perience much surface on which condensation may take place.
In the tests, we see the cherry-wood, low in specific gravity, it
is true for its kind of wood, absorbing moisture at a more rapid rate
than the softer whitewood and pine samples, and further the denser
walnut bearing a very close resemblance to the whitewood up to
the time of submersion in boiling-water.
Not enough is shown at this time to say whether the woods bear
the same relation to each other in regard to imparting their moisture
as in absorbing the same.
Closely allied to the subject of the absorption of moisture is the sub-
ject of expansion and contraction, or, as generally spoken of, the
shrinking and swelling of wood.
It may be inferred that the amount of moisture absorbed will not
always be correctly indicated by the swelling of the wood.
The impression seems to hold among woodworkers that cherry
retains its shape rather better than whitewood, or in the reverse
order of their rates of absorption here shown.
The expansion of wood and its elasticity in a transverse direction is
an important question.
Where it is essential to maintain close joints, such information
would enable us to say whether it was possible or not to secure this
effect in any given kind of wood, and it is of interest to know what
amount of lateral compression would be necessary to hold the wood
in place. Obviously the range in elastic movement under lateral
compression must be greater than the range in shrinking and swelling
due to shrinkage and swelling, to make it possible to keep the joints
together at all times.

The Subway Problem in Great Britain.

I n all that follows it is well to remember that all wires except the
telephone are "in a circuit." One wire will operate a great
many telegraph instruments, electric-lights, "tickers," or messen-
ger-calls, but, practically, every one of the 700 telephones in use in
New York city has its separate wire. In New York we have doubt-
less 30,000 miles of wire, of which eighty per cent are telephone con-
ductors. In London, with four times our population, there are not
over 10,000 miles of wire, of which 11,000 miles are telegraph wires
and 7,000, or thirty-seven per cent, telephone. Of the former but
8 miles are above the ground. Of the 7,000 miles of telephone
wires in London all are overhead, excepting those operated as pri-
ivate lines by the Post-Office Department, which are underground
in the same conduits as the telegraph. In the whole of the United
Kingdom there were last year about 27,000 miles of telegraph wire,
of which about 20,000 miles, seventy-four per cent, are underground.
Comparing New York with London, the first striking difference we
find in the relative proportion of telephone to telegraph wires.
This must be remembered, for it constitutes the chief difference in
the underground problem as between the two cities.
The telephone in England, comparatively speaking, is still a luxury, electric mes-
senger-service is practically unknown, and electric street-lighting in
embryo.
On the Continent the Government has, as a rule, been more liberal
to the telephone interests. Comparing Stockholm and Edinburgh,
for instance, each with about the same number of inhabitants, we
find that while in the former there are over 5,000 subscribers to the
Telephone Exchange, in the latter there are about 400. On January
1, 1886, there were about 355,518 telephone receivers and transmi-
ters in use in the United States under license from the Bell Company.
In Great Britain there were on the same date 184 exchanges with
19,784 subscribers. As has already been intimated, little has been
done in London towards the burying of any wires except those of the
telegraph proper.
It will be interesting to compare the relative demands of telegraph
service in the two cities. The Associated Press dispatches from
New York are said to average daily over Western Union wires alone
2,900,000 words. The maximum newspaper work reported by the
Government telegraph authorities in London was, on the day of
Gladiators's great speech on home rule, April 18, 1886, 1,050,000
words. The day the Emperor William died, by the way, there were
sent off from the Berlin telegraph office 29,878 messages, aggregating

J. E. Howard.
Mr. Preece frankly stated this objection to the iron-pipe system, and said that he "would welcome any change that offered possible improvement. The chief thing in favor of iron was the "protective" or "fireproof" quality of its material and its comparative cheapness."

"Increasing the size of the conductor was of benefit, and some experiments with a large wire heavily insulated with "cathode's 'bit'" and laid in asphalt, have given tests that were interesting and promised well when more fully tested by the Government."

The experience of London is that of nearly all the English cities: telephone and electrical wires overhead, telegraph principally underground. Newcastle, however, is an exception. Here, at the very outset, the telephone company put all its wires below ground in the inevitable iron-pipe. There is but one example of inserting such wires in Great Britain, and it is that of a few miles of wire radiate to the 700 or 800 subscribers, who are within three-quarters of a mile of the exchange. Now 16 and 18 copper wires are used, quite heavily insulated and buoyant in water, but the electric company, however, have decided to throw down all the old wires and replace them with a single cable of 720 miles in England, and the other is in the United States. Other large cities are said to be on the point of burying telephone wires and have already put nearly all their telegraph wires underground.

However, the whole situation today in Europe, including Great Britain, may be summed up as follows:

Telegraph service, overhead, small copper wires on neat standards upon house-tops, owners compensated for use of roof. Poles only allowed where roof service is impossible.

Telegraph service, largely underground in England and on house-tops elsewhere.

Electric (are) light service practically all overhead.

And in conclusion it may be said that so complex and intricate a tangle as the subway problem in New York is not even dreamed of in Europe, much less solved. With our growing cities of electricity, we have our district-message systems, and our underground electric systems.

The want of connections is a serious one, and the great demand for electric light and power are in the same category as that for telegraphy, and the problem is equally serious. and the consumption of our commercial life. We think the problem of their difficult today. What will it be when every man has a telephone in his house; when gas-light within, as well as without, gives way to the electric-light; when our streets are lit by arc lights and metropolis like the threads of a gigantic spider's web, including and connecting neighboring cities and growing towns and even distant cities, already stretches a network of wires, in which the question of their entire length, is almost inextricably involved. In 1891 there were 1,115,551 miles of wire, and the total number of miles of iron-pipe, 9,000,000 miles, the length of the telephone wires, 6,000,000 miles, and the shortest, current produced by such a telephone is only four hundred-thousand pounds as strong as the ordinary telephone current will give distinct, audible articulation.

Two facts are apparent from our brief comparison:

1. (Successful) under-ground electrical service is today in London chiefly a question of telegraphy, while in New York it is chiefly one of successful telephone service.

The method and experience of London, whatever we shall find them to be, cannot be taken as an infallible guide for our New York conditions.

2. All the unquestioned attendant drawbacks, I shall take it for granted that no one here still honestly persists in believing that success-ful underground service is impossible even for the telephone, while we used not so far as is generally supposed. The Postmaster-General has now under his consideration a scheme for using underground service,

The laws that govern the transmission of speech are not thoroughly known and the facts are few. But in the field of underground telegraphy, we have much evidence of the great advantage of putting a wire in a conduit, and the overhead proportion as compared with the underground steadily diminishes."

In London and in Edinburgh, as in Brussels, Antwerp and other large Continental cities, the telephone wires are overhead, not, to be sure, in the streets, but, nevertheless, in the air; they are upon the house-tops. The telephone companies obtain permission from the owners to erect wooden or iron supports upon the roofs, and some of these carry over two hundred and fifty wires each. While this network of wires is visible from the streets when they cross over from block to block, they are invisible in the way from the windows of houses, nor are poles erected in the same way for telephone wires.

Next to a subterranean system, this is by far the most satisfactory method of stringing wires, to the public. Then, too, in London, copper or bronze wires are used instead of the larger iron conductors. In Paris the problem solved itself, for the electricians found the great system of sewers ready for them, and all the wires are strung upon their arches or sides, as accessible almost as if in a telephone is on only four hundred-thousand pounds as strong as the ordinary telephone current will give distinct, audible articulation.

Now, examining the London system, let us answer the practical American question, "How does it work?"

From the point of view of the practical electricians, the best and certainly the cheapest insulation in the world is dry air, and ideal electricity can be conveyed over any distance most nearly attained on a clear winter's day with a naked, overhead copper wire. Compared with an overhead system even in the moist climate of England, Mr. Preece well knows that we have been led to believe that an underground system is ten times, more efficient, commercially, or, as he puts it, "its cost is four times as great and its capacity one-fourth." Or, to put this in working figures: Between London and Edinburgh the distance is some six miles, and the two central telegraph offices thirteen miles of this distance are underground, while the remaining 577 miles are overhead. Between the points where the services is entirely 390 miles, the Doncaster's multiplex works six ways from Doncaster, as far as twenty miles from the central offices, partly underground, it works only four ways, that is, all overhead, 450 words per minute; partly through iron-pipes, 100 words per minute. This great in efficiency, be it remembered, is considered in connection with the telephone conductors only. Under similar conditions it is but fair to suppose that long-distance telephonic communication at least would be almost impossible.
express the relation in the above nomenclature and

\[ p = \frac{R}{41.67} \]

reducing gives the formula:

\[ p = \frac{R}{41.67} \]

or, with sufficient accuracy,

\[ p = \frac{R}{416.7} \]

The projection available with any given thickness, or the thick-
ness required for any given projection, may easily be computed by
the above relation. Notice that the offset given by the above for-

mula is the projection for which the stone would be on the point of
breaking and not that which may be safely used.

The margin to be allowed for safety will depend upon the care
used in constructing the wall, in selecting the materials, and in bed-
ing and placing the footings. If all the loads have been allowed for at their probable maximum values, and if the material is
to be reasonably uniform in quality and to be laid with care, then a
considerable safety margin is given for the convenience of those
who may wish to use 10 as a factor-of-safety.

SAFE OFFSET FOR MASONRY FOOTING-COURSES, IN TERMS OF THE

THICKNESS, USING A FACTOR-OF-SAFETY OF TEN.

<table>
<thead>
<tr>
<th>KIND OF STONE</th>
<th>Offset for a pressure in tons per sq. ft. on the bottom of the course.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R in lbs.</td>
</tr>
<tr>
<td>limestone</td>
<td>2.00</td>
</tr>
<tr>
<td>granite</td>
<td>1.60</td>
</tr>
<tr>
<td>lime stone</td>
<td>2.00</td>
</tr>
<tr>
<td>sandstone</td>
<td>1.50</td>
</tr>
<tr>
<td>slate</td>
<td>1.00</td>
</tr>
<tr>
<td>best hard brick</td>
<td>1.20</td>
</tr>
<tr>
<td>hard brick</td>
<td>1.00</td>
</tr>
<tr>
<td>concrete</td>
<td>1.00</td>
</tr>
<tr>
<td>(1 part Portland cement and 2 parts sand)</td>
<td>10 days old</td>
</tr>
<tr>
<td></td>
<td>80</td>
</tr>
</tbody>
</table>

To illustrate the method of using the above table: assumed that it
is desired to determine the offset for a limestone footing-course, when
the pressure on the bed of the foundation is one ton per square foot.
From the second column of the above table, opposite limestone, we
find the quantity 2.0. This shows that, under the conditions stated, the offset may be 2.0 times the thickness of the course.

If it is desired to use any other factor-of-safety, it is only neces-
sary to substitute for \( R \) in the preceding formula the desired frac-
tional part of that quantity as given in the second column of the above table. For example, assume, for want of more appropriate data, that it is necessary to use lime-
stone in the foundation and that it is required to contact the foot-
ing-courses as rapidly as possible. Assume, also, that the pressure, \( P \), is 1 ton per square foot, and that the factor-of-safety is 2.

That is, the projection may be 2.3 times the thickness of the course.

The above method is strictly true only when the footing is solid stone. To realize these results it is necessary that no stone should
project more than half its length, and also that each stone should be
well bedded. The results in the table agree very well with the prac-
tice of the principal architects and engineers for hammer-dressed stones laid in good cement mortar.

The preceding results will be applicable to built footing-courses only when the course is less than the safe

The proper projection for rubble masonry lies some-
where between the values given for stone and those given for con-
crete. In the case of large stones, well bedded in good, strong mortar, then the values for this class of masonry will be much

inexposed to traffic. If the rubble consists of small irregular stones laid with Portland or Rosendale cement mortar, then the projection should be much less than that given for concrete.

If the rubble is laid in lime mortar, the footing-course should not
project more than half that allowed when cement mortar is used.

Notice that drawing in the footings of the foundation decreases the area under pressure and consequently increases the pressure per unit of

area; hence, the successive projections should decrease from the bottom upwards.

Ira O. Baker.

...it is no small undertaking to offer to a cautious and exacting pro-

fessional a collection of sketches of European architecture. Possi-

bly the standards of criticism have advanced more rapidly than the art growth which the critics are supposed to guard. At any rate, much more is expected now than was demanded ten or fifteen years ago, and the draughtsman who would seek approval from the

profession must excel not only in the art of draftsmanship but as a

The American Architect and Building News.

BOOKS AND ART.

AUGUST 4, 1888.

It is no small undertaking to offer to a cautious and exac-
ting professional a collection of sketches of European architecture.
Possibly the standards of criticism have advanced more rapidly than the art growth which the critics are supposed to guard. At any rate, much more is expected now than was demanded ten or fifteen years ago, and the draughtsman who would seek approval from the profession must excel not only in the art of draftsmanship but as a...
and intellectual capacity of his offspring and how understandingly he has informed himself as to the real nature of an architect's work. The blame for non-success should really rest as often on the father as on the son, and if the former took proper steps to measurably understand the work and the intended laborer, our offices would be cumbered with fewer incompetents, who can never advance beyond a certain degree of efficiency and usefulness, but must remain through all their lives mere draughtsmen who can be trusted to do only cer-

tain kinds of work, and can never hope to reach the higher grades of that honorable guild, or hope to establish a practice of their own. In other walks of life, however, they might have become as useful and successful as any.

Many a father seeks advice at our hands, as he does at the hands of other architects, and we think that in future we will suggest that if both father and son will carefully examine the book on architectural drawing written by Mr. Spiers they will both be helped in reaching a decision, for it will show very clearly what one part of an architect's work is, and will cause the elder to consider whether from what he knows of his son's character it is likely that he can in due time accomplish the results here shown, and will cause the younger to appreciate from the start that even in the matter of drawing persistent hard work lies before him.

The book was never prepared with an idea of being used in this way, and it will probably astonish the author that this use is the first that occurred to us as we turned over the pages. There have been many books written on architectural drawing, but never one like "Architectural Drawing," by R. Phere Spiers, F. S. A. Architect, 1888 Cassell & Co., limited: New York, London, Paris and Melbourne.
this. It is the work of a man whose own skill as a draughtsman is well known, and whose methods and ideas have become crystallized in many years which have been partly occupied in giving advisory instructions to pupils who are using his books for their drawing classes.

Voked Concession

Carried on, for the picture of the man who is the author of the book, but students of this book would probably produce drawings of a similar object in a distinctly dissimilar manner. For instance, instead of drawing the horse's head, for the illustration, all being prepared in the same style—that of the writer or some draughtsman selected by him—these twenty-five full-page plates show how drawings of different classes of work were made by fifteen architects, maps of whom are well known by their work in American and English work. Such men as R. Norman Shaw, H. H. Stannus, Alfred Waterhouse, G. E. Street, Ernest George, D. L. Pearson, G. B. Purdy and others. These drawings were not prepared for this book, but were selected by the author as best illustrating the many different ways in which an architectural drawing can be rendered.

In the same way that illustrated books form the most valuable part of an architect's library, so these plates form the most helpful part of this book, for in the development of the artistic side of his talent the architect has to work through the medium of the pen or the pencil, which can only be altered by setting before the eye an illustration. The support of the contention is advancing with such skill and freedom that the architectural guide to too fast a style of work may be done with pencil and brush than would be the most careful description that Mr. Spiers could contrive.

Back-handed Railway Buildings in Persia. — The opening of the first railway line in Persia, that from Shah-Ablul-Amin, has procured more congratulation than ridicule from the Persians, probably because the absurd side of the whole affair is not properly understood. The only railway line to connect Tehran with the Caspian Sea, is in the hands of a Belgian company. The indolence of the affairs to which we are about to refer, is due obviously less to the sympathetic than to the newness of the vacaries of whose rule are responsible for the present degraded condition of the country. From the Caspian to Tehran is a distance of 500 miles, and seeing that there are no roads worthy of the name between and the Elburz chain has to be crossed, any European would naturally hazard a larger sum of money worked towards Tehran. Particularly as the rails were sent to the Caspian from Europe via the Trans-Caspian Railway. However, regardless of the cost, the Tehran end has been completely neglected; the ridiculing and attempting to connect Tehran through the polar ice seas near the pole. M. Perrin is an astronomer and his precise and exact observations are no fiction of the fancy, but faithful transcripts of the heavens. The observations are conducted from the planet Mars. Terrestrial astronomers seem at last to have reached the happy position of being able to observe some of the changes that are taking place on the surface of the pole. Mars, the planet of the pole, 1800 will be the means of increasing our knowledge of it. Persia. Mr. Steven was but that which was then his landlord's remedy.

The Canals of Mars. — The canals of Mars were carefully observed at biennial observation, on April 11th, by M. Perrin, the director of the observatory of Nice, under his condition, that the observation of the one is the finest in the world, and its teleological features as such. They crossed the continents in straight lines, some of them being six hundred miles long, and cutting each other at various angles. Their object seemed to be to indicate the communications between the different parts of the same planet, or between different planets.

Perrin saw something beside correspondence in his two series of observations. He bears witness to changes that have occurred between the two opposites, not only in the correspondents, but also in the surface of the planet. He found that the continent Lybia had entirely disappeared. Plainly vanish was that which no longer exists; it has been engulfed in the surrounding sea. Lake Meris, in this vicinity, situated north of the canals, has also vanished from sight. The extent of the region whose aspect is thus completely changed is a little greater than the surface of France. A new canal, invisible in 1860, has appeared. A third change was observed by M. Perrin, the appearance of a little spot that marks the northern pole of Mars. He states that it is now necessary to connect through the polar ice seas near the pole. Mr. Perrin is an astronomer and his observations are conducted from the surface of the planet Mars. Terrestrial astronomers seem at last to have reached the happy position of being able to observe some of the changes that are taking place on the surface of the planet.

Inability to Recover a Stolen House. — A case of unusual clear- ness has been placed in the hands of lawyers Stevenson to apply a new frame house, but in the lease no mention was made of the house in the contracts, and a landlord’s warrant was placed in the hands of his tenants. Upon attempting to serve the warrant the tenants did not appear, and the house was found to be empty, and the building of the house, and the ground, upon which it was situated, was taken possession of by the landlord. The woman who is the wife of the tenant, is not in the legal possession of the house, and the landlord’s warrant was placed in the hands of the tenant. The question was whether the building of the house could be divided into parts from which they could not be removed. The question proved successful, but it was afterwards discovered that the building had removed from the house with its contents, and consequently the tenants still remained in the possession of the house, and the contents of the house, and the contents of the building. The free tenant subsequently died. The question proper? After hunting up authorities Mr. Stevenson came to the
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SUMMARY:

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TRADE SURVEYS.

THE Congressional Library muddle has been still more confounded by a vote of the Senate, refusing to concur with the House of Representatives in ordering work on the building to be stopped, and proposing as a substitute, that it should go on, but for the future under the supervision of engineering officers of the army. While such supervision would be better than that of a commission of amateurs perfectly ignorant of the work which they control, it would be more costly, and much less likely to secure irreproachable results in the way of arrangement and details of design than the supervision of the architect who is responsible for the plan. This is the sort of supervision which is employed in all civilized countries in similar cases, and is found to be most satisfactory and economical; and no one has yet explained why the same method should not be found applicable in this country. In the debates in Congress it is darkly hinted that “jobs” exist under the surface of the contracts for the Library, and the importation of army officers seems to be intended as a menace to civilian corruption. In our own mind, we are satisfied that the whole scheme has consorted the minds of either the architect or the Commissioners. In reading the “charges” and counter-charges, rumors, hints and innuendoes about men in high public station in this country, we are often reminded of Cardinal Mazarin’s remark to an official colleague, who was greatly disturbed by the accusations of corruption raised upon him in the newspapers. “Don’t pay any attention to them,” said the minister, “these people are only showing what they would do if they were in our places;” and we have not yet seen, in the printed accounts of the Library affairs, any indication whatever of anything worse than feebleness and ignorance on the part of the Commissioners, and a lack of deference to the feelings of disappointed bidders on the part of the architect. The scandals about the employment of women as “drivers of carts,” and so on, ought evidently to be laid at the door of subordinates, who are, to say the least, not too carefully selected by politicians anywhere, and least of all in Washington; and the best way to avoid them is certainly to give the architect the customary fees, and let him pay out of his own pocket such computers, tracers, and other assistants as he requires, while the contractors pay their men, and are themselves paid by the yard, perch, square or whatever the rateable measure for the work they do, which can be readily measured, and the prices approved by army, or other engineers, if Congress is not willing to trust Mr. Smithmeyer, before the payments under the contract are made. As to the plan of the building, which some of the newspapers still object to, we can only repeat that it has been chosen by the official representatives of the Government out of a considerable number of competing designs, and authoritatively adopted, and if it is now to be modified the Government should bear the expense—not Mr. Smithmeyer, who has simply obeyed orders. To bring up the ideas of Mr. Poole, of Chicago, as a reason for depriving Mr. Smithmeyer of his great commission is both unfair and mean. All architects know that Mr. Poole and Mr. Spofford, the two gentlemen now on the Board of the Architectural Commission which selected the plan, differ radically in their ideas of the proper arrangement of such a building, and if Mr. Smithmeyer, as is not denied, followed the programme which Mr. Spofford, both as the head of the Library itself and as a member of the Board, and if Mr. Spofford has only done his duty, and Mr. Poole himself, however erroneous he may think this programme, would, we are sure, be the last to wish to see his criticisms used as a handle for dislodging the man who faithfully and intelligently followed it. The Philadelphia Press proposes the appointment of a mixed Commission of architects and librarians to prepare new plans, to be substituted for those adopted by the original commissioners; and there is some merit in the idea of retracing the steps that have already been taken, and beginning afresh, with just such a jury to decide upon plans as ought to have been decided upon in the first place; but this can, and should be done without injury to Mr. Smithmeyer, and both he and Mr. Spofford, the two men who understand the problem best, ought to be members of the new commission, if there is to be any.

THE New York Architectural League has issued a very timely notice of its exhibition of work in architecture and allied fine arts, which is to be opened at winter quarters, beginning December 27, 1888, and closing January 12, 1889, at the galleries No. 368 Fifth Avenue. The League invites architects, artists, sculptors, decorators, and workers in wood, metal and textiles, to contribute examples, and reminds them that a large space is at the disposal of the managers, and that by early notice so long beforehand they will have ample time to consider their contributions. The League exhibitions have now become important events, calling out a great deal of interesting and beautiful decorative work, as well as architectural drawings, and the next one promises to surpass all that have preceded it. Detailed information, and blanks for intending exhibitors, may be obtained from the Secretary, Mr. F. A. Wright, 47 Liberty Street, New York. It is, by the way, intended to establish the League in a house of its own before long. A scheme has already been prepared for assuring the income required for meeting rent and expenses, and the members look forward to a future of greatly increased usefulness for their energetic society.

THE Sanitary News describes a new plumber’s trick, which has been first discovered in Milwaukee, but may be known elsewhere, so that architects and inspectors will do well to be on their guard against it. In Milwaukee, and in some of the smaller towns, all soil-pipes put up in dwelling-houses must be tested by filling with water. A certain firm, knowing that a defective pipe had been used, contrived to plug it with clay, so that the water applied for testing did not enter the pipe at all. It is stated how the inspector happened to call out this ingenious deception, but plumbing inspectors become wonderfully expert in observing suspicious indications, and the offending firm was reported, and punished by having its license revoked until the defective pipe should be replaced by a new one. Most persons will say that the revocation of the license ought to have been made permanent.

THE Sanitary News mentions also a piece of public sanitation which ought to be made as widely known as possible. People who read the newspapers will remember the angry discussion over the employment of bromine by the New York Board of Health, to disinfect the foul earth thrown out of street excavations; and the Sanitary News, in speaking of this, recalls the fact that a few years ago, during an epidemic of diphtheria and scarlet-fever in Detroit, Dr. O. W. Wight, the famous health officer of that city, determined to disinfect the sewers. For this purpose seventy-four thousand pounds of sulphate of iron were dissolved and poured into the sewers of the city, and three tons of sulphur were burned in iron pots, lowered into them. Besides the cleansing of the channel, due to the
iron sulphate, the sulphurous-acid vapors from the burning brimstone penetrated the whole system of sewers and house connections, and the result was a great abatement of diphtheria, and the almost entire disappearance of scarlet-fever. We hope that this experiment, which has so generally been known as it should-be, will be frequently and extensively repeated in places. Even by the scale of the political economists, an average American child is worth a great many tons of brimstone and copperas, and the whole cost of the Detroit disinfection would be returned with a profit by the saving of a single life; while, if the results should generally agree with those obtained by Dr. Wight, we might even hope, by systematic efforts, made simultaneously in our great cities, to accomplish, what physicians tell us is possible,—the complete extirpation from civilized countries of diphtheria, scarlet-fever and membranous croup, three of the worst diseases that afflict mankind.

The New York Board of Health, which controls all plumbing work in that city, has adopted a new specification, or code of rules, for house-plumbing, which went into effect July 1, and, as it will be strictly enforced, it is worth knowing something about. The most interesting point is, perhaps, the total exclusion of ordinary soil-pipe from dwelling-houses in New York, by a clause demanding under all circumstances the quality known to the trade as "extra heavy," the minimum weight of which, for four-inch pipe, is set at thirteen pounds per foot. Large objects in iron pipe, once permitted, are now forbidden, and it is not even allowed to use modern soil, in which case, called joints, the code expressly demands for this purpose "pure, soft pig-lead." In other respects the rules are not materially different from the old ones.

Mr. George Aitchison, a very good authority, re-
views in the Builder the discourse of Mr. William Morris, in a recent number of the Fortnightly Review, on the "Revival of Architecture." It is hardly necessary to say that Mr. Morris does not think that architecture can be suitably revived except by copying Gothic forms again, and Mr. Aitchison, while fully endorsing the idea that architectural beauty is limited to buildings with one point, and that details, is inclined to think that the spirit of the present age is so much opposed to architectural art that there is no hope of its revival until strong public feeling, excited by some great event, or series of events, shall seek expression in great monuments; and the best comfort he can offer is, perhaps, to train themselves to the utmost in their art that they do well to ready in case the wave of enthusiasm should occur in their time. "At present," he says, "the only question that interests mankind is, whether their buildings can be built quickly and cheaply," and, further, "I believe we have been on our problems,—perfecting steam-engines, boring and the like. The brown bricks and the bridges, producing artificial light, and communicating instantly with the utmost parts of the earth,—so eager have we been to get rich, that we have overlooked beauty, and so surrounded have we been with every form of ugliness that we have grown callous."

There is no question of the truth of the notion that epochs of great art follow periods of peculiar exaltation of public sentiment. Without the terror and despondency which fell upon the Athenians at the approach of the countless hosts of the Persians, and the sudden revulsion to joy at their deliverance, and patriotic pride in their own bravery, and gratitude to their divine protectors, which followed the victories of Marathon, we may well believe that the Parthenon and the Erechtheum would never have been built, and the remark, with which the Athenians appropriated to themselves the fund accumulated by the allied States for the common defence against the Persians—that their prowess had made the fund unnecessary, if not the necessity, at least the condition of exultation and enthusiasm which was to find its highest flower in the purest architecture and the noblest sculpture that the world has yet seen. In much the same way in England, the providential dispersion of the dreaded Spanish Armada, assisted, perhaps, by the immediate plunder brought home by Drake and his friends, was followed by the architectural period of Elizabeth's domestic architecture, and midway between the two others, the great Gothic epoch of the thirteenth century was also particularly the age of emancipation from the ignorance and slavery of the Dark Ages. For all this, we cannot ourselves quite believe that the people of the nineteenth century are doomed to wait for an incursion of barbarians before they can build beautiful houses and churches, and, furthermore, we are not entirely convinced of the unapproachable superiority of the antique and medieval architecture over our own. We do not disagree with Mr. Morris in remembering that the Romans and Freemasons worked upon a traditional type, in any conception of which is impossible for us. Not having to trouble themselves about anything but the details that they were to apply to a structure, the lines or arrangements of which had been previously fixed for them, they had time and leisure to bring those details to perfect perfection. We have ample evidence that when they deviated much from the routine in which they had been brought up, they made an impec- quite as bad as any that a modern architect would be guilty of, and that the development of a style was a development by small steps, each clever man using what had been done before him, and conveying into it a little additional perfection from his own taste or ingenuity. That these defects discourage us is anything but reasonable. It is true that we have no fixed type of architecture, but if we have not that, we have what is better, a far more catholic taste and cultivation than our ancestors. A well-trained architect of the present day is fitted, by his study of antique elegance, to give his buildings a purity of outline which few of the mediæval architects ever attained, and to throw a light upon the methods of Gothic construction. Mr. Morris, for his part, has always professed that he has studied the methods of workmanship essentially Greek. Hence, if we turn to the ancient cities, where such an art was cultivated in Europe, and, if his knowledge of sculpture is not equal to that of the Greeks, it is at least superior to that of any Gothic architect. To bring these gifts and acquisitions into use, the main thing needful is, as Mr. Aitchison and Mr. Morris would probably say, an overflowing sentiment, in the expression of which they should do their best to cooperate. To be capable of being inspired with such a sentiment it is not necessary for an architect to engage in preliminary wars and agitations, although these might give intensity to his feelings. But it is really required is a sympathetic disposition, constant and accurate observation to detect the relations of architectural forms and motives to mental emotions, and a contempt for the cynical worldliness which tries to prevent men from showing their feelings. To be a first-rate architect, as well as a painter, sculptor or novelist, one must have a heart, and must also be modest and truthful enough to be willing to show what is in it to other people, and earnest enough to find one's purest reward in awakening a thrill of sympathy with the sentiment one has endeavored to express. There is no want of sentiments for architecture to convey. The pure and tender domesticity of the present age has plenty of need and perhaps more active religious sentiments, which can be investigated in evangelical society, or among the heroic soldiers of the Salvation Army, or in the deliberations of a Pan-Anglican Council, or amid the privations of a missionary station, and would well bear to be remembered in the fabrics which modern Christianity is to raise for the worship of Him who is the source of all Christian sentiment in every age.

The plan for a great suspension bridge across the Hudson River, twenty-seven hundred feet in span, which is now under consideration before a Government commission, and will probably be completed in a few years if the commission does not disapprove it, is, it appears, far superior in a work of this magnitude to any conception of the curve formed by this cable is five hundred and fourteen feet. The whole weight of the suspended portion is only six and one-half tons, and the breaking resistance fifteen thousand pounds, so that there would seem to be no great difficulty, by building the supports high enough, in bridging almost any chasm by similar ropes, and establishing foot-ways between them.
A mongst the existing antiques which have a coercive interest for us are the bronze horses of St. Mark's, sometimes ascribed to Lysippus of Scyoun, a contemporary of Alex- and. They were only a part of a group,4 perhaps the skillful work of bronze that ever lived. His skill, to which these famous horses bear witness, was fully equalled by his industry, for he is credited with the production of 1500 bronze statues whose character may be inferred from the size and artistic importance of those which are known to us by name, such as the colossal figure of Zeus at Taormina, sixty feet in height, a colossal Hercules at the same place, which was transported to Rome by Fabius Maximus; while the Farnese Hercules by Glycon, and the Torso of the Belvedere are thought to be copies from originals by him. The large number of his works rests perhaps on the legendary statement that it was his practice to lay aside in a particular place a single piece of gold for every statue he sold, and that at his death 1500 pieces of gold were found in this repository. If the tale be founded in fact there is here a record only of those statues that he had the good luck to sell, and there is no knowing how many remained unsold. Where are they now, these masterpieces? To what base uses have they been put? In what unrecognizable forms do their imperishable particles serve us to-day? Coined into money to liquidate the pay-rolls of the cohorts that destroyed them; cast into medals to commemorate the fall of the cities which they formerly ornamented, some of them to-day must be represented in the cabinets of European numismatists, side by side with other medals which record on their faces the actual appearance of the perished originals. That so vast a number of bronzes should have vanished is extraordinary enough, but this marvel must be multiplied a thousand-fold before it is possible to measure the loss that in this particular alone the greed and ambition of nations have inflicted on posterity; for when we trace the course of events we discover that the sculptured treasures of Greek cities were destroyed, and the selected ones preserved, by the Romans under Mummius, Metellus and Sylla, and afterwards at Rome endured the fate that befell native Roman treasures; while those left in Greece first endured the assaults of Christian reformers and at a later date the attacks of the iconoclasts. Then, during the centuries, Baldwyn, checked in his passage to the Holy Land, not only subdued Byzantium but overran parts of Greece, and his northern horses are credit- ed with destroying the Jupiter Olympius, the Juno of Samos, and the Minerva Parthenos, which had till then been preserved at Byzantium. Next, in 1312, the Spaniards attacked the Grecian empire, and not many years later had to yield on the same battle-fields to the victorious Venetians. In 1453, the Moslems under Mahomet II, had their innings and faithful in the interpretation of the Koran destroyed, while sculptures could be found. From that time onwards the constant struggles between Turks, Venetians and Greeks carried war and rapine into every part of the land that once felt the influence of Greek art, and as these constant struggles caused men to turn their thoughts more to arms than to intellectual pursuits the aesthetic senses of succeeding generations became more and more blunted, while the Greek of pure strain was either destroyed by the sword, or so polluted by inter-marriage with the military scum that succeeding devastators left behind, that small wonder can be felt when the resulting mongrel shows so little regard for the works of those from whom the professions to claim descent as to feel that to make line out of sculptured marble is a legitimate, a natural and a praiseworthy act. It is then a matter for gratitude that the earlier invaders removed some of the plastic treasures of Grecian art, and among them the Horses of St. Mark's, which were removed by the Venetians from the hippodrome at Byzantium after the fourth Crusade, in 1265, and for centuries have with stately grace been stepping off into space from their positions over the porch of St. Mark's.

They are notable works of art whoever wrought them, and their fame has for ages sounded through the world, so that there was every reason why Napoleon in 1797 should add them to the 'bag' he attempted to make of all the art-treasures of Europe, with the object of making Paris the glory of the world in this particular as he intended it should be in every other. How these weighty animals were dismounted our illustration shows, and another shows them as forming part of a triumphal procession which is here shown entering the Champs de Mars on the 9th Thermidor, year VI of the Republic [July 27, 1798]. The inscription on the car that bore them was: "Cheveaux transportés de Corinthe à Rome, et de Rome à Constantinople, et de Constantinople à Venise, et de Venise en France," and the further assurance: "Ils sont enfin sur un terre libre." It has not been possible to discover where the horses were bestowed until they were hoisted to the top of the Arc du Carrousel, which was not built until 1806, and harnessed to a chariot of gilded lead, which was intended to bear the emperor in his coronation robes. In this place they remained for about ten years. But one of the things that early claimed the attention of the allies was to take steps for the return to their former resting places of the artistic spolia which the great conqueror had gathered, and so in 1815 the bronze horses of St. Mark were on their way back to Venice, stopping at Vienna on the way, and were soon hoisted to their present position. Of them Goethe, who does not boast a deep knowl- edge of the living animal, exclaims: "A glorious team of horses,—I should like to hear the opinion of a good judge of horse-dish. What seemed strange to me was, that closely viewed, they appear heavy, while from the piazza below they look light as deer."

And Samuel Rogers sings:

"In this temple porch
Old as he was, swear him a hundredth year,
And blind—his eyes put out—did Dandolo
Stand forth, displaying on his crown the cross.
There did he stand, erect, invincible,
Though wan his cheeks, and wet with many tears,
For in his prayers he had been weeping much;
And now the pilgrims and the people went
With admiration, saying in their hearts,
'S Surely those aged limbs have need of rest!'"

"There did he stand, with his old armor on,
Fro' gibbon in hand, that streamed aloft,
As conscious of its glorious destiny.
So soon to float o'er mosque and minaret,
He sailed away, five hundred gallant ships.
Their lofty sides hung with emblazoned shields,
Following his track to fame.
He went to die
But of his trophies four arrived ere long,
Snatched from destruction—the four steeds divine,
That strike the ground with mingled roar of their feet,
And from their nostrils snort etoille flame
Over that very porch."

Another poet, "Owen Meredith," has found this a noteworthy incident and in elaborating it he makes use of a method that has been followed by many of his craft, both ancient and modern, and endows his beasts with speech.

1 Continued from No. 227, page 26.
2 There were at one time in St. Sophia 420 statues.

* From "Tableau Historique de la Revolution," published in 1804.
"At midnight, in the murderous streets, the dew
Was blood-red, and the heavens were hurt with sounds
Of shriek and wail the ravaged region round.
So that men heard not, in the Hippodrome,
Those Four Bronze Horses, that had come from Rome,
In conference, talking each to each.

"One said:
'Our purple-mantled master, Power, is fed,
And how shall we four fare? Let us away
Thro' the thick night! For ever since the day
We followed that great Western Caesar home
To grace the glories of Augustine Rome.
We four have felt no hand upon our mares
Less great than theirs', who grapp'd the golden reins
Of Empire; they behind whose charriot wheel
Yet burning rats their burning course reveal,
Who rode the rolling world. We also, when
Power pass'd from Rome, his car drew here again,
And carried Conquest in his course divine
From West to East, to dwell with Constantin.
But now is Power departed, who knows where?
Out of the East!'"  

"So spake that voice in air.
The others answered 'Whither shall we go?
Our master being gone! For who doth know
Where we may find him?'

XII.
"AND THE LION OF ST. MARK,
Listening in the dark,
To these replied the Lion of St. Mark.
'Power, stood on my way wings. Come also ye
Whither I go, across the vassal sea.
And let us bear with us, to please him well,
Beauty, the sponsor of Power. And we will dwell
Together.'

Then they answered 'Even so,
Lion and where thou goest, we will go,'
So those Five Beasts went forth."

These horses are commonly believed to have been taken from the hippodrome at Byzantium, but they may have occupied a somewhat similar position to that they now hold, for the accompanying sketch by Viollet-le-Duc, with which he illustrates his suggestion as to the possible treatment of the exonarthex of St. Sophia, suggests that the horses of St. Mark's may once have held guard, even if riderless, over the entrance to some pagan temple or basilica of the Eastern church.

But though it is quite commonly known that they came from Byzantium to Venice, it is not so generally known that these much-travelled steeds had visited Italy before, and had been hoisted up and lowered down more than once to satisfy the whim or self-glorying instincts of one potentate or another: from which it is plain that even in ancient times this famous quartet were held in highest honor. The chronicles of Scivos and Magno give the earliest information about them by recording that Augustus Caesar brought them from Alexandria after his victory over Antony, and set them up on a triumphal arch at Rome; and used for this purpose once, succeeding emperors, Nero, Domitian, Trajan used them in turn to adorn other arches built in their own honor. At Rome, then, they remained for some three hundred years, harnessed now to one form of triumphal chariot and now to another, until Constantine decided to transfer the capital of his mighty empire to a new seat, and not unnaturally packed up these much-prized horses with the other works of art with which he proposed to adorn his new city on the Thracian Bosphorus.

The pedigree of these steeds of noble strain is, then, of the longest and it lacks only a few centuries of being complete—from the time of their probable founding in the workshop of Lysippus, about 350 B.C., to the death of Antony, 30 B.C. By what route they reached Alexandria, by sea direct or overland by Asia Minor and Syria, is open to conjecture. Perhaps as

Antony met Cleopatra in Cilicia and there succumbed to her charms, he may, if the group was a love-token, have secured the neighboring country for its choicest treasure and may have found these already travelled statues in some neighboring town; or he may have sent agents to Corinth to secure them, for Corinth is by some believed to have been their original home. At any rate, the beholder may please his fancy as he will by constructing an itinerary which will only add to their renown as horses who have covered only less space than those driven by the sun-god.

Apart from their artistic value, aside from their history, these horses are singular in one other particular. Horses modelled in the round are not infrequently adjuncts of architectural

1 From Owen Meredith's (Robert, Lord Lytton), "Siege of Constantinople."

8 From "Tableaux Historiques de la Revolution Francaise."
The American Architect and Building News.

August 11, 1888.

[Continued from No. 657, page 30.]

of any other material. Nearly all strap-hinges and the handles of common butts are made of it; also, for some forms of common bolts and any article of hardware which permits the metal being punched or pressed into shape, wrought-iron is more suitable than cast, and is much used on account of its superior strength. For finished work, such as knobs, plates, etc., there is very little wrought-iron hardware on the market. But the real sale of wrought-iron is made in the form of ornamental hinges, straps and braces, but the amount of work involved in producing any given pattern is so largely in excess of what the same amount of work would produce in other metals that wrought-iron will always be for a material for ornamental hinges, etc.

Quito recently, however, there has been made an important discovery which bids fair to alter about a change in the use of this metal. Wrought-iron melts at a very high temperature and it has, therefore, long been practically impossible to cast it in fine molds; but by the addition of a small percentage of aluminum, which it can be done, an alloy is formed which melts at a greatly reduced temperature and gives the metal the degree of fluidity necessary to successful casting. It is claimed that the wrought-iron casts obtained in this way have all the sharpness and clearness of cast brass and at the same time retain the structural qualities of wrought iron.

When wrought-iron has mixed with it a proportion of carbon exceeding 0.5% but not greater than 2% the structural nature of the metal is entirely changed and it becomes known as steel. So far as relates to finished hardware, steel is used only for springs and portions of detail, as the metal does not cast readily, and the surface will not keep bright. In fact, there are the same objections to it that there are to wrought-iron and almost the only use to which it is now put in hardware is in the manufacture of nails and screws and some brands of bolts, which will be described later on.

Wrought iron contains over 2% of carbon it becomes known as cast-iron, a metal which melts at a comparatively low temperature and is capable of being cast with very sharp lines. It is used a great deal for finishing work, though from its brittle nature and lack of tensile strength it is not utilized to any great extent for construction purposes. In all such cases, however, it is wrought-iron which is used. If left in its natural condition as it comes from the forge or hammer, it will rust very speedily, and to prevent this, the most common method is to heat the iron and paint it while hot with fine brass oil, colored with lamp-black and mixed with a quantity of dryer or turpentine. When the iron is dry, it is sometimes roasted in a kiln — fired, as it is termed. In this manner the paint seems to be dried into the pores of the metal, and it is left with a smooth, lustreless black surface, capable of resisting the action of the weather for quite a while, though by no means rust-proof.

Instead of the foregoing, a bath is used composed of linseed oil and gum-aniline or copal, the iron, on being finally fired and polished, presents the appearance of bronze. The tones can be varied to a considerable extent by the addition of color in the shape of powdered alloys of copper and bronze, which are mixed with the oil. The “Tucker bronze,” the “Berlin bronze” and the “so-called copper” are all varieties of this nature. Only rarely is a thin film of bronze or composition spread on the iron by the aid of electrolysis. All of the bronze-faced iron hardware is treated with the hot-oil finish just described. The cheapest forms of iron hardware are japanned or even merely coated with ordinary black varnish, in which the iron is covered over with a quality of japanned paint, the finish of which is about the grade of goods. Japanning is practically indistinguishable where the iron is not exposed to scratches or rubbing. Hinges and latches are finished in this way more than any other one form of iron hardware, though of late years the best machine lock makers have taken a great deal of care in japanning the outer castings of locks. Fine grades of pulleys are also sometimes sold with japanned frames.

Iron is galvanized by simply immersing in a bath of a melted amalgam of zinc and mercury, containing a little sodium. The iron is first cleaned with sulphuric acid, and before immersing in the bath, it is usually dusted with sal ammoniac powder. There is not a particle of real galvanic action about the process. It is sometimes thought that the zinc and mercury form a species of alloy with the iron which prevents it from rusting. Galvanizing is, indeed, the best preservative of iron applied in the form of a wash, but the color is not sufficiently pleasing to permit of its use in a hardware line. None of the foregoing processes are especially suitable for iron, as they all effectually disguise the nature of the material. There has recently been invented a process for protecting iron from rust, which is in some respects the best thus far devised. It is known as the Bowes-Barff process, a term used to indicate two processes by which the surface of the metal is converted into magnetic oxide of iron, in which condition it is absolutely rustless. In the Barff process the metal is simply subjected to the action of superheated steam. This process is peculiarly
suitable to wrought-iron and highly finished work. In the Bower process the iron is successively subjected to the action of highly heated air and carbonic-oxygen gas. The heat converts the surface of the metal first into red oxide of iron, which is finally reduced to the magnetic oxide by the action of the gas. Owing to the simplicity of the process, it is claimed that its cost is less than that of galvanizing. It may be applied to any kind or style of wrought or cast iron or steel. The surfaces so treated have a perfectly uniform blue-black color. The sharpness of the lines is not affected in the least, and when the work is polished the final color is a lustressous ebony black as can be obtained in no other way. This coating of magnetic oxide is so hard that it is removed with difficulty by an emery wheel. A few of the leading dealers are beginning to keep in stock some fine grades of door hardware finished by the Bower Barre process. Among the only parties making use of the patent in the production of builder's hardware are the Yale & Towne Manufacturing Co. This concern is beginning to put in the market quite an extended line of Bower-Barre iron goods.

Iron hardware is also found in the market finished with copper-plating, the raised surface of the pattern being buffed to show the natural copper color, whereas the background is left black or strongly oxidized. There is quite a variety of goods in this line. Similarly ironwork is nickel-plated, being left with either plain polished surfaces or with polished raised patterns on a black ground. Both nickel and copper plating, are hairline with the metal.

Brass and bronze are terms which are often confounded when speaking of hardware, though the materials are quite different in composition and are usually dissimilar in appearance. Brass is an alloy of copper and zinc in varying proportions, the ratio for ordinary purposes being seven of brass to three of zinc. Brass is far more malleable than bronze and can be rendered more ductile by the admixture of a small quantity of lead, which at the same time will diminish the hardness of the alloy. Brass tarnishes very easily if handled or exposed to the weather, and is consequently generally protected by a coating of shellac, which, however, will not entirely prevent it from changing. Brass may be altered slightly by changing the proportions of the metals entering into the alloy, also by treating the finished castings with acids or hot chemicals in the same manner as will be described later for bronze.

Bronze is commonly an alloy of copper and tin, the proportions varying from twelve parts copper to one part tin to metals to be used in the fabrication of mathematical instruments, to two parts copper and one part tin, for telescope or spectulum metal. Bronze is sometimes more complex in its nature, lead being added in very slight quantity, and aluminum sometimes being the tin. It is far more malleable but harder and more fusible than brass, and can be subjected to oxidations easier for kindling perfection. It is oxidized more easily than brass, and because of this it is possible to obtain a greater variety of colors for hardware goods.

Both brass and bronze can be cast with great ease, as compared to white metal castings, but the bronze depends on, of course, entirely upon the care bestowed in preparing the pattern and the mould. There is a great difference in the quality of the work turned out by the various manufacturers. In the best of work the mould is formed with very fine sand and is double-faced, that is to say, after the pattern has been imprinted in the sand it is withdrawn, the matrix sprinkled with a finer grain sand, and the mould respaced. After that, the moulds are suspended in the flames of burning coal, by which means they are coated with a fine layer of impoluble soot. When the molten metal is poured into the mould, the soot is pressed evenly into all the minute pores or interstices of the sand, and the result is a surface as smooth and sharp as often to require but little hand-chasing.

Brass goods are usually finished in the natural color of the metal with a thin coat of shellac. The same proportions of tin and copper are usually used for all the bronze work of a single manufacturer, and the different manufacturers do not always adopt the same alloy. Bronze is, however, finished in a great variety of styles and colors, all produced essentially as follows:

The bronze on leaving the casting-room, is trimmed or chased as may be necessary, and is then immersed for a few moments in a strong acid bath which takes an almost infinitesimal film from the metal, leaving the surfaces entirely free from oxidations or impurities. The piece of metal is then washed in weak alkali and clear water, to make it perfectly clean. Then the bronze is suspended in a bath of hot acids specially prepared with various chemicals to produce certain changes in the color of the metal. This operation is a very delicate one, requiring the care of trained workmen and a nice appreciation of the proper time to take out the bath. The color of the metal changes very rapidly, turning first from a bright copper red, to a pale gray and then into beautiful shades of browns and rich purples with ultimate dark tones depending upon the composition of the mixture or pickle. When the desired shade is reached the bronze is removed, dried in sawdust and rubbed down even until the metal gleams. Some designs the raised portions are buffed down until the natural color of the metal appears, the pattern showing on a ground of the darker oxidized tone. Almost any color or shade can be had with bronze by a proper treatment. The Hopkins & Dickinson Manufacturing Co. have had bronze as dark as iron, and in fact quite similar in appearance. Of course ordinary hardware is simply left the natural color of the metal, when made in plain bronze. It may be said here that plain bronze is as a rule more expensive than figured work. The plain surfaces require a very even grade of metal and smoothness of casting, whereas any imperfections are hidden by patterns, and a cheaper quality of workmanship does not expose itself. In the East there seems to be a decided preference for the plain goods, while in the West the figured styles are more commonly used. When exposed to rough usage a patterned piece of hardware will in general show wear less than a plain surface.

It must be remembered that the surface finishes produced in the manner just described are not to be described as permanent. The color is in reality laid on, and is superior to paint or varnish only in that by the means of the hot pickle the color penetrates into the metal slightly, so that it will not fade out or diminish as it if put on with a brush. Bronze hardware is sure to change in time, no matter how it may be finished, and generally the stronger tones are the least satisfactory in the end, fading out to unpleasing musty hues. Shellac will hold the color, but as soon as it wears off, which is sure to do on such pieces as knobs and door-handles, the exposed surface will turn white, and if it gets wet, a thin patina of blue may be altered slightly by changing the proportions of the metals entering into the alloy, also by treating the finished castings with acids or hot chemicals in the same manner as will be described later for bronze.

The treatment of silver-plated bronze is of a similar nature. The knob or plate is immersed in a silver-plating bath attached to an electric dynamo. A very few moments suffice for the deposition of the silver. The article is then taken from the bath and treated with hot acids and solutions until any desired result is produced. A careful wash in water will remove the acid, and the raised patterns slightly brightened on a buffing-wheel. There is at present a great deal of oxidized silver hardware in the market. Most of it is oxidized but slightly, leaving the figures a clear frosty white, but it can be had quite black if desired. The Yale & Towne Manufacturing Co. has an oxidized silver finish which is as black as old oxidized gun-metal.

Several very pleasing styles of finish are obtained by electroplating the bronze with copper and then treating with acids. An old-copper color thus obtained is one of the most durable finishes in the market, whereas the brass will tarnish and the copper will keep its color. When the acid is not a consideration it is sometimes desirable to have gold-plated bronze hardware, especially for such things as knobs, which are exposed to constant handling. Gold-plate is no handsomer than some shades of natural bronze, but the gold will not tarnish or be influenced by the weather. Gold-plating increases the cost of the work twenty fold, and being so expensive is executed only for special orders.

Nickel-plating is applied more commonly to iron or steel than to bronze. This finish is but little used for nice work as the nickel will tarnish by exposure to the atmosphere after which no amount of rubbing will restore its first appearance. Nickel-plating is best adapted to the archaic, square, etc.

The following list will give an idea of the great variety of possible treatments of bronze hardware.

FINISHES FOR BRONZE HARDWARE.

1. The Hopkins & Dickinson Mfg Co., finish:—
   A. Statuary. Dark background, light surface.
   B. Statuary. Medium dark background and surface.
The old "Brooks House", West Medford, Mass:
House of

J.S. Bell

Denver, Col.

Andrews & Jaques

Architects

Boston, Mass.
RECEPTION ROOM

DINING ROOM in House of L.M. HORNTHAL

ALFRED ZUCKER & CO.
Architects
346 & 348 Broadway
New York

1887

DINING ROOM — in House of L.M. HORNTHAL •貂 6 • E. 75th • St • NEW YORK •
The American Architect and Building News.

E. Ebeny. Suitable only for Plain or Lined Design.
G. Gift or Gold-washed.
H. Gold-plated.
1. Gold-plated. Mat
ded with Enamel, in all colors.
K. Gold-plated. Matted with Silver.
L. Silver-plated. Matted with Gold.
M. Silver-plated. Matted with Copper.
N. Nickel-plated.
P. Nickel-plated. Matted with Gold.
R. Nickel-plated. Matted with Copper.
S. Hand-plated. Silver, suitable only for perfectly plain patterns.

II. P. & F. Corbin, finish:—
No. 1. Natural Color, Light Bronze.
No. 2. Chemical Dark Brown or Statuary Bronze.
No. 3. Same as No. 2, with different arrangement of colors.
No. 4. Natural Color on Surface and Black Background.
No. 5. Nickel-plated.
No. 6. Nickel-plated Surface with Gold-plated Background.
No. 8. Gold-plated.
No. 10. High Polish, Natural Color.
No. 12. Sage Green Background and Natural Color on Surface.
No. 13. Terra-cotta Background and Natural Color on Surface.
No. 14. Steel Gray Background and Natural Color on Surface.
No. 20. Old Brass Finish.
No. 22. Antique-Copper Finish.

III. The Ireland Mfg Co., finish:—
No. 1. Light Bronze.
No. 2. Light Brown.
No. 3. Black Background, Polished Surface.
No. 4. Brown Background, Polished Surface.
No. 5. Nickel-plated Surface and Background.
No. 6. Bright Surface and Black Background.
No. 7. Nickel-plated Surface and Black Background.
No. 8. Nickel-plated Surface and Black Background.
No. 11. Gold-plated.
No. 12. Steel Gray Bronze.
No. 15. Oxidized-silver Surface and Background.

V. Nashua Lock Co., finish:—
No. 1. Natural Color, Light Bronze, Polished Surface.
No. 2. Dark Bronze.
No. 3. Light Brown, Polished Surface, with Black Background.
No. 4. Light Bronze, Polished Surface, with Brown Background.
No. 5. Nickel-plated, Plain Surface.
No. 6. Nickel-plated Surface, with Black Background.

Besides the finished work, both brass and bronze are used for screws, springs, lock-fittings, etc. A few locks are made with cases of cast-brass and some manufacturers are preparing to make copper-plated iron ore for the same purpose.

Brass and bronze together are used more than any other one metal for builders’ hardware and are the basis of nearly all door and window fittings.

An important addition to the list of metals available for hardware purposes has recently been made in the shape of a composition designated as Phosphor-Bronze, an alloy of which the constituents are not as yet made public, but which the patentees describe as being a phosphorized alloy of copper and tin. The chemical action of phosphorus on the metals composing the alloys is claimed to be two-fold; on the one hand it reduces any oxides dissolved therein, and on the other it forms with the purified metals a most homogeneous and regular composition. In strength, toughness and hardness of which are completely under control. No other metal combines, in so high a degree as phosphor-bronze, the conditions of toughness, rigidity, hardness and great elastic resistance. Thus far phosphor-bronze has been used in the hardware trade only for screws and for lock springs. In cities wherein soft coal is used, it has been found that brass springs soon become chipped owing to the action of free sulphuric acid in the air. Careful tests have shown that phosphor-bronze offers twice as much resistance to corrosion by acid as copper. Further experiments have been made, extending over a period of ten months, to determine its durability, when exposed to the weather, as compared with the best brass wire. After lying on the damp ground for that length of time the brass was found to be quite brittle and worthless, while the phosphor-bronze, under exactly similar conditions was practically unchanged. It will be readily seen then how valuable a metal this is. Unfortunately its degree of elasticity is less than that of brass, and the springs required for a lock when of phosphor-bronze are sometimes so large as to be impracticable. It is, however, by all odds the best material for springs and is used by the Hopkins & Dickinson Manufacturing Co. in their best grades of locks.

Aluminium has recently appeared as a possible substitute for bronze, being a metal not unlike lead or platinum in appearance, but is very light, having a specific gravity of 2.65, equal to about one-third that of steel and one-fourth that of silver.

It is very strong, will not tarnish, and is almost indestructible. It melts at a comparatively low temperature and can be cast with sharp lines. Copper, brass, and bronze are improved in color, light, and definition with a condition of ten per cent of aluminium. It is, however, a metal of the future and is not yet in the hardware market.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE ARCH OF THE PLACE DU CARROUSEL, PARIS, FRANCE. M. PRECIER, ARCHITECT.

See article on "Equestrian Monuments," elsewhere in this issue.

THE PROJECT OF ST. MARK’S, TEILIGING THE CHAMP DE MARS, PARIS, FRANCE.

SKELETONS OF THE OLD BROOK HOUSE, MEDFORD, MASS.

GATE-LODGE FOR E. R. JOHNSON, ESQ., ALTA CREST, GREENWICH, CONN. MESSRS. CARREERE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

This lodge, or farmer’s cottage, which is built of wood and stone, will cost, including heating apparatus and plumbing, $4,800.

HOUSE FOR J. S. BETTS, ESQ., DENVER, COLO. MESSRS. ANDREWS & JAKES, ARCHITECTS, BOSTON, MASS.

DINING-ROOM AND EXHIBITION-ROOM IN HOUSE OF L. M. HORNTHAL, ESQ., NEW YORK, N. Y. MESSRS. ZUCKER & CO., ARCHITECTS, NEW YORK, N. Y.

MILAN CATHEDRAL,— A propos of the final architectual competition for the Cathedral of Milan, Mr. Paul Cesi Bianchi, the architect of the Cathedral, has been delivering an address at Milan on the origin of the Cathedral. As to the much disputed question of the active part taken in its building by Jean Galens Visconti, Count of Vertu, Mr. Bianchi declared himself a strong partisan of Visconti, and devoted the first part of his address to the consideration of the foreign influences to which the great monument had been subjected. In the second part the lecturer spoke of the native and brought out in a most interesting way the importance of Tuscan art and design. As in the first part, he attached particular importance to the personality of Antoine de Saluce, the architect who was prominent for the part he took in the development of the construction of the monument, so in the second he emphasized that of John of Milan, who worked on the Cathedral after having been the pupil and friend of Gaubil at Florence, and having there exercised some remarkable influence on the Italian writer on art, Alessandro Manetti, in a recent correspondence thinks that the Tuscan influence so highly praised by Mr. Bianchi should not be allowed to count for too much. He also points out the incompleteness of the identity of Antonio deli Orgini, the actual author of the Cathedral, or the person who first proposed its construction and elaborated his idea, with the celebrated Florentine architect, Andrea dell’Orgini, a statement which Mr. Bianchi undertook to prove. The mere fact that Orgini died in 1596, and that the work of building the Cathedral of Milan was only commenced twenty years later, is sufficient to show that Mr. Bianchi allowed his enthusiasm for Tuscan art to carry him too far. “However that may be,” says Mr. Mullich, “it is to be hoped that the address may be published, for the resources it contains will fill the field in which up to this time have been concentrated the labors of all those interested in the cathedral.”
ANCIENT AND MODERN LIGHT-HOUSES. — XXII.

PIER-HEAD LIGHTS.

On the great lakes most of the harbors are improved by building two parallel piers of cribwork filled with stone out into the lake until these piers reach a certain depth of water; the relief afforded by them is but temporary and they have to be extended from time to time.

The end of one pier is marked by a small light of the fourth or fifth order, supported on a frame structure either square or polygonal. In the tower there is room for the spare lamps, supply of oil, etc., and a place for the keeper to sleep. When the pier is extended these towers can be readily moved out to the end.

The story that they are so light that a schooner ran her bowsprit through one and carried it from Grand Haven to Chicago is current but not trustworthy.

When the pier is entirely completed, the practice is to build a separate station to place on it a conical cast-iron tower similar to the one at the entrance to Portsmouth Harbor, N. H.

Quite a pretty light of the kind, but modelled after a small Roman temple, is on the end of the Portland, Maine, Breakwater.

RIVER-LIGHTS.

The total number of lighted aids to navigation in the United States on the 1st of July, 1887, including light-ships and lighted buoys was 2034, of these 1252 are what is known as river-lights.

Congress has specially authorized the following rivers to be lighted:

Hudson and East Rivers, N. Y.; Delaware River between Philadelphia, Pa., and Bordentown, N. J.; Elk River, Md.; Cape Fear River, N. C.; Savannah River, Ga.; St. John’s River, Fla.; Mouth of Red River, La.; Chiciot Pass and navigable channel along Grand Lake, La.; Missouri, Ohio, Tennessee and Great Kanawha Rivers; Columbia and Willamette Rivers, Oregon; and Puget Sound, Washington Territory.

A river-light is an exceedingly simple affair, consisting of a pole or mast with an arm or a shelf at its top by which to support a lantern. These are generally placed on the shore, but sometimes the light is needed in mid-stream in case a small crib filled with stone forms a base for the pole. Or, sometimes, an iron spindle is inserted in the rock as is the case in several places on the East River, N. Y.

The lanterns in general use are known as tubular lens lanterns, they are not liable to be blown out and will burn all night.

There are many places difficult and dangerous of access in stormy weather where small lights would be of great value could they be constantly maintained, this has been accomplished by a simple addition to the lens lantern of a reservoir containing a gallon of oil, which is automatically fed to the lamp by the principle of the German student-lamp. By this device the lamp will burn and give a good light for at least eight days and nights without attention and during this time there is almost sure to be weather calm enough for the keeper to attend to the light. This improvement was made at the Light-House Depot at Staten Island; it is of recent date and already promises to extend the use of the stake-lights to places where formerly it was thought necessary to establish regular light-houses.

One of the simplest towers in the Light-House service existed for many years at Edenton, N. C. As the sketch shows it was a tree, whose branches supported a box for the lantern and a platform reached by a ladder.

I regret to say that this picturesque structure perished through old age and was replaced by a prosaic pole to the top of which the lantern was nightly hauled by a rope.

As soon as the energetic citizens of the neighborhood discovered that the light-keeper was no longer condemned to the exertion of climbing a ladder night and morning, the Light-House Board received a number of applications for his position.

FLOATING-LIGHTS.

Floating-lights are of two kinds, light-ships and lighted-buoys. The former are very strongly built schooners, which show during the day a colored disk from each mast to distinguish them from ordinary vessels, while at night powerful lights are hoisted to their tops:
nor wave can extinguish the light, while an ingenious governor determines a constant flow of gas to the burner irrespective of the pressure in the buoy. When lighted they will burn for a long time without attention, generally about three months, though this length of time may be altered by changing the size of the buoy and the pressure to which the gas is subjected.

This system of lighting by compressed gas is, of course, applicable to stationary lights and is used in the beacons in Currituck Sound, N.C., and also on the Romer Shoal, New York Harbor. Another kind of lighted buoy has just passed successfully its experimental stage and is now being actively pushed to completion as a practical aid to mariners. It is the joint invention of Lt. Comdr. M. R. S. Mackenzie, U. S. N., and Lieut. John Millis, Corps of Engineers, U. S. A., and in general terms consists of a spar-buoy supported by an incandescent electric-light connected to a dynamo-machine on shore by an armored cable.

The incandescent lamp is enclosed in a cylinder of stout glass to protect it from the waves, and this cylinder is further protected against the shocks of ice or other floating bodies by a kind of cage of steel bars.

Six of these buoys, three on each side, will be set to mark Godfrey's Channel, New York Bay: the house containing the engine, boiler and dynamos will be located at Sandy Hook; the whole work is now under contract and will probably be in operation by the fall.

It has been frequently suggested that, that portion of the Atlantic Ocean most frequented by vessels should be lighted by a series of floating light-houses. At our Centennial Exhibition at Philadelphia several drawings and paintings were shown exhibiting the methods by means of which it was proposed to accomplish this object.

The following are some of the advantages claimed by the inventors: the light-houses could be anchored anywhere on the high seas and both guide and light vessels to their destination (one inventor showed his light-houses strung across the ocean like street-lamps in a city); they could be used as post-offices, telegraph, signal and lifesaving stations. Pilot's would await on them the arrivals of vessels; in stormy weather ships could moor to them and outside the gale. Captain Harris's painting, quite a large one, showed three floating light-houses and several vessels in a violent storm, the latter are much tossed but the light-houses are steady and are assisting the vessels by firing rockets and throwing life-lines from mortars. The supports of the light-houses are apparently can-buoys of large size. Captain John Moody's float is also of wrought-iron and shows considerable originality. It has four immense rays or arms, these being intended primarily to steady it and could also be used for storage purposes; the Captain claims that its peculiar form allows it to be boarded at any time and in any weather and that in time of war it could be used as a fort.

It is needless to say that none of these projects have been put into effect, perhaps the reason may be found in a remark by one of the inventors: "The undertaking is certainly great, and to carry it out in a series of vessels across the Atlantic would cost a great sum of money."

FINDING WATER BY THE DIVINING-ROD.

With reference to the paper on "Modern Divinations," which appeared in this Journal (February 18, 1888), we have received the following communications:

You may perhaps be surprised to hear that there are a number of intelligent readers of your Journal that believe implicitly in the "dowsing rod" for finding water and that these readers include noblemen, gentlemen, parsons, bishops, officers of the army, engineers, magistrates and others. The chief "water-wizards" at present are John Mullens and Lawrence; and the first can, I know, furnish a volume of testimonials to his powers from parties such as I have named. John Mullens has operated in very many places in England, and as far north as Dundee and other places in Scotland. He belongs to the same county as Lawrence, is a working mason on a gentleman's estate, and an unpretending honest man, who, if desired, sinks and builds his own wells, and charges nothing if the water is not found. He prefers to be employed after long droughts, as water found then, he reasonably concludes, will generally be from a permanent source. In wet seasons, he says, "there is water everywhere," and the good springs are consequently worse to find. He has been employed here several times to find water, after much expense had been incurred with engineers and others, and has always been successful, although at first most of us doubted his powers. I have tested him in every possible way, and he has never failed. No one now hesitates about his powers. The vicar was perhaps the most incredulous until he had tested the man thoroughly, what convinced him most being that when Mullens was asked to find water in his flower garden, he set out accurately the running sewer from the house for a long distance — not a trace of which was discernible above ground, and which no one knew but the vicar. He did other work of the same kind at the mansion here, finding an old disused sewer, the existence of which was suspected, but, although searched for could not be found.

He has been employed, I believe, on similar duties by the London authorities. He discovered our water-mains and branches here wherever he crossed them in the course of his journeys, greatly to the surprise of an engineer from Sheffield who constructed our reservoirs, and who followed John "afar off" for several days. The same engineer afterwards confessed to the writer that he was puzzled; but he admitted the man's powers. Mullens used the hazel and thorn "twig" only. No member of his family has the "gift," hence everything has to be done by himself. He asks no assistance save a "twig," cut close by, and a lad to follow behind him and the dog in where he makes a mark with his heel. He charges his fare and a modest fee, and is willing to submit to any reasonable test. He does not profess to explain his power, knows little or nothing about science, and is rather illiterate. Not a few large breweries and manufactories owe their water-supply to him. He does not profess to find still water; it must be running. In the case of the water-mains here, the "twig" turned up above the pipe in fields, woods, and
highways, where no signs of the ground having been disturbed appeared, the pipes having been long down, and no one knowing anything about their whereabouts but the waterman, and he depends on the map when he seeks them.

I have been a stickler for a gift to anything supernatural, but to natural causes not yet understood. That water can be found by the man in the way described, I have no doubt whatever; and I am equally sure he will confound any seer who tries him. Mullens says that the water which is the life of trees, and the arteries by which the heart are the most active; and the way the point whirs round in a moment above water is marvellous. The "twig," is Y-shaped; and the man, holding a leg firmly in each hand and the point downwards, stops it and examines it. On one occasion I held one end of the "twig," which it projected through his hand, the vicar holding the other end, both firmly. Mullens simply holding it, but without the power which I have described, yet it whirled round as before, except where we held it, and consequently twisted the bark into wrinkles by the force it exercised.

Another correspondent writes: My attention having been drawn to the late report on the road caused the vicar to take upon himself to seek water, and he must be allowed to have succeeded in finding it in a small apple tree. The fruit consisted of a small branch, about eighteen inches long in the shape of the letter Y. When the man was a mason — tried to find water, he walked slowly over the ground-chasing the rod firmly with both hands, and now to the front of the house, then to the rear, and the bottle was drawn down, there was a spring of water below, and gave his opinion as to the depth of the surface. I was sceptical about the rod, and thought he might have used some slight-of-hand; but in the course of the discussion, and after the subject of water, care must be taken not to mix a natural stream of water by the side of a road caused by a heavy shower of rain. I asked the man to test it, and I took hold of the rod as well as himself, in order to prevent the stick from twisting about, but in crossing the water I could not stop it doing so. I then held it with a pair of pincers, which had the desired effect as regarded that portion of the rod, but not so with the forked branches; in twisting upwards, each branch was split in the middle of them.

I engaged the mason to look over an estate of which I had the management, and some portion of which was short of water. I took him to some deep wells of which I knew the depth. He was able to tell the depth of water by the whirling of the branches; and also to water which I wished to sink a well. He fixed upon a place, and said there was water about sixty feet from the surface. Then he proved to be correct, afterwards, I had a well sunk, and found a tolerable supply of water.

He was taken to two other parts of the estate where I was anxious to get a supply of water; but he could not find any there. I afterwards took him to supply there was a watercourse of a small spiny, which he immediately said: "There is a large supply of water here, and bubbling near the surface." This was the case. A spring about fifty yards off, and which he could not see, as the trees hid it. Some articles of this kind, however, are not made of a great length for they are not treated by an encyclopedia of architecture. Perhaps M. Planat has been brought within the scope of this article; a civilian, but it is likely that the architect entrusted with the execution of this kind will consult technical works, where he will find in detail the rules and explanations of which he has need. It is not a dictionary or even to an encyclopedia of architecture that he will go when making his researches; it is rather to books on physics or chemistry, to those on hydraulics, or even physiology, for he would like to be armed with the most profound knowledge of mechanics and the making of steel, for example, he will seek his information in scientific works. This is a point on which we may complain of M. Planat, in that he has given too great importance to the study of the materials. He places them in a certain order of interest, far from that; but it is fair to ask one's self whether they are properly in place and whether they are not treated in works on architecture. It is only a question of style — which is perhaps personal to me and may not be shared by other — by the method adopted by him in editing the articles. These articles aim at surprising one, and will be treated in a particularly interesting manner. The others — and this ought to be the most serious — that of giving more authority to such and such interpretation of which an author known and accepted as an authority takes in some degree the responsibility; but this method may also have certain ill effects which have their base in the amour propre of the author of an article. A writer before being known would evidently make himself of such importance as possible, but his signature is an engagement of his dignity not to give incompleteness, or too brief information, but that its modest tone would have the air of ignorance; consequently he will be less disposed to allow the editor to revise and correct and cut the articles, and the editor will have greater fear of wounding the writer's self-love.

The list of collaborators on the encyclopedia is published at the head of the first volume, where we see the names of MM. André, Amory, Anquetil, Anquetil-Duperron, Ansart, Bayet, Bicchieri, Claye, Guadel, Guillaume, Hermant, Lainé, Pascot, Sicelle, etc. These names would give sufficient evidence of the serious and exact tone of the work. The editor could perhaps, through the suppression of the signature at the end of each article, supply himself more liberty in the exercise of his privileges as editor of the encyclopedia. This is only a slight criticism and may be disputed.

Violet-le-Duc, in a new work, which is entitled _Modern Architecture_, has just published the first volume of an encyclopedia of architecture and construction, which is worthy of being seriously recommended. It is a valuable work to consult, and a curious one to read. The words or hands will not be too numerous; but all those which are treated will be handled in a complete and intelligent fashion and in a very interesting form for the architect. Understanding the importance of details of such a work, M. Paul Planat has, naturally enough, surrounded himself with collaborators, requiring each one of them to treat those subjects which each had already digested.

Some of them have consented to prepare abstracts of their architect's works, and others have studied the architecture of the various nations. Others have traced the picture of the phases which art has passed through in modern nations. Others have reduced to brief and substantial articles the rules of practical construction and the hints for the working architect. But the method of this encyclopedia is a reality and one and should give a series of exact results. But documents must be studied with care. Veracity must be suppressed, and when it is a question of a special dictionary, such as a dictionary of architecture, there is need to pass through all the foreign to foreign to construction, or at least have with it only a secondary connection. It is evidently easy to prove that mechanics, metalurgy, chemistry, and even physiology are necessary in matters of construction, and that the application of these different sciences may be encountered in many cases. "A notion, at least elementary and practical, of these sciences will make henceforth an architect's mind as necessary to the working of a building as it was to the building itself. The laws of the architect's art are as necessary, in many cases, as in the construction of a theatre, a concert-hall, or lecture-hall, but then, it is likely that the architect entrusted with the execution of this kind will consult technical works, where he will find in detail the rules and explanations of which he has need. It is not a dictionary or even to an encyclopedia of architecture that he will go when making his researches; it is rather to books on physics or chemistry, to those on hydraulics, or even physiology, for he would like to be armed with the most profound knowledge of mechanics and the making of steel, for example, he will seek his information in scientific works. This is a point on which we may complain of M. Planat, in that he has given too great importance to the study of the materials. He places them in a certain order of interest, far from that; but it is fair to ask one's self whether they are properly in place and whether they are not treated in works on architecture. It is only a question of style — which is perhaps personal to me and may not be shared by other — by the method adopted by him in editing the articles. These articles aim at surprising one, and will be treated in a particularly interesting manner. The others — and this ought to be the most serious — that of giving more authority to such and such interpretation of which an author known and accepted as an authority takes in some degree the responsibility; but this method may also have certain ill effects which have their base in the amour propre of the author of an article. A writer before being known would evidently make himself of such importance as possible, but his signature is an engagement of his dignity not to give incompleteness, or too brief information, but that its modest tone would have the air of ignorance; consequently he will be less disposed to allow the editor to revise and correct and cut the articles, and the editor will have greater fear of wounding the writer's self-love.

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August 11, 1888.

The American Architect and Building News.

To the Editors of the American Architect:

Dear Sirs,—In the article "On the Hygroscopic Behavior of Varnishes," you stated that "it is not an uncommon thing that the varnish of a recent painting ...". I wish to correct this by stating that the varnish of a recent painting can be perfectly dry and still have a hygroscopic effect. The drying process of varnish is influenced by the humidity of the air, and once the varnish is dry, it can still absorb moisture from the air and change its color. This is why it is important to use a primer that is resistant to moisture and to apply multiple coats of varnish to ensure a long-lasting result.

Yours faithfully,

[Signature]

To the Editors of the American Architect:

Dear Sirs,—I read with interest your article on the "Hygroscopic Behavior of Varnishes." I would like to point out that the statement "it is not an uncommon thing that the varnish of a recent painting ..." is not entirely accurate. Varnishes are hygroscopic in nature, meaning they can absorb and release moisture from the surrounding air. This property can affect the color and transparency of the varnish, especially in humid or dry conditions. The drying process is influenced by the humidity of the air, and once dry, the varnish can still absorb moisture, which can lead to changes in color and sheen.

Yours sincerely,

[Signature]
mining magnates, who had a tremendous interest in getting the gold out of quartz rock quickly and cheaply. The inventor obliged them by simulating their demand for large lots of quartz by making a little machine after his own hand; and as he touched each block it instantly crumbled into atomic dust, in which the specks of gold it had contained stood out like stars in a field of space. The machine was a public success.

Mr. Keely, if you will in the same manner disintegrate some quartz for us in its natural place, I will pay you for it.

Then a trench was dug down to the Salt Hill Mine, and there the twelve solid men pointed out a reef of quartz on the side of a mountain as Mr. Keely had directed. This little machine was then placed in the end of it at the salt hill, and as the gravel was washed over it, the dross simply made dunes and washed the construction. There is a wide range of practicality and the more penetrating-minded architects are using the opportunities of increased facility in their designs. Advices from a number of interior points in the Western States have revealed that the grunting information of the various articles used in the building work has been undertaken within the past two or three months. This is the result of a most amazing fact. If a person who has never been to the place where the act is performed, he is told that the thing that is being done is not possible, because the observer is working or is not even interested in what is going on. The further he is from the place where the act is performed, the more he is interested in what is going on.

A CANAL LIFT.—An engineering work of singular magnitude and importance has just been inaugurated at Arques, near St. Omer, in France. The undertaking so successfully inaugurated is the work of Mr. Edwin Clark, C. E., of Great Marlow, and an associate of Stephenson in the construction of the tubular bridge over the Moniel Straits. The work comprises a canal lift, superseding the series of ordinary locks, which at present so seriously impede the traffic on the large canal system communicating with Belgium. The Continental canals are on a much larger scale than American, and the boats usually carry from 210 to 220 tons. The ground at this particular spot rising very rapidly, the work was attended with immense difficulty, involving great loss of time and great cost in their management. This invention of Mr. Clark's the canal boats are now lifted the whole height of nearly fifty feet. The first lifts of this type make a total expense of twenty-four thousand dollars whatever of water. This singular machine consists practically of a gigantic hydraulic press, whose piston is 3 feet 5 inches in diameter, and whose cylinder is 10 feet 9 inches long. A belt of eight men, affixed in an enormous tank or reservoir, are bodily raised or lowered, water and all, to the required height. This reservoir is in reality an actuating engine, and the work, though not patented, but he has just completed a still larger lift in Belgium, which the company during the present month. The introduction of this system will in future totally change the whole character of our canal systems, as a range of high hills may be thus easily traversed without any loss of water from the summit, and the same system is now being adopted in Connecticut and New York.

The Architect.

SOME OLD-TIME STRIKES. — In 1760, 1768 and 1770, the journeymen shoemakers of Philadelphia struck for higher wages and were successful. In November, 1893, a strike occurred in New York City which is considered as one of the false frontiers' strikes and which has been generally considered as the first strike in the United States. In the same year the sailors struck for an increase of pay from $10 to $14 per month. They marched around the city and compelled other seamen to join their work, but were put to flight by the constabulary, who arrested their leader and lodged him in jail. The strike was a failure. A very singular strike occurred in 1857 in Pittsburgh when Doctor L. H. Hume, a shipbuilder, notified his men that he would not furnish them with the customary grog, and that no liquor should be used in his shipyard. The men who were employed there for some time was for an increase of pay from $1 to $1.12 per day, and for more whiskey, the allowance being a pint and a half per day to each man, the work was put down.

The American Architect and Building News. [Vol. XXIV. No. 650.]

TRADE SURVEYS.

Two architects of the country have done as much work this year as they did last. The larger percentage of it has been of the cheaper variety of building. Builders engaged in large operations found it to their interest to use the architects for these small buildings. In the case of the architects of the west the mountains have been generally busier than the architects of the east. The rate of building has been an interesting subject to a range of subjects and presents a range of practical value that is not likely to fade. The little machine was turned on full force and the gum-ball fired through its full length, coming out at the further end in a few minutes.

A MONUMENT TO SEMPER. — Funds have been collected in Germany for a monument to the famous architect, Semper, to be erected at Dresden. It will adorn the Brühl terrace, and will be the work of Professor Schilling, the author of the Niederwaldden monument.
AUGUST 11, 1888.]

The American Architect and Building News.

THE DECECO WATER CLOSET.

THE SQUARE-TOP DECECO CLOSET.

Of late considerable attention has been paid to the aesthetic side of plumbing, and there has arisen a considerable demand in the better work for fixtures which shall please the eye as well as satisfy the mind.

In this connection closets with square tops have been called for and have to a certain extent become the fashion. The above cut shows the model which we have designed in response to such demand.

It is made both in pure white (like the oval) and in a very delicate "ivory" tint. It has been pronounced by many who have seen it as the handsomest closet in the market.

It is precisely like the ordinary Dececo except as regards the top of the bowl and the slight ornamentation about the foot.

THE DECECO COMPANY,
12 High Street, NEWPORT, R. I.
MONUMENTS.

Soldiers' Monument, Lawrence, Mass.
Designed by M. J. Powers.

Bacchus and Infant
Terra-Cotta by Codron.

Spite my Art, Beating
The exterior of this house is stained with CABOT'S CREOSOTE STAIN for Shingles, Fences, Clapboards Etc.

The Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply:

Our Stains contain no water and are the only exterior Stains that do not contain kerosene:

Prices are 30, 50, and 75 cents per gallon according to color.

Send for samples on wood, and circulars.

Samuel Cabot, 70 Kilby St., Boston, Mass.
BUILDERS' MONUMENTS.

FROM LKTTKII FROM ARCHITECT, scific one into that in and the which __ dangerous the 1883, the this found to be

dred by to children's diseases, at Detroit, the Baltimore Health Department mentioned that the mortality from scarlet fever was greatly influenced by the enforcement of the new law. During the seven years prior to 1883, the average number of fatal diphtheria cases in the city was four hundred and sixty-nine annually. Since 1883, although for the first year or two the ordinance could not have received sufficiently extensive application to be very effective, the annual average has been two hundred and thirty-four, or almost exactly one-half of the previous average.

As most people know, the penalty of death by hanging is to be abolished in the State of New York after this year, and the few persons whom New York justice sees fit to remove from this life as a warning to others are to be made way with in the most modern, scientific and humanitarian manner, by means of electricity. How the electricity is to be applied no one seems to know, but the Legislature of the State appears to have had a vague idea that, if any of its constituents should ever need to be executed, which, judging the immunity extended to Chiara Cigarele, must be a very remote contingency, there would be something grand and modern in applying a tame thunderbolt to them, in place of the hangman's noose, and that a way would be found for making the application when required. Fortunately, perhaps, for the peaceful part of the community, a few patriotic citizens have taken steps to investigate the subject of electrical execution, and it is to be hoped that they will be able to devise an effective method by the time it is required. A few experiments were made, a year or so ago, at Buffalo, by a commission appointed by the Governor, with the object of carrying out a death sentence, and the conclusion reached by the Commissioners was that the dogs, which were used as illustrations, died most comfortably by being first chloroformed, and then placed in a tank of water, after which a wire was wound around their noses, and then connected with the wire and the machine.

The most interesting as this observation was, it shed very little light on the point to be studied, for the obvious reason that criminals are by no means so easily chloroformed as dogs, and without taking away their senses by anaesthetics it would be next to impossible, even if it were desirable, to put them into tanks of water, and wind wire around their noses, preparatory to administering the fatal shock. Feeling that something still remained to be done, Mr. Harold P. Brown and Dr. Frederick Peterson made use of Mr. Edison's laboratory at Menlo Park for the purpose of trying some further experiments on dogs, and, with the help of the appliances of the laboratory, they have arrived at interesting results. It is found, among other things, that the resistance of different animals to the passage of the current differs greatly, one being not at all injured by a current of fourteen hundred volts intensity, while another died instantly under a current of one hundred and sixty volts intensity. It seems that the resistance applied in the skin, and it is supposed that the skin is covered with hair, and, supposing a current of ample intensity to be provided, it may be difficult to get it to enter the victim's body, unless his hair is at least shaved off at the point of application of the poles. Moreover, the resistance increases with the area of the pole-terminations, so that the more persons, in which the patient was to be seated, would be likely to present too large a metallic surface to enable the current to pass freely into the body, while as Dr. Peterson points out, a strong current applied in this way would burn and disfigure the skin. The result indicated by the experiments was that murderers would be most certainly and comfortably disposed of by shaving the top of the head, or cutting the hair very short, wetting the scalp, and applying a small electrode, not more than a quarter of an inch in diameter, while the other electrode, furnished with a wet sponge, should be applied to one of the thighs or to the small of the back. A charge would pass through the brain, and death would follow in extinguishing life, in a manner "rather agreeable than otherwise." If carried out decently, such an execution would have nothing objectionable about it, unless perhaps to the patient, but if there were any uncertainty about the application of the current, the scene might be horribly prolonged by the struggles of the person to be operated on. Apparently, the best application of all would be a lightning flash, or a current of similar intensity, which could be discharged without warning, and without the nervous agony of adjusting sponges and wires. At present, no one knows exactly the tension, as indicated by volts, of a lightning flash, but it is very high. In fact, the voltage of the thunderbolt comes almost entirely from its intensity, and very little from the quantity of electricity contained in it, a recent computation having shown that the electricity in an average discharge of lightning would keep a single incandescent lamp, of the ordinary kind, in operation only two or three minutes.

We regret very much to find that a contemporary for which we have so high a regard as the Sanitary News wants the Commissioner of Patents to keep a loaded gun ready to shoot us with, on account, as it appears, of the dangerous mental disorder shown by our modest comments on the de Bausset flying-machine which were printed thereon; for we said so what we said object to such treatment, we hope we may assuage the Sanitary News's alarm by a little further explanation of what it considers our "nauseous" idea of the possibility of utilizing gravitation as a means of propelling air-ships, after the method said to be practised by some birds. It is hardly necessary to say that every one interested in aerial locomotion watches the flight of birds with anxious curiosity, to see if anything can be learned from them which may help in solving the...

great problem, and observers have not yet been able to determine whether the propulsion in flying creatures partly from the shrunken wings, or wholly from the movement of their bodies, such as the sea-gull and hawks of different kinds, the flapping of the wings serves mainly to lift the body vertically, or nearly so, into the air, the effect being produced by the arrangement of the feathers of the wings, which, when the wings are moved upward, turn like-blades, allowing the air to pass between them, but, when moved downward, lap upon each other in such a way as to prevent the passage of the air, and enable the wings to exert a powerful downward pressure, which lifts the body in proportion to the effort. The familiar Arnott valve, used in ventilators, the principle of which remains open so long as the draught of air is continued, and the flue from the chimney, the slightest down-draught, gives an idea of the action of the wing-feathers in their alternate upward and downward movement.

As any one may see, by watching a sea-gull rise from the water, a violent and prolonged flapping is first necessary, to lift it vertically, or nearly so, into the air. When it has reached a certain altitude, the flapping steps, and a slight movement of the wings brings the bird into such a position that, with its wings outspread but motionless, it slides down the air, until its downward gravitation is equal to the upward force of the air, and thus toward the earth, only utilizing the resistance of the atmosphere under its wings to change the movement of a fall vertically downward to a gradual descent, at a comparatively slight angle with the horizon. If the wings were immovable, the bird would pursue a straight line until the bird plunged into the water, but they are both capable of a delicate adjustment, at the creature’s will, and just before touching the water, a slight muscular effort may turn them so as to change the descent into a horizontal movement, which is maintained until the impetus derived from the descent is exhausted. In this manner it is raised to the necessary elevation for another aerial slide. Very frequently, the bird, instead of skimming horizontally over the water until his momentum is exhausted, moves his wings again, so as to direct himself upward with the remaining portion of the same impetus, and thus save himself a few flaps of the wings in ascending for a fresh start.

Now, although it is generally agreed that to equip an airship with machinery for driving it upward proportioned in power to the wing-muscles of a bird would make it too heavy for practical use, it is perfectly possible to lift one, furnished with means of generating hydrogen or air corresponding to that from which a gull or a hawk begins its long flight, and then, by allowing the hydrogen to escape, leave it resting, by means of its wings, on the air, just like a bird balancing itself for a downward swoop. From that point the direction, and the speed of its movement, might be controlled by shaping the wings, until the structure reached the ground; and it would be perfectly possible, after its flight had brought it nearly to the earth, to raise it for a fresh start, by means of a supply of hydrogen brought in a compressed condition, just as a bird would raise itself by flapping its wings. Of course, we do not expect immediately to see balloons soaring about the sky in this manner, and the Commissioner of Patents need not lay in a store of ammunition at present under the apprehension of a visit from us, but, simply as a piece of science, there does not seem to be anything absolutely impossible in the notion, and no method of propulsion which we have ever heard supposed for navigating the air offers anything like the power which could be obtained in this way. There is a man at present exhibiting at the Northern seaside resorts, who suspends himself by a belt, furnished with hooks, to a parachute some eight or ten feet in diameter, and has the parachute taken up into the air by a hot-air balloon, made out of cotton cloth, covered with a rubber-like setting, which is advertised as two thousand feet, but which we are willing to believe a little less, he detaches the balloon by pulling a cord, and descends, sustained by the parachute, in safety to the ground. Having thus solved, like so many others, the problem of descending safely from high; height, it w a great step not to be a very long step to the addition of movable wings, controlled by cords, on each side of the parachute, by which the descent might be varied in direction, without increasing the risk of accident; and it is quite conceivable that an apparatus of this sort, cheap and simple as it is, might be found very serviceable, particularly for military use. What might be done with it on a smaller scale we will not pretend to predict, but as a suggestion to those who laugh at the idea of raising miles into the sky, a Mr. Warren, now at New York, and sailing thence to Liverpool, and who cannot believe that an air-shape can ever be made capable of struggling against wind storms, it may not be amiss to say that the gradient of a course from a point five miles above New York to Liverpool is about one in a mile, which is enough to give a tolerably rapid movement in such a medium as air; while, in regard to the speed attainable, it should be remembered that if a little bird, weighing two ounces or so, with nothing but its weight and its wings to drive it, can on its trip over the florid hurricane, it is not beyond possibility that a structure from such a bird might be so navigated as to pass through the currents of the air as easily as a steamship does through those of the sea.

Some of our readers will remember that Mr. Norman Shaw is a good deal of a connoisseur in matters of plumbing, and published long ago some remarks on rain-water and soil pipes which were of value. Recently he has turned his attention to the study of drain-pipes, and, not being satisfied with present hail, has invented a new form. The defect of the ordinary drain-pipes is, that they project outside the building, and are thus open to soot and rain. Mr. Shaw’s project consists, as he says, in the difficulty of laying them in straight lines, and the impossibility of ascertaining whether they are properly jointed or not. In fact, it is very difficult to make a good cement joint with cylindrical tubes, as it is in the present case, or to fill the joint, or, if the joint is filled, the cement projects into the pipes and makes a junction which is seldom removed at the right time, if at all, and in either case casts lint and sediment, and leads in time to the complete choking of the pipe, when it is necessary to break up several lengths of pipe, in order to get out the offending one, and replace it with another. To meet these objections, Mr. Shaw has had made for him drains shaped in section like the letter U, or, rather, with the oval profile which is recognized as best for large sewers, but with the top open, a groove or rebate being formed in each edge. The heading-joints have “hubs,” or sockets, like those of the cylindrical pipe, but open at the top. To use this idea, the drain is placed in the trench, and jointed with cement, and, the top being open, it is easy for the workman to rub the joints smooth as the pipes are laid, and for the architect to see whether the trough made by the section of drain is perfectly smooth and straight, before it is covered over. The cover used is simply a series of flat earthenware plates, which fit into the sockets or rebates on the edges, and, after being set in place, are plastered with half an inch or so of cement. The small radius of the inlet helps to keep the drain clean, and, if any stoppage takes place, the flat tile cover is easily removed without necessary. So far, Mr. Shaw has used only drain-pipes of earthenware, but as he has had some sections made of artificial stone, of Portland cement, sand and small pebbles, and, although he has not yet brought these into actual use, he finds the appearance of them “most fascinating,” and hopes for the best results.

We grieve to hear that the imported laborer who works in the Divine vineyard as rector of the Church of the Holy Trinity, in New York, has been adjudged to hold his position in contravention of the laws of the United States, and the corporation of the church has been compelled to pay fine of one thousand dollars for inviting him to this country. There has been appealed to the Supreme Court of the United States, and, in making the appeal, the counsel for the defence has added to his plea the extraordinary claim that the Contract Labor Law, under which the conviction was obtained, is unconstitutional, so far as it applies to importing clerks, on the ground that it restricts that free exercise of religion which is granted by the Constitution to every man. We shall be curious to see what the Supreme Court will say to this idea, under which, as it seems to us, a congregation might lay claim to the spiritual ministrations of any other violator of a statute, whether in or out of jail, provided it is supported by its “free exercise of religion,” if he was not immediately released to them. The District Attorney, Mr. Walker, who has a sharp eye for absurdities, and considerable courage in expressing his opinion about them, endeavored to avoid confusing the case with this doctrine, but was obliged to yield. In the while, as the case will probably not be reached in the Supreme Court for two years or more, Mr. Warren is likely to go on with his duties, unless a new complainant should appear.
ARCHITECT, OWNER AND BUILDER BEFORE THE LAW.—IV.

WHAT is the sort of employment constituted by the acceptance of terms of competition publicly offered is less understood by all parties than it should be. In the first place, it ought to be remembered that whatever contract is entered into between the promoters of a competition and those who agree to their terms is binding on both. Although a promise to do work for nothing is not a contract, and performance of the promise cannot be required, a promise to do work for an inadequate or even a contingent remuneration is valid, and can be enforced. Thus the chance of securing employment, such as forms the inducement held out in competitions, may, if it is clearly offered, form a valid consideration for a promise to submit a design, and an architect who promises to do so in accordance with the terms of competition offered is bound by his part of the contract, and cannot subsequently decline or neglect to send his drawings, except with the consent of the party to whom the promise was made.

On the other hand, the party inviting competitive designs is bound strictly by the terms of the invitation. It is well settled that "an offer of reward or compensation by public advertisement, either to a particular person or to a class of persons or to any or all persons, is a conditional promise, and if any one to whom such offer is made shall perform the service before the offer is revoked, such performance is a good consideration and the offer becomes a legal and binding contract," and it has been decided that the contract thus made is to be regarded as a written one, and therefore not subject to the operation of the Statutes of Fraud or Limitations. If no one should accept the terms offered, by doing the work in accordance with them, the promise contained in them will be still only conditional, and the offer, so long as it remains conditional, may be revoked, but as soon as any one does the service specified in the invitation, he has established his right to compel the persons who issued it to fulfill their part of the contract. There are many cases involving this point, but nearly all of them refer to services rendered in response to public advertisement by finders of lost property, or persons engaged in capturing thieves or reclaiming stolen goods.

Where, as in these instances, the finder of a lost article or the capita of a criminal is compelled to sue for the reward promised by advertisement, he is always successful, provided he has complied with the advertised terms, and it has even been held that a person who found anything lost, for which a reward had been advertised, and who, on offering to restore it to the owner, was refused the promised reward, might lawfully keep the article himself.

Unfortunately, the advertised "invitations to architects" to make designs in competition sometimes expressly stipulate that the architects who accept them shall abandon all claim to fair treatment, as, for instance, a recent one, in which the promoters "promised nothing, but would be governed by what seemed to them for the best interest" of the corporation which they represented; or make promises too vague to be enforced, but where the promise is definite, it will certainly be enforced in favor of those who comply with the conditions which accompany the promise. The most noted case of this kind which has yet been decided, and one of very great importance to architects, is that of Walsh v. St. Louis Exposition and Music-Hall Association, 16 Missouri Appeals, 502, and 9 Missouri (Supreme Court) 456. This suit grew out of a competition instituted by the St. Louis Exposition and Music-Hall Association, which issued an invitation in the following terms:

"St. Louis, April 19, 1883.

"DEAR SIR,—At a meeting of the Board of Directors of the St. Louis Exposition and Music-Hall Association, held on the 18th day of April, 1883, the following resolutions were adopted:

"First. That all architects, residents of this city, and five non-residents, be invited to prepare and submit designs.

"Second. That from those presented by residents, seven, which shall be considered the most meritorious, shall be accepted and awarded five hundred dollars ($500) each, and the five presented by non-residents shall each be awarded the same amount. All designs for which are paid five hundred dollars ($500) shall be the property of the Association.

"Third. That it shall be pronounced to the architect any foreign architect may submit a design, but if not accepted as the most meritorious of all, he will receive no compensation and his designs shall be returned.

"Fourth. The architect who is successful shall not receive five hundred dollars, but he shall be engaged as architect and consultant and shall be paid for performing such duties the usual commissions as adopted by the American Institute and the St. Louis Institute of Architects.

"Fifth. That all architects entering for competition shall so notify the president or secretary on or before May 5, 1883.

"Sixth. That said plans and specifications shall be placed under seal in hands of the secretary on or before July 2, 1883, and that they shall be without names or marks to indicate by whom made.

"Seventh. That there shall be ground plans of the several floors, drawn to a scale of one-sixteenth of an inch to the foot, and elevations and cross and longitudinal sections, drawn to a scale of one-eighth of an inch to the foot, with descriptive specifications. Elevations to be geometrical and in line simply. No perspective drawings will be admitted. All plans must be simply tinted in India ink. No shaded drawings will be admitted.

"Eighth. The said designs and specifications shall be for a building to cost not over four hundred thousand dollars ($400,000) exclusive of power, electricity and elevator machinery, arrangements for which, however, must be made.

"Ninth. As to the building itself and what architects should be requested to include in their plans, we recommend the following features:

"First. That building shall not cover more than 480 x 320 feet.

"Second. A music-hall, with seats 20 x 20 inches, to seat four thousand people, and arranged so that it can be used for halls, exhibits or dramatic purposes. That the stage shall be large enough to accommodate the organ and seat one thousand persons. The hall to be well lighted, ventilated and with perfect acoustics.

"Third. A small hall to seat one thousand two hundred persons, with suitable stage.

"Fourth. A basement under building, to be arranged for machinery, carriages and other heavy exhibits, and for power-shafting.

"Fifth. Fine art rooms for display of pictures and statuary.

"Sixth. Floral hall that will provide for rockery and water displays.

"Seventh. General exhibit-hall for all articles.

"Eighth. Dressing-rooms, closets, etc., for public use.

"Ninth. Boiler-rooms, coal-stocks, etc., away from building.

Continued from page 287, No. 306.
"Teeth. Arrangements for elevators to high parts of building."

This invitation was sent to Mr. Thomas Walsh, of St. Louis, who notified the officers of the Association of his intention to submit plans and specifications prepared and sent accordingly two designs in compliance with the requirements. One of these designs was, as he afterwards learned, decided to be the best submitted, and was retained as the property of the Association, but another person was appointed architect of the building, and work was commenced. Mr. Walsh then presented a claim to the appointment, and informed the officers of the Association that he was willing and ready to undertake the work of architect and superintendent of the building. On their refusal to transfer the commission to him, he brought a suit for damages, which, under the usual rule, that the carrier of damages for the refusal of one party to fulfill a contract is the profit which the other party would have derived from its complete execution, he laid at twenty thousand dollars, or five per cent on the estimated cost.

The Musc-Hall Association did not deny that Mr. Walsh's design was placed first, but resisted his claim on the ground that nothing in its proposal implied an unconditional obligation to employ as architect or superintendent the person whose design might be found the most meritorious or acceptable of those submitted. He said such promise being intended or made, Mr. Walsh had no ground of action. The Circuit Court, in which the case was first tried, sustained this view, and gave judgment for the defendant. Mr. Walsh then took the case to the Court of Appeals, which reversed the finding of the court below, and ordered a verdict for the plaintiff. Another appeal was then taken by the defendant to the Supreme Court, which fully affirmed the decision of the Court of Appeals, and probably established the law on the subject in this country.

The stipulation on which Mr. Walsh relied for proving the conditional promise, of which he, having fulfilled the conditions, was entitled to the benefit, was this: Fourth, which reads as follows: "The architect who is successful shall not receive five hundred dollars, or he shall be engaged as architect and superintendent, and shall be paid for performing such duties the usual commissions as adopted by the American Institute and the St. Louis Institute of Architects."

The Association explained this by saying that the expression, "the architect who is successful," was not intended to mean necessarily the person who submitted the best plans, as this might be some one unfit to be trusted with the responsibility of execution, but that it meant the architect who should, on the whole, be considered worthy of the appointment.

It is surprising that such transparent sophistry should have imposed upon the Circuit Court, but it did not for an instant blind the keener eye of the judges of the Court of Appeals, who say, in their opinion, that "the whole tenor of the proposition emphasizes that no such restrictions were thought of in the framing." "Who is the person intended by the expression, ‘the architect who is successful?’" they asked.

Twelve architects are promised a reward of five hundred dollars each. It is obvious that to be one of these is not to be the "successful" person, for the five non-resident architects receive their five hundred dollars without any regard to the quality of their work, and the whole tenor of the circular shows that it is intended to stimulate the powers of competitors by promising something to the one person who shall surpass all the others in doing the work which the invitation specifies. This one, at least, is the "successful" competitor meant by the circular, and if the plaintiff, as he avers, did prepare and hand-in designs, plans, elevations, sections and specifications which were, upon examination and consideration by the defendant and its Board of Directors, considered and declared as the most meritorious of all those that had been submitted to the said proposal, and the same were accepted by said defendant as such he became the successful architect to whom the fourth clause of the proposal distinctly promises the superintendency."

[To be continued.]

**ACCIDENT TO SEVILLE CATHEDRAL.—A pier of the Cathedral at Seville failed August 3d, causing a portion of the roof of the nave to collapse. The falling debris destroyed the organ and did other damage to the cathedral. It is said that not less than $500,000 will be needed for the repairs, part of which sum will be raised by a national subscription.**

**BUILDERS' HARDWARE.—III. NAILS.**

The nails commonly used in connection with building operations are too well-known to require description. They are specifically designated as plate-nails. Up to within a comparatively short time, nails were made by hand almost entirely by women and children, and it is one of the best arguments in favor of the introduction of machinery that the process by which nail-making has been perfected has released a vast multitude from the laborious and wearing occupation, besides giving a great deal better results. The application of machinery to the manufacture of nails is purely an American idea and so recent have been the innovations in connection with this industry that we imagine many people would be surprised to know the changes which have been made both in the form and in the character of the ordinary nails, during the past generation. It is only about fifteen years since iron nails were annealed, or capable of clinching without rupture.

In the manufacture of nails the iron is first rolled into plates having a thickness equal to the desired thickness of the nail and a width a little greater than the length of a finished nail. The plates are cut so that the length is longer than the grain, the idea being that when the nails are cut out the fibre will run lengthwise the nail and thus make up much stronger. Special machinery cuts the nails out in alternate wedge-shaped slices so that the metal is used without any loss. The wedges are picked up, held in a vice, the head stamped on them, and the finished nails finally dropped out into the casks. The machinery is too complicated to allow of any description here, but the process is very simple and easily understood. Nearly all the common nails are made from plates. Hand nails are still made for special uses such as for horse-shoeing, but the cost is too great and hand-made nails are really no better than those which are made by machinery.

Nails are designated according to their length by pennies. The origin of the designation is generally assumed to be in the old system of weights, the nails being made with as many pennyweights of metal as the number indicates. This designation, of course, no longer holds good, as nails have changed materially both in size and weight, but it is still retained for common convenience and we believe the graduation is uniform with the various manufacturers. The weights run from two to twenty penny and the nails vary in length from one inch to six inches. Six-inch nails and larger are more properly designated as spiles, though the trade recognizes a special form of nail of somewhat stouter proportions, made in several of the larger lengths and technically sold under the name of spiles.

Trautwine's "Pocket-Book," page 425, gives the sizes, etc., of nails as follows.

<table>
<thead>
<tr>
<th>Name</th>
<th>Length, inches</th>
<th>No. to pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>3d</td>
<td>1</td>
<td>.005</td>
</tr>
<tr>
<td>4d</td>
<td>1</td>
<td>.007</td>
</tr>
<tr>
<td>5d</td>
<td>1</td>
<td>.009</td>
</tr>
<tr>
<td>6d</td>
<td>1</td>
<td>.011</td>
</tr>
<tr>
<td>7d</td>
<td>1</td>
<td>.013</td>
</tr>
<tr>
<td>8d</td>
<td>1</td>
<td>.015</td>
</tr>
<tr>
<td>9d</td>
<td>1</td>
<td>.018</td>
</tr>
<tr>
<td>9d</td>
<td>1</td>
<td>.020</td>
</tr>
<tr>
<td>10d</td>
<td>1</td>
<td>.022</td>
</tr>
<tr>
<td>11d</td>
<td>1</td>
<td>.025</td>
</tr>
<tr>
<td>12d</td>
<td>1</td>
<td>.027</td>
</tr>
<tr>
<td>13d</td>
<td>1</td>
<td>.030</td>
</tr>
<tr>
<td>14d</td>
<td>1</td>
<td>.032</td>
</tr>
<tr>
<td>15d</td>
<td>1</td>
<td>.035</td>
</tr>
<tr>
<td>16d</td>
<td>1</td>
<td>.037</td>
</tr>
<tr>
<td>17d</td>
<td>1</td>
<td>.040</td>
</tr>
<tr>
<td>18d</td>
<td>1</td>
<td>.042</td>
</tr>
<tr>
<td>19d</td>
<td>1</td>
<td>.045</td>
</tr>
<tr>
<td>20d</td>
<td>1</td>
<td>.047</td>
</tr>
<tr>
<td>21d</td>
<td>1</td>
<td>.049</td>
</tr>
</tbody>
</table>

Common nails are now very largely made of a low grade of steel, the cost being not over ten cents per hundred pounds more than in wrought-iron.

In regard to the strength of nails, Trautwine also states that boards of oak or pine nailed together by four to sixteen tennemy common cut-nails and then pulled apart in a direction lengthwise of the boards and across the nails, tending to break the latter in two by a shearing action, averaged from three hundred to four hundred pounds per nail to separate them as the result of many trials. "Johnson's Encyclopedia," states that the rough surface of a cut-nail adds about twenty per cent to its holding power. The absolute resistance nails will offer to withdrawal varies so widely with circumstances, that no satisfactory results are available.

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1 Combined from No. 659, page 65.
The sizes of nails used for specific purposes is largely a matter of judgment on the part of the builder, but the common custom is to use four-penny nails for shingling and slating, six-penny for clapboarding, sizes and eights for finishing, eights and nines for flooring, nines and tens for boarding and forty-penny and upwards for framing. Architects sometimes consider it well to specify the sizes of nails to be used for bridging the floor-beams, and for slating, but on general principles we would suppose that a builder who would need any such restrictions would not be a man to employ under any circumstances.

Nails are commonly sold by the cask of one hundred pounds. The following are the net prices in the Boston Market.

**PRICES FOR CUT-STEEL NAILS, JUNE 20, 1888.**

**COMMON, FENCE, AND SHEATHING.**

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
<th>Price per Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>6d</td>
<td>1 in.</td>
<td>$2 25</td>
</tr>
<tr>
<td>8d</td>
<td>2 in.</td>
<td>2 25</td>
</tr>
<tr>
<td>10d</td>
<td>3 in.</td>
<td>3 20</td>
</tr>
<tr>
<td>12d</td>
<td>4 in.</td>
<td>3 20</td>
</tr>
</tbody>
</table>

**FINISHING.**

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
<th>Price per Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>6d</td>
<td>1 in.</td>
<td>$2 75</td>
</tr>
<tr>
<td>8d</td>
<td>2 in.</td>
<td>3 25</td>
</tr>
<tr>
<td>10d</td>
<td>3 in.</td>
<td>3 40</td>
</tr>
<tr>
<td>12d</td>
<td>4 in.</td>
<td>3 75</td>
</tr>
</tbody>
</table>

**SPECIAL.**

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
<th>Price per Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>6d</td>
<td>1 in.</td>
<td>$3 85</td>
</tr>
<tr>
<td>8d</td>
<td>2 in.</td>
<td>3 25</td>
</tr>
<tr>
<td>10d</td>
<td>3 in.</td>
<td>3 25</td>
</tr>
<tr>
<td>12d</td>
<td>4 in.</td>
<td>3 75</td>
</tr>
</tbody>
</table>

**SPIKES, OF ALL SIZES.**

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
<th>Price per Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>6d</td>
<td>1 in.</td>
<td>$2 50</td>
</tr>
</tbody>
</table>

Common nails can be had galvanized in all the ordinary sizes. Galvanized nails cost 24 cents per pound extra.

Canada wrought nails are sold for $16.00 per cask. Clinch nails (annealed) cost from $3.10 per cask for ten-penny, to $4.50 for two-penny. Swedish-iron nails are made from a better quality of wrought-iron, and are especially used for slating, as they are supposed to stand the weather better than is the ordinary plate-nails. When made from genuine Swedish iron, four-penny nails are sold at $5.50 per cask. American-iron Swedish are $3.85 per cask. Architects usually find it advisable to specify Swedish-iron nails for roofing-work.

Tinning nails from twenty to fifty cent per pound, depending on the number of nails to the pound.

Finishing-nails are lighter and thinner than common plate-nails, and besides being made quite smooth, they have very slight heads, to permit of being easily countersunk in the wooden finish. They are made in a number of sizes, from 3/8 to 2 inches in length. Next to finishing-nails are the common brads, made with a head in the form of a shank on one side.

The sizes are from 3/4 inch to 2 inches in length. Brads are used for small finish, tacking on panel moldings, etc., the metal being quite thin and the head driven edgeways of the grain so as not to show on the wood. Swedish-iron patent brads are manufactured by the Stanley Works, and sold at from 18 cents to $1.25 per pound, with a discount. Common brads are listed at the same prices. Clout nails are made with broad, flat heads, and are sold in sizes varying from 3/8 inch to 2 inches in length and costing from 48 to 15 cents per pound, with a discount. They are used about a building chisel for tacking gutters, etc. Hungarian nails are a species of large, rounded-headed tacks. They are made from 3/4 inch to 1 1/2 inch long, and average 60 cents per pound, with a discount. Figure 1 illustrates the various special forms of common nails.

All of the foregoing may be classed as common or plate-nails. Nails of a very different kind, manufactured from steel wire, have been in use for a number of years in America and for a longer period in Europe, and in both places they have been very favorably received and are fast superseding the common cut-nails for many purposes. The advantages of them over the common nails are many. For the same amount of metal they are much stronger; they can be driven into very thin boards without splitting them, and can be removed without leaving so unsightly a hole as is usually made by the common nails. Besides this, on account of their superior stiffness they can be driven into very hard wood, where much caution is necessary if common nails are to be used. They are also more easily produced and are handled with less labor. They are manufactured by a simple machine which is automatic in its action, a coil of the wire adjusted to it being cut off in even lengths, headed, pointed and, if necessary, ribbed according to the kind of nail which is desired. The same sizes prevail for these as for the ordinary plate-nails. The following table gives the lengths and number to the pound as listed by the Salem Nail Company, also the net retail prices per hundred pounds in the Boston market.

**TABLE OF BEST QUALITY OF STANDARD STEEL-WIRE NAILS.**

<table>
<thead>
<tr>
<th>Size</th>
<th>Length</th>
<th>Number of Nails to One Pound</th>
<th>Price per Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3d</td>
<td>1 1/4</td>
<td>1200</td>
<td>$3.00</td>
</tr>
<tr>
<td>4d</td>
<td>1 1/2</td>
<td>975</td>
<td>5.00</td>
</tr>
<tr>
<td>5d</td>
<td>1 1/4</td>
<td>729</td>
<td>7.00</td>
</tr>
<tr>
<td>6d</td>
<td>1 1/2</td>
<td>494</td>
<td>9.00</td>
</tr>
<tr>
<td>7d</td>
<td>2</td>
<td>325</td>
<td>5.25</td>
</tr>
<tr>
<td>8d</td>
<td>2 1/2</td>
<td>184</td>
<td>7.00</td>
</tr>
<tr>
<td>9d</td>
<td>3</td>
<td>122</td>
<td>12.00</td>
</tr>
<tr>
<td>10d</td>
<td>3 1/2</td>
<td>105</td>
<td>13.00</td>
</tr>
<tr>
<td>11d</td>
<td>4</td>
<td>87</td>
<td>15.00</td>
</tr>
<tr>
<td>12d</td>
<td>4 1/2</td>
<td>66</td>
<td>16.00</td>
</tr>
<tr>
<td>13d</td>
<td>5</td>
<td>50</td>
<td>18.00</td>
</tr>
<tr>
<td>14d</td>
<td>5 1/2</td>
<td>45</td>
<td>20.00</td>
</tr>
<tr>
<td>15d</td>
<td>6</td>
<td>35</td>
<td>22.00</td>
</tr>
<tr>
<td>16d</td>
<td>6 1/2</td>
<td>30</td>
<td>24.00</td>
</tr>
<tr>
<td>17d</td>
<td>7</td>
<td>25</td>
<td>26.00</td>
</tr>
</tbody>
</table>

Other manufacturers occasionally classify the nails in a more natural way by lengths and numbers. The American Screw Company of Providence, R. I., manufactures a very extended line of these nails and sells them in lengths varying from three-sixteenths inch to twelve inches in length, with a thickness of wire varying from No. 22 to No. 0 wire-gauge. The prices are by the pound. Everything above two inches, No. 9 wire, is sold at five cents per pound. For smaller sizes the prices increase up to fifty cents per pound for 2 1/2 of an inch, No. 22. For nails with special heads or special points one cent per pound. For nails combining all these specialties add one cent per pound for each specialty. For tinning add fifty per cent.

Besides the common wire nails the Salem Company makes a variety of patterns such as first, clinch, smooth, box, casing, finishing, common brads, flooring, slating, shingle, fine nails, and wire spikes. The wire spikes are made in sizes from three to nine inches long averaging from fifty to four and a half nails per pound. Figure 2 shows the shapes of the different nails. Besides these there are several other special nails relating to builders' hardware. The variety of nails manufactured from wire is very extensive, and the nails are deservedly popular.

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**Fig. 2. Wire Nails. (Half Sizes) Salem Nail Co.**

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**Fig. 3.**

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**Fig. 4.**

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**Fig. 5. Brass Cut-Out Nails. (Half Size.)**

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**Fig. 6. Clinch Staples.**

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J. B. Shannon & Sons
their catalogue, Figure 5. These are made in iron and bronze, at 50 to 72 cents per dozen, or in brass at 90 cents to $1.25 per dozen, list price.

In connection with nails may be mentioned the common staples such as are used for blind slats, etc. These are sold in various sizes, from three-eighths of an inch to one and one-fourth inch in length, costing from forty-four to twenty-eight cents per pound. The Florence Tack Company, as well as several other manufacturers, curries a line of steel and iron clinch staples such as are shown by Figure 6. These are made in a number of sizes from five-eighths of an inch up, and cost from thirty cents a hundred and down.

TACKS.

Tacks are of comparatively little value to the builder, being used more especially for carpets, furniture, saddlery, and the like. The various lengths of common tacks are designated by ounces, the size of the tack indicating the number of ounces put in a paper when packed full weight. The lengths are essentially the same with the different manufacturers, for the same weights. Tacks are cut by much the same kind of machinery as is used in the manufacture of plate nails. Steel, American-iron, Swedes-iron and copper are used for tacks. Iron is sometimes galvanized and occasionally nickel-plated or tinned. Figure 7 illustrates the relative sizes of tacks manufactured by the Stanley Works, and the following table gives the list prices of the same company.

**TABLE OF TACKS (STANLEY WORKS).**

<table>
<thead>
<tr>
<th>Size</th>
<th>Price per doz.</th>
<th>Price per lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Iron</td>
<td>Steel</td>
</tr>
<tr>
<td></td>
<td>Full weight</td>
<td>Half weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>80 80 80 80 81 00</td>
<td>70 35 1 12 5 1 12</td>
</tr>
<tr>
<td>2</td>
<td>60 60 60 60 60 60</td>
<td>50 25 1 12 5 1 12</td>
</tr>
<tr>
<td>3</td>
<td>40 40 40 40 40 40</td>
<td>40 20 1 12 5 1 12</td>
</tr>
<tr>
<td>4</td>
<td>30 30 30 30 30 30</td>
<td>30 15 1 12 5 1 12</td>
</tr>
<tr>
<td>5</td>
<td>20 20 20 20 20 20</td>
<td>20 10 1 12 5 1 12</td>
</tr>
<tr>
<td>6</td>
<td>15 15 15 15 15 15</td>
<td>15 7 1 12 5 1 12</td>
</tr>
<tr>
<td>8</td>
<td>10 10 10 10 10 10</td>
<td>10 5 1 12 5 1 12</td>
</tr>
<tr>
<td>10</td>
<td>8 8 8 8 8 8 8 8 8 8</td>
<td>8 4 1 12 5 1 12</td>
</tr>
<tr>
<td>12</td>
<td>6 6 6 6 6 6 6 6 6 6</td>
<td>6 3 1 12 5 1 12</td>
</tr>
<tr>
<td>16</td>
<td>5 5 5 5 5 5 5 5 5 5</td>
<td>5 3 1 12 5 1 12</td>
</tr>
<tr>
<td>20</td>
<td>4 4 4 4 4 4 4 4 4 4</td>
<td>4 3 1 12 5 1 12</td>
</tr>
<tr>
<td>25</td>
<td>3 3 3 3 3 3 3 3 3 3</td>
<td>3 3 1 12 5 1 12</td>
</tr>
<tr>
<td>30</td>
<td>2 2 2 2 2 2 2 2 2 2</td>
<td>2 3 1 12 5 1 12</td>
</tr>
<tr>
<td>35</td>
<td>1 1 1 1 1 1 1 1 1 1</td>
<td>1 3 1 12 5 1 12</td>
</tr>
<tr>
<td>40</td>
<td>1 1 1 1 1 1 1 1 1 1</td>
<td>1 3 1 12 5 1 12</td>
</tr>
<tr>
<td>45</td>
<td>1 1 1 1 1 1 1 1 1 1</td>
<td>1 3 1 12 5 1 12</td>
</tr>
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<td>50</td>
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Tinned tacks can be had in iron or copper, in all the above sizes, at an advance of from twenty to thirty per cent. Double-pointed tacks have, within a few years been made from flat steel wire. Five sizes are made by the Florence Tack Company, from seven-sixteenths to three-fourths inches long, varying from $1.20 to $1.80 per dozen box. They can be had plated, tinned or in copper. The advantage of these tacks is that they hold more tightly in the wood and at the same time are more easily removed without breaking off in the hole.

Fig. 7. American-iron Cut Tacks. (Half Size.) Stanley Works.

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"When we drive east from the cloud of steam, majestic white horses, Are we greater than the first men who led black ones by the bridle?"

MRS. BROWNING.

**EQUESTRIAN MONUMENTS.**

A FAMOUS group of antiquities which has an antinomian interest, is formed by the colossal statues and marble horses on the Piazza del Quirinale, formerly the Monte Cavallo, at Rome, the prototypes of various groups of "horse-tamers" such as the two groups at the entrance to the Champs Elysées from the Place de la Concorde, at Paris, by Canova, the two groups on the Pont de Jena, Paris, erected at the time of the exhibition of 1878, and the similar subjects by Hoffer at Stuttgart, and those by Mansell at Salzburg, while Berlin possesses other interpretations to which have been given the political nicknames "Gehemuster Fortschritt"—progress checked and "Beforderter Rückschritt"—retraction encouraged. The groups at Rome with the red granite obelisk, forty-eight feet high, behind them, are possibly the most widely known pieces of sculpture in the world. Those who have not seen them are familiar with the photographs which show the rampant animals swaying out to right and left and checked by the nude and firmly-braced figures of the tamers." Common fame credits the work to Phidias and Praxiteles, and these august names are cut upon the bases. Authority for the belief dates from the thirteenth century, for the "Mirabilia Roma," that time written, recounts the fable that these naked athletes are none other than the famous sculptors themselves, and naked in token of the clear-sightedness of philosophical science; for these famous Greeks are fabled to have come to Rome in the time of Tiberius as wandering philosophers, and taking a hint from the proposition "a pen for your thoughts"—which must have been current in those good old days—bargained for the erection of statues in their own honor provided they could disclose to the emperor his most thoughts: and these are the statues, a living breathing rest of the tale and their vaticinatory successors. One can but believe that the mists of the Dark Ages, which still surrounded the learned compiler of the "Mirabilia," must have befogged his understanding, for the legend makes the statues to be works erected to the honor of and not executed by the hands of the most famous of ancient sculptors.

More commonly they are known as the "Dismount," the two gods Castor and Pollux, whose divine ad victor for the Romans the battle of Lake Regillus, and who after the battle rode slowly into Rome to tell the news, and having watered their horses headed toward the
Design for
Dormitory Buildings for
The University of Pennsylvania

(Not accepted)

Cope and Stewardson
Architects
When they drew nigh to Vesta. They valued down again, And washed their horses in the well That flows by Vesta's fame. And straight again they mounted, And rode to Vesta's door; Then like a blast, away they passed And no man saw them more.

The Battle of Lake Regillus.

Most people will agree that it is much more likely that sooner or later sculptors should do something to immortalize the Great Twin Brothers, who fought so well for Rome, than that they should find an inspiring theme in a bit of vulgar divination with which horses seem to have no possible connection. Whether or no posterity is right in ascribing these works to Phidias and Praxiteles, they are said to be the work of hands trained in the same school, and date between 450 and 400 b. c., and although between the time they were actually executed and the earliest record we have of them centuries elapsed, there is a chance that mouth-to-mouth tradition may have kept the record true in this case as it has in so many other instances. At any rate, no one seems to know where they came from, if they were trophies rapt from some Greek city, and not works executed in Magna Grecia to the order of some dignitary in honor of the twin gods—or the strolling "philosophers."

That they once stood before the Baths of Constantine and were moved thence to their present position by Sextus V, is shown by the inscription, which reads:

"Sextus V Pont. Max. colosseae hae sunt temporis VI deformati restituit veteribusque repositae inscriptio nis e proximis Constantianis thermis in quribalem arcanum transituit anno salutis MDLXXXIX pontificatum quartum."

The horses are subordinated in scale to the gods in order to greater homage to the deities, and the fact that they were intended to be great works of art is shown by each being cut from a single block of marble. Certain portions left originally in the rough and evidently cut away by the restorers—for the horses in particular have been much restored, only the head and a part of the left side of the one assigned to Praxiteles being antique—show, in the opinion of Foggelberg, a Swedish sculptor, that the figures were originally sculptures in high relief and built into some structure, a supposition which is supported by the drill-holes, now filled up with lead, in the shoulder-blades of the figures which were probably made for the insertion of the metal dowsels that held them in place.

The accompanying illustrations, one after a sketch by Leonardo da Vinci and the other after a sixteenth-century engraving show the mutilated condition in which the groups existed at that time. The horse here shown is the one now at the right of the spectator, and is known as the work of Praxiteles.

Well known but not so famous are the groups of Castor and Pollux, on the top of the steps leading to the Piazza del Campidoglio or Square of the Capitol, and in the immediate neighborhood of the Marcus Aurelius. These statues are believed to have stood originally either in the theatre of Balbus or in that of Pompey; but they were more or less lost to sight till, in the time of Gregory XIII, they were discovered in the Ghetto and by him removed to their present position in 1578.

The trophies on either side of them are called the trophées of Marsyas and were removed from niches in the pavilion (costitetti) built at the termination of an aqueduct.

MOUNT CAVALLO.—The Quirinal Palace, formerly often occu-
pied by the popes in summer, but now the residence of the King of Italy and called the Palazzo Reale, was begun in 1534, by Flaminio Ponzio, continued under Sixtus V and Sixtus V and Pope, Pope, and completed under Paul V by Ma-
darino. It has been called "one of the larg- est and ugliest buildings extant."

THE PROSPERI.—The buildings were Castor and Pollux, sons of do-
ter, and associated with the brothers of Helen. They were executed, after she had been carried off by Theseus, joined the expedition of the Argonauts, and together with Lynceus, Castor was killed by Idas, whom Jupiter then slew with a flash of lightning. Pollux killed Lynceus and gained permission from Jupiter to fight his brother, so that he lived one day among the gods of the underworld and the next among the gods. Jupiter rewarded their brotherhood by placing them among the stars as Gemini, and Neptune so admired their affection for each other that he gave them power over the waves to go anywhere and everywhere especially honored by sailors. They were also regarded as patrons of poets, presidents of public games, and inventors of the scandal. They always rode magnificent white horses, which were named Cyllaros and Harpagus. One of the most famous temples of the Republic was in their honor, erected out of gratitude for their assistance at the battle of Lake Regillus. On the 11th of May, the Equites visited this temple in a magnificent procession. Three superb marble columns with other fragments of this temple, still stand in the Forum.

HORSES OF MARLY.—At the entrance to the Champs Elysées are the marble
figures of horse-tamers by Coustou. They were removed in 1794 from the palace of Marly to their present position. During the siege of Paris in 1870 they were dismantled and stored for safety luckily, since during the siege and the common shot struck the pedestals and would probably have destroyed the statues.

"I stand at the break of day In the Change Elysées, As they shot o'er the Tuileries early, Stroke Luxor, and grey speck And with in the light of the morning With their marble masses on fire Ramp the white horses of Marly." — John Hay.

Marly. — The château of Marly, a favorite residence of Louis XIV a few miles from Versailles, was destroyed during the French Revolution.

[To be continued.]

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

The Goddard Chapel, Tufts College, College Hill, Mass.

Mr. J. P. Rinn, Architect, Boston, Mass.

[Hellochrome, issued only with the Imperial Edition.]

Gothic Towers and Spires, plates 22, 23, and 24. — Beverley Monste; Litchfield Cathedral; and St. Mary's, Saffron Welden, England.

[Issued only with the Imperial Edition.]


The Houses of Marly, Now at the Entrance to the Champs Élysées, Paris, France. G. Coustou, Sculptor.

See article on "Equestrian Monuments."

Castor and Pollux of the Capitol, Rome, Italy.

See article on "Equestrian Monuments."


Citizen's Bank Building, Frederick, Md. Mr. J. A. Hemp-wolf, Architect, York, Pa.


Mount Vernon Place may justly be looked upon as the typical centre and nucleus of the City of Baltimore, both physically and morally. If one may use the expression in such a connection—a sort of concentrated essence of what is best in both the social and architectural spirit of the city. It is now very near the actual geographical centre, and, having for many years held undisputed sway from a fashionable and aristocratic standpoint, after passing a crisis of imminent danger of downfall, it has in the last few years under a spirit of loyal reaction been substantially redeemed, and once more, and for a long time to come, will continue to be the most prominent social centre also. From its elevated position we may look eastward over one-half of the city, and obtain a very fair idea of the general aspect. Along the broad streets in three other directions one may have a nearer view of very nearly all of the several styles of house architecture that are characteristic of the place, and while we stand there under the shadow of that column which is one of the best bits of architecture in the land, and notwithstanding the much to be regretted lost opportunities, and mistakes of treatment all about us, we are forced to acknowledge that this is by far the most effective and monumental spot in the city, and among the few such to be found anywhere in the United States.

The arrangement is perfectly simple and sustained. In the centre is the white marble Doric column, some two hundred feet high, on its square base, all encased by heavy iron railings of conventional classic form about a circular space of about one hundred feet in diameter, standing at the intersection of two streets, which for the distance of one block due east, west, north and south, broaden out sufficiently to contain a rectangular central space or "parking" of grass plot and shrubbery. To the south and east the ground falls rapidly, giving an extended view bounded by the effective grouping of the great Hopkins Hospital in the distance, while to the west and north the parks are quite level.

For many years these parks were simply enclosed with a low stone curbing, surmounted by a heavy iron railing, similar to the one still surrounding the monument, whose carefully locked gates were only periodically opened for the purpose of raking up the leaves that fell from the still rows of trees that stood on the sidewalks, just outside the rail, or to move the very ill-kept sod, that was the only ornamentation the parks could boast of, except when at spasmodic intervals certain generous and aesthetic persons in authority would try the experiment of a few rustic bird-boxes and dwarf evergreens—which being carefully looked up to the fine resources soon fell into disrepute and decay and were duly removed to make way for the next feeble inspiration in landscape-gardening. All this was totally uninteresting and suggestively funereal enough, without doubt, but, barring the bird-box detail, it did possess the merit of repose and a certain consistency of general scheme with the surrounding buildings, broad from dwelling-houses with Classic details:—good of their kind in the style of some forty years ago—and the southeast corner occupied by the low and broad white marble Peabody Institute, with its straight cornice-line surmounted by a bulustrade.—all the detail of crude Roman Classic to be sure, but the general effect not inharmonious with the monument as a centre. And the final result would not have been unhappy if upon the remaining three corners there had been erected low and broad marble buildings of somewhat similar proportions, and even no better in detail. These buildings might have been applied to various desirable and appropriate uses and a decidedly stately dignity of effect would have been attained, perhaps more so than in any other grouping of our city architecture heretofore attempted.

The first loudly discordant note was struck when on one of these corners was erected in so-called Gothic, built of several different colors of green and brown stone, the Methodist Church, a building that has not failed to obtain quite loads of newspaper commendation, but which has acquired no impressive effect from either dimensions or proportions, and whose details are only florid ornamentation with a rather frivolous spire, not too bad in itself, but which never fails to impress one with the idea of presumption in standing so near the severe dignity of the noble marble shaft.

Very soon after the erection of this building, followed in rapid succession the reconstructions of the four "parkings"; the high iron rails, uneven sidewalks, and overgrown struggling trees were removed, the last action (as to the trees) calling forth a large amount of remonstrance from the public, accompanied by sentimental reminiscences and even tears; but all such disapprobation should now be entirely dispelled by the replacing of the trees in appropriate varieties and properly spaced. So far so good, in the progress of improvement. One would think that the key-note of suggestion was so
clearly and strongly given for the whole scheme of landscape garden- nand architectural details to be applied to these four simple rectan- gular spaces — some two hundred and fifty feet long and wide, of the monument, as it stands the crowning feature of each — approached from any direction — that it would have been difficult to go astray. A man whose artistic training and knowledge of the forms of life in general, would not have missed a moment. The situation seemed most distinctly to call for a total abandonment of the "picturesque" and the closest adherence to the "monumental" (the "conventional" if you will, with a mixture of graceful steps and lines, to be uniformly of granite or white marble, and the designs for fountain, or lamp, or pedestal of the purest Classic detail. What has been done is not generally intelligible. The spaces have been generally bisected and broken off in curved and wandering forms of grass-plan and pathway, so large in scheme that the design is lost before one can grasp it. The rather fantastic forms of copings and parapets are formed of many small pieces and colors in no consistent combi- nations, while the smaller details of iron lamps and railings would be more appropriately placed as part of the decoration of a "Cafe chinese" and "Grecian" porch. But the scene is not so well-kept and altered with alternating seasons, however eye-catching as a detail in itself, do not perhaps add to the general harmony of the whole, where the many parts already have so little sympathy with each other.

While the south and east parks contain no other details worthy of comment, we may turn to those on the north and west and find there certain special features of interest in the various bronze groups laid in the new State House. The most conspicuous of these is a "fountain" of Mr. W. T. Walters, and while we may not be willing to abandon all criticism at this point we cannot but recognize with pleasure and gratitude the inventive spirit that is definable in the design of the base and pedestal of this fountain. The waters issue from a height of eight feet, in diagonal jets, and fall into a circular fountain, the basin of which is surrounded by different groups of smaller figures. The fountain is covered with lilies and lily-pads, and the lilies are quite satisfactory and typical of an ideal Chief Justice. The statue is colossal and raised upon a rectangular granite pedestal, unfortunate in the very commonplace and heavy projecting mouldings at the top that are cut from the scale and detail of the bronze and have no raison d'etre.

In the middle of the west park is a large circular basin with granite coping, at the center of which low and closely-massed water-jet fountains cover the ground. Here again one of the statues by the sculptor, Rhinehardt, a plaster cast of which stands in the gallery of the Peabody Institute. Rhinehardt, as well as Judge Tancay himself, was a Marylander, and Baltimore was at different times, the home of both, but, never having seen the Chief Justice in life, the artist was forced to depend on photography as his only means of producing a portrait. While the more intimate friends of Judge Tancay are not unanimous in their opinion as to the faithfulness of the likeness, the general effect of pose in the sitting figure, naturally and gracefully draped, is a most happy adaption of his life, and it is such a portrait that is so apposite and satisfactory and typical of an ideal Chief Justice. The statue is colossal and raised upon a rectangular granite pedestal, unfortunate in the very commonplace and heavy projecting mouldings at the top that are cut from the scale and detail of the bronze and have no raison d'etre.

Around this basin, but at some distance from it, on the diagonal axes, are placed the four bronze reproductions of the Barye groups on the Lewis, "Peace," "War," "Fores," and "Order," considerably reduced from the size of the originals, though quite large enough to be very interesting bronzes in themselves.—but so disposed as to form no part of the design of the fountain,—and standing thus isolated they become somewhat insignificant in themselves. If they had been massed nearer the center and made to form a part of a general scheme of fountain decoration, with the lamps etc., (which we feel was the original intention) the result would have been more satisfactory than at present. At the extreme east and west ends of this park respectively stand, quite isolated on their own pedestals, Barye's sitting Lion—typical of brute force in repose, and Dubois' "Warrior" as a "pagan," suggesting human force in repose, not the least beautiful perhaps from the suggestion it presents of close inspiration from Michael Angelo's Medici, "the Punishment." The Lion may stand as a symbol of force, severe to the limit of crudeness, with the same defect noticed in the Tancay pedestal of heavy projecting cap mouldings, which in these smaller groups was so obtrusive that they were considerably reduced after the execution. This has been committed of placing a base-relief on a much diminished scale of another of Barye's lions a panel in the pedestal that supports the huge group of the executioner. We hope to be able to quote the reproductions of the groups of sculpture of both man and beast to fast five different scales in the narrow limits of the one park, and closely associated with each other.

Also, the pedestals and the casts seem scarcely to belong to each other. The lower portion of each cast being merely an irregular mass of bronze, forming part of the detail of the group, not resting naturally upon the granite, and needing the addition of a lower rect- angular bronze plinth as a base.

For getting on this same subject of the role of the Robert Garrett house; a very architectural though not strikingly interesting piece of work, by McKim, Meadle and White; but quite famous on account of its legal controversy with its most illustrious neighbor, and a few steps from it, on the front of Mr. Walters' own house, where whoever passes under its small Classic portico with the anticipation of keen artistic enjoyment in the treasures of its interior, is very likely not to be disappointed.

In the immediate vicinity have also lately been erected several of the pretentious and expensive houses that have been built in the last few years, but whose architectural merits scarcely call for any special criticism.

THE NEWBRERRY REFERENCE-LIBRARY.—
STRENGTHENING THE BOARD OF TRADE BUILDING.—
THE WORK OF THE LOAN AND BUILDING ASSOCIATION.

FOR several years past the people of Chicago have been looking forward to the time when a commencement should be made up on a collection of reference-books, which promises to be among the very finest in this or any other country. A sum amounting to $25,000, to be subscribed as an endowment for the purpose of a reference-library by a late citizen of Chicago named Newberry, has been in the hands of a board of trustees for some time. All the city papers have at various time (noticeably the Chicago Tribune) expressed a more interest in the subject of the Newberry Library — as it is to be called — was not pushed and everything done in a minute. The trustees, however, have apparently been slowly, surely, and it would appear wisely working all the time with a definite aim and end in view, so that at length the public now begins to see the first results of this labor. The trustees commenced by selecting as librarian the eminent Mr. William F. Poole, who besides making himself widely known by work strictly in his own line, has also interested himself deeply in library construction and written one or two pamphlets upon that subject — publications that attracted more than ordinary attention. Since the appointment of Mr. Poole as librarian the collection of books has commenced, though upon a somewhat limited scale, and now the volumes already purchased are temporarily housed in buildings directly opposite the square which is eventually to be used as the permanent home of the library.

For over a year the members of the architectural profession have been trying to secure that the true fancy work is used for the new edifice which they intend shall be the most perfect building of its kind yet erected. Very wisely it was decided that competitions were, above all things, to be avoided, and that in order to have a satisfactory building the material would have to work out their problem in conjunction with an architect in whom they should have perfect confidence. Although a decision was reached sometime ago, it is only since the last Chicago letter that we can announce that a definite plan has been adopted for the present Mr. T. Walters,* as the gentleman selected for this important task. Mr. Cobb retires from the firm and for one year devotes himself exclusively to this building: a portion of his time to be spent in travel both in this country and in Europe, visiting all libraries of importance.

The ground selected for the location of this important building is one entire square which, it is expected, will eventually be completely covered by the edifice. At present, however, only one wing (if it may so be called) is to be built and it is expected that this will contain one of the collections for the collection to be added during the next three years, thereafter additions will be made as the needs of the library may require. The profession will await with some curiosity for a right of the accepted plans, since the libra- rians have ideas of their own on this subject which are totally at variance with the accepted usages; in fact, if his conceptions are followed out as a basis of general arrangement, it will be a veritable revolu- tion in Library building. But yet his general plans under any opposition have at length received the support of the principal libra- rians of the country.

The air is again full of rumors about the Board of Trade Building. One has it that the people of the west end are to be left out of the entire building to be razed to the ground, etc. The fact seems to be that a portion of the building will probably be held up on screws and the foundations strengthened. Such a very common proceeding as this, where we are always having something really remarkable going on in the way of raising or holding buildings, would ordinarily pass almost unnoticed, but in this case we are being treated to a more than usually curious discussion, and this time, unhappily, it is stirring up bad blood amongst the architects. Unfortunately, the tower of the building was not built quite plumb, and certain parts of
the building have settled more than was anticipated. These and several other things taken together have given the friends of certain architects (who hoped originally to build the building) a chance to call upon these same architects for opinions, which, apparently, they have hastened to give not only to members of the Board of Trade, but to every one in general, and that in a most self-laudatory manner and seemingly quite forgetful of all professional etiquette. They criticise not only the conduct of the building itself, but also the architect, the old building-committee and everybody in general who did not originally favor their plans. Naturally, the architect feels greatly stirred up, and he, in turn, forgets professional dignity, and writes an open letter to one of the daily papers, wherein he mentions no names but gives a most cutting reply, illustrating his point that those who live in glass-houses ought not to throw stones, by some examples more forceful than dignified. This is a sentence which will end the affair, which is more than usually to be regretted owing to the fact that all the parties are members of the American Institute of Architects. These are the institutions of the profession. At any rate, it is to be hoped that they will not consider it necessary to wash any more of their dirty linen in public.

Some agitation has lately been aroused relative to the advisability of placing the Loan and Building Associations here under some supervision of state officials, and thereby, if possible, more effectually guarding the interests of the shareholders. Owing to this agitation some very remarkable statistics have been published, whereby it is shown the enormous number of people who are connected with these saving institutions and the vast interests that are at stake. There are a number of these societies in the city of Chicago alone, and the suburbs are full of them. During one month, ending June 25 last, 229 mortgages were recorded by building-associations, of which the sums loaned reached the surprising aggregate of $385,000. This would bring the annual total to nearly $5,000,000, which, it is said, will probably be exceeded this year. This, at the average loan of $1,250, means about 4,000 buildings of houses which are furnished with capital, while the whole sum of $5,000,000 represents the earnings of nearly 60,000 families. Such a vast number of people as this implies is a great surprise to most persons, although it was in a general way recognized as a fact that large numbers were interested in these institutions. This showing of home-builders is one of the most gratifying exhibits of the building-department this year, and when good citizens think of the Haymarket plot these are duly thankful to the noble lord, the Chairman of the Board, "is proving painfully successful with regard to its government.

"London — this huge, ugly, overgrown metropolis of England—has for many years labored under a considerable disadvantage with regard to its government. It is too large to be governed together under one municipal authority, as are our other large towns, through certain departments of the City. These vestries are, in reality, the parochial councils of the various parishes of London, but with somewhat enlarged powers. The functions of these vestries or district boards-of-works — for they are called by either name, and vary according to the rates, the maintenance of the roads, the efficient lighting and drainage of the district, and various questions of sanitation and medical inspection form part of their duties — indeed, they are closely analogous to such bodies as local boards-of-health and urban sanitary authorities. The jurisdiction of each vestry, however, is confined within its own boundaries, and, therefore, it was found necessary to form a central authority which should take up and discharge those duties which the vestries were unable to perform. Each vestry, therefore, elected one or more of its members to form part of this central executive body, which was termed the Metropolitan Board of Works. As time passed on fresh duties were continually given to this Metropolitan Board until at the present time, there is no municipal body in England at all approaching it in power. It has the power of revenues from some of the most valuable lands throughout the metropolitan kingdoms. To it is entrusted the execution of many Acts of Parliament. It examines our theatres and controls our fire-brigade. Under the Artisans-Dwellings Act, it can, by a single refusal, deplete the funds of the worst endowed building-associations in the most densely populated districts. It can also, if it thinks fit, cut new streets right through the centre of London, acquiring the necessary land, and even taking over such institutions as the Orphan Asylum, etc., or any other that it may see fit to take into its power. This is the whole Board, which is infested with bribery and corruption of the very worst kind. First one official, then another is implicated, wholesale intimidation is revealed, and now even some of the members — whose conduct surely should be above suspicion — are shown up before the public in a light the reverse of pleasant.

"The most urgent of all, is the Architects' Department that all these definitions are being made. And the architect, Mr. Robertson, Chief of the Department, who supervised the letting and sale of sites. This was, in all probability, the most important and intricate of the whole business. If it had been better supervised, the result was simply the right, and he kindly kept his friends outside the Board informed as to those which were particularly eligible. He was also obliged enough to let them know the lowest price the Board would take, and suggested that if they made an offer the Board would let them have a site to close with the offer. The Board usually did so, and consequently Mr. Robertson's friend was fortunate enough to get the coveted site for many thousands of pounds. Since the appointment of this Royal Commissioner Mr. Robertson has thought it prudent to place the seat between himself and his old friend Mr. Isaacs.

Another official — one of those gentlemen who evidently combine the swindler in wood with the forlorn in re — who has been in the employ of the Board for. I believe, twenty-seven years, has proved as clever as Mr. Robertson. His son, evidently a chip of the old block, whose duty it was to supervise the letting of the Board's public houses, sorrowfully admitted that, during his tenure of office, one tenant had actually obtained a lease without bribing him. He would go on telling you such stories as these. I could tell you how plans were delayed on every possible excuse, if the official palaces were not greased; I could show you how every commission of the sale was placed in the hands of some small white collars of the Board in every case of competition. Of course, it would be only the proper thing to recognize Robertson's kindness by a little present, and a small cheque, therefore, generally found its way into Robertson's hands. These were calculated to amount to many thousands of pounds, since the appointment of this Royal Commission Mr. Robertson has thought it prudent to place the seat between himself and his old friend Mr. Isaacs.

With one characteristic anecdote I will leave this subject. Mr. Villiers was about to erect a large music-hall in Piccadilly Circus. He accordingly went to an eminent and highly honored firm of architects, Messrs. Isaacs & Florence, with whom he gave his professional advisers on one condition, viz., that they should find some builders who would be prepared to carry out the whole of the works, reserving payment till the completion. Mr. Isaacs explained that the condition was a somewhat exceptional one. He tried and succeeded, and accordingly proceeded with the plans. Things went merry as a marriage-bell until sometime after Mr. Isaacs had reported to the Board that all was going on according to a certain quarter that if he wished his plans passed quickly, he had better go and see a certain architect, a member of the Board; otherwise very considerable delay might ensue. To Mr. Villiers the condition was a somewhat doubtful one, but he went, and met the architect, Mr. Smith, who was engaged to see that the work was done according to the plans. Mr. Isaacs was told by Mr. Smith that he had left the plans with the Board. "No," replied the architect-member; but, he added, with a shrug of his shoulders, "There are other ways of killing a cat besides hanging him." Mr. Villiers perfectly understood, and his member was in a fair way to be appointed to the building. This matter was explained to Messrs. Isaacs & Florence, who did not, however, quite squeal in the arrangement, and brought an action against Villiers. This was ultimately settled by Mr. Villiers paying...
£100 as compensation to his old architect, which £100 was paid to Mr. Villiers by his new architect member of the Board, and the plans were duly passed. This member is a Fellow of the Royal Insti-
tution, and an Almoner to the City of London, a Fellow of the Society of Antiquaries and of the Royal Geographical Society, and an aspirant for a seat in Parliament. I am afraid that now he will not succeed either in filling the Liverpool City Chair, or the Westminster Parliament. His mind and experience in this and other matters is highly appreciated by either his fellow-
men or by the Royal Institute of British Architects, whose Council speaks in a most complimentary manner to the proposition of Mr. Villiers for an official copy of the evidence with an obvious purpose.

We have had another little outcry about high buildings. This time it was sought to extend those enormous edifices, termed Queen Anne's houses, by any gallery. Here's an instance that extension would be no great addition to London's architecture, for a duller and more lifeless elevation can scarcely be imagined. The eminence of architecture in pictures of the nearest is, therefore, as soon as possible removed and replaced by better; but now the School Board has passed a resolution stating that the architect is personally responsible for the damage caused by this bad work and will have to make good their solicitation. Mr. Robert's contention is that an architect is not personally peculiarly responsible for inferior work, and that, moreover, the immense number of buildings in whose erection he had to sign as architects, it is absolutely impossible for him to be re-

sponsible for the quality of each individual brick or lion of mortar. It will be interesting to watch the progress of this case.

The Italian Exhibition held at Earl's Court, I should like, first, to congratulate the Director-General, Mr. J. R. Whitley, upon the great success he has achieved in his enterprises, which is the more remarkable seeing that several months should have been lost to the public from more disastrous ones. We find symptoms of unrest and a desire, so to speak, to attract more than to please. The same spirit which animated Ber-

milini and Bornini in their eccentric and unhappy vagaries seems but too apparent in the modern Italian school, and they seem unable to grasp the fact that there is a beauty and grandeur to be found in a simple, even if severe work, for which no amount of rococo orna-
mant or artistic eccentricity will form an adequate substitute.

Precisely the same feeling can be traced in the pictures and sculpture. Here we find that modern Italian painting is impressionist to a degree, and it is pretty generally understood to be the case. We are evidently quite aware what line the critics on the pictures will take, for, referring more particularly to the productions of the modern Milanese school, he says: "To the English public the works of the Milanese artist are bound up in the spirit of the rapidly growing and required reform in the art-creating. We are no longer to be content with the imitations of what is new. We are no longer to be content with the imitation of what is new. We are to demand from the art-creating, that its productions shall be faithful to the Italian school, and not, as is too often the case, be mere copies of the work of the foreigner."

Again, the Academy holds itself quite aloof also from the other archi-
tectural bodies, and the Government Schools of Art are very little in sympathy with either the Association or the Academy. Yet if, in the past, the Royal Institute of British Architects has had the honor to join hands and work together for the good of the profes-
sion as a whole, the result would be extremely satisfactory to all con-
cerned, and England would possess an architectural school second to none.

I am indebted to British Architect for reminding me, with regard to the Liverpool Cathedral Competition, that the committee never actually selected Mr. Emerson's designs. This is true, I believe, the case, but it will be remembered that Mr. Christian, the assessor, in his report summed up strongly in favor of Mr. Emerson's designs, and the other members agreed with him in that his designs would be adopted. The point, however, that I wish to bring particular stress on was the childishness of having a competition for the design of the proposed cathedral before a considerable pro-

duction of the work was in hand. This, I believe, is the case, and that the idea of building a cathedral has been definitely abandoned for the present, owing to the extreme difficulty in raising enough subscriptions.

Silver Bell Metal. It has long been thought an excellent thing to mix silver with the other metals, or, as it is usually cast, says the New York Sun, and many pious persons have rejoiced at the thought that the silver chime of the bell was in part due to their gifts. Now comes a writer in an English scientific paper with this paragraph: "I once asked a foreman in a well-known bell foundry whether putting a silver bell was not an advantage. He replied, of great advan-
tage—to the founder, as the silver sinks to the bottom; the founder pours off the copper and tin, and when the silver has cooled, puts it in his pocket."
A MAGNETIC HOIST. — A new application of magnetism has been found in connection with a crane for lifting steel rail at the Irion Works at Cleveland, United States. It consists of an electromagnet made out of two bars of soft iron fourteen inches long and three inches wide. Each of these bars is wound with about 50,000 inches of wire and is connected in a circuit of a 600-volt dynamo. The coils are connected in series and the wires are wound upon the magnet, and are connected in a circuit of a 600-volt dynamo. The currents are shut off from these coils by an armature that is moved by a cam, in such a manner as to control the operation of the crane. The magnets are used for lifting steel rail, and are substituted for cranes. The amperage of the current according to the size of the billets of metal required to be lifted, and the lifting chains which are thus used are called special cranes. One peculiar point of the apparatus which is still more important, in this case, is the fact that the magnets would attract the chain above equally well, regardless of the mass below, and lifting chains are used on the crane, and consequently the force of the chains is determined by the mass of the billets, and it is now possible that this apparatus affords an excellent field for the brass chains made by the electric-welding process of Professor Eliahu Thomson.

Engineering.

There are signs of a revival of demand in textile products, iron, lumber, paper, and other signs of an improving demand for the second quarter of the year. Lumber dealers speak of an improving demand in most of the Northern and Southern States, and there is a demand for the iron works of the New England and Middle States. Under this steady demand stocks of raw material have declined. There has been an increase in the price of milliliums to a considerable extent, and milliliums are now selling at from $1.25 to $1.50 per ton. The price of steel rails has been fixed at $1.25 per ton, and the price of steel plates has been fixed at $1.50 per ton. The prices of bricks and tiles have been fixed at $1.25 per ton.

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Of late considerable attention has been paid to the aesthetic side of plumbing, and there has arisen a considerable demand in the better work for fixtures which shall please the eye as well as satisfy the mind.

In this connection closets with square tops have been called for and have to a certain extent become the fashion. The above cut shows the model which we have designed in response to such demand.

It is made both in pure white (like the oval) and in a very delicate "ivory" tint. It has been pronounced by many who have seen it as the handsomest closet in the market.

It is precisely like the ordinary Dececo except as regards the top of the bowl and the slight ornamentation about the foot.

THE DECECO COMPANY,
12 High Street, NEWPORT, R. I.
SEPULCHRAL MONUMENTS.
The exterior of this house is stained with
CABOT'S CREOSOTE STAIN
for Shingles, Fences, Clapboards Etc.

These Stains are very durable
and give a much more artistic effect
than paint, while they are cheaper,
and very easy to apply:

Our Stains contain no water and
are the only exterior Stains that do
not contain kerosene:

Prices are 50, 50, and 75 cents per gallon
according to color
Send for samples on wood, and circulars

SAMUEL C. CABOT
70 KILBY ST. BOSTON, MASS.
PORTALS.
AN extraordinary story comes from Brooklyn, N. Y., to the effect that a building is about to be erected there which will have a tower five hundred feet high. The structure to be so adorned is the "Union Biblical Institute," which is to be built for the excellent purpose of providing a non-sectarian place of education for young men intended for the ministry. Why such a building should need a tower higher than the Washington Monument is a question which may be debated in connection with that of the sort of theology which will be inculcated in it; but it seems that the upper portion is to be utilized for an observatory. To judge from the interesting design, reproduced from the drawing of the architect, Mr. Frank K. Irving, in one of our exchanges, we should say that this building will be of the prominent class which has been somewhat hastily adopted. The top of the tower, instead of the hemisphere which indicates an astronomical purpose, is a high, pointed cone, octagonal in plan, surmounted by a cupola forty feet high, which would effectually cut off the view from the observatory of everything within a considerable radius of the Aztec. Now, considering the rather important astronomical defect, we are told that the observatory is to be equipped with a telescope forty-eight feet long, which, as the observations, according to the standard of the Apollo, is only about thirty feet in diameter, and as its use in a vertical position is precluded by the cupola, we see that it will have the chance of being made a distinct addition to the heavens, if it is to be used in the making of computations of the orbit of Mars, or engage in other scientific problems of the sort. Such as it is, however, the plans for the building have already been filed, land has been bought, and a million and a half is said to be subscribed by "a few wealthy gentlemen" to carry it into execution.

CURIOSITY is said to be proposed in New York. There is already in that city a large colony of Chicanins, who are governed by a sort of representative body of their own. This Chinese Municipal Council has for a long time occupied an old house in Mott Street, where a considerable amount of public business was carried on for the benefit of the Mongolians. Now, the house having become too small for the uses to which it is put, it is to be torn down, and replaced by another which is to be designed in the Oriental manner, and built only, if not entirely, by Chinese workmen. Whether the New York Inspector of Building will approve the sort of architecture current in Pekin remains to be seen, but if not, the style can probably be modified to suit his requirements. It is said that a temple, or "boss-house," occupied a portion of the old building. If so, a liberal part of the new one is likely to be fitted up for the same purpose, and architects and others who take an interest in the externals of religious beliefs will find a new subject for study provided in the metropolis.

OF the most promising undertakings to which Congress has this year voted aid is that by which the United States Geological Survey is to ascertain the extent of arid lands in the United States which can be reclaimed by irrigation, and to devise means providing the necessary water-supply on an extensive scale. As we understand it, the plan is to be based on the view by which the surplus water of the tributaries of the Mississippi are to be collected in overflow reservoirs, and utilized for supplying a portion of the dry district, while the remainder of the territory is, we suppose, to depend upon the Colorado and Rio Grande systems. How the general plan may be effectuated, it seems likely, if thoroughly done, to transform completely the southwestern territories. The vast tract which was marked in the school geography of our boyhood, as the "Great American Desert," is now, we believe, known to have been, not many centuries ago, one of the most fertile regions of the world, and its dry dust, properly moistened, still forms a deep, rich loam, perfectly suited for the highest cultivation. Through what influences the original water-supply has been diminished, and the soil reduced to useless dust, is not, perhaps, clearly understood, but the effect of restoring it again is to be seen in the development of the desert. If the vast desert region, capable of being reached by irrigating canals, should be reclaimed, it is estimated that the extent of land in the United States would be increased by more than one-half, and, even if the new farms were not of extraordinary fertility, their value, at a fair estimate, will be nearly three thousand million dollars, for agricultural purposes, without counting the value of the buildings, railways and other improvements which would be associated with the development of the country. Together with this development should, if what we are told is true, come a curious modification of the climate, not only of the irrigated region, but of a vast area lying near it. It is said, we do not know how truly, that the Great Salt Lake, which, like the Caspian Sea, has been described as a lake which had been rapidly diminishing in extent by evaporation, until the Mormon settlement, is now, since its banks have been cultivated, rising again, so that houses which once stood on the shore have been moved back, to keep them from being swallowed by the advancing water. If a comprehensive system of irrigation should be followed by similar results, we might fairly expect to see Arizona, New Mexico, Colorado and Utah, which now, in the best portions furnish a bare subsistence to twenty or thirty cattle to the square mile, converted into a moist, semi-tropical region, dotted with great lakes, from which balmy breezes would blow eastward all over the country.

La Semaine des Constructeurs thinks that the Argentine Republic carries off the palm for extensive building operations. While Philadelphia and New York, with their two or three thousand new houses a year, seem to us tolerably enterprising in this respect, it is said that near Buenos Ayres a whole town is being built at once, consisting of eight hundred houses with a town-hall, post-office, court-house, library, theatre, and church, several hotels, office-buildings and restaurants, a tramway line and a system of sewers. The new town is intended for Italians, of whom great numbers emigrate there and take up land in the United States. Of this new town, the first number of which will appear on the day that the new town is opened to the public.

We are indebted to Le Génie Civil for curious statistics. One of the most recent ones which it publishes is that Russia is at the present moment more inhabited than any other country in the world. From this it seems that Russia is above all others the country of horses, containing nearly twenty-two millions, or about one to every four inhabitants. The United States comes next, with nine and one-half millions, or about one to every six inhabitants; and the Argentine Republic third, with four million horses, the number of these animals in proportion to that of human beings, being large in all the South American States. Of the European countries, outside of Russia, Austria-
Hungary supports most horses, the number being three and one-half millions, or about one to ten inhabitants; while Germany, with a larger population, has only about three and one-third million horses. France possesses somewhat less than three million, and England about the same number, but France contains three million head of cattle, and England only one million; and of these the oxen and the horse are so well distributed through the whole kingdom as to be far beyond proportion. In Spain the oxen outnumber the horses nearly four to one, the number of both sorts combined being about three millions. Holland, naturally enough, possesses but one hundred and twenty-five thousand head of horses, the climate being too mild and the country too poor to encourage them to the extent of the other countries. In Italy, the numbers of horse and oxen are nearly equal. The horse in general is at least twice as expensive as the ox; and in England the produce of wheat, barley, oats, and rye, is one-fourth more valuable than in France. The manufacture of the idea of the horse is less than in England, the number of horses growing less with the number of cattle. The different kinds of horses, from the tiny little pony of the English to the large, powerful animal of the American plains, are capable of performing all the varied tasks of husbandry. The horse is the most valuable animal to a farmer. It is the only beast that can travel and work day and night, and does not require a stable. It can pull heavy loads and can carry men for long distances. It is also more useful than any other kind of animal for the production of cereals, and is the only animal that can be obtained at any time of the year. In the year 1856, it occurred to Mr. George H. Page, of Dixon, Illinois, that a manufactory of condensed milk might with advantage be established in German Switzerland, the most pastoral of all countries. He built a little factory at Charms, at the outlet of the Lake of Zurich, and engaged the milk of a few cows. The enterprise was a failure, and in ten years the factory consumed regularly the milk of two hundred and sixty-three cows; and in 1857, twenty years after the establishment of the business, it used the milk from more than seventeen thousand cows. It would hardly have been practicable either to utilize so much of such a perishable raw material in one factory, or to feed so many cows within reach of a single group of buildings, and, in fact, before this time six branch manufactories had already been established, of which three are in England, one in Germany, and one in New York State. In connection with the numerous Tompkins, or Charms, is a can factory, which supplies the tin boxes in which the condensed milk is put up. That the consumption of these is sufficient to keep the can factory busy may be inferred from the fact that last year more than twenty-nine million cans of the condensed milk were sold, the receipts from sales being nearly two million dollars. The factory or rather, group of factories, is managed according to the most enlightened modern views. Schools, as well as houses, are provided for the workmen and their families, and funds for insurance and relief are established.

CONSIDERING that, according to Professor Riley, this is the year for the appearance of the seventeen-year locusts in the province, and the western states, particularly Kansas, are annually attacked by swarms of grasshoppers of other kinds, it may be of interest to learn from Le Génie Civil how such insects are fought in Spain and Algeria, where they are just now so numerous as to threaten the destruction of the crops. The most effective weapon now in use against them in Algeria is called the crypia apparatus, and is the same as that employed by the British administration in the island of Cyprus a few years ago. The main element of the apparatus is simply a roll of yard-wide cotton cloth, about sixty yards long, stretched across the route where a column of grasshoppers appears to be approaching, and held in a vertical position by stakes, while the lower edge, by means of cords and smaller stakes, is kept so close to the ground that the insects cannot crawl under it. On the upper edge of the cloth is sewed a strip of oiled or varnished material, six or seven inches wide and on the back of the grasshoppers, two or three feet long, in a direction parallel with the screen, and three or four feet deep, are dug in the ground at intervals, and the upper edge of each pit is trimmed with a strip of zinc, ten or twelve inches wide, inclined downward. All these preparations are made while the head of the insect column is still a hundred yards away, and, meanwhile, men are sent to cut the sides of the column, and narrow it by flapping their clothes, so as to frighten the grasshoppers on the outside, and make them crawl closer to the centre, at the same time that they direct its march toward the middle of the cloth screen, which, in the case of a very large swarm, is made of extra length by joining two, and is then set in the shape of a wide V, with the opening toward the insects.

ON arriving at the screen, the grasshoppers try to fly over it, but the precaution of the dynamite is always taken, when their movements are sluggish, and their wings will not carry them to the necessary height. Failing in the attempt to fly, the insects crawl up the cloth, until they reach the smooth, varnished edging, on which their claws can take no hold, so they fall back again. After a few such fruitless attempts, they decide to circumnavigate the obstacle at the ground-level, instead of trying to surmount it, and a general lateral movement takes place, so that the first arrived have fallen directly into the pits, and are prevented from getting out by the zinc rim; and the lateral march brings the others to the same fate. When the pits are half-full, Arabs with heavy feet and strong nerves are appointed to pelt the grasshoppers with stones or small stones, which are refilled with earth, to which, where practicable, lime or some other disinfectant is added. By this simple apparatus, if the pits are made deep enough, and the whole is carefully set and well attended, an entire army of grasshoppers may be exterminated in an hour or two, and the screen taken away for service elsewhere. Up to June fifteenth of this year, it is estimated that four hundred millions of grasshoppers had been destroyed by means of it in Algiers. Of course, there are hundreds of millions left, but the Algerians are encouraged to persevere by a knowledge that the British, in five years from their occupation of Cyprus, and at an expenditure of less than three hundred thousand dollars, practically extirpated the insects from the island, which had been annually ravaged by them for generations, and now, at a yearly cost of about eight thousand dollars, keep the fields perfectly protected, much to the satisfaction of the natives, who have come to regard their new masters as benefactors rather than invaders. In Spain although the "Cypriote apparatus" is coming into use, millions of the insects have been destroyed with gasoline. Early in the morning, while the grasshoppers are benumbed with the night's cold, and are lying in the furrows, Captain Nesfield, purposefully, ten columns of men walk beside them, pouring gasoline on them from a watering-pot. As each comes to the end of his furrow, he lights the gasoline with a match, and the grasshoppers are consumed in a moment. Of course, this method wastes the gasoline which may soak into the ground, and a watering-pot has been constructed which prevents the gasoline from passing into the body of the pot, so that the gasoline can be lighted at the spout, and the grasshoppers watered with fire.

AMERICANS are often said to enjoy nothing so much as personalities in regard to people of note, and, judging from the sort of news provided for them by the foreign correspondents of the newspapers, there must be some reason for saying so. We, therefore, make no apology for mentioning that the widow of that remarkable architect and artist, Mr. E. W. Godwin, has just been married to the American artist, Whistler. The widow of another architect and artist of equal talent, but very different temper, Mr. W. Eden Nesfield, has lately married a Spanish corporal, the owner of the property left her by her husband. Just two years ago Mr. Nesfield made a will, leaving property to the amount of about one hundred and twenty-five thousand dollars to various persons, including his wife, who was made residuary legatee. One year ago, in August, 1887, another will was made, leaving the whole property to Mrs. Nesfield, and constituting her sole executrix and universal legatee. In March, 1888, Mr. Nesfield died. On the presentation of the will of 1887 for probate, it was opposed by Henry Nesfield, brother and executor of the deceased, who opposed the will on the ground that it was made by a man of sound mind when it was executed; and the will of 1886 was submitted as the true one. Three eminent lawyers were engaged by each side, and preparations were made for a long struggle, but, on the calling of the case in court, three weeks ago, the counsel for Mr. Henry Nesfield rose, and said that within a few seconds after the learned judge had finished looking through the documents in the case, and had come to the conclusion that he ought to offer no further opposition to the proof of the will of 1887, and that no evidence need be brought forward except that to show the due execution of the will submitted by Mrs. Nesfield, on the ground of her being of sound mind. The court accordingly confirmed the will of 1887, the parties agreeing that each side should pay its own costs. Whether this singular termination of the dispute means that the brother was bought off, or that he was really magnanimous enough, or that satisfying himself of the soundness of his case, in 1887, to withdraw his opposition from conscientious motives, we are, of course, unable to say, but we prefer to believe the latter.
BUILDERS’ HARDWARE.—IV.

Screws.

The substitution of screws for nails in building operations is one of the most marked features of modern work, and is, in a way, indicative of the changes that have come about since Medieval times. In those days men built for eternity; now, the object is to build so that it is possible to take the work apart; and nothing shows more clearly the extent to which this idea is carried than the variety of uses to which screws are put. There is, however, another way of looking at the change, and a more practical one, too, for screws certainly have a great many advantages which nails never could possess. They are much more secure when in place; they are neater in appearance; they require but little more labor in driving than nails, and can, at any time, be removed without injuring the material into which they are screwed. Some who have had trouble in removing old screws which had rusted into hard-wood work may object to the last statement. An old carpenter, however, once told us of a very simple way to remove even the most obdurate screw: if a red-hot poker is held against the head of the screw for a few moments, the heat will expand the metal, loosening it from its hold on the wood, after which it can be readily unscrewed.

The improvements in the processes of manufacture of screws have been even more marked than those which have been noted in regard to nails. The blanks for screws were formerly cut out by hand. The first improvement was to cut them from rolled round iron, the heads being formed by pressing the blanks into a die while hot, and the threads cut with a file, a very laborious operation which resulted in a very poor quality of screw. The screw-working machinery, as at present in use, has very largely been designed by Americans: the blanks are cut and headed from coils of wire on one machine; another machine takes the pieces, gives the proper shape to the head and neck, turns the shank, and finishes the screw. It has been claimed that the entire operation necessary to turning out a perfected screw is so economical in its action, that the fluctuations in the first cost of the crude wire will often equal the total cost of manufacture.

The most important improvement which has been made in their manufacture is the application of the gimlet point, by means of which a screw can be turned into the wood without the aid of a gimlet or auger. It seems so natural now to us that it is difficult to understand why the world was so long content with the poor productions of half a century ago.

The form of style of the ordinary screw, as at present in use, seem so perfect in every respect that it would be difficult to suggest any improvements. There are, however, a few forms of patent screws in the market which may be of interest in this connection. Figure 8 illustrates a screw, patented in 1873, fitted with a drill point instead of the ordinary gimlet point. Figure 9 is a screw with a thread somewhat like that of a bit, the thread, however, diminishing in pitch from the bottom to the top. Figure 10 is a form of coach-screw, having threads of a curved cross-section and provided with a wedge-shaped point, which allows the screw to be partly driven into place with a hammer. Figure 11 is essentially the same as the ordinary screw, except that the point is flattened, and it has a circular cutting-edge. Figure 12 is a wood-screw provided with a cutter and point in such a manner as to cut its way into the wood instead of pressing it to one side as is the case in the ordinary screw. None of these varieties, however, have any very extended sale, and we are unable to say by whom they are manufactured or controlled. Figure 13 illustrates about the best of the patent forms. It is a diamond-pointed steel screw, manufactured by Russell & Erwin. Screws

---

1 American Screw Gauge. | 1:00 Standard Bimetallic Gauge.
of this form can be driven with a hammer their entire length into any hard wood, and then held by one or two turns as securely as the ordinary screw. The head is made convex to strengthen it and prevent its splitting when struck with a hammer. The thread is of the ratchet form, which permits its penetration without tearing the wood fibres.

Ordinary gimlet-pointed screws are made in four styles, depending upon the use for which they are intended. The Shank and point are always practically the same. The head is either flat, Figure 14; oval, Figure 15; round, Figure 16; or of the form shown by Figure 17, which Russell & Erwin designate as having a "piano" head.

The kinds of screws which are manufactured for various purposes are almost infinite in variety, but so far as relates to TABLE OF SCREWS.

<table>
<thead>
<tr>
<th>Gauge</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>22</th>
<th>24</th>
<th>28</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$0.09</td>
<td>$0.20</td>
<td>$0.25</td>
<td>$0.35</td>
<td>$0.45</td>
<td>$0.60</td>
<td>$0.75</td>
<td>$0.85</td>
<td>$1.00</td>
<td>$1.20</td>
<td>$1.40</td>
<td>$1.65</td>
<td>$2.00</td>
<td>$2.40</td>
<td>$2.75</td>
</tr>
</tbody>
</table>

For this purpose are iron, steel, brass, copper, bronze and phosphor-bronze. The screws commonly in use are of iron. Steel screws are comparatively little used on account of the cost. Brass, copper, and bronze screws are used in connection with finishing hardware. Phosphor-bronze screws are used only in special cases.

Iron wood-screws are made in twenty different lengths, varying from one-quarter inch to six inches. Brass and nickel-plated screws are made only as high as three inches in length. Each length of screws has from six to eighteen varieties in thickness, there being in all thirty-one different gauges; so that altogether there are about 250 different sizes of ordinary wood-screws in the market. Figure 18 gives the different gauges in use from zero to thirty. Iron screws are finished with either a bronze, japanned, lacquered or tinned surface. P. & F. Corbin also manufacture copper, bronze, and silver-plated screws. These and a few special varieties are kept in stock by most dealers. The preceding tables give the sizes, prices, etc., of iron, brass and nickel-plated screws, compiled from the catalogues of the American Screw Company, and P. & F. Corbin.

Nickel-plating increases the foregoing prices as follows:

<table>
<thead>
<tr>
<th>Length under the Head.</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price per hundred.</td>
<td>$2.70</td>
<td>$3.00</td>
</tr>
<tr>
<td></td>
<td>$2.70</td>
<td>$3.10</td>
</tr>
<tr>
<td></td>
<td>$3.10</td>
<td>$4.10</td>
</tr>
<tr>
<td></td>
<td>$4.00</td>
<td>$5.25</td>
</tr>
<tr>
<td></td>
<td>$4.30</td>
<td>$5.80</td>
</tr>
<tr>
<td></td>
<td>$6.00</td>
<td>$8.10</td>
</tr>
<tr>
<td></td>
<td>$9.00</td>
<td>$12.30</td>
</tr>
<tr>
<td></td>
<td>$12.00</td>
<td>$14.50</td>
</tr>
<tr>
<td></td>
<td>$12.00</td>
<td>$14.50</td>
</tr>
<tr>
<td></td>
<td>$17.50</td>
<td>$19.50</td>
</tr>
<tr>
<td></td>
<td>$28.50</td>
<td>$28.50</td>
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<tr>
<td></td>
<td>$28.50</td>
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<tr>
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<td>$28.50</td>
<td>$28.50</td>
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<tr>
<td></td>
<td>$28.50</td>
<td>$28.50</td>
</tr>
</tbody>
</table>

Intermediate sizes approximately at the same ratio. Discount: 75 and 65%.

Besides the ordinary wood-screws, the only other kinds used constructively to any extent by builders are lagscrews, and hand-rail screws. The former are more commonly known as coach-screws, and are manufactured in 128 different sizes varying from 1/2" x 1/2" to 1" x 12". In appearance the shank and the gimlet-point are the same as ordinary wood-screws, but the head is square, like a nut, and without any cross-cut, so that the screw can be turned up with a wrench. The following table gives the prices of a few of the sizes, as per the lists of the American Screw Co.

TABLE OF GIMLET-POINT COACH-SCREWS.

<table>
<thead>
<tr>
<th>Diameter in Inches.</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price per hundred.</td>
<td>$2.70</td>
<td>$3.00</td>
</tr>
<tr>
<td>$2.70</td>
<td>$3.10</td>
<td></td>
</tr>
<tr>
<td>$3.10</td>
<td>$4.10</td>
<td></td>
</tr>
<tr>
<td>$4.00</td>
<td>$5.25</td>
<td></td>
</tr>
<tr>
<td>$4.30</td>
<td>$5.80</td>
<td></td>
</tr>
<tr>
<td>$6.00</td>
<td>$8.10</td>
<td></td>
</tr>
<tr>
<td>$9.00</td>
<td>$12.30</td>
<td></td>
</tr>
<tr>
<td>$12.00</td>
<td>$14.50</td>
<td></td>
</tr>
<tr>
<td>$12.00</td>
<td>$14.50</td>
<td></td>
</tr>
<tr>
<td>$17.50</td>
<td>$19.50</td>
<td></td>
</tr>
<tr>
<td>$28.50</td>
<td>$28.50</td>
<td></td>
</tr>
<tr>
<td>$28.50</td>
<td>$28.50</td>
<td></td>
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<tr>
<td>$28.50</td>
<td>$28.50</td>
<td></td>
</tr>
<tr>
<td>$28.50</td>
<td>$28.50</td>
<td></td>
</tr>
</tbody>
</table>

Hand-rail screws or joint-bolts are usually made in two ways, either with one end cut with a wood-screw thread, and the other provided with a machine-screw thread and loose nut, or with a machine-screw thread and nut on each end. One nut is generally cgeaged so it can be turned up easily by a pocket wrench. Joint-bolts are of two diameters, either 3/4" or 1-inch, and the standard lengths are from four to six inches, though some manufacturers produce joint-bolts as long as fifteen inches. Joint-
bolts with two nuts are sometimes made with 1/4-inch diameter with a swelled centre. Figure 19 shows the various forms of joint-bolts, and the following table gives the prices per gross.

<table>
<thead>
<tr>
<th>Diam.</th>
<th>Length, 4 inches</th>
<th>Length, 4½ inches</th>
<th>Length, 5 inches</th>
<th>Length, 5½ inches</th>
<th>Length, 6 inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Two</td>
<td>One</td>
<td>Two</td>
<td>One</td>
<td>Two</td>
</tr>
<tr>
<td>3/8</td>
<td>$0.06</td>
<td>$0.12</td>
<td>$0.16</td>
<td>$0.20</td>
<td>$0.25</td>
</tr>
<tr>
<td>7/16</td>
<td>$0.10</td>
<td>$0.20</td>
<td>$0.25</td>
<td>$0.30</td>
<td>$0.35</td>
</tr>
<tr>
<td>1/4</td>
<td>$0.14</td>
<td>$0.28</td>
<td>$0.35</td>
<td>$0.40</td>
<td>$0.45</td>
</tr>
</tbody>
</table>

Screw-eyes are too well-known to require illustration. They are made of steel, iron or brass wire, with a gimlet-pointed thread cut on the shank. Iron screw-eyes are made plain, bright, bronzed or nickel-plated. The diameters of wire used vary from wire gauge 0, to 14, the lengths of the eyes being from 1 1/4 to 2 1/2 inches. The list price in brass or iron is $2.00 per gross. The smallest size cost 55 cents per gross. Brass screw-eyes cost about twice as much as iron. These prices are with a heavy discount.

Figure 20 shows the common forms of screw-hooks. The list prices for these are $5.00 per gross for No. 4 iron, and $5.25 per gross for No. 4 brass. A list of sizes and prices for screw-hooks as well as screw-eyes. The smaller sizes of hooks can be had in brass with washers or roses at a slight advance in price. The hooks are made as large as 4 1/2-inch, No. 0 wire.

Picture-hooks or hangers are intended to screw into the wall, through the plastering. They are made with screw

The MORALS AND MANNERS OF ARCHITECTURE.

METHODS of practice have changed in a marked degree within twenty years. The demand for the services of the architect is more general and there is a greater willingness to pay fairly for such services. Although all real-estate interests are somewhat depressed, probably by the annoying effects of strikes, or the apprehension of them, there is still a good deal of work to be done and the calling is not overstocked; that is, with capable and industrious regular practitioners. If the best tendencies could prevail architecture is likely to be considered, what its disciples have long claimed it to be, a "liberal profession," as an interesting occupation and a profession of brains. Can it be fairly said that the tendencies are in the right direction?

In early years our business suffered from the jealousy of the builders, and still suffers from a general indifference and lack of appreciation of the usefulness of its functions. But the places and perquisites of its practitioners were not attractive enough to provoke envy or encourage encroachment. With the growing American demand for soft-handed occupations it has acquired a new object of sharp and hostile criticism and active interference from several quarters; and its position and prerogatives are assailed, not only by its old rivals the "practical man and the civil engineer," but by the man of business, the man of science, and a motley hordes of sculptors, painters, decorators, furniture-makers and upholsterers; and often by a union of some or all of these.

Work formerly under one direction is now divided and subdivided. Personal skill is sacrificed to profit. The single practitioner is placed in competition with associations of speculative and constructive talent, business shrewdness, and every form of competition backed by ample capital. Added to all this architecture has become too extensive for the function as a genteel employment suited to the artistic amateur, attractive to him from the supposed lack of well-defined demands and limitations and from a distinguishing title that may be assumed or discarded at will. These tendencies have been noted in English practice also, and, to judge by the discussion in English journals, with much apprehension.

Such signs of change raise important questions of artistic progress and business methods in the design of buildings and the direction of building operations. Are such changes part and parcel of modern tendencies? and if so, what is to be substituted for them? Under all these other defects of professional practice, the result of greed and a lack of honest devotion to true art, independent of outside influences and to the neglect of ourselves? What are the improvements in more favorable circumstances we have so long desired? No attempt is made to prevent others, not architects, from conducting building operations; and it is admitted that against negligence or fraud no diploma can defend a client.

Lack of trained and intelligent, rigidly and impartially enforced. Every one concerned in building should be held accountable for his proper share of avoidable defects. Architectural societies should insist on the doctrine that there can be no good architecture without good building. Laws cannot make architects or enable the profession. Hard work added to natural qualifications are the only means to such an end.

If the tendency of practice is towards large associations and combinations what is to be the effect on students and draftsmen? Shall we be confined within narrow lines of routine work and forfeit all chance of breadth of culture, and hope of independent practice? Excuse as parting advice: What is the supposed confidential and intimate relations of architect and client? Will combinations, in order to meet large current expenditures, be able to live out of this contract price. What is the limit of compensation, or make wholesale rates for quantity, as it were? And, lastly, can a school or combination do the art work, or even the constructive work, of a "master," or are we ready to admit that the day of masters is gone by, and that art and science are merged in the slaves of trade and adopt the methods of the "Trust" and the "drummer"?

There is much reason to fear that architecture is following so soon the tendency of the times—and some of the worst tendencies. The country is suffering under an infestation of babblers and drones. Every one wants to talk and scribble and sketch, and few to study and draw. Facility in men, and their coveted end money and notoriety. The worst work of the times finds publicity through the reporters' vulgar style displayed in slovenly print on rotten "chemical paper." It is fortunate that so much trash is recorded on a private library has given place to costly furnishing and brick-brac. Luxury usurps the place of learning. There is still reading, but mostly for amusement and excitement. As we look back and wonder at the scholarship of the men of three centuries ago, but they were scholars because they did not read so many things as we do. Their speech was the best, because they lacked with Plutarch and the ancient historians. We spend no bad time than to look to our final effects, and less and less of our minds instead of commingling with choice spirits, we diligently inform ourselves of the most commonplace trivialities. We are getting buried alive under a mountain of silly inane and insipid books with their sponges saturated from the stagnant goose-pond of village gossip.

The architects, and also the masons and carpenters of the past, with access to a few noble buildings, or some simple volumes, by observing and thoroughly worked that every works that ever was. Keep in mind, as we are writing, to evoke our heartiest admiration. Their advances were by slow and well-considered steps.

The greatest works of our own and elder days are commonly marked by great restraint. Many of our large structures would be improved by stripping them of much of their ornamentation, which often detracts from the massive grandeur of high-plied brick and
stone. It would be easy to point out pretentious buildings of which the blank wall is more impressive than the ornate facade whereby the architect has endeavored to entice attention.

Among craftsmen the unscrupulous loafer, if favored with an oily tongue, can often lead to the skilled labor of the nation. In like manner the man clever enough to gain the command of a maturing of artistic slang, dumb himself "Architect," rifles the Arab's tent and the Indian wigwam for novelties and dodges, with which to stimulate a debilitated public. The modern architect is the consummate artist, the master of the beautiful, and is permitted to squander peoples' money and abuse honest bricks and mortar. Art, like society, is afflicted with a plague of restlessness.

Many a time does an evil tendency stand forth against such abuses for fear of misconception or misrepresentation. One is fearful of being thought lacking in this or that accomplishment which may be temporarily in vogue. There is not enough time to be a master of the whole time. Success must be achieved by leaps and not by climbing. An architect of ability re-introduces an old style of which he has acquired control by long study and practice, and for which he has the use of his powers he makes it a pious and artistic success. He is at once copied, not only by weak disciples in a weekly manner, but by men of sufficient brains to lead in a path of their own choosing. Cathedrals, castles and convents are pressed into service in bulk or jumbled together with little regard for age, climate or previous conditions.

With such mixed and false application of design is united an equally false presentation of it. For an intelligent showing of a building there is offered the sketch of the impressionist, or that of the visionary. The true purpose of architectural drawing — to enable works of art and of man to stand the test of materials — the conception of the architect — is entirely lost sight of.

There were few if any architectural sketches, as we understand the term, in the work of the American architect. In real constructive art, every drawing is a working-drawing; there is no such thing as "exhibition" or "show" drawing. The power to design has no necessary connection with the power to draw. Many excellent architects are utterly weak in invention and combination and taste, and never produce a building worthy of respect, unless they copy it outright. The power to draw with accuracy and facility is of great use to record and interpret the elements of their expression. Without ideas the power is a delusion and a snare both to draughtsmen and employer.

An architect should be a true artist, that is, he should create by necessity of his art instead of by imitation of mechanical formulas. But structures they must be and not the chaotic product of ill- digested and half-comprehended sketches. An architect should not be the aristo of the card table or the avant gard of the easel painter and there is no ground of comparison between them. The work of the latter ends when his begins. The only use of pictorial art to the architect is a questionable commercial one — the comprehension and delusion of clients. It has no more real connection with proper architectural design than the cheap politician's trickery has to do with statesmanship.

Artistic drawings, which true to their purpose, are utterly uninteresting to the general public. When treated in a manner to excite popular attention they cease to be of technical value. A gallery of simple views of good buildings would be deserted for a collection of the finest and most complete chronicles — if not of every. And yet buildings erected from these very drawings might elicit enthusiastic praise. The public are right in this. They recognize the unreality of the paper-and-ink building. They always suspect something odd and this sham is borne out by themselves at the expense of the permanent success and dignity of a noble calling. It has become the fashion of late to rule out photographs from the galleries of architectural cabalists. Properly, they should be the only representations of buildings allowed. What matter whether the medium of the designer's control be a bit of board and a pencil or a floor and a piece of chalk so that it produces a worthy structure?

The art of the architect is far above and beyond that of the mere easel painter. The desire to be known as a draughtsman, principally, is unhealthy and a great weakness in the character. The great general has little ambition to play in a brass band. It is one of the most singular and discouraging features of modern practice that so much stress should be laid on the mere power to render draughtsman-like sketches of the most ephemeral and fugitive for that successful results require the highest natural qualifications developed by the most unremitting labor and study should be willing to toil in the obscurity of draughtsmen's locks or on even on finished pictures. It certainly shows a false tendency, but some of its causes are sufficiently evident.

The building art of to-day has to deal with many new conditions, unknown in the old architects. The great interest of the architectural journals, the exhibitions of architectural drawings, the pictorial advertising, which is a part of all who are interested in the growth of the new art and of any future class coming up among the lawyers who want no fees unless "they can get them out of the defendant," or, to be more accurate, who only "long for the fraying of friendly rivalry." If this be progress what sort of practice will the majority of future architects have of their own if not a review of his published life of a distinguished contemporary says of his course in an important competition, "It was, of course, an immoral thing to do and the rebuttal was deserved, but one cannot help regretting that the attempt was not successful."
Tower, Dome and Terrace of the Hotel Ponce de Leon.
St. Augustine, Fla.
PLANS OF HOTEL: PONCE DE LEON; CASCADE; AND: M.E.CHURCH:
CARRERE AND HASTINGS, ARCHIT. NY. AT ST. AUGUSTINE, FLORIDA...
hardly be styled what is known in modern slang as "Sunday School politics," but it is altogether too common a way of treating architect-
ne.

In treating the effect of professional combinations it is not in-
tended to include the simple partnerships of architect with archi-
tect. These may be entirely legitimate, and may produce as good work as any such union. They arise from the limitations of posi-
tions single-handed, and have no great care for personal
achievement they offer certain inducements. But pronounced indi-
viduality of temperament would lead their owners to differ
little that might come to pass as John Smith rather than as
a share of the reflected glory of Messrs M. Angelo, John Smith &
Co. There is no doubt that under given conditions good work can be
done by combinations of architects. In some respects more service
may be of positive business advantage. But the experience of
the world inclines one to believe that the greatest results must come
from the single master hand. Or, if at any rate, that the helpers must
emerge entirely subordinate to the master.

But these legitimate unions in no way injure the welfare of the
profession. Their fame and their profits are divided by the number of
partners. And when the combination of many hands, with all the
experienced talent and a large establishment, another elects to deal with
the one controlling head of all the departments of his building.

But a second form of combination has been fostered by the course
of some architects. These have persistently cultivated the belief
that the great building artist was above practical matters and the
small details of construction and supervision. That his art was
momentous enough to dispose of convenience and practical
fulness, here he must either neglect or employs various experts
and agents to devise and direct, leaving him to conceive great designs to be
reduced to everyday usefulness by humber assistants. Or to select from men
that has no qualifications other than the name of architect, and employs designers as well as other experts
to execute the work that he secures, and claims all credit for.
The men employed at these points, to a practical man, one
point, conclude that if an architect can be produced by combination
they can patch up one for themselves. Hence the grouping of
the man of business, or builder perhaps; a decorator; upholsterer or
chairmaker; and one or more pictorial artists for the show busi-
ness. An engineer may be the head of the group or one of
its members. Generally the lion's share of the profits of this archi-
tectural "trust" is taken by the manager or broker of others' talents.
One man, it is said, has a laboratory that a large proportion of
committee striving to get twenty men's work for the payment
of one fee through the medium of competition, the superficial advan-
tage of these contests is now quite as obvious as the struggle
engaging young practitioners with but his own head and hands
and slender purse to rely on; to be sure he can "learn by defeat," and
his education will be ample if not profitable.

It is admitted that these peculiarities of modern practice are
endangering the standing of the profession with its employers, and the
question naturally arises: "What are you going to do about it?"
As for the office of the American Institute, it is a little
and its Chapters and kindred societies shows that membership has
increased, that many meetings have been held, and that on the whole
they have gained somewhat in interest. A large sum of money has been
spent in the support of the publication and the publication of
other papers, and some useful information has been disseminated. The
local societies have in some cases done more thorough and useful
work in their own education, than the Institute itself has ever done.
But when one looks for important results, as embodied in pro-
fessional custom and practice, not much is found. Something of
improvement has been secured in building-laws. A schedule of "usual
and proper charges" has been issued and amended. Its recommenda-
tions have been followed by the members when found agreeable and
in furtherance of selfish interests, but too often disregarded.
An alliance between the printing and publishing interests, and the
American Institute, is a tract on competition, in which the reasons against the practice of outnumber and outweigh those
in its favor; and yet the report closes with suggestions for regulation
and not for abolition. And the effect of these suggestions, although
lamented by members, led to the amalgamation of the American Institute
and has not even bound the members of the society that endorsed them.

An elaborate form of contract has been printed, but so wordy and
so entirely oppressive to the contractor that it has never come into
general use.

Open fraud has been usually condemned, but there has been little
loss of caste by those known to habitually indulge in practices over-
seas that have been done at home. This is not favored by temperance
or natural attainments has paid little heed to the rights of
wealthier brethren. Professional union has been a rope of sand.
There has seldom been a case in court in which conflicting testimony
is more easy to give. The mutual contention has not been given by men supposed to travel by
the same road.

The fact that so little has been accomplished by the societies should
not prevent one from a belief that they will do more. If the right
acts now be started, and started with the determination to treat
the vital questions of practice, and to neither ignore nor evade them.
Six good brave men in each of our large cities could do more to establish the profession on a firm basis than any of like-sculpted societies
of the present order. Let a minimum rate of compensation be estab-
lished and recommended. Let it be agreed that all men with excep-
tional advantages shall increase their rates, and shall continue to give
all work their full personal attention. Thus neither employer nor
employee will be the loser. Make it clearly understood that an
architect shall be judged by his professional attainments,
and not by the number of buildings he may erect,
says of an architect: "If his buildings will not stand — may he
not be manifestly stable — they fail in the first requisite of art;
and it is the fact that the building is a structure, and not a mere
trumpet, which raises architecture so inmeasurably above scene-painting.
We cannot eradicate selfishness by ordinance or the edicts of society.
We will dismiss the subject in the future.

John A. Fox.

EQUITRZANI MONUMENTS. — IV.

WHETHER or no a centaur may be considered an equestrian figure, he is too graceful in the attitude, too perfect in the union of the animal and human parts, to be neglected and immeasurable examples of the popularity of this theme have come down to us, most of them as mere or less fragmentary bits of sculptured friezes which depict the battles of the centaurs and the Lapithae, their destruction by Heracles, their combat with the Amazonae, or the abduction of both named and nameless females. In these seems it seems as if the sympathy of the observer must go with the hybrid. He seems pathetically handicapped, as if he were almost conscious that he is vainly struggling with a too powerful fate. Yet get him alone by himself, he seems a most happy individual, a flaminously insouciant creature, always able to travel without fatigue, untroubled by clothing, having fear of neither bit nor harness, not having to endure the neglect and cruelty of grooms, and withal able to read, to pipe, to talk, to eat deliciously and enjoy life in short, as few created creatures can. It is no wonder that he was a favorite subject with sculptors who knew how to blend the divine grace of the human form with the almost equally subtle grace of the perfect horse. It is fitting that Meuse and Napoleon are, in their way, the most enjoyable of statues and amongst the most famous, yielding in this respect to the black marble ones in the Capitol at Rome only because more people go to Rome than to Naples. The centaurs of the Capitol are said to have been executed in the time of Hadrain; at any rate they were removed from Hadrian's Villa to the Capitol in 1736. They were sculpted by Aristaeas and Pappas Carian, sculptors. The centaurs of the Capitol incompletely reproduce the allegory of the joyousness with which youth endures the assaults of love and the anguish and tears and joys of youth.

Entrance to Hotel Ponce de Leon, St. Augustine, Fla., by F. W. PoCteLLIS, leading from King St. to Court. Messrs. Carrere & Hastings, Architects, New York, N.Y.


Paganus and Centaur. From a vase.1 Engraved seal showing Muses, Paganus and Centaur in art of.

Reliefs from the Temple at Assos. Sketch by F.H. Bacon.

1Continued from No. 660, page 76.
2From Müller's "Denkmaler der Alten Kunst."
possibly found on the original pair after which the Rome and Paris statues were probably copied. Like it seems to think that the Capitol centaurs themselves originally had cupids on their backs.

As the centaur was altogether a mythical being, and more a creature of the imagination even than the gods and goddesses whom ancient sculptors so often selected as their subjects, and for whom they could conceive no more fitting presentation than to fashion them in the semblance of perfect human beauty, greater liberty was taken with them in deciding on the manner in which man and horse should be combined; but we are most familiar with the type which shows the upper-half of a human body set upon the shoulders of a horse. The fact that the Greeks used different words "centaur," "hippo-centaur," and "omoe-centaur," which are now translated as meaning the same creature, may really indicate that the centaur was more man than horse, while what are usually called centaurs, in which the horse predominates over the man, should strictly be called hippo-centaurs. Those interested in such matters have known that these different forms were represented in ancient art; but it was difficult to determine when the earlier form, if it be an earlier form, became obsolete, or whether there were really two forms of centaurs existing contemporaneously in the art of different epochs. Until the recent excavations at Assos this dividing line was obscure, but there was discovered there a temple bas-relief which showed centaurs of a very archaic model, dating probably from the sixth or seventh century before Christ, which had the striking peculiarity that the forelegs of the hybrid were human and only the hind-legs equine. A still more singular fact is that upon another part of the same frieze are centaurs fashioned in the usual way. Are the first, then, centaurs and the second hippo-centaurs?

Another type, supposed to be of Phoenician origin, was brought to light in 1880 at the Villa Bevenuti, near Este in Italy, where embossed on a bronze stele, or water-jar, was discovered a centaur which differed from the common kind in that he was furnished with wings, and thus seems to form a connecting link between the winged bulls of Assyria on the one hand and the classic Pegasus on the other.

So far as it is possible to determine the ancients rarely attempted to model in the round Pegasus, the special servant of the Muses, although he was a favorite subject with painters and poets. Whenever they did model the winged steed, it was probably as an isolated attempt the difficult task of portraying the one, Fame, the other the Genius of the Arts, in the uncomfortable act of avoiding a hasty dismounting through the flourish of the sweeping wings. But on gems, medallions and bas-reliefs Pegasus has been a favorite subject with sculptors and painters, both ancient and modern. One of the most vigorous, life-like and artistic presentations is shown upon the reverse of a medal of the Lembri, by Benvenuto Cellini. The only record of a statue of Pegasus it has been possible to discover is one that merely mentions the existence of a statue of Pegasus and Bellerophon at Byzantium.

In the funeral procession of a monarch it is even in these days not unusual to lead his favorite charger, whose empty saddle adds more of pathos to the scene than does the elaborately bedecked funeral car; and it is with some Indian tribes the custom that beside the grave of the dead chief should be slaughtered the faithful beast who had shared so many of his master's dangers. In the first case we feel that the unburdened charger is one of the most impressive features of the surrounding funeral pomp, and in the other we understand that Indian superstition seeks to provide the departed chief with a speedy way of reaching the Happy Hunting-ground. The connection of this Indian custom with the manner of the ancient pagans is singularly close, and it is not unlikely that in the customs of all races who have enjoyed the service of the horse could be traced a more or less close symbolic connection between the fitting of a departing soul and the horse. The rude cut that represents an antique bas-relief, a sculptured metope from the temple at Selinus and now in the museum at Pa...
it is a temptation to consider it among the first of the long series of sepulchral sculptures that lined the Street of Tombs at Athens, the Via Sacra at Rome, and similar avenues of the dead elsewhere, on which the horse was sometimes introduced, first because of its symbolic connection with death, and afterwards as a conventional form of decoration. In one of the most common forms, though perhaps not the simplest or the earliest, the symbolic element is represented by a horse’s head in the upper corner of a bas-relief as if looking through a window from the outside at the friends of the deceased enjoying the funeral-feast within.

On, at least, one of these relics there is a muffled figure seated somewhat apart from the feaseters which may be intended to represent the dead man for whom the horse on the outside is writing. In later forms a greater variety of treatment was practised and the equine symbol expanded till, as on a sepulchral urn in the British Museum, it is represented by a four-horse chariot driven by a winged genius. In this last case the horses seem to be introduced amid the rather rich decoration quite as much as a piece of conventional ornament as because of its symbolic value.

Another type of equestrian sepulchral sculpture is found in the somewhat noted slab or stèle which formed the monument of the soldier Dexileos, son of Lysanias, which was found in 1863 and reappeared on the very spot where it was originally placed 328 years before our era. In this case the horse—Dexileos is shown as riding over a fallen enemy—was introduced either as being an appropriate decoration for the monument of a soldier who fell at the Battle of Corinth, or the departed upon a journey, while in the paintings in the catacombs the horse is understood to symbolize the swiftness of life.

This connection of the horse with death makes it appear quite natural that as consolation to the bereaved parents a gilded bronze equestrian statue should have been set up in Brixia on the death of a child only in his sixth year, a fact which otherwise seems merely whimsical.

Chiron.—Chiron, the most famous of the centaurs, was a son of Saturn, and lived on Mt. Pelion. He was instructed by Dius and Apollo, and so excelled in medicine, hunting, music, gymnastics and prophecy that the most distinguished Greek youths were sent to him for instruction, such as Polens, Achilles and Dionysus. Chiron was a friend of Hercules and was immortal.

The Centaur.—“The gallop of a well mounted horse is still a unique spectacle, as is every equestrian exercise performed to display, in their moments of common activity and accord, the two most intelligent and beautiful creatures in form that God has made. Separate them, and it might be said that each one of them is incomplete; for neither of them has any power by itself. To couple them, mingle the man with the horse, give to the horse originality and life to the rest of the horse; and the centaur is born. He is strong, resourceful and vigorous, and you have a being of sovereign force, thinking and acting, courageous and noble, skillful and wise. The same is true of the centaur, whose general form is that of a horse with a human head, and his dress is made of tapestries and Seeking muffled. He has shown in this that the equestrian statue was the last work of the monster of the Iliad who was the last of the Centaurs. The Romans and Gauls used the centaur rather than the full figure as a symbol of their alliance and good charactors. On this account, it would be difficult to say which god in heaven would be the patron of this horseman. If we consider the centaur as a man in the race in her chiquity, Aquitav, Salien, Blas, Fauza, and Vincenata and plains of their same stone, the Medici, the Hippodrome, the Hippodrome Amphirolle, the horses horses Dioniz, Mars, Apollo, Zeus, Pluto and the Great, As the sliding of the sever hundred goat Zantheus never show themselves otherwise than on horseback, hence the horse was naturally revered to all of them. In the Christian faith, the immemorial gods of the ancients have become incomparably more important (when they were not so unfortunate as to degenerate in the hands of their enemies). The horse is now recommended in its stable to the protection of several saints, from the obscure Hellenian St. Aid to the noble nobles Dioniz St. Elish and St. Lever, who take the horse, as well as the mole, under their especial protection, and to speak of the glorious horn men St. Elish, St. Michael, St. James, St. Maurine, St. Stephen, St. Vladimir and St. Martin, especially revered by warors and hunters in whose honor the principal centers of horsemen in Europe was founded.”

—Zoological Mythology by Angelo de Bertiellis.

(To be continued.)

ITALIAN CITIES.—III.

MILAN.—I.

MILAN is the first large city which one meets with in upper Italy after leaving Turin. Lombardy, of which Milan is the capital, was formerly a laeustriac region whose earliest inhabitants dwelt in huts built on pilings. These people were the first who brought into this Cisalpine province artistic tastes and manners. Later the Gauls brought in their light-hearted and turbulent mores, their gaiety and vivacity—and of all the people who inhabit Northern Italy, the Milanese is the one, who, through the delicacy of his intelligence and the enthusiasm of his nature, most closely approaches the Frenchman. He is capable of irony, and delights in pleasantries—a rare thing on the pugnacious peninsula. He loves to eat, and does not despise the juices of the vine. He enjoys a reputation for gluttony, of which he is rather proud; and, in fact, there is a proverb which says that the Milanese makes his saddle plate and a mantle full of holes. Almost all others of his compatriots generally prefer to have a fine mantle, even at the expense of an empty stomach. The Lombard territory is well calculated, moreover, to determine in its inhabitants an immediate appetite, for it is prodigiously fruitful, and its natural fecundity has been increased tenfold by the work of man.

Works of irrigation make it possible to obtain from its artificial meadows seven crops of hay each year. The Alps which bound the plain on the north act the part of collectors, which bring toward the plain clear and fertilizing waters. This territory is more rich in rivers than any other in Italy: the Adria, the Oglio, the Ticino, the Adige and the Misico, to mention only the most important, traverse it from north to south, and form in their courses those admirable lakes around which, they are so many important resorts. Broad canals connect these great water-courses, which flow into the Po, and serve to distribute in every direction the means of irrigation from which the native reaps full profit. These immense works of canalization are due to the genius of that greatest architect of Italy, and amongst them can be counted the great Leonardo da

1 From Miller's "Denkmalser der alten Kunst."
2 From "Art."
Vinci, who was considered almost a mad man when he for the first time proposed the project of building the Scala. The monks of Clervaux, who at the commencement of the twelfth century founded, under the direction of St. Bernard, a branch of their institution at a short distance from Minizes, must also have been curious as to the teachings to the development of the agricultural prosperity of this territory and the multiplicating in it of the means of irrigation. Thus Lombardy can be considered the country of easy grace of the importance and the quality of its products, if not because of the mildness of its climate. Cattle-grazing is here carried to its greatest development, and Lombardy furnishes butter not only for the whole kingdom of Italy, but a good deal of it is shipped by sea. The water was used for fertilising the ground by means of artificial canals, this province was already a great dairy country; for the historians of antiquity recount a very ancient custom in the Lombards of placing the vessels containing the milk of infants in the same basin with that of cows. 

...
The Cathedral at Rheims, which Stendhal considers one of the most beautiful churches in France, was built in 840, and measures 490 feet in length by 100 feet in height. The Cathedral at Strasbourg, which is perhaps the only purely Gothic monument on the Continent, was finished in 1275. The first stone of the nave was laid in 1277, and the work, in accordance with the tradition, the highest hit of masonry which exists in Europe, its height is 426 feet.

The tower of St. Etienne at Vienna is 414 feet high, four feet less than the St. Stephen's Cathedral.

The St. Michael at Hamburg is 390 feet.

The famous tower of Pisa measures 270 feet in height by 240 feet in width, from north to south. The height of the dome above the keystone is only 165 feet.

The legendary pyramid of Egypt, from which, according to the saying, of Bonaparte, "forty centuries look down on the French Army," is.

The niche of the Invalides, at Paris, reaches a height of 360 feet above the ground.

The pyramid at Cholula in Mexico is only 162 feet high.

The Cathedral of Notre Dame, at Paris, measures 240 feet in height. The total length of this church is 490 feet. Its interior width at the crossing is 150 feet; the width of the nave is 40 feet. The nave of the Cathedral at Strasbourg is 49 feet, and its interior length is 145 feet.

The Church of St. Paul, at London, is 590 feet in length by 169 feet in width. The height of the dome is 319 feet. The major figures are those connected with the proportions of St. Peter's at Rome. The total length of the basilica, including the portico and the thickness of the walls, is 660 feet. The foundation was spread over an area of 7 inches thick. The walls of the pyramid is 8 feet and 9 inches thick, and the pyramid is 98 feet and 8 inches in width. The interior length of the crossing of St. Peter's is 98 feet. The interior width is 82 feet.

The total height from the floor to the summit of the cross which surrounds the dome is 408 feet. The height of the dome under the key-stone is 249 feet. The interior height of the façade is 253 feet.

THE GLASS WINDOWS IN ENGLAND.

It is curious that England is mainly indebted to an archisshop and an abbot for the introduction of the glass window. At the commencement of the seventh century this country had no "glass-makers." At that period the windows of private dwellings, as well as of churches, were filled with linen cloth, or with wooden lattices. In the latter part of the century, Wilfrid, Archbishop of York, proceeded to effect extensive repairs in the Cathedral, at that time in a ruinous state, and he is described as having "put up" to the windows and rooms of the land-chapel, which he derived aid from his friend and contemporary Benedict Bisop, Abbott of Wearmouth, who about the year 674 brought glass manu facturers from Germany to York. The windows of his mother church, the venerable Bete states that up to that time the making of glass was unknown in England. He also asserts that these French and German glass manufacturers gave instructions to the English in the "art of making glass for windows, lamps, and other uses." Five hundred years after the era of Bishop and Wilfrid, windows of glass exist in England, but despite all that had been done to naturalize this industry, the glass was still imported from the Continent. Five hundred years later on, we hear of Venetian artisans at Lambeth, under the patronage of Villiers, Duke of Buckingham, engaged in making "glass-plate" for coach windows and mirrors. This brings us down to 1675. A century more finds the French making great progress in the production of large plates, in which they soon met with formidable rivals on this side the Channel. In England more than a hundred years before the Venetian artists produced "glass-plate" at Lambeth, this early manufacture being established by the times and those who had made the great achievement so far as windows were concerned, and to the perfection of this branch we owe important practical results, affecting our daily life. London Stained Glass.

THE BATHS AT MONTEREY, MEXICO.-Scattered through the gardens, and in the Bishop palace of Monterey, are the most charming baths. There is a few of the sixes indulged in by these plain laborers, who have the aspect of a very old, judging by their manse proportions and barbarous simplicity, but no one here seems to know their history. The bath proportionately, with the usual, four raised to the above the ground. Around is a wide spaced walls, and the whole is encloosed by another his abodes wall about eight feet high, making a circular room more than four feet wide. All the staircases are broad, low stone steps, mud over one side a trellis of grapevine which makes a dressing-room sheltered from the sun. Bath, walls, and seats are stained a soft, warm red, with patches of green here and there, and the room is filled with sunshine, warmth and color in such ideal combination that nothing at all will find nothing to say.

Another is in the entrance to the baths which is a simple arch in the wall with no provision whatever by the architect for shutting out observers. At present a piece of coarse linen flaps its length over the area, the windows and doors are arched, and the whole effect of the space, I suppose. During the afternoon the baths and gardens are crowded with people. After their bath the women walk or ride home in what is commonly called a street-car, though it is common to have black hair streaming in dirty ripples over their shoulders, entirely unconcealed by head-covering of any description. - Miss. E. N. Shiels, in Diario Americano.

ST. MICHAEL'S, COVENTRY, RESTORED.-The restoration of St. Michael's Church, Coventry, was begun March 1st, 1871, by the replacement of the top stone of the steeple, which is the tallest of the three tall spires. The work was undertaken three years ago, one of the earliest steps being an elaborate study of the old columns of the Times for national help in restoring the structure. The ceremony yesterday was performed by Mr. G. Woodcock, a contributor of over £500, the fund, after paying the bills for the job, being turned over to the son, the contractor, in replacing the weathercock, at an altitude of 300 feet. A short religious service was gone through, and there were some words of congratulation and thanks all round with the wind the crowds who had assembled at the various points scattered up the ceremony executed for the receiver of the stone. Together the steeple is 426 feet high, and the statues have to be replaced; and these and other details, such as the removal of the scaffolding, will occupy the some time. The total restoration has cost between £50,000 and £60,000. - The London Times.

TRADE-CARDS OF THE 17TH CENTURY.

An analysis of railroad, commercial, and financial statistics for the past thirty years has brought to the writer's attention a number of features which are ordinarily overlooked. A rearrangement of conditions and relations as compared to contemporary problems, and the diminishing capacity of the country is rapidly increasing. The power of railroad managers has contracted and rates almost everywhere have declined. There is a large range of traffic as compared to the past, according to the reports available, but it is the habit of those who control and administer the railways, as well as the companies, to see that this would be a disturbing or disappointing character, hence it is impossible to present conclusions that conclude, business men and financiers are observing and accepting results the conclusion. This era can see more clearly than they gather their business as they go; but money is not being made in large quantities and the public is unable to grasp in the dark to a certain extent. The fog surrounding the economic affairs is a very hot beast and cannot be unseen in an uncertain direction. The talk in the trade circles today is that with the termination of the political contest a vast amount of new business will be opened up on the market. The large manufacturers of the Coming are taking this statement. The manufacturers fear a disadvantageous decision of this nature than they have ever had, and the result is an outcry against the government, such as to make it practically impossible for any permanent harm to be done to our industries by any reduction of duties that can be made. The reaction apparently has already set in against even moderate reductions. A great many who theoretically favor reductions and who still believe in the present policy are so mixed up with the country's industrial prosperity that they are weakening in their anxiety to see the great experiment made. The manufacturers of the North is a great many times have recently expressed the opinion that with the great mass of transportation and with a better prospect for a satisfactory disposal of their crops they will be sufficiently satisfied to let other things go for the present. Manufacturers and capitalists from the North who have very recently come to the conclusion that their interests are better off in the South, there is an undertone in the Southern States doubtfully in favor of pursing such a course as will keep mills and factories busy. If reduced duties are taken for that end and by such arrangements that the South's desire is that American activity must be maintained and that they will aid stand by that development. The following is a succinct statement of the position. In no deciding, the manufacturers and business men do not declare themselves for or against this or that economic policy, but they simply place themselves on practical good sense grounds and let that pilot them to their destination. Further advices from architects and builders within the past two weeks show that an increased number of architects have been taken out and that a great deal of work will be pushed through between now and fall. As stated some time ago, house-building is being vigorously picked and relatively more money is being expended in that direction. There is an urgent demand for tenement-houses worth from $1,000 to $2,000 in the States west of Pennsylvania than ever there has been before. Chicago lumber merchants have been doing a good business throughout the Western and the Eastern States all through, and particularly of this fact nail-makers speak of this same thing. A large amount of cast-iron pipe has been ordered recently for water-works engagements, and in both. But plain pipes are used, and the construction of gas-works are planned, engine-builders are full with work for small engines and both separate manufacturers of iron and steel manufacturers have started in recent times others for the fall and winter. There is an excellent condition of affairs among the smaller industries. The business of completing previously undertaken contracts amounts to a good deal. The horses and chaises built last year are calling for a great deal of appropriating this year. The large part of the manufacturers have had the foundation of confidence for the winter's business. The leading manufacturer of the last year, that one strength of each the statement made to the promised activity. Nearly all of them are employed. The heavy manufacturers would be oversold for but for the extraordinary proportions we can raise prices. We are but part of those who are affected by importations are quite busy. Even those who are affected by this are not importing are gradually coming to terms. This state of affairs is indirectly of benefit to the people at large who profit by the distress condition going on in all our railroads and among the people who lose by overemployment of the people. It would give them these benefits because they keep their eye upon the advantage of the null men or manufacturers and overlooked the heights that the people derive from the vigorous operation of the losses of trade and commerce. N. J. FARRIS & CO., PHILADELPHIA.
The above cuts show at a glance the relative protection afforded by their water seals in the case of the Dececo and of the Washout closets.

From its cheapness and apparent cleanliness, the Washout is probably the most popular closet in use to-day. In one respect the two closets are alike: they both depend for the exclusion of drain air on the water in their traps. This is the season of the year when many families close their houses and leave them for varying periods. As soon as any closet is left to itself, evaporation begins to steal away its water. In the case of the Washout, when the water has been lowered less than two inches, this guard against drain and sewer air is removed. In the Dececo over four inches, beginning with a considerable body of ponded water, must be lost before the same condition exists.

It will be noted that in the Dececo the outlet channel is entirely covered with water, leaving no part which is ever brought into contact with fouling matter to give off emanations.

It has also, and in the part where it is most needed, sufficient water to submerge and temporarily deodorize faecal deposits.

The trap of the Dececo is in sight, and there can be no question as to whether or not it is properly filled with water. When it appears to be right, it is right.

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be accorded by most opponents of architects to a body composed of their own fellow-citizens.

CHURCH tower fell in Washington lately, under circumstances which will make the investigation of the causes of the accident very interesting. The church was a new one built of stone, and furnished with a square tower, one hundred and fifty-eight feet high. At the ground-level the tower was pierced with one door and two windows. The structure of the building was almost entirely completed, and the tower was ready for the roof, when cracks appeared in the cut-stone water-table of the tower, and in the main wall of the church near the tower. The architects were notified, and examination, concluded that the cracks in the water-table were due to the settlement of the backing, which showed signs of having forced out the water-table in front. To remedy this, the joints above and below the water-table were sawed out, to allow a slight settlement of the facing; and no further movement showed itself until a few days’ when, the workmen on the building noticed fresh cracks. The only person to whom these indications seemed important was the watchman, who made up his mind that the tower was about to fall, and stationed himself on the opposite corner of the street to see the catastrophe. After waiting nearly all night, the tower actually fell, fortunately for him, instead of bending outward, it collapsed vertically, the fall not being beyond the sidewalk line. A portion of the adjoining wall of the church, and of the roof, was demolished, but the damage was comparatively slight. The cause of the accident seems quite uncertain. Although the piercing of the lower walls of a tower in careless or ignorant hands is often dangerous, the strength of the piers remaining had in this case been calculated accurately, and a large region of strength allowed, and if, as the Washington Star reports, the lower part of the tower still remains intact, there can be no question as to the sufficiency of its supports. In this case it seems probable that the accident should be laid to that fertile source of mischief stonework, in the form of torsion, the sideways bending and backing of the walls in the middle portion of the tower, but, until the ruins are cleared away, no definite explanation can be offered.

THE New Orleans Picayune has a new theory about building laws. After quoting at some length the provisions of the building regulations of Berlin, apparently without the slightest suspicion that nearly all the large cities in the North and Middle States have similar ones, it proceeds, with that lofty scorn which used to animate our politicians of forty years ago, to say that “Monarchical and despotic governments appear to concern themselves a good deal with the private affairs of their subjects. Republican governments properly concern themselves chiefly with laws for obtaining their collection. In matters of personal protection the Picayune takes care of themselves.” According to this doctrine, if a man wishes to build houses in such a way that they fall down on the heads of the passers-by, or to arrange his drain-pipes so that they poison his neighbors, or to plan factories and school-houses with a view to having the persons in them compelled to jump out of the upper windows, in case fire breaks out in the basement, he must not be interfered with, as these are private affairs, with which only monarchical and despotic governments meddling. “In matters of personal protection,” in the land of the free and home of the brave, as the saying is told, must take care of themselves, by wearing iron helmets, and germicide respirators, and asbestos garments, we suppose, and the government should content itself with applying the screws to the tax-payers, to raise funds for buying votes and enriching the members of the ring. We do not know how the Picayune expresses this idea, but to the partisans of the republican government have brought the art of “levying taxes and enforcing their collection” to a point which would provoke a revolution within a year in most “monarchical and despotic” countries, and, at the risk of seeming to the Picayune a “despotist,” if not, indeed, a monarchical despotist, we cannot help thinking that the practice of utilizing some of the surplus energy left after collecting the taxes in looking out that the people who pay them are not slaughtered with impunity by greedy builders in theatres, tenement-houses, hotels, factories and school-houses is one quite worthy of the government of a free community.
THAT interesting publication, the form of contract "adopted by the Joint Committee of the American Institute of Architects, the Western Association of Architects, and the National Association of Builders," has just been issued, and in my opinion this time, in the hands of most of our readers. The specimen copies sent to architects are accompanied by a circular, which requests the adoption of the form in the practice of the recipient; and an arrangement has been made with the Inland Publishing Company, of Chicago, for furnishing the blanks, with which is written the form, at the instance of the architectural, for instance, by certain a moderate price, copies without inserted names being sent, free by mail or express, for eight dollars per thousand, well printed on good paper. In general, the work of the Joint Committee deserves the highest praise. We must confess to having had some misgivings, in the first instance, as to whether the Master-Builders' Association described its views on the subject of contracts, lest the form adopted should introduce novelties of a kind very inconvenient to the architect, and unpalatable to the owner; but the architects on the Joint Committee have taken good care, not only of professional interest, but as it appears of those of owners; and although, if the owners had been represented on the Committee, we imagine that they would have claimed some of the authority given by the form to the architect, their rights have been so carefully defined and guarded that they have been fully secured. From the privilege of ordering extras, is intended, not, as Lord Granthorpe thinks, to enable the architect to run riot at his employer's expense, but to enable the former as the medium through which orders for extras must come, to keep them properly recorded, and to estimate the value of them intelligently, and a requisite in a tender of the man as an architect to the owner, which follow from conflicting directions given, or pretended to have been given, by architect and owner independently to a crafty contractor.

In one or two respects we think the form might be improved, or, we should more modestly say, we do not see the advantage as great as might be claimed on the face of the model. In its first clause, the agreement provides that the contractor shall "well and sufficiently perform and finish" the work required, "under the direction and to the satisfaction of the Architect, acting as agent of said Owner." We suppose that the Joint Committee had good reason for selecting the words which we italicize, but it seems to us that very good oaths ought to be necessary for incorporating in a building contract an admission that the architect is the agent of the owner, as against the contractor, instead of being, what the law presumes him to be, a learned and impartial judge between them. The courts are frequently called upon to consider arguments offered by counsel for contractors who wish to get paid for work which the architect refuses to accept, to the effect that the architect is the agent of the owner, that the law forbids any man to be judge in his own case, and that as, on the principle in a master-contractor relation, the owner is paying for work done by the architect, it is incumbent on him on the ground that it is unsatisfactory to him, the certificate of his agent, being his own certificate, is not conclusive as to payments to be made by him. To this the usual answer of the judges is that the architect is not the agent of the owner in this matter, but an independent expert, who is presumed to decide fairly between the parties, and whose award cannot be regarded as the act of the party who wishes to avoid payment; and on this ground the certificate has almost invariably been sustained. If, now, the accepted form of contract expressly declares that the certificate of the architect is given, not as the opinion of an impartial man of science, but as the device of the agent of a person who presumably wishes to escape from paying his debt, although the clause can be enforced just as one might be enforced which demanded the certificate of the owner himself as a condition precedent to payment, it seems to us likely to be resorted to as a spirit of the law, and lead to the smallest pretext, greatly to the detriment of the dignity and authority of our profession.

The last Bulletin of the French Architects' Protective Society shows that its work is increasing, and its influence rapidly extending. It has now more than two hundred members. The importance of this movement in the profession; it defied the interest of its members last year in four suits, two of which were carried through successfully, while the other two are still in court; and its aid has been involved in six new ones, which have not yet reached the stage where their circumstances can be made public, but which, we are told, involve two or three questions of great professional importance. The Supreme Court of the United States has been long in litigation is now decided, and the architectural community will hear the result of the trial with much interest. It seems to be considered hopeless in France, as in England, to try to open the eyes of courts to the fact that clients do not pay for professional work, and that architects' drawings are instruments; but this was a peculiar case, in which the Society saw an opportunity to gain a point in the struggle for architects' rights in the matter, and took up the contest with a zeal which deserved success. It seems that an architect was invited to take part in a limited competition for a group of school-houses, the cost of which was in dollars, while the execution of the work was promised, at the usual compensation, to the successful competitor. The applicant for the Society's aid was placed second by the professional judges, but it was proved that his design was the only one which could be carried out within the limit of cost. Before anything was done toward executing the design, the town elected new officials, and the whole project was forgotten by every one except the architect. After waiting awhile, he sent in his bill for services, and was refused payment. He brought his case to the courts, was awarded two hundred and thirty dollars, while the execution of the work was promised, at the usual compensation, to the successful competitor. The architect, who might have obtained a minimum of one thousand dollars, paid only thirty dollars, and was awarded the half per cent on the proposed cost of the work. His drawings had been returned to him, and before the town officers would pay him what the court had awarded him, they demanded that the drawings should be given up. The architect declined to part with them, and the town then applied to the court to know whether he did not exceed them in his plans. The lower court held that it did, and an appeal was taken to the Council of State, which decided last month that "as the damages awarded represented the architect's remuneration for his work, by paying them the town became proprietor of his drawings," and decreed that they should be given up.

Mr. R. E. Robson, the distinguished author of the best work on School Architecture ever published, and until recently architect to the London School Board, has been drawn into a controversy with the Board which is of great importance to the profession. Some time ago, under Mr. Robson's direction, an important group of school buildings was erected on Broad Street in London. Lately, cracks appeared in the walls, and on investigation it appeared that the concrete footings were of bad quality, and that much less concrete had been put in than the specifications called for. Thereupon, after the usual fashion of boards and committees, instead of applying for redress to the contractor who agreed to put in the foundations according to the specifications, and got paid for doing so, the Board left him to enjoy his ill-gotten gains, and made a formal demand on Mr. Robson to take the amount out of his own pocket, and hand it over to them, on the ground that, having certified that in his opinion the contractor had completed his agreement, it was for him, in case his opinion was a mistake one, to make good the contractor's fault at his own expense, while the contractor might keep the money which he had not earned, without being even asked to return it. In Mr. Robson's case, the hardship, or rather, the insolent brutality of the demand was enhanced by the fact that in the discharge of his duties as architect to the Board, he had been required to look after so many buildings that it was utterly impossible for him to give personal inspection to all of them. This was perfectly well understood by the Board, which appointed a clerk-of-works for the express purpose of seeing that the specifications was carried out, and in addition to this officer, an Inspector of Works, which appointment was made on the distinct ground that Mr. Robson's time was so valuable to the Board for other purposes that he ought to be relieved of the bulk of the work of inspecting buildings in progress. The School Board does not deny this, but claims that by signing a certificate for payment, the architect was relying on information given, and which was given to the Board for the purpose of furnishing him with such information, he rendered himself personally liable to make good all faults which the Board's agents should fail to discover in the work of the Board's contractors. The "Builder" suggests this claim "morally absurd," and believes that it will be found "logically inadmissible" and we trust that the event will prove it so.
ARCHITECTURAL EDUCATION IN THE UNITED STATES.

II.

THE UNIVERSITY OF ILLINOIS.

THE University of Illinois is an institution which was organized under the same conditions as Cornell and the Institute of Technology, although it differs from both of them in being practically a free school. It is located at Urbana, Ill., about one hundred and twenty-five miles south of Chicago, lying near the boundary lines between the states of Illinois and Indiana, which together have a population of some eight thousand. The University was opened in 1868, and at that time had a nominal department of architecture, which, in the fall of 1869, was placed under the direction of Mr. James Bellangee, a graduate of the Science-Department of Ann Arbor University. Mr. Bellangee had worked for some time in an architect's office in Chicago, but, we believe, had had no special technical training. The special instruction afforded by the course was limited to architectural drawing, descriptive geometry and projection drawing. In 1871 Mr. Harold M. Hausen took charge of the department. He was a graduate of the School of Architecture in Christiania, Sweden, and had studied two years at the Bau-Academie in Berlin. He remained at the University for only a year, and little to establish the department. Mr. N. Clifford Ricker, the present incumbent of the chair of architecture, was at that time a student in the so-called architectural course under Mr. Hausen, a course including a few engineering branches and a very slight smattering of drawing and design, excellent of its kind, but very limited in extent. During 1872 Professor Ricker studied in the office of J. W. Roberts, an architect, in Chicago, a pupil of Mr. Richard Upjohn, and in the fall of the same year assumed charge of the Architectural Department at the University. The next summer Professor Ricker went to Berlin where he entered the Bau-Academie as a special student, and afterwards travelled in Europe. The department of architecture has since that time been developed entirely by his individual exertions, and he has been almost alone in the work, the funds of the University not allowing him a very generous amount for equipment, photographs, etc., especially as the attendance has always been rather small.

It would hardly be worth while to consider in detail the growth of the system of instruction from the condition under which Mr. Hausen left it to its present state, and for the purpose of comparison with the other colleges it will be sufficient to consider the course of studies as it now exists. According to the by-laws of the University, the studies are elective in the sense that a student may pursue a selected course and graduate from the University, becoming an alumnus; but a prescribed course is rigidly required for a degree. The course in architecture, as at present laid down, extends through four years; but this requires so much time, and so many draughtsmen and young architects are unwilling to spend four years in this kind of preparation, that the trustees of the University decided to establish a special course for those who wish to pursue their technical studies. This is known as the Builders' Course. Candidates must pass examinations in the common branches, but not in the studies of the preliminary year, unless they desire to pursue other studies later on. The Builders' Course is as follows, occupying a single year of three terms:


SECOND YEAR.

1. Elements of Wood Construction. Elements of Stone, Brick and Metal Construction.

THIRD YEAR.


FOURTH YEAR.


In order to more clearly appreciate the relative importance given to the various branches, a summary may be of interest, as follows:

Under the head of pure mathematics we find that trigonometry, geometry, algebra and calculus together occupy nearly 480 hours. Applied mathematics, such as descriptive geometry, graphical statics and resistance of materials occupy 480 hours; theoretical study of construction occupies 336 hours; languages being taught to either French or German, have 198 hours; the theory of architecture, including history, esthetics, and lectures on color and the like, has 360 hours; drawing occupies 960 hours; shop-practice 360; and a few side branches, such as chemistry, physics, as chemical polity, political economy, etc., together take up 384 hours; making the total number of hours for the whole course 3420. It will be seen by this summary that 28 per cent of the time is given to drawing, and 31 per cent to studies which are purely architectural in their nature, including the shop-practice, so that altogether 59 per cent of the students' time is occupied entirely with architecture, while 41 per cent of the entire course is given to studies which do not bear directly upon the profession in one way or another.

Let us now consider the method in which the instruction is communicated to the pupil. The first purely technical exercise of the student is shop-practice, which commences in the first year of the course. Shop work was introduced into the University by Professor Ricker, in 1873, after having made some investigation of the Russian system as illustrated at the Vienna Exhibition. This was the first 1

1 Prof. Ricker writes us as follows:—"The Builders' Course is primarily intended for the benefit of mechanics, who have long sought, cannot spare the time (for preparing for the required entrance examinations into the University, or for young men with imperfect preparation, who wish to learn a trade afterwards, and the students in this course have been wholly drawn from these two classes. The number taking the Builders' Course rarely is one-fourth that of students in the Architects' Course, though now twice that in any previous year. To guard against abuse of this course and prevent its becoming a kind of by-path around the entrance examinations, three restrictions are provided: 1. A tuition fee of $2 per term is required. 2. Students of the class rank as preparatory students. 3. Attendance is strictly limited to a single year, and to the studies of the prescribed course only; should a student wish to take other studies or remain longer, he must pass the full examinations as a candidate." I think the effect of the course has been good.

1. Most of these students are skilled mechanics, who wish instruction in the most essential branches, and it should be provided for them in this State University.

2. Most become foremen or builders, very few draughtsmen or architects. So I think that we should meet most of the evils of the two years or special courses as pursued in other colleges."

use of the system in a school in this country. The practice at the shop during the first term includes all of the ordinary roof-carpentry and joining wood, such as tracing, planing, splicing, Joining, dovetailing, etc. The work being done on pieces about one foot long and two inches square. In the second term attention is given to cabinet-making, with glued joints, lead-work, enamels, inlaid-work and turning. In the third term the student is employed in the construction of model buildings, towers, window, door frames, etc., to scale and from drawings, to give him some knowledge of general construction. During the last of the term some attention is given to stome-cutting by the help of the instructor. The work is being worked up in the ordinary methods of dressing stone. Professor Ricker says he does not feel entirely satisfied with the way in which this work is handled in the shop, and hopes, eventually, to have real stone and stone work with to work with. This shop practice is practically several degrees better than what one would get by apprenticing himself to a regular builder, at least so far as concerns mere handcraft, although, of course, student in a school can get no idea of the mechanical construction of a large building.

As a necessary and natural sequence of shop-work comes the study of theoretical construction occupying the greater part of the second year. This is illustrated with models, photographs, etc., the lectures being type-written by the department on prepared tracing-paper and blue-printed, so that each student can have copies of the lectures by paying for the cost of the blue-printing, which the University does at the rate of one and a quarter cents per page, making for the entire work a cost of about three dollars and sixty-five cents. A personal copy is required of every member of the next class. Each student in the class, however, is obliged to possess a copy. The lectures are not delivered orally, but specified portions of the topics are assigned for each day, and the students are required to post thorough work in the class. The term includes the consideration of materials, sizing, shrinking, dry-hot, various kinds of lumber, strength of materials, joints and fastenings used in carpentry, methods of construction of framings, walls, ceilings, parapets, groined-work, roofs, etc., in fact all that has to do with carpentry in construction. In the first term's work the student is required to make twenty plates in illustration of the topics, selecting from definite topics given out. In the second term's work some time is given to the study of stair-building in so far as relates to the general principles of planning, and students are admitted to a special course for working-out the constructive details of stair-building, though this is purely optional. In the latter part of the term's study, building construction is taken up and discussed in its various details, also the subject of foundations, iron and steel as materials for building operations, stone-work, tile, terra-cotta, etc., and corrugated-iron. All the recitations, which are drawn directly from the professor's written notes, are supplemented by practical problems in which the student has to use his knowledge and show that he appreciates what he has been reciting.

The study of the history of construction is that of sanitary engineering in the third term of the second year of the course. Paul Girard's "Drainage and Sewage of Buildings," and Staley's "Separate System of Sewers," are used as text-books, with lectures and blue-printed copy anywhere. The study occupies only half of the term, the remainder being given to practice with civil-engineering and surveying instruments.

The introduction to the course, which is bound to receive the most attention. A certain facility in drawing is presumed to be possessed by the pupil before entering the University, though practically it is found that the student knows little more than how to hold a pen and make a simple line, and enter into the course until the second term of the second year, though, in the first term of the second year time is allowed for a certain amount of free-hand drawing. It should be said, by-the-way, that all of the free-hand drawing taught in the University, is under the direction of Professor Ross, a graduate of the Normal Art School of Boston, who has been doing some excellent work in Champaign, and has built up a very interesting department there.

In architectural drawing, as such, a start is made by using Tuthill's "Architectural Drawing" as a text-book, the student being required to work up one set of drawings each term. During the second year, in case the student has had previous experience, he is required to draw out some building in elevation from some published perspective, or if far enough advanced, is instructed in simple tinting and etching with a pen. Perspective is taught by the use of Professor Ware's text-book, practice being obtained by drawing a series or five examples which are given by the professor. Of course, it is very difficult to develop a great deal of architectural ability in a student in the course of two terms of architectural designing. The University does not profess to make finished draftsmen, but to show the way and lead the student to work on his own lines, the time being so short that is given to the study, as much, though in subsequent terms a great deal more work will be made by the student to work into the course, if the student is at all ambitious, and as a fact most of the students do a great deal more architectural work than is strictly required by the course.

Following this, the student is given some practice in architectural designing, though this comes only in the last year of the course. During the second term of the fourth year six problems are given to each student beginning with a small detail of a building, and working up to a small problem of an entire structure. In the third term, the last of the course, a single large problem is given each student, and this is worked out fully, with all necessary drawings and an outline of specifications, just as if it were an actual problem in professional practice.

It generally happens that students, if they become interested in the work of this course, will begin the designing earlier than the senior year, and so a great deal more work will be accomplished in this direction than would be inferred from the list of studies.

The lectures on the history of architecture are written out and blue-print copies are made the basis of the instruction, supplemented by reading of various standard authors and discussions of essential points. For purposes of illustration Professor Ricker uses a large collection of mounted engravings, photographs, etc., to draw from all possible sources, arranged in architectural sequence and brought in with such lecture as may be necessary. In order to fix in the students' minds the distinction in style, each student is obliged to make during a term five plans of stair- and elevations of architectural details. The students are at liberty to select what details they will trace, but the University retains the tracings and furnishes the pupils blue-prints of the same at a cent and a quarter per sheet, so that each student can have at a very slight outlay, an entire assortment of tracings illustrating the lectures he has been studying.

The lectures on the history of architecture are written out and blue-printed in the same manner as the lectures on construction, and each student is obliged to have an entire copy of the lectures for the year.

For the students of esthetics a translation has been made by Professor Ricker, of Reddening's "Architecture Dorée, ou les Banquettes." The translation is blue-printed, and the students provided with the prints which serve as the basis of the recitations. In the same way a translation of Planet's "Chaise et Ventilation des Chambres," and "Thermalism," is used for the subject. Much of these topics is supplemented by practical problems, worked out by the students.

The works are given as a consideration of estimates, based upon Vogel's "Pocket-Book," and supplemented by blue-printed lectures, some thirty problems being worked out by the pupil. Two weeks more is given to agreements and specifications, the student being required to make up a special set of architectural drawings for the various buildings. A portion of the term is also devoted to the study of Professor Clark's "Building Superintendence." The students are not required to outside office-work until their junior vacations. It has been found that the students have to be handled very tenderly, as they are so apt to become discouraged with the study of purely technical branches, and it is hard to make them appreciate the necessity of schooling in architecture. At present
there are no requirements made of students in the way of vacation work.

In regard to the equipments of the school, there is still a great deal to be desired. Professor Ricker's department is known as the School of Architecture of the College of Engineering, and is not of a very large size, but a small branch of the University proper, so that it has been very difficult to make the trustees appreciate the necessity of providing proper endowments and equipments for the architectural department of the University. The building was intended to be chiefly an agricultural college. Professor Ricker has, however, fought nobly and evolved a great deal out of a very little. The Architectural Department has a number of rooms in the upper stories of the main University building, and for shop work occupies the greater part of what is known as the Mechanical Building, a structure devoted on the ground-floor entirely to shop work, the upper story being used as a lecture-room. The University is fairly well equipped with architectural books. All of the leading publications are represented, and many of the less noted ones. For persons connected with the department the Royal Institute's Builder, the Engineering and Building Record, the American Architect, the Decorator and Furniture, the Art Amateur and the Portfolio, London. Besides these, there is quite an extensive collection of photographs, which are kept in the lecture-rooms, where they are readily accessible for lectures. The department is benefited by its proximity to a very fair collection of casts, presented to the University by citizens of the adjoining towns, comprising specimens of the best sculpture from all the European galleries. Professor Ricker has also at his disposal a collection of casts presented by the Spanish Government, and another of casts of various architectural details from Leh of Berlin, together with models of ceilings, roofs, triumphal arches.

Applicants for admission to the School of Architecture are required to be of at least fifteen years of age, and to pass examinations in grammar, arithmetic, geography, and history. Students are made to go through a course of scientific subjects, such as geometry, physiology, botany, natural philosophy and rhetoric. There does not appear to be any other limitation of age for attendance at the University, although we believe the average age of the graduates is about twenty-five. The number of pupils in the Architectural Department is at present forty-four, including those who are following special courses. Of the graduates about half have been directly or indirectly connected with architecture; one quarter have gone into building operations as contractors, and the rest have abandoned the profession entirely. There have been twenty-four graduates in all, thus far, without counting some thirty students who have gone on and since followed other courses of study and lines of architecture, and about fifteen or twenty who have gone into building, making in all nearly seventy-five graduates or ex-pupils of the University. This does not include students in the Builders' Course. The students come almost entirely from the West, and very few of them ever leave that section of the country.

The degree of Bachelor of Science is given to those who complete either of the courses of study in the College of Engineering, and a post-graduate degree of Master of Architecture is given on the recommendation of the Professor and preparation of a thesis.

In regard to the expense of attending the University, the tuition is heightened in the following way, however, the student is obliged to pay a matriculation fee of ten dollars, and beyond this there is a fee for incidental expenses of seven dollars and a half per term. The matriculation is five dollars, payable once a year, in addition to the incidental fee. For the shop-work there is no charge whatever, not even for the material which is used. According to the estimates made by the University authorities, the maximum annual expense, exclusive of books, of a residence of thirty-six weeks at the University is somewhat less than two hundred and fifty dollars. In practice very few students go through on so little as this, and we believe the average is considerably higher, though there is no necessity for a student's expenses being more than three hundred or three hundred and fifty dollars per year. Twelve hundred dollars ought to carry a student easily through the entire course.

A SUGGESTION FOR RELIEVING OUR CROWDED STREETS.

Among the most important streets in our crowded cities is the street not only too crowded for comfort, but so much so as to seriously interfere with the free and open use by limiting the amount of business that can be done upon them. The traffic upon a street may be considered having three heads—the street-railway, the wagons and the pedestrians.

In Boston no one has ever been written upon the question of the crowding by street-cars that little need be said here. The fact is that street-creation by the best convenience to be dispensed with. That their number might be greatly reduced by affording other and more rapid means of communication between the suburbs and the centre of the city is most probable, and the most rapid are those now engaged in the evolution of this means of lessening the over-crowding of the streets.

A good deal of the crowding of the streets by wagons, there seems to be no immediate prospect of any improvement. The only help the next best to the pneumatic-tube system. This if well carried out, of proper size and power, might be able to do a considerable proportion of the transportation now done by wagons. In default of such conditions for this to widen the streets, but the expense of doing so would be enormous; indeed, it is generally considered to be absolutely prohibitive.

The some of the principal streets in which the retail trade is now so concentrated, are not widened before long. It is probable that the bulk of the finer retail trade will gradually, and with much friction and pecuniary loss, creep out from the centre of the city into the broader avenues and streets which more liberal-minded men have caused to be laid out, radiating from the city to the south and west. There will, of course, always be a wide distribution of certain kinds of retail business, such as the supplying of provisions, but there are other kinds of retail business, more especially wiser to have mainly concentrated in districts. There may well be second centres of retail trade, and, so far as width and convenient location are concerned, Tremont Street, between Washington Street and the Back Bay, in all probability, will be able to meet every requirement of such a subsidiary trade-centre for all time to come. The same may be said of Huntington Avenue. The experience of New York shows clearly that the broadest streets, even when at first the heads of class of residences, ultimately become the minor centres of retail trade.

But the question is as to the main centre of the retail trade. By the main centre of the retail trade is meant a locality in which not necessarily the rarest and most costly goods are exclusively sold, but where the trade of rich people is conducted, and which will always be able to buy the largest selection of goods at the lowest prices. Boston distinctly has such a trade-centre, containing the largest stores and daily more crowded with people making purchases than any other part of the city. It is so crowded, especially the sidewalks, that it seems to have nearly reached the limit of its capacity, and it seems probable that stores on the outskirts of the district may thrive at the expense of those already established in the most eligible sites. To meet this situation the approaches to them being less uncomfortably crowded. If what is the most conveniently-situated locality is thus gradually abandoned, the wholesale trade and other uses, would it not be wise to retire the main traffic to the community at large. It would be so not only because of the inconvenience of the present situation of the main centre of retail trade, but also because it would, in any other place, lose somewhat of its concentration value. Some of the advantages of concentration of trade are obvious to any one who is familiar with the great dry-goods stores, which not only give the customers the benefit of the reduced percentage of expenses in the low prices under one organization, but offer a larger selection, newer goods, and better prices, due to the power of making larger purchases from manufacturers and other causes. Much time and strength is also saved to customers through being able to buy many different things in one large store. But there are many other advantages in concentration, even when not under one organization. By concentration the greatest

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economy in the supplying of small amounts of power is rendered possible; likewise of heat, of electric-light, of telephones, of pneumatic tubes for dispatching parcels from place to place in the city and to distributing-stations in the suburbs, of fine fireproof buildings and the best appliances for preventing or extinguishing fires, of efficient policing, and so on. But perhaps the greatest economy of all is in space. To the community at large, as well as to individuals, whatever arrangements tend to save time are of the utmost importance.

If it be true that the expense of widening some of the most important streets in the liberal way that has been done in Paris, and which has made that city famous as the handsomest, pleasantest and most convenient for shopping of any in the world is prohibitive, there yet remains a method of meeting the difficulty of overcrowded streets in a far less costly way than even the usual moderate widening. That is to add the existing sidewalks to the roadway and to build new and much wider sidewalks through the fronts of the buildings in the form of "arcades." Such arcades exist in the old town of Chester in England, much more systematically and extensively in Turin, and more or less in many other European cities. Such a scheme could be carried out at very moderate expense for construction and the damage to buildings would be slight; in fact, by raising such as had too low a ceiling in the first story, not a single building would have to be torn down. The cellars under the arcade and the floors above it would not necessarily have their usefulness at all interfered with.

The damage to property would, practically, consist merely in the taking of so much rentable floor-space. The lessening of the light in the stores on the ground-floor would be amply compensated for by keeping the arcade brilliantly lighted by electric lights day and night at the public expense. No attempt at external architectural unity of design would be necessary, as the finish of the arcade could be made to accord with the style of the buildings through which it passed. The noise of the trampling of many feet could probably be lessened by using a wooden-block pavement, with grain on end: as it would be under shelter, the principal objection to the use of this kind of pavement in streets would not hold. The arcade could be made thoroughly fireproof and automatic-sprinklers and automatic fireproof curtains could be arranged to prevent a fire spreading along the arcade. The public, in walking through the arcade, would be protected from snow, rain and sun. Many stores, reaching through from street to street, would form covered ways across blocks in addition to the arcade on the cross-streets. The new shop-fronts could be entirely of glass, as heavy plers would have to be pro- vided at the place where they would come to give the sense of support as well as the reality, an advantage which architects should be quick to appreciate.

There would be a secondary advantage in the arcade scheme hardly less important than that of affording more room to ordinary street traffic; namely, that of economically providing an easily-accessible subway (by taking the portions of the private cellars that would be under the arcade and partitioning them off) in which to place pneumatic-tubes, steam, water and gas pipes, and telephone, telegraph and electric-light wires. It may even be thought to be a wild suggestion that some day the space under such arcades might come to be used for some form of rapid transit.

The advantages of public and shopping-districts are so obvious to any one who has seen them abroad that it is a matter of wonder that they have not come into use in this country, and especially in Boston, where the streets are so narrow and crowded. J. C. OLmsted.

UNITED STATES GOVERNMENT BUILDING PRACTICE,—XII.

ROOF COVERING.

Under this heading is generally included everything to complete the roof after the framing and boarding or roof tiles are put on; including slating, copper-work of decks, valleys, flashings, tin-work, roof-trimmings, hips, ridges and down-pipes.

On the better class of Government buildings the steep portions of the roofs and sides of dormers are covered with slate, and the flat or deck roofs with copper; on cheaper buildings tin is used on deck roofs.

Slating. The best known slates are from the Bangor quarries in Maine, Poole Bottom, Pa., and Buckingham, Va., but fine slate is also found in other places, and is generally of a blue-black or dark-purple color and sometimes red.

The steep or mansard portions of roofs, tower-roofs and roofs and sides of dormers are covered with slate.

All roofs whether covered with slate, tin, or copper should be covered with heavy fibre building-paper, or sometimes in best work a coating of one-half Portland cement and one-half coarse, clean sharp sand about 1/2" thick is used over terra-cotta roofing tiles.

The slates for large important buildings are generally made 10" x 20" x 2", to 3", thick, with sawn edges and tails laid with 3" lap showing 1/2" to the weather: for smaller buildings they are usually made 9" x 16" x 1/2", average thickness with cut edges and tails 3" lap and showing 1/2" to the weather. All slates should be secured at a half by two broad galvanized wrought-iron nails 1/4" long if on boarding, and by two 3/8" bolts on terra-cotta tiles passing through with nut and washer on underside of tile.

The slate on a great many large buildings have been secured directly to the L or L bar purlin by brass copper wire passing through holes in slates and tied around bars; also by Farquhar's patent slate-fasteners (see Figure 43): but since terra-cotta roof-tiles have been used this is discontinued, and bolts passing through slates and tiles are used. The holes in slates for bolts or nails should be countersunk for the heads, in good work.

The slates for circular and conical surfaces should be cut to radiate from the centre or apex, the courses decreasing in width towards the top, and each course should be of a uniform width and properly break joint.

All the slates should have smooth split surfaces, out of wind, with edges and tails cut or sawn straight or square. The lines of slates at valleys, hips, ridges and eaves should be cut straight and the slates

have a double course at eaves and ridges, and fit closely to hips. Fitting-pieces should be provided at eaves and against chimneys, etc., to properly throw off the water.

Where slates come against masonry, copper or tin flashings should be used to protect the masonry and the slates. Terra-cotta roof-covering tiles should be secured by bolts or nails.

(Continued from No. 669, page 607.)
Competitive Design for a Church at Wakefield, Mass.

[Watt and Cutler, Architects]

[signature]

Po. 662
AMERICAN ARCHITECT AND BUILDING NEWS, Sept. 1, 1889
VIEW FROM THE NORTH-WEST.

"VITRUVIUS."

Cyrus F. Dean.

NEW YORK CITY OFFICE COMPETITION.
Studies by
Architectural Studies
University of Illinois

Sketch for a Cottage
E. H. Raymore

Sketch for a Residence
by Geo. R. Potter
University of Illinois
Competitive Design for West End Schoolhouse: Bridgeport, Conn.

Longstaff & Hurd, Architects, Bridgeport, Conn.
in same manner as slates, and where the tiles are plain flat, they should have a proper lap and be laid similarly to slates in every way. Thence to shane the advantage over slate, in that if the slates are heated by fire and water is thrown on them, they are apt to split and crack, but the tiles will not.

Copper.- Copper and tin are used for deck or flat roofs, gutters, valleys and flashings, and are secured in place in the same way. Copper is used for the better class of work, being much more expensive than tin, and in any event is generally used for gutters and valleys and flashings.

Sheet-lead and zinc have been seldom used and then they have not proved satisfactory.

Copper for flat or deck roofs is generally made 12 ounces to 14 ounces per square foot, and for gutters, valleys and flashings 14 ounces to 18 ounces per square foot, being required heavier for northern than for southern climates. The deck roofs are generally made IXX charcoal tin, sometimes IX, in sheets 14" x 20", and for gutters, valleys and flashings IXX in sheets to suit the widths required.

The joints for both copper and tin are generally made standing for those running up the incline of the roof secured by either copper or tin tags nailed to boards or terra-cotta plates, or embedded in cement spaced every 12", and the upper ends worked into the seams as per Figure 44, and in best work the joints riveted ever 24" apart: have the horizontal joints to be flat double-locked, well soldered and perfectly watertight.

Copper or tin gutters and valleys should also be double-locked and soldered. The standing joint is better than the flat for running up the incline, as it allows more expansion and contraction, but flat joints of course are necessary for the horizontal ones. Great care should be taken in the making up of the joints in the upper or valley parts, as there is much variation in the temperature of the climate.

The copper should always be tinned on upper side, where the drain-water from roof is to be carried into a cistern for use, and sized or blacken 3 cents per square foot. This should always be done, as at some future time the roof-water might be used.

Flashings.---Against all masonry etc., flashings should be worked in between slates, or tiles turned up against masonry at least 4", and have a cap or apron flashing let into joint of brick-work or into chase cut in the stonework, caulked with lead on the underside, and turned down over the underclash, the edge being at least 1" above slates. Projecting courses of stone or brick are frequently capflushed with copper, tin or galvanized iron: the metal to be let into joints, covered with a strip of tinfoil or silk, and then turned up under noticed crown or shingle, or sometimes secured to galvanized-iron strip as hereafter described for gutter.

The valley flashing should be one piece of metal in its entire width, and should extend from 10" to 16" each side of angle, and have slates overlap it 4", with the horizontal joints double-locked and soldered, and the flashing nailed on each side to boarding or porous roof-tiles every 12 inches.

Gutters.---Gutters are generally formed on top of stone or brick walls, by iron-angles set up for the front, secured to masonry by expansion-bolts, or to wood strips built in the brickwork and nailed to look-outs, the lining being in one piece the entire width of gutter, and in as long lengths as practicable; it should extend up the roof under the slates or roof-covering higher than the front edge so that in case down-pipes have to be secured stopped up, the water would not then get into the building. The front edge of gutter is generally secured to stonework by having a galvanized sheet-iron strip No. 16 B. W. G., 3" or 4" wide containing the whole length of gutter secured in place by a U-shaped or an I-shaped rib or screw, or sheet lead, in but these should be placed far enough from the edge not to chip it off by expansion (see Figure 46). The gutters should have nails every 16" towards outlets formed in wood or cement, not less than 4" in 10" 0'.

Gutters formed in stone should be lined, or have joints between stones protected by metal, caulked on each side with lead into stone, and then turned up as per Figure 45.

Wherever nails are required for nailing gutters, valley flashings etc. to woodwork, they should be copper, galvanized-iron or tinned until their heads are capped and all soldered perfectly watertight. All joints should be soldered, and riveted wherever possible.

Outlet.---Bell-shaped 16-ounce copper outlets should be formed in gutters twice the area of down-pipes, securely joined and soldered to gutter, and to 16-ounce copper goosenecks which are to be properly connected with the iron down-pipes on the inside of the wall; the outlets to be covered with copper, or galvanized-iron hemispherical gratings to prevent debris getting into the pipes. The downstream-pipes from gutters if carried down on the inside of wall in channels, should be of cast iron 3" diameter or squared 6" size, and out, the joints to be made with oakum run with molten lead and caulked watertight; or in more expensive and better work wrought-iron screw-joint pipes 3" diameter tarred inside and outside with screw-joint connections. The iron pipes should have elbow at bottom and rest on brick pier and secured every 4" 0' to brickwork in place by pipe-hooks and con-valleys and flashings in basement; or carried through wall below first floor, with ornamental mouthpiece to discharge on drip-stone for free drainage.

The pipes if brought down on outside of wall should be copper or galvanized-iron 3" to 4" diameter or squared 3" by 4" secured to wall every 4" 0' and have mouthpiece for discharging on drip-stone, the outlets being cast-iron pipes 5" 0' above grade for connection to drain or soil pipes.

Roof Flashings.---The roof flashings, that is, gutter fronts, crown moulds of cornicles, hips, ridges, deck-cornicles, dormer-cornicles etc., are most always made of galvanized-iron or copper on wood roofs, and frequently on iron roofs. Copper for these flashings is more durable provided it is well brazed and has strong framing for support, but is not so stiff and is more expensive than galvanized-iron.

The weight of copper used varies from 16 ounces per square foot for light flashings to 24 ounces, for heavy moulded and ornamental trimmings, the galvanized-iron varying from No. 26 B. W. G. to No. 48 B. W. G., according to the thickness, and being heavily rolled to remove any inequalities, cavities or blisters from the surface.

All flashings should be thoroughly brazed and supported by and riveted to the casings of chimneys (if on iron roof) every 3" 0' apart riveted or bolted to the iron work; or (if on a wood roof) should be supported on wood blocking or coves on the interior closely following the moulded contours of the galvanized-iron or copper, which is to be strongly nailed to the wood. All joints and connections should be properly lapped not less than 3", riveted wherever practicable and thoroughly soldered. Galvanized iron or copper nails should be used for securing to framing or woodwork, the heads to be capped and soldered all perfectly watertight.

Paining.---All the exposed galvanized-iron, tin and metal work should be painted with a good quality of leaden, or linseed oil; the portions which are ornamental to have two additional coats of approved tints. The copper work whenuntinned should not be painted, especially where the natural color of the copper is intended to have an architectural effect.

Measurement.---Slating and roof-covering tiles are generally estimated by the square = one hundred square feet of roof laid, the actual net roof-surface should be obtained allowing only sufficient amount for wastage caused by cutting as valley, eaves, and gable ends, and for hips forming: no allowance is made for the double courses at eaves and ridges.

Copper and tin for roofs is also measured and estimated by the square, taking extreme measures for surface and allowing for wastage of valleys and hips.

Copper and tin flashings and gutters are generally estimated by the lineal foot, giving extreme measures at all external and internal angles, giving the girth and metal of each projection: no allowance is made for the double courses at eaves and ridges.

Copper and galvanized-iron hips, ridges, crestings, cornicles etc. are generally estimated by the lineal foot, giving girth, contour, design and manner of securing in place.

Dormer fronts in copper or galvanized-iron are generally estimated by the square foot, taking net surface as near as practical and allowing for wastage in cutting, in the price.

Finials are estimated by the piece giving design and dimensions.

Roofing-paper which should form a base for all roof-covering is generally 2 or 3 ply felt, well tacked down with 1" diameter tin washers and coated with asphalt: it costs from $2.00 to $2.50 per square, or $3.00 to $3.50 per 100 square, and is sometimes used alone.

Slating costs from $8.00 per square for small slates with cut edges nailed to boards, up to $18.00 and $20.00 per square for best quality large slate with barn edges and secured on terra-cotta roof-tiles. All costs for the custom-houses at Albany, N. Y., Cincinnati, O., Harrisburg, Pa., Philadelphia, Pa., and Memphis, Tenn., and for the Barge Office in New York City, were 10" x 20" x 2" to 2½" thick, 10 pieces, for $20.00 per square. Lead roofing and galvanized-iron fasteners, and cost from $27.00 to $30.50 per square.

Terra-cotta roof-covering tiles are made up from 4½" to 5½" thick; the plain flat ones secured like slates cost from $12.00 to $15.00 per square, and the ornamental ones, viz., wings, horns, shoulders, etc., which are made on the tiles and the designs, cost from $15.00 to $20.00 per square. Allowing for wastage costs from about $5.50 per square for IX charcoal tin, to $6.50 and $7.00 for IXX tin.

For flashings and gutters about 4 to 5 additional cost should be allowed for the labor and securing same in place.
The cost of copper-roofs depends almost entirely on the price of copper; the labor of working it is less than either tin or galvanized iron. Copper was very expensive until 1865 and 1866, when the cost fell to 15 cents and 17 cents per pound, when the cost of roofing was from $18.00 to $22.00 per square, dependent on the weight per square foot, and the sizes of the sheets; it has advanced again in price to 28 cents and 31 cents per pound, and roofing now costs from 40 cents to $1 per square.

Plain galvanized-iron for trimming costs from 16 cents to 22 cents per square foot, the trimmings put in place complete, cost from 30 cents to 50 cents per square foot, dependent on the size and contourment.

Jas. E. Blackwell.

CIRCULAR


DEAR SIR,—The Committee of Conference on a Standard Form of Contract, appointed at their last Annual Conventions by the several Associations above named, beg leave to present the accompanying specimen copy of such Contract as the result of their united labors in that behalf, and respectfully ask its adoption by you in your States.

The object sought to be obtained by the Committee was to prepare a Form of Contract which could be received and adopted generally by Architects and Builders, and published blanks, to constitute an agreement, as between the owner and the builder, which should be embodied, as embodied in the accompanying printed copy, may be said to be the authorized Standard Form of said Associations.

The Committee have labored in this work as follows:—After an exchange of views through correspondence, an arrangement was made to have the Committee meet in the City of New York. Accordingly such a meeting took place on the sixth of June last, and an organization was effected by electing a Chairman and Secretary. This meeting was adjourned from day to day—daily sessions and one evening session being successively held—until the labors of the Committee were essentially completed. The matter was then referred to a sub-Committee, consisting of the Chairman and Secretary of the Joint Committee, to revise the manuscript for publication. It was afterwards submitted individually to the several members of the Committee, subjected again to another revision, and finally adopted as printed.

In order to preserve the Form from errors, alterations or interpela- tions, it has been copyrighted. It is the general intention of the members of the National Association of Builders’ to have it understood that in all cases where proposals for any work are submitted by them, such proposals are made with the understanding that the contract shall be on the Standard Form is the one that is to be executed by them upon such proposals.

The Inland Publishing Company, 19 Tribune Building, Chicago, Ill., have copyrighted and published the blanks, with prices, etc., to be obtained from them on application. The blanks will be furnished at $1.10 per 100, $4.25 per 500, and $8 per 1,000, free by mail or express. Architects can have their names inserted, and all consequent pronouns inserted, as they may order, at small additional cost.

The members of the Committee, appointed by their several Associations, are as follows:

Of the American Institute of Architects:

P. Hatfield, New York, N. Y.
Alfred Stone, Providence, R. I.
S. A. Treat, Chicago, Ill.
W. Clay, Chicago, Ill.
J. P. Alexander, Lafayette, Ind.
George C. Peussing, Chicago, Ill.
F. Tucker, New York, N. Y.
O. P. Hawkins, Chairman.

Wm. II. Sayward, Secretary, 164 Devonshire St., Boston.

NEW YORK, August 8, 1888.

FORM OF CONTRACT ADOPTED BY THE JOINT COMMITTEE OF THE AMERICAN INSTITUTE OF ARCHITECTS, THE WESTERN ASSOCIATION OF ARCHITECTS AND THE NATIONAL ASSOCIATION OF BUILDERS.

THIS AGREEMENT, made the ___ day of ___ in the year one thousand ___ and hundred and ___—hereinafter designated the Owner ___—and ___—hereinafter designated the Architect ___—being the said part of the first part, in consideration of the covenants and agreements hereinafter contained on the part of the Owner, being the said part of the second part, do covenant, promise and agree with the said Owner, in manner following, that is to say:

1st. The Contractor shall and will well and sufficiently perform and finish, under the direction, and to the satisfaction of—Architect (acting as Agent of said Owner ___), all the work included in the plans and specifications of this contract and signed by the parties hereto, (copies of which have been referred to the Contractor ___), and to the dimensions and explanations thereon, thereof and herein contained, not omitting or neglecting to do or perform any part of the work, unless by some particular omission or neglect, the meaning of the said drawings and specifications, and of these presents, in all labor and materials to be done thereto, and shall provide all scaffolding, implements and carpenters requisite for the due assistance of the said work.

2nd. Should it appear that the work hereby intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the said drawings, or in the said specifications, the Contractor shall apply to the Architect, and the said drawings and specifications as may be necessary, and shall conform to the same as part of this contract, so far as they may be consistent with the original drawings, and in event of any doubt or question, the true meaning of the drawings or specifications, reference shall be made to the Architect, whose decision thereon, being just and impartial, shall be final and conclusive. It is distinctly understood that all drawings, plans and specifications are and remain the property of the Architect.

3d. Any alterations be required in the work shown or described by the drawings or specifications, a fair and reasonable valuation of the work added or omitted shall be made by the Architect, and the sum herein agreed to be paid for the work according to the original specification, shall be increased or diminished as the case may be. When such valuation is agreed to, the parties shall have hereto, signed with the alteration, upon the written order of the Architect, and the valuation of the work added or omitted shall be referred to (3) arbitrators, (no one arbitrator to be the party with the work to which these presents refer), to be appointed as follows:—one by each of the parties to this contract, and the third by the two thus chosen; the decision of the two arbitrators shall be binding, and each of the parties hereto shall pay one-half of the expenses of such reference.

4th. The Contractor shall within twenty-four hours after receiving written notice from the Architect, to that effect, proceed to remove from the grounds or building, all materials condemned by whether worked or unworked, and take down all portions of the work which the Architect shall condemn as unsound or improper, or as in any way failing to conform to the drawings and specifications, and to the conditions of this contract.

5th. The Contractor is hereby empowered to oversee and exercise due diligence to secure the work from injury, and all damage happening to the same by neglect, shall be made good by the Contractor.

6th. The Contractor shall and will proceed with the said work, and every part and detail thereof, in a prompt and dilligent manner, and shall and will finish said work according to the said drawings and specifications, and this contract, on or before the day of ___ in the year one thousand ___ and hundred—and (provided that possessions of the premises be given to the Contractor) the said work shall be completed and accepted by the building furnished him, on or before the ___ day of ___ in the year one thousand ___ and hundred—____), and in default thereof the Contractor shall pay to the Owner ___ dollars for every day that the said work shall remain unfinished, as and for liquidated damages.

7th. Should the Contractor fail to perform the contract or any part thereof, or to any material neglect or omission of the work by the neglect, delay or default of any other contractor; or by any alteration which may be required in the work; or by any damages which may be caused by the unusual action of the elements, or otherwise; or by the abandonment of the work by the employees through no fault of the Contractor, then there shall be a like amount of additional time for the date set for the completion of the said work; but no such allowance shall be made unless a claim is presented in writing at the time of such obstruction or delay. The Contractor shall award and certify the amount of additional time to be allowed; in which case the Contractor shall be released from the payment of the stipulated damages for the additional time so certified and no more. The Contractor may appoint from such award to arbitrators constituted as provided in Article XXIV of the contract.

8th. The Contractor shall not let, assign or transfer this contract, or any interest therein, without the written consent of the Architect.

9th. The Contractor shall make no claim for additional work unless the same shall be done in pursuance of an order from the Architect, and notice of all claims shall be made to the Architect in writing within ten days of the beginning of such work.

10th. The Owner agrees to provide all labor and materials not included in this contract in such manner as not to delay the material progress of the work, and, to the event of failure so to do thereunto loss to the Contractor, agree that will reimburse the Contractor for such loss; and the Contractor agrees that if shall delay the material progress of the work, or allow the same in any manner, the Contractor shall become liable (as above stated), then shall make good to the Owner any such damage—over and above any damage for general delay herein otherwise provided, the said loss being, in damage, in either case, to be fixed and determined by the Architect, or by arbitration, as provided in Article XXIV.

11th. The Owner shall give the Architect an insurance on said work, in his own name and in the name of the Contractor, against loss or damage by fire, in such sum as may from time to time be agreed upon by the Contractor, the policies being made to cover work incorporated in the building, and materials for the same in or about the premises, and made payable to the parties hereto, as their interest may appear.

12th. Should the Contractor at any time refuse negotiation or supply to
THE EXCAVATIONS AT SYBARIS.

While the discoveries at Sybaris have not been, as it was at first believed, those of the Greek city destroyed five centuries ago, yet they have disclosed a graphic fact—namely: that prior to the existence of the Greek Sybaris there was on the site which the Greek colonists, after the fashion of those days, appropriated and built a new city on, an Italian city, the necropolis of which, and which contains remains due to an archaic civilization so precisely corresponding to those found in other parts of the peninsula— at Vetulonia, at Civita Castellana, Corneto, and various more northern points — as to add to the evidence of a general Italic civilization prior to the Etruscan, and extending over the entire peninsula.

I had the pleasure not long since of visiting the excavations now going on at Sybaris. No great charge has been made under this contract, unless the final certificate or final payment, shall be conclusive evidence of the performance of this contract either wholly or in part, against any claim of the Owner and no payment shall be construed to be an acceptance of any defective work.

14th. And the said Owner hereby agree with the said Contractor to employ materials to do the said work according to the terms and conditions herein contained and referred to, for the price aforesaid, and hereby do hereby agree with the same, at the time, in the manner, and upon the conditions above set forth.

15th. And the said parties for themselves, their heirs, executors, administrators and assigns, do hereby agree to the full performance of the covenants herein contained.

In Witness Whereof, the parties to these presents have hereunto set their hands and seals, the day and year first above written.

In presence of

MR. RUSKIN'S MUSEUM AT SHEFFIELD.—Half-a-dozen years have passed since Mr. Ruskin offered to Sheffield all his art treasures, providing the town would find a suitable building for their preservation. His only want was freedom to pursue his spirit of beneficial liberty of his mind, taking to personally superintend the arrangement of the objects in the museum, and be responsible for its management during his lifetime. It was accordingly resolved that a building be built at Endcliffe, the most beautiful spot within the boundaries of the old town. Money was not wanting; £30,000 were subscribed; plans were prepared and the site purchased by Sheffield Corporation, but it had been thought possible. Then an irritating obstacle occurred. Matter of fact, a subsequent intervention, Mr. Ruskin did not understand the nature and purposes of the St. George's Guild, and distrusting its conscience, made it a condition of subscription that the museum should be under the management of the Guild. Technically, he declined to be a part of it, and the title and the nature of the museum should remain inviolate and permanent possession of the town. Mr. Ruskin had his own ideas of how the building should be used, and how the whole question would be disposed of. Technically, he declined to allow any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting.

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In Witness Whereof, the parties to these presents have hereunto set their hands and seals, the day and year first above written.

In presence of

MR. RUSKIN'S MUSEUM AT SHEFFIELD.—Half-a-dozen years have passed since Mr. Ruskin offered to Sheffield all his art treasures, providing the town would find a suitable building for their preservation. His only want was freedom to pursue his spirit of beneficial liberty of his mind, taking to personally superintend the arrangement of the objects in the museum, and be responsible for its management during his lifetime. It was accordingly resolved that a building be built at Endcliffe, the most beautiful spot within the boundaries of the old town. Money was not wanting; £30,000 were subscribed; plans were prepared and the site purchased by Sheffield Corporation, but it had been thought possible. Then an irritating obstacle occurred. Matter of fact, a subsequent intervention, Mr. Ruskin did not understand the nature and purposes of the St. George's Guild, and distrusting its conscience, made it a condition of subscription that the museum should be under the management of the Guild. Technically, he declined to be a part of it, and the title and the nature of the museum should remain inviolate and permanent possession of the town. Mr. Ruskin had his own ideas of how the building should be used, and how the whole question would be disposed of. Technically, he declined to allow any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting. He declined to read any further lawyer's quibbles, and his indisposition left the matter in abeyance. However, to keep his promise and to dispose of the property, he brought his mind down to legal hair-splitting.
RECORDS of tests of building materials are always interesting to architects, especially such experiments as have to do with masonry and masonry materials. When a series of tests is considered, the compiler naturally assumes an authority as the late General Gillmore, the results are such as cannot fail to be of value. In some respects the title of General Gillmore’s recent work is a misnomer in that it would seem to indicate a larger series of experiments than is actual.

The experiments having to do with piers form themselves a very small portion of the volume, and the bulk of the work is taken up with other small cubes and different materials.

The tests were made at the Watertown Arsenal, near Boston, with the aid of the 800,000 pound testing-machine. In the introduction there is a quite extended reference to a series of tests made at Staten Island in 1875 by General Gillmore. The results in this case present some curious facts in regard to the nature of the bearing surfaces brought against the material to be tested. Thus it was found in testing such stones as granite, East Chester marble and blue Berea sandstone, that the ultimate resistance of the samples crushed between either steel bearings, wooden blocks, lead sheets or leather pads was in the ratio of: Steel, 100; wood, 95; lead, 65, and lead. Under such conditions stones which were less compact than the first, the proportions were: Steel, 100; wood, 82; lead, 65, and leather, 63½.

General Gillmore explains the reason for these differences by assuming that the softer materials such as wood, lead, etc., under great pressures tend to force their way into the pores of the stone, and to act like wedges to split it apart, whereas the steel is more homogeneous and exerts nothing but a direct pressure on the surface on which it might reasonably be made from this fact is in direct opposition to an old idea of inserting lead-bearing plates between the bedstone and bottom plates of iron columns. General Gillmore’s assumptions are correct, lead plates so used would tend to weaken rather than increase the effective resistance of the pier.

In testing the samples, General Gillmore devised a very efficient way of testing without any kind of crushing of the material. The plates of the testing-machine are as nearly absolutely parallel and plane as human mechanism can make them, but it is almost impossible to make any sample of stone absolutely parallel and plane between their faces, and if there be any inequality in the surfaces the subsequent pressure of the machine would be apt to split it rather than crush it. The device adopted was to place the sample in position between the bearing plates of the machine and bring upon it only sufficient pressure to hold it from slipping, the testing machine acting horizontally. Thin plaster-of-Paris paste was then put over every cavity between the beds of the sample and the iron plates was thought to be sufficient. The plaster was allowed to harden for twenty-four or thirty-six hours, and the pressure then applied.

Subsequent experiments General Gillmore had ascertained that the results of tests indicated not only that the slabs of stones increased in resistance per square inch as their surfaces increased, but also that the ratio of the square inch of cross-section of cubes increased with their size. In other words, if a cube of one inch side was crushed per square inch of pressed surface increases approximately in the ratio of the cube roots of the respective cubes.

Subsequent experiments have not shown this rule to be absolutely correct. It is a theoretical equation, and one which could hardly be applied to large blocks or piers unless the material were as homogeneously in the small cube. A comparatively large cube ceases to be a unit, and is rather formed of many smaller pieces assembled together by cementing substances of various strength, and perhaps sharply separated by minute cracks, cavities or pores. Under such conditions the ratio of the increase in the size of these units, if it were a true unit. It is known, and has been proved by tests made at the Watertown Arsenal, that a cube built up in sections would be a solid cube with an error. Another interesting fact brought out by the Watertown experiments is that the compressive strength of prisms increases as their height diminishes.

The same is true of the tensile strength of iron, steel, glass, etc., the breaking strength of all being materially less with the shape of the specimen.

General Gillmore has undertaken to work out a formula to express the variation in the strength of the different sizes of cubes. The formula, in which:

\[ W = \frac{C + 2m \times (h - h_0)^2}{h^3} \]

is:

where

- \( W \) is crushing load of a cube having the same area of bed as the prism.
- \( C \) is crushing load of a cube having the same area of bed as the prism.
- \( h \) is height of cube of crushing strength \( C \) in inches.
- \( h_0 \) is height of prism in inches.

By actual experiments it was found that with an 8" x 8" prism \( h_0 \) the crushing load was 262,840 pounds but with an 8" x 2" cube two inches high could not be broken by the maximum load of the testing-machine, 800,000 pounds. A 4" x 4" x 3" sample crushed at 105,886 pounds, whereas a 4" x 1" x 1" sample required 252,840 pounds to crush it. The deduction we would make from this is that such deduction is not made by General Gillmore, that is any such tests as he has made are absolutely of no value in determining the strength of masonry piers, for it is very seldom that the height of the pier is less than ten or twelve times its diameter, and in such cases, where the substance is perfectly homogeneous like granite or marble, General Gillmore’s tests would be wholly unanswerable.

General Gillmore refers to the fact that the strength of concrete varies considerably, depending upon the conditions of setting; and he quotes some English experiments to show that twelve-inch concrete blocks, when rammed into courses, resisted compression an average of thirty per cent more than concrete cubes of the same size made in the ordinary way. It was also found that twelve-inch cubes set for one year stood 150 per cent greater than those set in air during the same length of time; while six-inch cubes were stronger set in air than in water.

After making a number of tests of individual blocks of stone, one interesting series of tests was made on compound prisms formed of the bases that could not be broken singly. It was found that those twelve-inch freestone cubes, which had singly resisted the maximum load of 800,000 pounds, when combined as a pier with dry joints yielded with a reverbearing explanation from a load of 745,000 pounds. A 10" x 10" which had been previously unbroken, yielded when compounded with 2 12" x 12" x 2" prisms each equally placed, under a stress of 534,000 pounds. General Gillmore does not attempt to draw any deductions from these experiments, but simply mentions them as interesting, and leaves his readers to draw their own inferences. If the stone had been thoroughly bored in good cement, the results would have been quite different. There are some valuable experiments recorded having in view to ascertain the elastic limit of stones; and, as the result of this investigation, it is found that the elastic limit of concrete is average about five per cent of their ultimate resistance. This would, of course, be considered in determining the practical resistance of building stones.

It is to be regretted that the part of the volume which, to architects would have the most practical value, that is to say, tests of actual piers should be so slightly treated. The sets of piers tested were all of the same size, one and one-half brick in cross-section and ranging in height from 12 to a height of 18 feet, the courses high, built up of freestone and conglomerate in hydraulic mortar made of one part New York Company’s Resendale cement and two parts sand. The mortar joint averaged about three-eighths of an inch thick. The pier was one and a half cap of North River bluestone of same cross-section as the pier, with the bed-faces rubbed smooth and plane. The height of the brickwork between the bluestone varied from sixteen and one-half inches. The length of the course varied from two and a half-twenty-three and a quarter inches, including the end of the stones. The age of the piers when broken was one year and nine months. The crushing strength was from 250,000 to 375,000, average being 354,000, equivalent to 185 pounds per square inch, or 333 tons (119 gross) per square foot.

It would be impossible with any testing-machine at present constructed to experiment with larger piers than the size which General Gillmore adopted, we cannot feel that the tests or records are in any sense final or such as can be used as criteria for piers which are customarily met with in large buildings.

General Gillmore does not state whether the brick piers failed by reason of the brick crushing or the cement giving way; be states, however, that the brick piers were stronger than concretes made with Newark Company's Rosendale cement, and the mortar better connected with Norton's cement, but weaker than those made with National Portland cement.

General Gillmore's work is not of so practical value as his former volume on "Limes, Cements and Mortars." It is more technical, more pedantic in its argument and less direct; but so far as it goes it is a valuable addition to the library of an architect or an engineer. Still, it really adds very little to the literature of the profession. Such tests as he made are not very practical in their results. It is not possible to reason from a small cube to a huge wall or pier, neither has the opportunity yet arrived for making more extended tests on a scale which would give results as conclusive for known cements as the tests made by Professor Lanza, of the Institute of Technology, for wooden beams. In considering masonry structures too much allowance has to be made for imperfect workmanship. A one and one-half brick pier is no gauge for a five-foot wall. The book, however, is well worth reading, with caution, but we fancy the results would be misleading to young minds, and would be of not very much value to practical builders.

BUILDING ON THE PACIFIC COAST.

To the Editors of the American Architect:

Dear Sirs,—Some time ago a correspondent asked you the best city West likely for an architect to locate in. Your reply was San Diego reports said, "a building boom was asserting itself," but your advice was to make further inquiry.

Now I would take the liberty of saying a few words to all concerned with the building trades. I am an architectural draftsman, and came here eight months ago, I have not been able to obtain more than two months' work since. Architects are going away these past three months for want of work. I personal known carpenters five months idle, and only could get a few days' work during the past seven months. Bricklayers and all others are in a similar way. The boom is quite a large, the great majority have work on hand, but they do not have the honesty to tell all, and those who are depending on their labor for their bread ought to stop away to another town here that enough to do all the work on hand, or likely to be for the ensuing five years. With reference to San Diego, I enclose a letter from parties there which speaks for that section.

In fact I have had letters from the entire coast, and they are all couched in the same language.

My opinion is, this southern part has been overrun by real estate follows lying in wait to seize their prey. Evidently they have succeeded.

Many purchasers who bought on the installment-plan thinking to sell at a profit, are most anxious to sell now at a loss. I have had an offer of $3000 for a lot now let, and this is by no means a good price. Surely we may sacrifice 155 per cent of the money paid to evade an installment now due. I could give many other evidences that this is not the place to locate in just now for any in the building-trade. Yours truly.

Disappointed.

THE "SAFE BUILDING" PAPERS.

LISBOURNE, Ky., August 15, 1888.

To the Editors of the American Architect:

Dear Sirs,—Be kind enough and inform through your journal of other papers on "Safe Buildings." No one has been determined by the July number of the American Architect, and obliged.

SOPHIE.

The American Architect for July 7 closed the latest chapter of what is to constitute the first volume of Mr. Berg's work on "Safe Buildings." The work has been decided to publish this first volume during the coming autumn, so that the information may be in more accessible shape than it now is, scattered through the issues of this journal for two years past.—Eds. American Architect.

THE BROOKLYN SOLDIERS' MONUMENT.

To the Editors of the American Architect:

Dear Sirs,—The competition for the Soldiers' and Sailors' Monument for Brooklyn, N. Y., is to all appearances a very limited one. Although the committee by means of your valuable paper invites architects and engineers for competition, the particulars for which may be obtained at the Mayor's office, none of my friends who are willing to send in a work received any answer to their application for particulars. Another striking feature in this so-called competition is the time given, not quite four weeks. Either do the gentlemen who form the committee know nothing about art, or they are indifferent as to a work of art. It is to be hoped that ample time be given to any artist who is willing to compete and that then the committee arrange an exhibition of all the drawings and models, in order that the art-loving public be allowed to judge of their merits.

Justic.

[Tthe date for receiving competitive designs has just been changed to October 10, 1888.—Eds. American Architect.]

A CORRECTION.

MONTREAL, CAN., August 24, 1888.

To the Editors of the American Architect:

Dear Sirs,—I notice in your issue of the 19th of July, under the heading of "Canadian Pacific Railway Station," that you say the derrick plant was designed by me. I beg to correct that statement and to inform you that this derrick plant was designed by Mr. M. M. C. Timbrell, a member of the firm, Messrs. R. L. Son & Sons, the contractors for the machinery of this station. Yours truly,

P. ALFRED PATRISON, Engineer.

V-SHAPED DRAIN-PIPE.

WORCESTER, Mass., August 22, 1888.

To the Editors of the American Architect:

Dear Sirs,—Can you inform me if the V-shaped drain-pipe, referred to in your issue of the 3rd inst., has been patented? Also, has Norman Shaw, is to be found in our market? It seems to me it would be a very useful article in a great many instances and a valuable addition to the pipe forms in general.

Very respectfully yours,

STEPHEN C. EARLE.

[We do not think this shape can be found in the market. Mr. Shaw says, that he has had to get them made to order for him, as they could not be had on the East, and they would be still less likely to be found here.—Eds. American Architect.]

THE FORCES OF NATURAL GAS.

Although the wells about Findlay are under control by valves, the Louis Berg's "Safe Building," if not yet complete, is the greatest argument we have yet seen, and with the public, as it was once supposed to be, that it was impossible to escape a feeling of awe in this region at the subterranean energies which seem adequate to blow up the whole country heavenward. Some of the miles were opened today. Opening a well is uncoupling the service-pipe and letting the full force of the gas issue from the pipe at the mouth of the well. When one of these wells is thus opened the whole town is aware of it by the roaring and quaking of the air. The first one exhibited was in a field a mile and a half from the city. At the first freedom from the clamps and screws the gas rushed out in such disorder that it was not possible to observe it. Although we stood several rods from it, the roar was so great that one could not himself heard shouting in the ear of his neighbor. The geologist stuffed cotton in his ears and stood a short distance from the lesion, held by the chemist, stood close to the pipe to measure the flow. The tube, which had not been taken to care to protect himself, was quite dead for some time after the experiment; not even six feet in length, was then screwed on and the gas ignited as it issued from the end of the ground. For enough for several feet from the end of the tube there was no flame, but beyond was a sea of fire sweeping the ground and rising high in the air—billows of red and yellow and blue flame, fierce and hot enough to consume everything within reach. It was an awful display of power. We had a like, though only momentary display at the famous Karg well, an eight-hundred-feet well. This could only be turned on for a few seconds at a time, for it is in connection with the general system. If the gas is turned off, the fire in houses and factories would go out, and if it were turned on again without notice the rooms would be full of gas, and an explosion an attempt to relight it. This danger is now removed by the invention of an automatic valve in the pipe supplying each fire, which will close and lock the valve and admit no more gas until it is opened. The ordinary pressure for household service is about two pounds for the square inch. The Karg well is on the bank of the creek, and the discharge pipe is about six inches long. The gas (though not in its full force) was turned for our astonishment, extends over the water. The roar was very like the Niagara; all the town below the Karg is a roar. When lighted, the billows of flame rolled over the water, brilliant in color and fantastic in form, with a fury and rage of conflagration enough to strike the spectator with terror. I have never seen any other display of natural force so impressive as this. When this flame issues from an upright pipe, the great mass of fire eighty feet into the air, leaping and twisting in endless fury. For six weeks after this well was first opened its constant roaring shook the town, and by night its flaming torch lit up the heavens and banished darkness. Writing of one who has just seen the display seems possible. —Charles Dudley Warner, in Harper's Magazine for Ju.

THE CHEMICAL CLASSIFICATION OF SEWAGE.

Dr. Pfeiffer of Wiesbaden ("Vierteljahrschrift für Hygiene") says that he has said this to say on the insufficiency of the purification of sewage by means of chemical processes: "For some incomprehensible reason, this entirely impracticable and, as regards its results, most unsatisfactory mode of treatment has during the last few years grown much in favor, and the author is of opinion that the time has arrived when a strenuous
opposition should be offered to these so-called clarification processes, and when, in the interest of animal sanitation, the authorities, warning of such a course, should go forth upon the intrusive cost of the chemical systems of treatment, as compared with the good they can effect." Assuming that the main object to be accomplished is the removal from the sewage of bacteria, he says: "This may be accomplished in two ways, either by utterly destroying all their germs, or by extracting from the sewage the whole of the moisture and impurities. The conclusion that the former is the most rational cannot be escaped, but is the produc- tion of opinion for this winter or next spring. One is that if the cold, water-making branch of the farm is placed in perfect harmony with the common-sense of the people, it will be a good point.

Another, is that if the outcry of capital from abroad continues, as it seems to be doing, and at the same time a few of the old, new enterprises which have been waiting for a clearing up of the present absence of confusion of things, as a result of the last ho- kins in newspapers speak of a steadying demand and of low prices, as well as of unsatisfactory railroad earnings, and of decreased holiday clearings they may show a tendency to weigh less heavily than we may expect. A clu- dicate to the opinion that the manufacturing demand all over the country is in the winter months from week to week, and it is evident that, for years past, in the petroleum market, an improving condition in the iron trade and good for what it is. This is not to say that they are not safe guides. The condition of things is that there is more capacity than there is employment, or that the need of safety can be met more easily, more labor in the markets than is wanted, for increasing weakness among the manufacturers who entered into business during the past two or three years. The com- mercial activities are in the iron trade when we are in the next year of these weaker traders. Jobbers and manufacturers who watch the iron trade are close to it, observing that there will be a swelling up or the trade channels of several very moderate houses which are crowded into already very crowded channels. These dangers can be obviated only by a greater increase in commercial and manufacturing activity, in other words, unless we are visited within the six months with an unusual activity, we must make the present condition to be the same as the past two years or two has been a source of considerable confusion. Some con- sequences are now at work that may avert this confidence. The trade relations that exist to restore their confidence here are very much, but they are reaching a point where their control is in jeopardy, and the outcome of those relations is dependent for its results on the activities of the American manufacturers." The cotton-growers are agitating themselves to see how they can avoid the effects of the "washing trade." The mining interests are looking for- ward with more confidence than they have for months to a heavy and vigorous re- demand. There are behind all these great interests two or three great companies at work which are strengthening the situation and improver their classes, or which may destroy the spectacle of the control of great interests. The composite action of these interests, or those of a less, last year or two has been a source of considerable confusion. Some con- sequences are now at work that may avert this confidence. The trade relations that exist to restore their confidence here are very much, but they are reaching a point where their control is in jeopardy, and the outcome of those relations is dependent for its results on the activities of the American manufacturers. The paper makers and hardware manufacturers, electrical machinery manufacturers, builders of engines, and weavers of cotton, are increasing their capacity at the present time, according to the statements of some of the leading manufacturers, in a smaller district, there is a strong increase in expected for future supplies and stocks and there has been since the opening of the rea- son and artists and manufacturers in the trade West and East are expressing the opinion that there are difficulties in the iron trade and activity in the shops where iron and steel are worked upon is practical. In the West the agricultural implement manufacturers have been liberal buyers of steel. The manufacturers of pipes and tubes have in the past two or three weeks the buyers of a great deal of material. The manufacturers of wood- working machinery have been rather slack for some months but orders for the past four or six weeks have encouraged them to increased efforts. The building of elevators in the Northwester it is said will receive a sharpstim- ulus in the coming season. This is due to the fact that the rail roads, the manu- facturers and their friends have given a favorable opinion of this proposition. The manu- facturers of this section have been waiting for permission from the government which will keep the boat and ship building capacity of the lakes remark- able as it is now, the mouth of the river. New pipe lines are being built and this will help the iron trade. Quite a number of railroaders will place orders for cars to a large amount just as soon as their managers see the prospects of a termination of the railroad work in the West and East. Industries throughout the West have during the past two weeks felt a little improvement in the way of large orders for work for early delivery. Job- bers in Boston, New York, and Philadelphia have re- ported an intention of the way in which the demand has increased in engagement of the way in which the demand has been steady. The former would be the way to take into account last spring the vague dangers of the campaign. The country was already in the course of a good year and in the last of its year, but has been exceeding well. The workmen have acted wisely. Trade will still be seeking new fields and making the movement of large at work. West of the Mississippi river has doubled itself since 1880, although this movement has been quadrupled in four years, so say some of our en- thusiastic statisticians.

S. J. PARRISH & Co., Printers, Boston.
The above cuts show at a glance the relative protection afforded by their water seals in the case of the Dececo and of the Washout closets.

From its cheapness and apparent cleanliness, the Washout is probably the most popular closet in use to-day. In one respect the two closets are alike: they both depend for the exclusion of drain air on the water in their traps. This is the season of the year when many families close their houses and leave them for varying periods. As soon as any closet is left to itself, evaporation begins to steal away its water. In the case of the Washout, when the water has been lowered less than two inches, this guard against drain and sewer air is removed. In the Dececo, over four inches, beginning with a considerable body of ponded water, must be lost before the same condition exists.

It will be noted that in the Dececo the outlet channel is entirely covered with water, leaving no part which is ever brought into contact with fouling matter to give off emanations.

It has also, and in the part where it is most needed, sufficient water to submerge and temporarily deodorize fecal deposits.

The trap of the Dececo is in sight, and there can be no question as to whether or not it is properly filled with water. When it appears to be right, it is right.

THE DECECO COMPANY,
NEWPORT, R. I.
The exterior of this house is stained with Cabot's Creosote Stain for Shingles, Fences, Clapboards Etc.

These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply.

Our Stains contain no water and are the only exterior Stains that do not contain kerosene.

Prices are 50, 50, and 75 cents per gallon according to color.

Send for Samples on Wood and Circulars.

Samuel Cabot, No. 70 Kilby St., Boston, Mass.
FIGURE SCULPTURE.
is in this country accompanied with an amount of gratuitous interference and imposition which reduce the margin which an architect can save for himself after paying his draughtsmen to very small proportions, even if he has not been bullied or deceived into accepting an inadequate compensation at the outset. It is impossible for us, Americans, not to feel a little envy of the more prosperous practice of architects abroad. It is true that competition is greater there, but the rewards of the successful men are also far greater. As the cost of building is greater in Europe than in this country, the architect's income from commissions of the same number and importance is larger than here, while the expense of living is much less. Moreover, the excessively costly offices maintained here, with their scores of draughtsmen at salaries ranging from ten to a hundred dollars a week, are unknown abroad, where an architect of reputation can have his choice of artificled pupils who render him skilful and enthusiastic assistance, and pay him a large sum for the privilege of doing so; and, distances being comparatively trilling, while clerks-of-works are always kept, at the owner's expense, on buildings of importance, a busy architect, instead of having to spend almost his whole time in running around the country in terror lest one of his buildings should come to grief before he can see it again, has plenty of leisure to do his own designing, even to the details of the moldings and sculpture. Again, not only are the architect's office expenses light, but his pay is more certain, and, in important works, usually greater. There are few architects in this country who could continue in the main line of business for five per cent for a building costing ten or twelve million dollars, which is given as a matter of course abroad to any architect who should show himself capable of designing such a structure; and if it were given here, it would be so loaded with conditions compelling the architect to pay the clerk-of-works, or to give bonds for the completion of the building within the contract price, or a dozen other matters, as to reduce the architect's profit to a small sum, and burden him with exactions which would prevent him from doing more profitable work. In England a man like Street would not find himself incurring on simultaneously the Law Courts and several other important buildings in different parts of the country, making all the perspective studies, and, in the case of the Law Courts, at least, all the drawings for moldings, capitals and details of every kind, with his own hand, reserving at the same time leisure for daily exercise and recreation, and, in the hot season, leaving his buildings, safe in the charge of a clerk-of-works, for whose actions he assumes no responsibility, to enjoy a month or two of sketching on the Continent. With us such a professional life would be utterly out of the question. The only way in which an architect here could get a satisfaction of his business in summer would be either to have no business, or to divide it with a partner; yet the reward of the best American architect's years of unremitting toil and anxiety, if he is so fortunate as to find constant employment, is a decent living for himself and his family, while Street, Scott, Waterhouse and others, by middle life, have become very rich, Royal Academicians, and distinguished members of the most distinguished society, and their rivals on the Continent get, in addition, orders, and titles of nobility.

SOME little comment has been made upon an article published in a Boston newspaper, which mentioned that a certain architect of considerable note in that city had closed his office, and abandoned his profession, to accept a Government position, at a salary of twenty-five hundred dollars a year; a position which had made available official positions at salaries of fifteen hundred dollars a year. The newspapers seem to think that architects must be persons of very little courage or manliness, if three of them in a single city, who ought, as the journal which published the story informs us, to be "able to earn an income of five thousand dollars a year," are willing to give up this attractive prospect for a certainty of half or a third of that sum; and it seems only fair to come to their defence by pointing out that the probability that any architect in an American town will ever be able to earn five thousand dollars a year, by the practice of his profession is extremely small, and that the gentlemen in question, who were more likely to understand the circumstances than any one else, probably did what was most prudent for them.

T would do no harm to the public understand a little better than it now does the smallness of the pecuniary rewards which come to architects. There is no profession whose members are so savagely plundered and cheated by those whom they try their best to serve, yet there is perhaps no profession, except that of the ministry, whose members, in this country, at least, have incomes so uniformly modest. Although the great competition among lawyers keeps the younger ones poor for a few years, they may look forward to official positions at salaries of fifteen hundred dollars a year. The newspapers seem to think that architects must be persons of very little courage or manliness, if three of them in a single city, who ought, as the journal which published the story informs us, to be "able to earn an income of five thousand dollars a year," are willing to give up this attractive prospect for a certainty of half or a third of that sum; and it seems only fair to come to their defence by pointing out that the probability that any architect in an American town will ever be able to earn five thousand dollars a year, by the practice of his profession is extremely small, and that the gentlemen in question, who were more likely to understand the circumstances than any one else, probably did what was most prudent for them. After some years, the young architect would no doubt get a position of some consequence, and his income in after years would be considerably higher than it is now.
 DETAIN sends to La Semaine des Constructeurs one of his sensible letters on granite, or rather on the causes of discoloration of granite by rust, and the methods of preventing and removing this discoloration. In most granite countries a certain amount of iron is scattered through the rocks beneath the surface of the earth, usually in the form of sulfide, crystallized in the work of decomposition of granite. These crystals of pyrites occur in many other rocks besides granite, more particularly, perhaps, in slate and coal, and are frequently supposed to be gold. Wherever they occur, they decompose on exposure to the weather, leaving ultimately a free oxide of iron, which is washed by rain over the surface of the stone. Many white or mottled marbles also contain iron, which slowly imparts to the surface, under the action of the weather, a warm burnt-sienna color. This is not a serious disadvantage to marble, but in granite the iron stain combines disagreeably with the natural color of the stone, and granites containing iron particles should be rejected. According to M. Détain, the French granites of a dark-gray color are rarely, if ever, affected by rust. Those with white ground are more apt to contain iron, but are tolerably safe; while those with pink or red ground are almost sure to rust. With us, red granites are more subject to rust stains than others. There are some red granites which contain iron, but there is at least an equal number of gray and white stones with iron particles in them, and as these stains are an unpleasant appearance on exposure, new granites should be used. The best test, and strongly recommended to architects who have occasion to try a new stone, consists in a visit to the quarry, where its merits and defects may, with a little care, be ascertained with certainty; but washing the suspected stone with muriatic acid, and allowing the acid to dry on, will bring out the metallic iron. Singularly enough, the same means answers for removing the rust stains which have already formed on a stone. The muriatic acid readily dissolves the rust, and if it is then washed off with plenty of clear water, the stain will disappear until atmospheric influences have produced a new coat.

A shepherd boy tells him that near the River Arghisch, in a dark thickset, he has seen an old ruined wall, at sight of which his dog fled, howling. Negrò looks upon this as a supernatural direction, and leads his band of masons to the spot. Work is immediately begun, but the Christian ground religions to support the Moslem materials, and whatever they build during the day is overthrown at night. The Prince is furious, threatening the masons with instant death if they do not build the wall so it will stand, and they are in despair, when Manolli has a dream, telling them that the work comes near the next day is seized and built into the walls the celestial wrath will be appeased, and the work will stand. On waking, he relates his dream to his assistants, and binds them by a mutual oath to obey the divine direction. At sunrise a magnificent villa belonging to some Moslem is burnt, killing, fearing to be the victim. He hears sweet singing, and a girl makes her way off his horse and kisses his wife, Annika, bringing him bread and wine for his breakfast. In terror he falls upon his knees and prays for a flood to keep her from reaching the building. His prayer is granted, and a torrent rushes down the river-bed, but Annika bravely presses on, wading through the stream to reach her husband. Manolli prays again for a hurricane, and again his prayer is granted, and a furious wind bends the pine trees, almost carrying Annika away, but she resists and struggles on, until she reaches the walls. The other masons, relieved from their own fears, now relieve at this heavenly assistance, and Manolli, sadly kissing his wife, carries her up to the scaffolding, and places her in a niche. The masons tell her that they are going to pretend to build her in as a joke, and Annika stands quietly by until she is held fast. Then she cries to Manolli to release her, but the masons work on relentlessly, and the walls rise rapidly, while her dying voice is still heard from where she was. The Hospodar, finding the work going on so prosperously, asks the men if they could ever build a still more lofty and beautiful church. At their reply that they think they could so do, he begins to fear that they will go and work for some of his rival princes, and makes sure of preventing them by removing the ladders. The men, finding no other way to escape, make for themselves wings out of the shingles provided for the roof, and jump down, but the wings fail to work as they should, and the nine masons on striking the ground are killed, and turned into stones. Manolli also leaps, but at the moment, hearing from within the wall the voice of his poor wife calling to him, he bursts into a flood of tears, and striking the ground like the others, he becomes a spring of water, which is still flowing, and bears to this day the name of Manolli's Well.

Picturess effect of landscape beyond, together with an ex- pression of quiet durability which is more needed in our archi- tecture than any other artistic quality, and the more important examples, such as the viaducts which are sure to be soon re- quired at the entrance of railroad towns, may become works of the highest art. In many cases they are likely to be made so, if we may judge from the present tendency of railroad managers to seek the assistance of architects for giving their per- manent structures an attractive air. Already our country railway-stations, under professional care, are fast becoming transformed from hideous sheds, covered with clapboard, into charming buildings of stone, picturesque, solid and convenient, often quite richly decorated, and generally surrounded by pretty and well-kept gardens. The better class of these new stations in the country are far more attractive than the foreign roads, and if the design of the bridges could be brought up to that of the stations, the line of every well-managed road would furnish a route of considerable artistic interest.

We do not often have occasion to reproduce legends in these pages, and legends do not often have architects for heroes, but having come upon a pretty one which will be new, we imagine, to most of our readers, we reproduce it for hot-weather entertainment. The story is Roumanian, and is to be found in a description Gerard's "Land beyond the Forest." According to the ballads familiar all over the province, the great Hospodar Negru, one of the principal characters in Roumanian history, while detained in Constantinople as a hostage, occupied himself in studying Oriental architecture, and became so learned that he himself built the great mosque, which had nine hundred and ninety-nine windows, and three hundred and sixty-six minarets. The Sultan was so delighted with his success that he set him at liberty, and presented him with all the rich materials left over from the building the mosque, so that he might construct one with them in his native country. Negru took with him, therefore, not only the materials, but nine master masons, and the Greek architect Manolli. On reaching home, Negru, according to the legend, goes in search of a site for his new church.
BUILDERS' HARDWARE. — V.

BOLTS.

Aside from the coach or lag screws, and the stair-rail bolts already described, the only constructive bolts used by the builder are such as are necessary in joining header and trimmer beams. These are similar to the stair-rail bolts, but heavier and less finished. They are often made to order, but a few sizes are kept in stock by some dealers. Ordinarily 1 to 1 1/2 inch bolts are used, 8 to 24 inches long, with a square head on one end and a thread and square nut at the other. In any other cases requiring the use of constructive bolts, lag-screws are generally found to answer every purpose, though stove-bolts, Figure 25, are sometimes useful. These are made with flat or round heads. They are manufactured in six diameters, from 7/8 to 1 inch, and thirty-two lengths, from 1/2-inch to 7 inches. The manufacturers' list-prices are from $0.85 to $4.20 per hundred. Sink-bolts are similar to the stove-bolts except that the shank is threaded the whole length, and provided with two nuts. Tire-bolts are like flat-headed stove-bolts, but are without the cross-cuts in the head. Many other forms of bolts are in the market, but even the foregoing are rarely used by builders.

DOOR-BOLTS.

Figure 24 shows the most common form of wrought-iron door-bolt, designated specifically as a "barrel-bolt." This is made to screw onto the face of the door. The jamb-staple may be plain, as in Figure 24; bent, Figure 25; or necked, Figure 26. The latter is for a door swinging out, which is to be bolted on the inside. All of these forms are likewise made in cast brass. The iron bolts may be japanned, tinned or bronzed, and the knobs are sometimes nickel-plated, tinned, or made of brass or porcelain. Neck-bolts, Figure 27, are used when the bolt-plate or staple cannot be put directly on the line of the face of the door. The style shown by the illustration is that manufactured by the Stanley Works, and is made additionally strong by a central rod running into the bolt and riveted to the edge of the bolt-plate as shown by the figure. A similar style of bolt with a flat bar and a raised end instead of a knob, Figure 28, has a flat spring between the bolt and the plate, serving to keep the former in position.

Figure 29 shows a form which is designated as a mosquito-bar bolt, and is used for a number of light purposes. It is made without any jamb-staple.

Excepting Figure 28, the foregoing bolts are made without any springs. Much the same patterns are found in the market under the designation of spring-bolts, the bolt being held either open or shut by means of a spring inserted under the bolt against the bolt-plate. These are in a number of varieties, including neck-bolts, straight-bolts, square or round bolts, with porcelain knobs, brass knobs, etc. Figure 30 shows a form of square spring-bolt manufactured by the Stanley Works. There is also another form, Figure 31, in which the spring is on one side of the bolt, the notch in the shank holding the bolt either open or shut.

Fig. 29.

Straight cupboard-bolts, Figure 32, and flat cupboard-bolts, Figure 33, are made in a variety of forms which these shown are types. They are finished in the usual variety of styles. Figure 34 shows what is designated as a ship-bolt. Figure 35 is a variety of side flush-bolt adapted for chests, desk-tops, etc. Figure 36 and Figure 37 are two forms of bookcase-bolts. The former is screwed flush on the edge of the standing-door at the top, while a flat plate is attached to the edge of the swinging-door. On closing the latter, the brass plate strikes on the knob of the bolt and throws the bolt up into the door.

Fig. 32.

Fig. 33.

1 Continued from No. 661, page 85.
spring throws the bolt down when the door is opened. The action of Figure 37 is somewhat different. The bolt is mortised into the sofit or the bottom of the door-frame, and the two plates are screwed to the top of the doors. For a bolt as shown by the figure, the right-hand door is closed first, when the other door is closed it strikes the beveled connection of the bolt, forcing it up and consequently forcing the other arm of the bolt down into the plate on top of the right-hand door. The doors can then be locked together with a key or catch, though the friction on the striker will keep them closed. A spring forces the bolt up when the left door is opened. This form of bolt can be used for cupboards, wardrobes, etc., but we do not know of its having ever been applied successfully to large double-doors.

Flat-tail-bolts, Figure 38, are intended for high doors requiring to be bolted at the top, and are made in a number of different lengths, from one to seven feet. When the bolt is shot it is kept from slipping down by a rebate in the shank which catches on the lowest staple, as seen by the figure. Figure 39 is a form of bolt used for shutters having a wide bearing on each side. It is provided with a locking lever at the upper side, catching in a notch on the bolt. The same form is made without the locking-lever. Canada-bolts, Figure 40, consist of a long, square shank or bolt, with mineral or porcelain knob. The bolt is kept from slipping by a short, flat spring underneath. These are sold with several varieties of staples.

The following table gives the average retail prices of the bolts previously enumerated. Only the principal sizes are listed, but these will be sufficient to give an idea of the cost.

**TABLE OF PLAIN BOLTS.**

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Length in inches.</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
<th>12</th>
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<tr>
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<tr>
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</tbody>
</table>

For front and vestibule doors in two folds as well as for other double doors some form of mortise-bolt is required. These may be mortised into the edge or sunk flush with the face of the standing door. Figure 41 shows the ordinary sunk flush-bolt. This pattern is made with plates three-quarters inch wide and bolts from six to twenty-four inches long. The retail prices average from $5.60 to $9.52 per dozen in bronzed wrought-iron. Bolts of similar description but with a square rod, Figure 42, are made with plates one and one-quarter inches wide and fifteen to sixty inches long, costing $9.80 to $23.60 per dozen in bronzed iron, with bronze knob. The same styles of bolts are also made in cast brass; a few dealers keep them in stock nickel-plated. The pattern represented by Figure 42, is, of course, used only on the face of a door.

A mortise flush-bolt is one which is mortised into the thickness of the door and is operated by a knob or handle working in a face-plate, Figure 43, illustrates one variety. The bolts are made from nine to forty-eight inches long, and the retail prices are from $1.50 to $1.50 each, in bronze.

Figure 44, illustrates a form of self-locking flush-bolt. A lever on the bottom of the bolt catches over a shoulder on the face-plate when the bolt is shot. To release the lever it is simply pushed inward, a coiled spring at the top otherwise holding it in position. Figure 45, shows another device in which the bolt is thrown by turning the knob. A peg at the back of the

knob works in a horizontal slot in a tail-piece attached to the bolt. Raising the bolt brings the peg in the line of the centre of rotation of the knob and so locks it.

There are several varieties of latch spring flush-bolts, in
a latch-spring bolt which is mortised into the edge of the door, and in which the latch bolt is released by pressing on the faceplate.

For store doors it is customary to use bolts applied to the face of the door instead of being mortised-in flush. In this case the upper bolt is attached to a chain which hangs about six feet from the floor. The lower bolt is held up by a spring, but can be pressed down into place with the foot, a spring catch on the face holding the bolt when down.

Figures 44 to 46 inclusive, are types of a great variety of styles manufactured in several different metals with all kinds of finish and design. It is, therefore, impracticable to give for these any average prices which could serve as fair comparisons.

The Hopkins & Dickinson Manufacturing Co., have recently put on the market a form of flush-bolt intended specially for Dutch doors, that is to say, doors in two folds, horizontally. Figure 47 illustrates this. The bolt-plate is about seven inches long, and is related to match the rebates of the doors. The retail price of a single bronze bolt is $2.50.

Engine-house bolts are made in a variety of forms generally so as to permit of being opened easily, by a large catch or latch which throws the bolts up and down from bottom and top. These cost from $6 to $9 each, though it is impossible to give any fair general price as the bolts are made only to order.

(To be continued.)

An Archaeologist's Acuteness.—As already announced, a remarkable archaeological discovery has just been made in German Altenburg, a small town between Vienna and Dresden, on the Danube. From further details now published it appears that Professor Hausner, under whose direction the Carumnum excavations are carried on, ever on the alert, had for a month past observed the color of an extensive cornfield, which varied in every part. He found an elevated post of observation, and, after a week's close attention, declared it to be his opinion that the corn-field was growing over the site of an ancient amphitheatre. His drawings showed that the old theatre piece was somewhat concealed, and the corn was quite ripe in that part, because there was so much soil between the surface and the bottom of the theatre. Elliptical lines of green, growing paler the higher they rose, showed the seats, and lines forming a radius from the center showed the walls supporting the elliptical rows of seats. The Professor waited, impatiently for the corn to ripen, and the moment it was cut the excavations began. They have shown that the almost incredible suggestion was perfectly correct.

Six inches below the soil the top of the outer wall was found, and from there the soil gradually grew thicker until the bottom of the arena was reached, the pavement of which is in perfect condition. From the theatre a paved road leads to the Camp of Carnuntum. As soon as the theatre has been entirely freed of soil covering it, all the measurements will be taken, and it will be ascertained what arena it is.—London Times.

ITALIAN CITIES.—IV.

MILAN.—11.

I t there are anywhere in the world any religious structures which are larger than Milan Cathedral, it is nevertheless the largest among those built of marble. The first stone was laid in 1856 by Jean Galeas Visconti, who, having poisoned his uncle Barnabas, believed, according to the opinion of the times, that by this work of piety he would gain divine forgiveness. Many religious foundations of these days had no other origin. The name of the architect who made the design is not definitely known. Commonly a German artist, Heinrich Arles of Graun, is credited with it; but this story is usually contradicted by the Italians. There was at that time at Como, near Milan, a school of masons and architects who played an important role in the architectural history of Italy, and who were employed on all important constructions from one end of the peninsula to the other. On the register of those concerned in the construction of the cathedral are the names of many of the members of this school, which allows us to suppose that the building is the fruit of a collective collaboration. Many foreign artists of great renown were also called from time to time to give advice and counsel, and among them figured with some prominence Nicolas Bonaventure and Mignot, Frenchmen, toward the end of the 14th century, and some architects of Freiburg. But the Italian artists always carried on a smothered warfare against these foreigners, and forced them to withdraw. In 1486, the Duke Sforza, the successor of the Visconti, demanded that the magistrates of Strasbourg should send him the architects of their cathedral, that they might solve certain difficulties of construction which retarded the completion of this building. This variety of collaboration had naturally enough as a consequence the debasing of the style of the monument and destruction of the unity of the design, without which there can be no perfect work of architecture. Each one wished to correct and modify and undo that which his predecessor had done, and this interrupted succession of workers has completely destroyed the purity of the original conception. It was, nevertheless, an Italian artist who gave the finishing touch to the monument, born under an evil star. In 1560 Cardinal Borromeo intrusted the direction of the works to Pellegrino Tibaldi, an artist of the post-Michelangelo school. This artist was educated in the principles of the Decadence, and finished by giving to the monument that baroque air which prevents it from figuring amongst the monuments of the best school. Tibaldi held the Gothic style in horror as a foreign importation, and earnestly set himself about disfiguring the edifice and destroying so far as possible, every trace of its origin. He could not destroy the general ordinance of the design, but he introduced changes enough to make the incongruity visible. It was he, for instance, who opened the five doorways in the façade, instead of leaving them three as consecrated by long usage, and who decorated the windows in so inharmonious a manner. Thanks to his efforts the cathedral in some ways looks more like a building of the Renaissance than a monument of Gothic times.

Napoleon I, when he arrived in Italy, also wished to take a hand in the matter, since the façade was not yet finished. In eight years it was entirely finished, but we recognize to-day that it disfigures the monument instead of completing it. The Italian Government has

The exaggeration of these two tendencies has produced, as say the pedants who always assert purity of type in those monuments to which they accord their admiration, a manifest exaggeration in the artistic creations which have resulted from them. The Gothic is poor and mournful, the Renaissance splendid and despairing thoughts, and gives to religion a significance which it ought not to have, since it is composed, before all, of love and hope. The one is, so to speak, the Encyclopedia, the other the Encyclopaedia. In the Gothic, there is only one which can be contrasted with the Gothic, removes from Gothic architecture every severe and restful note. It accumulates too incoherently all kinds of ornamental motifs, and with a purely worldly intention under the pretense of left one on the other, the meaning to the Gothic origin, it gives to the religious edifice a mundane aspect which does not answer precisely to its intention. One seems to be more conceived under the pretense of the Gothic influence, and Strasbourg before the tombs of the apostles in St. Peter’s at Rome.

In reality, when one judges a monument, he ought to listen attentively to the sensations which it awakens; to ask himself if these sensations are still in accord with the object to which this monument is dedicated; and when the pleasure which one experiences in beholding it is found to be not to be equated to the sentiment one has compelled us to examine it, it may be admired without reservation and especially without asking one’s self if the building can be accredited to any particular style.

I have attempted to state briefly these views, apropos of the Cathedral at Milan precisely because, as a usual thing, this building is accused of being not exactly Gothic nor quite Italian. It shall be whereas a style which will be more interesting, at least as well as the other; but that which unquestionably is, it is, amongst the edifices of Southern Europe, perhaps the only one which translates with the greatest influence the irresistible movement which draws man towards God.

After the cathedral, the most interesting church which can be seen at Milan is that of St. Ambrogio. The personage who bears this name is one of the most illustrious that have adorned the history of the Milanese. St. Ambrogio was born a Gaul, at Treves, about 349. He followed the calling of barrister; but when Prbus, the prefect of Milan, desired to place a sculptor in his chapel, he suggested. There can be no doubt that at that time the City of Milan was attached, in the course of a civil upheaval he showed himself animated by a lively interest in the well-being of the people, so that he was elected bishop by acclamation. He dies less than a year, brought up the childless family of a bishop, and up to that time had practised the religion of the Druids; but he was baptised and consecrated priest, and could thus discharge these episcopal functions with which he had been invested.

The deplorable sentiments which had captivated the popular favor did not desert him after his elevation. He opposed an heroic resistance to the outrageous pretensions of the Empress Justine, who favored Aryan heresy. To satisfy the needs of the poor he caused to be sold the sacred vases, and refused to admit to the church the Emperor Theodosius, until he had done penance for the massacre which had been committed there. St. Ambrogio was buried in the basilica of the same name, about twenty years after. He was in some sort the torch of the church, which, since the death of Lactantius had remained without light. The Milanese held him in great veneration, so much so that they are still stylized by the Basilians as a boundary line of world-wide renown, which the first stone was laid in his episcopal see in 387, rears itself over the site of an ancient temple dedicated to Bacchus. It could be stated that, in the midst of the crowded city, amid the monuments, bas-reliefs, and other relics and historical curiosities which it contains. Since its foundation it has been rebuilt, re-modelled, and altered, and finally the same Tibulli, who did so much to alter the character of the ecclesiastical, was also called in to complete the architecture of this church. Such as we see it today, it offers the perfect image of a vaulted Lombardic basilica, which hardly dates back farther than the twelfth century. The church, of which the nave, under which is placed the bishop’s pulpit, toll for the last time in 1196. It is in this basilica that St. Ambrose resisted the Emperor Theodosius, and it is here also that St. Augustine abjured his errors. The church is a vast vestibule of religious architecture, surrounded by a vaulted portico without ribs, the walls of which still bear traces of the inscriptions of the twelfth century and paintings of the same date, which have only been removed from the middle one of which, of cypress wood, is magnificently carved, and is, according to many archeologists, a work of the eighth century. The interior is composed of three naves of Romanesque architecture of the same date as the portico. On the top of the transepts the spire rises to a dome. The columns which support the vases are covered with stucco in imitation of marble. The dome is octagonal, with pendentives of our religion. Thus, the church must especially express this need of approach,—this instant of aspiring towards Heaven; and every race has expressed this architectural tendency according to its temperament. The peoples of the North, with their splendid of nature which bewilders the South, have given to their temples a calm, severe and meditative physiognomy, from which the Gothic derives its most characteristic feature, its lidelik, its more easily moved, more impulsive, habituated to satisfy their eyes with smiling and luminous landscapes, desired churches in which should be reflected the joyousness and radiance of the southern suns.

Under the grand nave may be noticed a portly column, bearing on its summit a bronze serpent, which came from Constantinople, and which, according to popular traditions, is nothing less than the famous serpent worshiped by the Colchians, and which must have stood at the end of the world. But the greatest artistic curiosity which this church contains is the golden pietà, or reliquary, that of the acropod, sculptor of the fifteenth century, of Vudovino. It is the oldest piece of goldsmiths’ work known in Italy; and this monument proves that this admirable art, which Demosthenes Cullini was to carry in the sixteenth century to its highest degree of perfection, was then already known in Italy and had

As I have already observed, the Cathedral of Milan cannot be rigorously considered a monument which indisputably belongs to the Gothic style, but it is none the less beautiful for that. After all, the purity of style which we ordinarily exact when we encounter works of architecture is the result of prejudice and pedantry, rather than the expression of a good taste which has some of the qualities that we demand of an edifice is that it should please the eye, should realize an aesthetic conception of it, should incarncate in some form or other the beautiful and, especially, should faithfully respond to its intended use. A Gothic edifice with the newness of a work of art, a great realization, and can bear the mind of the spectator to a contemplation of fiction and poetry. A temple ought to awaken the reminiscences of ancient myths, which are symbolized, as are the myths of religion to which it belongs the aspiration of man toward God. In China, where religion is a vague and very undeciphered manifestation of faith, and where the idea of God is transfused mingled with superstitions beliefs and philosophical traditions, religious architecture lacks every indication of a pious character. The pagoda, with its uniform type, is a public edifice whose beauty and richness can vary according to the locality, but which is not capable in its structure of revealing any religious idea whatever.

At Rome and in Greece, where paganism was only the humanization of faith cut up into many incarnations of which each was the manifestation of the church is piled up the forces of the world, and had as many types as there were divinities on Olympus; and that explains to us why the religious buildings were so numerous and so varied. Religion is the only idea that can put man en rapport with God through prayer. Elsewhere it is sometimes terror, sometimes bestial superstition, sometimes blind submission, which forms the base of the dogma. Here it is the necessity of reasoning, of imitating at the divine source every rule of life’s conduct, and of remaining constantly in communication with the forces of truth which determine the character of our religion. Thus, the church must especially express this need of approach,—this instant of aspiring towards Heaven; and every race has expressed this architectural tendency according to its temperament. The peoples of the North, with their splendid of nature which bewilders the South, have given to their temples a calm, severe and meditative physiognomy, from which the Gothic derives its most characteristic feature, its lidelik, its more easily moved, more impulsive, habituated to satisfy their eyes with smiling and luminous landscapes, desired churches in which should be reflected the joyousness and radiance of the southern suns.
Church of S. Maria delle Grazie
Milan

The Roman Colonnade at S. Lorenzo
Milan
Alteration of Houses
For Mr. A. T. Lyman and Mr. M. B. Inches
39-40 Beacon St.

Hartwell and Richardson, Architects
68 Devonshire St. Boston, Mass.
already made considerable progress at a time when the other plastic arts and the arts of drawing were still in their infancy.

The Church of Santa Maria delle Grazie is one of the oldest. It was erected by the architect of this name on the occasion when he transported from Constantinople the three bodies which are considered to be those of the three Magi. The façade which we now see is much more recent, but theapse is older than the tenth century.

From the point of view of the history of modern art Santa Maria delle Grazie deserves special mention. The dome and the sacristy painted by Bramante, the copripartito, the friend, the protector of Raphael. We indeed recognize in this ingenious architecture, so gracious, so precious, so pretty, the style of that architect who was just then the master of the destinies of the Church of Rome, and who guided its history at that period. The great doorways which open in the midst of the façade, is surely a chef-d'œuvre of the Renaissance, and must even be considered one of the purest, finest, most irrefragable fragments which this epoch, so much discussed, so capable of being much discussed, has left to us.

It is in the old refectory of the convent that we go to look up the "Last Supper." Leonardo da Vinci, who had the kind of enviable happiness of surpassing all his contemporaries and surviving almost all of his works,—of which he left us almost nothing. There were only a few Greek or Roman artists who enjoyed this kind of glory. The history of this mural painting is singular: Leonardo worked over it six years; sometimes he spent several consecutive days at his task; sometimes he remained whole weeks without touching it. He mingled, alone at night, with the servants of taverns in order to discover a type for the face of Judas. It is not known whether the "Last Supper" was painted in oil or in fresco. Certain is that the architect of this masterpiece prepared the surface of his own, and it proved that his plastering was defective. Half a century later the painting was already dropping off in scales; and today we know the "Last Supper" only by the copies which the Pope decided to make it wholly destroyed. The new monks greatly hastened its ruin. In 1632 they cut off the legs of the Savior and his apostles for the sake of enlarging the door of the refectory. In 1732 they gave the coup de grace by intrusting the restoration to a certain Bellotti, who damaged it to such a degree as to make it unrecognizable. He had the assurance to entirely repait it, so that we see today, in the place where was the chef-d'œuvre of Leonardo, is only the imitation of the restorers. In 1796 a French general turned the refectory into a stable and then into a hayloft. Finally, they attempted, but without result, a new restoration. The best copies are those of Marco D'Oggione, pupil of Leonardo, and the engraving by Morghen.

Milan possesses also a church in which we recognize the perfect type of the style of the Decadence. It is called Santa Maria presso San Caroli, and is dedicated to Benedict, but I share the contrary opinion with Mongeri, who believes that it was designed by Dolebene, one of Bramante's pupils. In truth, the general disposition of the motives, the excessive exuberance of ornament, the odd mixture of obelisk, torso-frieze, statues, and particularly the decided effort of giving emphasis to the horizontal lines, perfectly characterize Dolebene's manner. We can say that this church presents one of the best perfect models of architectural aberration which has been born after the death of Bramante and Michael Angelo, for all the oddities of baroque taste are found united here, as can be judged from the design which we will lay before our readers.

The house Nos. 39 and 49 Beacon street as originally built were three stories in height with pitched roof, and cornice carved in solid wood. The porch cornice and window trimmings were of white marble, the body of the walls of brick. Another story of rooms has been added, the cornice, which was very much decayed, removed and replaced in marble, which material was also used in the decoration of the additional story. At the same time, house No. 39 was thoroughly remodelled internally, a wing in the rear rebuilt, and in place of the picture-gallery which it originally contained, a ball-room has been made. This is richly decorated with woodwork delicately carved and with silk hangings upon the walls.

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The first three kilometres from Milan lies the Chartreuse of Chiaravalle, so named because it was founded by the French monks from Chartres. The history of this foundation is quite curious. In 1134 the Abbot Bernard, whose reputation for great sanctity had already preceded him, arrived at Milan, having been put in his place in a conflict which had arisen between the Miannerse and Pope Innocent II. He was received and lodged with great honor in the Monastery of the Certosa, the city being extremely hospitable with the manner in which he discharged his delicate mission they besought him to found near the city an establishment regulated by the same laws which had already rendered the Abbey of Chartres so prosperous and exalted. St. Bernard yielded to their desires, and in a short ten years the colony of Chiaravalle had become the centre of the agricultural prosperity of all Lombardy. The abbey is very remarkable because of the purity of its Gothic style and for the grace and justness of its proportions. It contains within very remarkable paintings of the Lombard school, of which, we know, Leonardo da Vinci was the founder. Its clock-tower is a chef-d'œuvre of elegance and boldness, and rises with much vigor above the imposing mass of the church without, crushing it and without diminishing its majesty—a thing which is always a very difficult problem for an architect to solve. It is octagonal in form, to the height of the upper roof, which sustains the spire, and is composed of several rows of doors and windows arranged with a rich simplicity. The readers of the American Architect will remark that this tower is very similar to the type generally adopted by a great number of American architects.

It would not be possible to leave this review of the chief churches of Milan without mentioning San Lorenzo, which, according to tradition was a building erected by St. Ambrose over the ruins of the Baths of Hercules. The plan of the building and the structure of its dependencies give much support to this tradition. The capitols, the sarcophagi and certain chapels all belong to the Roman epoch. The building, moreover, is a combination of several kinds of architecture. It is Roman in its columns, Byzantine in its dome, and Lombard in the square towers which rise upon its flanks; but its principal feature consists in the Roman colonnade which borders theCorso di Porta Ticinese before a courtyard which lies before the church. These Corinthian columns still preserve, although damaged by a fire in 1071, that grandiloquent aspect which distinguishes from ordinary things the relics of the Roman period. They are more important here because Milan, in spite of the leading role which she formerly played in Roman administration, has only preserved very few remains of the period. We are told that these columns belonged formerly to the baths of Maximian. The name of the city also is found associated with the history of the most important act of the reign of Emperor Justinian, for it was at Milan that was published in the year 533, in the Church of St. Thecla the imperial edict which granted full liberty to practise all forms of religion.

(To be continued.)

Illustrations.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

BUILDING OF THE HASTY-PAPPING CLUB, CAMBRIDGE, MASS.
MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Cladoline print, issued only with the Imperial Edition.]

ALTERATIONS TO HOUSE OF MESSRS. A. T. LYMAN AND M. B. INCHES, BOSTON, MASS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

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VIEWS IN MILAN, ITALY.—THE CATHEDRAL: THE ARENA: S. MARIA DELLE GRAZIE: THE ROMAN COLONNADE.

See article on Milan elsewhere in this issue.

HOUSE OF J. W. JENKINS, JR., AT " WINDY GATES."
MR. C. E. CASELL, ARCHITECT, BALTIMORE, MD.

HOUSE OF W. H. KEAY, ESQ. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

ANCIENT AND MODERN LIGHT-HOUSES. — XXIII.
LIGHT-HOUSE ADMINISTRATION.

To select the proper sites for light-houses, to plan and erect them on difficult sites, to devise suitable optical apparatus, illuminants and lamps, to appoint proper keepers, to furnish the supplies, and to attend to all the minutia consequent upon a service

[Continued from page 65, No. 409.]}
fifth-order lights two keepers each, and sixth-order lights one keeper. The number of keepers is sometimes augmented when the light is situated on isolated points or uninhabited islands. At sixth-order lights, where the nature of the service does not prevent, the keeper is allowed to have other occupation in addition.

HOLLAND.

The management of the coast lights, buoys and beacons of Holland is solely in the hands of Government, and rests with the Ministry for the Marine, under whose control is an inspector-general and seven inspectors for its various districts, who are charged with the direction and superintendence of their branch of the service. The cost of construction and maintenance is placed yearly on the list of Government expenses.

The harbor lights being generally of only local importance are excluded from the care of the Government, being under the direction of the communities where they are situated. Plans and specifications for the construction of light-houses are furnished by the Government, and the work is let by contract to the highest bidder.

There are no general instructions for the district inspectors. The regulations conform to the local circumstances of each district.

In addition to the inspections by district inspectors, a general inspection is made by the inspector-general at times not stated.

Buoys and beacons are maintained by contract.

The construction of Belgian light-houses and harbor-lights is part of the general administration of roads and bridges (Ponts et Chaussées) under the superintendence of the Minister of Public Works. An annual sum is appropriated for repairs and maintenance.

The care of the light-houses is intrusted to the navy after they have been built by the engineers of the Ponts et Chaussées. The navy is under the control of the Minister for Foreign Affairs, and the "budget" includes each year the sum necessary for supplies and salaries.

The light-houses on the coast of the North Sea are under the authority of the Inspector of Pilotage at Ostend.

The inspectors of pilotage see that the lights are lit at the proper hours, and are kept in an efficient condition. The keepers, watchmen, etc., are under the orders of these inspectors who have the right to suspend them for five days; heavier punishments are inflicted by the General Director of the navy, which can only be remitted by the Minister.

Light-house apparatus is purchased by the Department of Public Works from those makers who seem to offer the best guaranty.

The Departments of Foreign Affairs and of Public Works consult together concerning any proposed changes in the lighting of the coasts.

AUSTRIA.

The superintendence of all the Austrian light-houses, buoys and beacons belongs to the Imperial Royal Admiralty.

The deputies of the Exchange at Trieste attend to the management of light-houses and inspect their interiors. The duties of these deputies include the erection of light-houses, repairs, salaries of keepers and their discipline; they also collect light-house taxes and appoint the keepers.

All taxes levied on commercial vessels belong to the Treasury of the deputation of the Imperial Exchange Commission, in order to pay for the lights and all necessary expenses, repairs and renovations. Every renovation or alteration of a light is first submitted for approval to the Admiralty by the Commission of Exchange, and the necessity for a new light is investigated by a commissary.

(To be continued.)

MEDIEVAL HOUSES.

The influence of the different schools of art of the provinces was as strongly felt in these dwellings as in the churches and public buildings. A house of Bourgogne is not quite the same as a house of Aquitaine, of the Ile de France, or of Normandy.

The special peculiarity of the Burgundian house, found nowhere else, was the spiral staircase built upon the street front, and making a vestibule for the ground floor. At Avallon, at Flavigny, in the little town of Semur in Auxois, and even at Dijon, there are still to be seen the remains of houses planned as shown in Figure 12. In the middle of the front is the staircase, A, corbelled out above the entrance-door, B; to the left or right, according to the enclosure of the staircase, is the door, C, opening into the first room, D, which communicates with E and F, the plan being the same on each floor. From the middle room E, which is an ante-room separating the salons E and F, there is an exit to the court or garden. An elevation of the street-front is given in Figure 13.

The entrance-door B, is sheltered by the overhang of the staircase, whose outer wall is carried on the ends of the steps which

form corbeling upon the front: the entrance to the cellar, O, is practically under the sill of one of the windows on the ground-floor. The cellars in Burgundy, have always been an important feature.

The plan of this house was simple, economical and roomy. On the first and second floors E, was an ante-room between the salons D and F.

Burgundy furnished a very excellent hard stone strong enough to

carry the small stair-tower, built in a curious manner on the outer end of the steps of the first turn.

The dwelling of this epoch in each province had a certain general plan common to all and adapted to the social requirements of the time, but, in the details, such as the shape and position of the openings, and that sort of thing, there was great variety.

The period was distinguished for great individuality of thought; every one consulted his own tastes or his personal wants in preference.
merely imitating his neighbor. No municipality had then con-
ceived the idea of imposing on all the proprietors in the same street
a uniform style of architecture. In those times of reputed great
oppression, no authority had yet tried to mould the dwellings of a
thousand citizens after a common type. Each man's consciousness
of his own individuality and personal responsibility was too great
for him to suppose, for an instant, that men would allow themselves
to be enclosed, like animals in a zoological garden, in barracks of a
uniform style, designed only to please the eye of the sightseer.

Stone gutters inclining toward two different gargoyles and carried
on projecting brackets appear in the elevation, Figure 15. This
arrangement is still common in Burgundy and in upper Champagne,
where long and durable stones for the gutters may be had. Else-
where hollow beams, or planks covered with lead, are used. From
the middle of the thirteenth century, in Burgundy and in Cham-
pagne, water from the roof was discharged through projecting gar-
goyles.

Several charming houses of the thirteenth and fourteenth centuries,
such as Vitteaux (Côte-D'or) some years ago, have been almost
demolished or altered. One of them, dating from the second half of
the thirteenth century, shows in plan the following arrange-
ment on the ground floor (Fig. 14): At A, under the enclosure of
the staircase is the entrance-door, as in the preceding example.
The door of the cellar opens on the street at B. The entrance-door
opens into the little vestibule C, from which one passes straight on to
the kitchen D, or, turning to the left, enters the saloon. The plan is
repeated on the first floor and gives two chambers; while in the
second, under the roof, is a large space divided in the middle of the
building.

The elevation (Fig. 15) shows, at A, the entrance-door, and, at B,
the door of the cellar. The stair-tower is no longer carried on the
ends of the steps, but on a flat and well-proportioned stone band.
At the top the stair-tower loses the cylindrical form and becomes
hexagonal, doubtless to lessen the difficulties of covering the roof.

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hexagonal, doubtless to lessen the difficulties of covering the roof.

An interior court, or more often a little garden gives air and light
to the kitchen and the back part of the salon.

The projection given by the corbelling of the stairs and a bracket,
recessed and supported by a heavy overheading roof which shades the whole front. Water falling into the gutters is dis-
charged at the left on the street by a wooden gargoyles, and on the
right into the court through a wooden pipe, falling into a little stone
reservoir at the corner of the kitchen. On the ground floor and the
first story, the chimneys are on the side walls, their tops being visible
in the elevation.

A building of about 100 metres, of which 49 metres were
reserved for the building, the architects of Vitteaux succeeded in
building a comfortable, healthy, well-lighted and sufficiently roomy
dwelling, of moderate cost.

Only the front and side walls are of masonry, and the floors are
carried on the two side walls and on the wooden partition in the
centre.

A building of this character and style would cost, including the
ceil, 250 francs to the square metre; or in all 12,250 francs, in
the provinces.

The houses built to-day in the small towns of the Departments
cost more, are less healthy and commodious, and are remarkably
ugly imitations of the large "bourgeois" houses of the cities.

There was no richness of ornamentation in these buildings, and
they were generally entirely without carving previous to the
fifteenth century; nor had they the vulgar symmetry so much prized
by the modern magistracy. What pleased and charms us in these
modest dwellings, is the impression of the satisfied wants and habits
of a family whose each and every thought in the construction, the
forecasting, skill and spirit with which the architect has profited
by the various accidents of the given problem.

In the same time of our moderns, to be buried in ashes, like Lantvrum,
it would be very difficult for the architect. It is known that in the thir-
teenth and fourteenth centuries, to get an idea of the tastes, manners and habits
of the generation which had built them: if, on the contrary, we go into
a fair well-preserved house of the Middle Ages, everything speaks
of the life of its former inhabitants, whom we find to have been
people of distinctive character and varied tastes, with their own
traditions and tendencies.

The whole of words, and the houses of the rich and influential
commoners, were distinguished unmistakably from the dwellings
of the commercial or manufacturing citizens. The latter built their
fronts upon the street, while the houses of the nobles and great com-
moners were retired from public gaze behind blank walls.

The Marquise of Rambouillet has been credited with originating
the plan of placing the house between the court and the garden.

This is one of the points which allowed the contemporaries of the
Marquise, speaks of the pains she took in the building of her hotel,
does not say a word of this invention of hers; and the hotels built
long before her time could not disprove it.

The hôtels de Saint Pol, Tournelles, Carbon, Tremouille, Sens,
Gaisseau and of Cuny, at Paris, are, and still are, between the court
and the garden. The houses of the commoners themselves differed in
style from those of the nobles; but the dwellings of the middle
classes, the gotiers andCitizens of Aix, for example, or those of the
hôtels de la Manufacture, or mercerise towns of Beauvais, Amiens,
Amiens, and Troyes were unlike those of towns inhabited by land-owner
living on their rents, or by wine and grain merchants. The com-
moners' house in Richeaux or Troyes opened on the ground floor,
and had a porch where the merchants chatted over business and other
matters, whereas, in Provins or Laon, there was usually a solid wall
on the street-front as high as the first floor.

[To be continued.]

A CORRECTION.

PHILADELPHIA, PA., Sept. 3, 1888.
To the Editors of the American Architect:

Dear Sirs,—We regret very much to see in our advertisement
"Are You Aware" which appears in your issue of September 1st,
that you have made a bad typographical error in a very
important paragraph, wherein you show that our "Gilbertson's Old
Method" IC 20 x 28 plates weigh only 220 lbs. when it should read
240 lbs. This is not a mere error but an error that cannot be passed
over like some others, but it so happens that the word for the word
"as" rests immediately in the figures referred to, and we would
maybe rather the "as" should not be read at all than read in this
shape. In other words, as it stands, it does us a pasting to you,
and we write now to ask you that you call attention to this error
in your next issue. Yours very truly,
MERCHANT & Co.

THE EFFECT OF LEAD PLATES IN MASONRY.

WASHINGTON, Sep. 4, 1888.
To the Editors of the American Architect:

Dear Sirs,—On page 102 of your journal, just received, attention
is called to the results and conclusions of tests by General Gillmore
on the nature of the bearing surfaces against the material (stone)
tried for compressive strength. It will be of interest to compare
with them similar observations of a commission engaged in the
year 1835, in testing marbles for use in the extension of the United
States Capitol, as communicated to the "American Association for
the Advancement of Science," in a paper read by our friend Jos. Henry,
Secretary of Smithsonian Institution:

The specimens (cubes of I½ inches in dimensions) were placed
between two thick steel plates and measured an average of
pressure independent of any want of perfect parallelism and thence
on the two opposite surfaces, a thin plate of lead was interposed
between them and the bearing pressure of steel, as done
by most experimenters in researches of this kind. Marbles
however, was expressed as to the action of interposed lead, which
indicates a series of experiments to settle this question, when the
remarkable fact was discovered that the yielding and approximately
equable pressure of the lead caused the stone to give way at about
half the pressure it would sustain without such an interposition.
Cubes precisely similar to each other which withstood a pressure
of 60,000 pounds and upwards when placed in immediate contact with the
steel plates, gave way at about 30,000 with lead interposed. This
One interesting fact was verified in a series of experiments, embarking on the problem that all steel under stress is not alike, and in no one case is single exception to vary the result. The explanation of this remarkable phenomenon is not difficult. The stone tends to give way by bulging out in the course of its four perpendicular faces, and to form two pyramidal figures with their apses opposite to each other at the center of the cube, and their bases against the steel plate.

"In the case where equable rigid pressure is employed, as in that of the steel plates, all parts must give way together. But in that of a yielding equable pressure, as in the case of interposed lead, the stone first gives way along the outer lines or those of least resistance, and the remaining pressure must be sustained by the central portions of the vertical axis of the cube."

After this important fact was clearly determined, "lead and all other inferior substances were discarded."

The commission who thus broke with the practice of Rondelet, Vicat, Rennie, etc., consisted of savants of whom this country may well be proud. Besides Henry, there were General Trotter, Professor Bache, of the Coast Survey, and Captain Meigs. The writer of this served as assistant to arrange details, and devised a method for bringing the upper and lower surfaces of the cubes into perfect parallelism, and formed two pyramidal figures with their apses opposite to each other at the center of the cube, and their bases against the steel plate.

Another way of testing the strength of building stones is in the examination of the mechanico-technical laboratory and testing-station for building-materials in Munich, has made the most exhaustive tests of the compressive strength of building stones, in the years 1874-76, in which he has made use of the direct pressure of thick steel plates, without interposed yielding bedding surfaces.

**Adolf Cluss.**

### Table

**Two points are to be noted which have been silently working in the direction of an enlargement of our trade foundations.** One is the vast expansion of our interior markets, the second is the crowded production that has been maintained in manufactures (for the demand of the South is quick and the busy observer of trade and trade movements who have recently returned from the South, I am told, the South is the great surprise of the West, and the great surprise of the West would not borrow unless they needed money. This idle money from the East is accumulable, and it can be made to found a trading corporation which will develop valuable markets for our manufactured products, for selling, agents from this foundation will travel over the country, and the West and South and all parts of the country have contracted and draw from this prolific source of new business.

### Notes

**Concrete for Strasburg.**—About 700 men are now constantly employed in the manufacture of concrete for the extensive new fortifications of Strasbourg and Metz. The German experts regard this concrete as the best portable material for such work, and the French have adopted it since the success of the elaborate experiments at Chalons.—London Times.

**Figures from the Tailor's Standpoint.**—The origin of the London tailors, the Drapers' Record, has taken to art criticism from a tailor's point of view and has examined the pictures of the Royal Academy. He has averred that most artists have painters' clothes so that the material can be recognized. Burne Jones is the only one who receives unqualified praise. Poynter is complimented by "it is formed in a most workmanlike fashion."

Robert Harwwood has put up "an outside breast-pock on the right side of his Lordship's coat." Holl's picture of Earl Spencer in a coat with an American eagle is "not so much like a tailor as a stage-carrier." Another "very bad example."" bears a dress-suit "something round the neck" supposed to be like silk. Another: "It also wants to wear a tailcoat." The critic has met in him the drapery writer. As to "style, fit, and fashion," the report is decidedly unfavorable. For "the furnishing and upholsteries departments," though, much approval is expressed.—The London News.

**Small St. Paul's remains a Religious Emprise.**—Referring to an incident quoted in connection with Lord Cardon's proposal to keep the church open all day and every day, a correspondent of the London Times is of the opinion that the proposal will be largely neglected. He wrote: "The subscription of St. Paul's in 1837, the opening of which at other times than during Divine service he vehemently opposed. I quote from a single sentence: "I am one of those who believe that the church is the temple of God, and not the sanctuary of the Church.""

Another correspondent of the London Times writes: "The church of the Church of England and the church of the Church of Scotland in Chicago, and the church of the Roman Catholic Church in the United States is in the church of the Church of England and the Church of Scotland in Chicago, and the church of the Roman Catholic Church in the United States is in Chicago."

There are no signs of decreasing demand for railroad-building coal, but there are signs of the demand for iron and steel. This is due to the fact that the price of lumber and other building materials is cheaper than the price of coal, and it is the price of coal that is in demand for railroad-building.

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Our illustration shows the details of the Dececo Flush-pot, to be used with porcelain, soapstone or wooden sinks, either kitchen or pantry. It is made of brass.

The flange into which the top of the Flush-pot is screwed is countersunk into the bottom of the sink and fastened with bolts. The same thing in iron is made for the Dececo iron kitchen sink.

When the pot becomes filled with water, the spindle and plug are raised and the contained water rushes out, carrying all before it and with it and flushes the drain with (in the case of kitchen-sinks) nearly as much water as is discharged by a bath-tub.

During use the pot, with its plug and water, acts as an efficient seal against the admission of drain air.

THE DECECO COMPANY,
NEWPORT, R. I.

AGENTS:
THOMAS DAY & CO., SAN FRANCISCO.
G. K. PAUL & CO., BOSTON.
B. F. COOLEY, LANSING, MICH.

MILLER & COATES, NEW YORK.
GEORGE F. BROWN, PHILADELPHIA.
Canopy over Pilgrim Rock, Plymouth, Mass.

Basis prepared for the Washington Monument by H. O. Avery.

The Miles Standish Monument, Duxbury, Mass.

MONUMENTS.
With this material wood-work can be thoroughly protected from fire at a cost of less than one cent per square foot.

It can be had in all colors at 30 cents per gallon.

Send for Anti-Pyre circulars and samples.

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SAMUEL C. CABOT

70 KILBY ST.
BOSTON, MASS.

ALSO SOLE MAN'FR. CREOSOTE SHINGLE STAINS.
A Mouse at Bremen.

A House at Bremen.

GABLES AND PEDIMENTS.
A CURIOUS statement comes from New York, to the effect that the insurance companies of that city have declared war on incendiaries, and propose to drive them into seclusion, where they can be kept out of mischief. The way in which this is to be done is, it appears, to identify persons who are in the habit of setting buildings on fire, and refuse to issue policies to them; and when an "incendiary," to give him the polite name invented for him by the New York papers, moves into a new house or store, the companies propose to cancel at once all policies on property in the building belonging to other persons.

It seems that professional "incendiaries" like to hire lofts in stores or tenement-houses, and there carry out their schemes, and it is expected that the other occupants of a building in which one of these individuals may gain a lodgment, finding themselves in danger of being left without insurance, will help the underwriters to expel him. We should say that in any other community than New York the best way to get rid of a known incendiary would be to call a policeman, and have him marched off to jail, but metropolitan justice has certain peculiarities, among which may be a disposition to let incendiaries and underwriters fight out their disputes among themselves; and, as, according to the newspaper accounts, there are many persons, both men and women, known to the insurance companies, who get policies on goods which do not exist, and set fire to the buildings in which they are supposed to be stored, the only weapon available against them appears to be some such system of boycotting as that proposed.

THE English papers announce the death of Mr. William Essie, one of the pioneers in the modern movement for domestic sanitation. Mr. Essie was born in Scotland in 1832, and was educated as an engineer. He was for a time assistant to Sir Isambard K. Brunel, perhaps the greatest engineer of the day, but, when still a young man, was sent to Russia with the late Dr. Parkes, to superintend the construction of the British military hospitals in the Crimea. On his return to England he devoted himself to what was then a new profession—that of sanitary engineering. He need hardly be said that the specimens of drainage work which he proposed and in which he became so interested, had to be considered barbarous now, but they served very well as a contrast to the improved systems which were even then beginning to be well understood among experts, and his book on "Healthy Houses," containing an explanation of the principles of modern house-drainage, with illustrations from his own theory, was a work of a remarkably lively style, so was so fortunate as to attract public attention in a remarkable degree. It passed through many editions, and was undoubtedly one of the principal agents in bringing about the sanitary reform which began fifteen or twenty years ago, and is still in progress; but the 'estimable and 'curious arrangement for Dwellings,' is little else than an abridgment of the "Healthy Houses." His energy and reputation did much to promote the establishment of the Sanitary Institute of Great Britain, and his extensive practice did not prevent him from writing frequently to the technical journals. He was lecturer on hygiene at the Charing Cross Hospital, and a member of many learned societies.

THE natural history, or rather, we should now say, the psychology and moral philosophy of microbes, seems to be the new trend of contemporary science. It is not long since we heard of a sort of animalcule which had a deadly hatred for microbes, and would devour and destroy them in the system, and it now appears that this beneficent little creature is in a considerable degree a work of art, consisting, as we are told by Public Health, of "a little mass of biopism," which has been educated to "take in" other micro-organisms. According to this authority, many, perhaps most, maladies "are produced by parasitism," the attack being simply the invasion of the harmonious community of organisms which compose the healthy body by a colony of hostile strangers. The invading colony, which may be the offspring of a single germ, finds the growths resisting this new invasion, so it never runs away, and a war follows. The strangers, according to this theory, have the property of secreting a soluble substance, which is poisonous to the native biopisms. The latter, however, are brave and intelligent, and in fighting the invaders they learn how to resist the poison, so as to become in time almost

The quarry, after the opening of Tunis to civilization, a Belgian company gained control of them, and made preparations for working them at a great rate, but the business did not prosper as was expected, and the company has just been reorganized, and changes made in the methods of extracting the marble.

For this purpose an extensive system of wires has been provided, driven by an engine of sixty horse-power, and affording facilities for sawing the stone in almost any part of the quarry. The wire cord is fastened together. Each strand is a steel wire about one-sixteenth of an inch in diameter, and the twist makes a turn once in two inches. The cord runs over pulleys at each end, and is driven at a speed of about fifteen feet per second. The loops of endless wires are very long, and contain from two to four hundred variations. At any spot where it is desired to use the wire for cutting, an iron frame is set up, having pulleys at the upper end, capable of adjustment in any direction, and two other pulleys below, attached to a bar which slides up and down on the frame, and is controlled by long screws. The wire cord is taken into this frame, and carried down over the lower pulleys, and the frame being placed over a block of marble, or a fresh portion of the quarry, the moving wire is lowered, as it cuts its way into the stone, until the block is severed. Sand and water are fed automatically into the groove cut by the wire, and the sawing goes on, inch by inch, for hours, or even days. When used for cutting from the quarry, two holes are drilled in the stone, in which the upright pieces of the frame are set, and the wire cuts between them, down to the level of the bottom of the drill-holes. The wire-saw is found so effective that it is now used for cutting the larger blocks into the special shapes that may be ordered, and the quarry company supplies finished work as well as rough blocks. It is a pity that these beautiful marbles should not be better known here. The antique yellow, which is found in great masses in the quarry, is, to our mind, the most beautiful marble ever put into the market, and a pink shade is found which is said to be very popular.

There are various indications which would show that in the next decade in this country will contain a good deal of marble and other colored stones, used in novel ways; and it is very desirable that the architect's palette of marble, so to speak, should be set with all the colors that can be procured.

The English papers seem to contain an increasing number of notices of historical estates offered for sale, and one would imagine that the heirs of the great families had been seized with a panic, and were abandoning their ancestral property at any sacrifice. The most curious piece of real estate now in the market seems to be the Island of Foulah, which lies in the Atlantic, thirty-five miles north of the Orkneys, and is generally supposed to be the "ulima Thule," or the extreme point of the world. The island itself is a mere rock, two and a half miles long by something less than a mile wide, inhabited by nearly three hundred persons. The residence of the lord of the manor is known by the pretty name of "Liora-field," but, as the house contains only four rooms, the name appears to be the principal attraction. Another estate, which seems likely to furnish more comfort to the owner than "farthest Thule," is the Echt property, the ancestral home of the LINDSAYS, the Earls of Crawford. Eight hundred and fifty thousand dollars has been refused for the estate, but as the net rental of the farms is twenty thousand dollars a year, and the owner enjoys, besides, the use of a magnificent mansion, partly built by the late George EDMUND STREET, a private observatory, and four thousand acres of forest and moor for hunting, the property may be regarded as paying a tolerably good interest on the investment.

The celebrated antique marble quarries which were discovered some years ago in Tunis are now to be worked with the aid of the wire-saw, a device which probably have amazed a Roman quarry-man. On the rediscovery of

unaffected by it. Where the pitarical colony is small, and vigorously resisted by the natives, it is exterminated without coming to the perception of the individual whose body may contain the invisible invaders. The contest grows so serious that disturbance of the functions ensues, and the individual is then said to be suffering from an attack of the disease of which the invading microbes are characteristic. The gallant little home microbes fight hard, however, and may gain by fighting strength and skill to resist; and unless the pirates show such force as to overpower the garrison, and extinguish the life of the patient, the natives, with every moment of successful resistance, gain in power, until they are able to drive out the strangers, and recovery takes place. More than this, the domestic microbes, when the particular enemy is defeated, and the microbial colony of the same sort, and their owner is said to be "protected" against a recurrence of the disease. Even for years afterward, as Public Health says, although the original microbes have long since been replaced by new generations, the "descendants of the old heroes" retain an inherited prowess, which enables them to beat off all attacks of the same order. Although the power of the system to resist infection depends upon the training of the bioplasms which inhabit it to contend with the bacteria of that particular infection, this training is lost and given up by the body itself. On the contrary, by arranging a contest between the home forces and an army similar in character to that which we fear, but of less destructive power, our bioplastic heroes may be so well drilled in the tactics necessary for defeating this sort of enemy that a subsequent onslaught of more serious character would be resisted by the body with certain success. The philosophy of vaccination and inoculation with attenuated virus of all kinds, and as the microbes transmit their warlike accomplishments to their posterity, the theory seems to open an unexpectedly brilliant prospect of the ultimate abolition of infectious diseases. In fact, the homeopathic principle of similia similibus curantur seems to have been nothing else than an early statement of the same notion. The followers of Hahnemann claim that a drug which causes certain symptoms in a healthy person will cure similar symptoms in a sick person; now they may go farther, and explain that by administering small doses of a medicine which is known to cause certain derangements in the healthy body, they train by degrees in resistance to such influences a force of bacteria which, when it grows large enough, will drive out the hostile bioplastic colony which has been causing similar derangements in the body of the patient.

A PIECE of reconstruction worthy of Chicago is now going on in Bremen. That city possessed, until last January, an Exchange, dating from the Middle Ages, and much frequented by the merchants. On the first day of the year it was burned. As it happened, the cellar of the building, after a common fashion in Germany, was occupied as a saloon, where beer and wine were dispensed to thirsty business-men. The vaulted ceiling of the cellar saved it from injury, to the great satisfaction of the merchants, who had a sentimental regard for the ancient room, and it was resolved to keep it intact. Unfortunately, the ceiling of the basement was considerably higher than the present street grade, and in rebuilding the Exchange it was considered of great importance to keep the first floor down nearly to the street-level. The merchants were easily convinced of the correctness of this view, but they could not make up their minds to lose their beer-cellar, so a compromise has now been agreed upon, by which the vaulted ceiling of the basement has been shortened, and the lower part of the depth below the present level of the floor, the walls and piers underpinned or rebuilt, and the vault reconstructed at a level enough lower to admit of entering the ground-floor directly from the street. At first sight this seems an extravagantly costly plan, but it is understood that the plans got six or seven days before the place was closed for beginning the alteration ten thousand persons visited it, and the sales amounted to more than five thousand dollars; so the proprietor is probably justified in wishing to keep his location at any sacrifice.

The English papers seem to contain an increasing number of notices of historical estates offered for sale, and one would imagine that the heirs of the great families had been seized with a panic, and were abandoning their ancestral property at any sacrifice. The most curious piece of real estate now in the market seems to be the Island of Foulah, which lies in the Atlantic, thirty-five miles north of the Orkneys, and is generally supposed to be the "ulima Thule," of the ancients,—the extreme point of the world. The island itself is a mere rock, two and a half miles long by something less than a mile wide, inhabited by nearly three hundred persons. The residence of the lord of the manor is known by the pretty name of "Liora-field," but, as the house contains only four rooms, the name appears to be the principal attraction. Another estate, which seems likely to furnish more comfort to the owner than "farthest Thule," is the Echt property, the ancestral home of the LINDSAYS, the Earls of Crawford. Eight hundred and fifty thousand dollars has been refused for the estate, but as the net rental of the farms is twenty thousand dollars a year, and the owner enjoys, besides, the use of a magnificent mansion, partly built by the late George EDMUND STREET, a private observatory, and four thousand acres of forest and moor for hunting, the property may be regarded as paying a tolerably good interest on the investment.

The successful practical suggestions of the Wiener Bauindustriezeitung is that an excellent paint for walls may be made by dissolving, with the aid of a moderate heat, one part of paraffine, in two or three parts of heavy oil of cresote. The solution should be thick when cold, but not solid. In use, the can containing it should be set in warm water, so that the paint may be liquid, and flow freely from the brush, and the wall should not be too cold. For brick walls exposed to dampness, or liable to become soaked by driving rains, this forms a useful application, either on the inside or the outside.
BUILDERS' HARDWARE.—VI.

FRENCH-WINDOW BOLTS.

French-window bolts are usually mortised into the centre style of one of the sashes and are so arranged that a crank or handle on the face of the sash will throw a bolt in each direction, so as to lock the window at the top and the bottom. Figure 49 is a form operated by a knob and spindle. In setting it, the gearing-box or mechanism of the bolts can be let into the door in the same manner as an ordinary mortise-lock, and the two rods dropped in through a hole bored the length of the sash, the rods screwing into the hubs on the gearing-box. The retail price of this appliance is $4.00 in bronze, including a bronze handle. Figure 50 is another form, similar in its action as regards the bolts, but intended to plant on the face of the sash. The crank handle drops into a catch on the opposite sash, and can be locked by turning the bar on top of the catch. The retail price in bronze is $4.00.

Espagnolette-bolts are arranged, like the foregoing, with the shoot up and down, but in addition the bolts are made to turn so as to hook onto a post or peg at the top and bottom. They are much used in France for double windows, and have several advantages, as they not only lock the sashes, but also draw them up firmly against the window-frame, thus making them more secure against the weather. Figure 51 illustrates one form of espagnolette-bolt.

There are many other devices adopted for securing French windows. In the cheapest class of work an ordinary cupboard-lock is used; and in the best work they are sometimes secured with a regular key lock.

CHAIN-AND-CHECK BOLTS.

At one time it was considered quite essential that a front door should be provided with a chain-door-fastener, which would permit the door to be opened a few inches to inspect any doubtful character on the outside, while it could be opened no farther. Figure 52 illustrates a typical form of chain-door-fasteners consisting of a slotted plate to go on the face of the door, and a chain secured to the door-jamb, with a dog on the end of the chain which will slide freely in the slot of the plate. A holder is provided to which the chain can be attached when not in use. There are many varieties of chain fasteners. They would average about $1.00 per set in cast brass, and $2.50 silver-plated. P. & F. Corbin manufacture a rim door-bolt which has a chain attachment, the dog of the chain working in a slot cut in the barrel or plate enclosing the bolt.

Instead of a chain, some form of hinged bar is often employed, the fixture then being designated as a check-bolt or door-fast. Figure 53 illustrates one form of door-fast (Nichols, Bellamy & Co., agents). The staple-shaped bar or rod works in a standard which is screwed to the door-jamb, and fits over a knob secured to the door. The door, on being opened forces the knob along between the prongs of the bar until it can go no farther, permitting the door to open only about four inches. When it is not desired to secure the door, the bar is turned back against the wall. When the bar is turned at right angles to the wall, or midway between these positions, the shoulders are brought directly over the knob on the door-catch, and the door is secured so that it cannot be opened at all. This fixture retails at $2.50, in bronze.

Figure 54 is another form of door-fast consisting of a straight bolt working through a hinged socket attached to the door. The bolt has shoulders at the end which fit into the catch on the door-jamb in such a manner that when the door is opened and the bolt tilted the shoulders are held by the jamb-catch, the bolt slipping through the socket on the door. The retail price of this fixture, in bronze, is $2.00.

Figure 55 illustrates a form of door-check which combines some of the features of both of the foregoing fixtures, though

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1 Continued from No. 603, page 109.
mortised door-bolts.

In addition to the ordinary lock on a door, it is sometimes found desirable to attach a plain bolt of some form, as an extra security. The form most commonly used is known as a mortise door-bolt, consisting simply of a barrel-bolt in a cylindrical case, which is mortised directly into the door-style and is operated by a spindle with turn-button or knob on the inner face of the door. In external appearance the various makes of mortised door-bolts are very much alike though some are finished so as to require no other mortising than can be done with an auger, while others require more hand work in the application.

Figure 56 illustrates a complete bolt, and also shows one form of internal arrangement. When the bolt is thrown, the shoulder on the follower, $B$, is turned so as to bring it very nearly on a line with the centre of rotation of the spindle, thus locking the bolt. The spring, $C$, tends to keep the shoulder from rising.

The simplest and most ingenious mortise door-bolt which has come to our notice is the one manufactured by Sargent & Greenleaf, designated as the "Gem mortise-bolt," Figure 57. It consists simply of a solid bolt completely filling the diameter of the bolt-case. The cogged spindle works over the teeth cut across the bolt. The last tooth towards the back of the bolt is smaller and projects less than the others, and the last cut is wider than the intermediate ones; so that when the bolt is thrown the cogged spindle wedges into the wide cut and locks the bolt, making it practically impossible to throw it back by external pressure. The beauty of this bolt is, there is nothing about it that can possibly get out of order, and the only effect of wear would be to make it work more efficiently, if possible. P. & F. Corbin, Russell & Erwin, the Stoddard Lock Manufacturing Co., and the Reading Hardware Co., manufacture door-bolts similar in the main to Figure 56. The following table gives the average retail prices:

**TABLE OF MORTISE DOOR-BOLTS.**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Plain Bronze</th>
<th>Nickle-plated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland Manufacturing Co.</td>
<td>$2.25</td>
<td>$2.25</td>
</tr>
<tr>
<td>H. B. Ives &amp; Company</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Sargent &amp; Greenleaf</td>
<td>5.50</td>
<td>5.50</td>
</tr>
<tr>
<td>P. &amp; F. Corbin</td>
<td>2.70</td>
<td>2.70</td>
</tr>
<tr>
<td>Russell &amp; Erwin</td>
<td>2.55</td>
<td>2.55</td>
</tr>
<tr>
<td>Stoddard Lock and Manufacturing Co.</td>
<td>6.00</td>
<td>6.00</td>
</tr>
</tbody>
</table>

* List Prices.

(To be continued.)

B Y a curious freak of fortune we can say that the most Classic of the monuments at Milan were erected at the commencement of this century. We know that on the morrow of the French Revolution there was through the whole Latin world a furious revival of classicism, a disinterment of Greecian past to the very verge of extravagance. People no longer swore but by Pallas and Vulcan, and women, habited in the peplos, desired that their offspring should be named Themistocles or Scipio, and that their daughters should be called nothing if not Julia and Xantippe—not particularly reassuring for their future husbands this architecture yielded to a similar mania, and at Milan, for instance, all buildings erected at this time bear the mark of this Classic renaissance. The arch of the Porta Ticinese is a striking example of this. It was to be erected to perpetuate the memory of the victory won by Napoleon I at Marengo in 1800, but while it was being erected, that hero was conquered and exiled to St. Helena, and the monument achieved another destination. It was dedicated, as the inscription says, "to Peace, the liberator of the people." Alas! monuments, like books, have also their destinies.

This arch, designed by the architect Luigi Canonicus, is conceived in the pure Grecian style. It is composed of two pilasters and two columns of the Ionic order supporting an architrave, above which rises a pediment. The height of the proportions makes the appearance agreeable, and when Milan is entered by the Porta Ticinese one might almost believe that he had entered a Grecian city, if it were not for the very modern garb of the inhabitants and the accidental appearance of the quarter. The finest arch which is to be seen at Milan is that of the Simon, so-called because it is thrown over the road which leads from Milan to the Alps of the Simpion. It has quite an accidental origin: it was first built of wood in 1806, by order of the Municipality of Milan, when Prince Beaunharnais, with his wife Amelia of Bavaria, ruled Lombardy as viceroy. The design of this improved monument was found to be so satisfactory that it was decided to translate it into marble, but the decoration was intended to be something other than that which it now bears. In memory of the battle of Jena, it was decided that a Victory should be placed on the summit. Thorwaldsen had sculptured the triumph of Caesar, and the deeds of Napoleon were to figure as bas-reliefs in the intercommunication between the pilasters. But the disaster at Waterloo modified this plan. Instead of the glories of the Emperor, the bas-reliefs immortalize the fates of the restoration—another proof, alas, that monuments are subject to the caprices of destiny.

The statues which ornament the public places at Milan are very few in number, and all belong to modern times. The monument to Count Cavour and that to Alexander Manzoni are conspicuous for that difficulty which I have had occasion to insist on in the course of these studies on architectural Italy— I mean the inconvenience which the civil garb in our day opposes to the sculptor. Cavour was a statesman, and Manzoni a romanticist, a philosopher and poet. One represents politics, the other, poetry; very much imagination, dreams, that is to say poetry; yet nevertheless the two statues are as like as two drops of water. What we see nowadays in the statue is a frock-coat and tricorn and alas, all frock-coats look alike. Though the sculptor has tried to find a new pose, to model with great care the expression of his subject, to give it

1Continued from No. 603, page 111.
of that religious family, and engaged himself on monumental doorways, a vast amount of public works. He founded a great library and conservatory of science and arts. He collected 44,000 volumes, which included 14,000 manuscripts. His statue is erected on the public place directly in front of the door of the library founded by him, and which, under the title of the Ambrosian Library, has to-day become one of the most important in Italy.

At the time when this cruel epidemic which decimated the population ravaged Milan, the people were obliged to construct a lazaretto, to which was given a very monumental aspect. In the interior we still see a court-yard, three of whose sides are formed by a portico in the Moorish style, which recalls the Spanish domination. It is curious to note how the Arab style arrived in Italy upon two opposite sides, through the Venetians, who brought it from the East, and through the Spaniards who brought it from the South of the Iberian peninsula.

The American Architect and Building News.
curiosity. The Palazzo Brera, which is also the Palace of the Sciences and Arts, contains nations of treasures. Its architecture is very remarkable: the façade, imposing by its simplicity, impresses the visitor favorably. In the court-yard is to be seen the statue of Napoleon I, by Canova, who has represented the hero naked, holding in his hands a sceptre and a Victory. About the court are arranged statues of illustrious citizens of Milan. This palace contains a valuable library, a numismatic collection in which are more than 50,000 coins and medals, eight rooms devoted to paintings and sculpture and an archaeological museum. Besides the Palazzo Brera and Ambrosian Library already mentioned, and in which there is a bust of Byron by Thorwaldsen, Milan possesses also a musical art museum and a civic museum for collections of natural history, mineralogy and ethnography, the Museo Poli, which contains a rare collection of jewelry and ancient arms, and finally the Palazzo della Ragione, where are stored the archives of the city, amongst which are found documents dating from the seventh century. The amphitheatre of the arena is an imitation of a Roman structure, built by the architects and in the same spot where the historic arch of the Porta Ticinese. This amphitheatre is elliptical in form, measuring 326 metres on the major axis and 152 metres on the smallest. It can accommodate 50,000 spectators, and around the arena the architect has arranged a canal, which could be filled with water and used for naumachia. In 1807 a regatta was given in this way in honor of Napoleon I.

Like all the great cities of Italy, there is at Milan a royal palace, formerly the residence of the rulers of the city. The royal palace at Milan has nothing remarkable in its style, but it contains one of the rarest curiosities of architecture which can be mentioned. We can still see here a little church dedicated to St. Gothard, which serves to-day as the court chapel. The tower constructed by Pocoraro, of Cremona, is a very marvelous construction in terra-cotta. It was built when Lombardies excelled in this kind of work, but there now remain to us very few specimens of the kind, because of the relative fragility of the material employed. It cannot defy the ages as can granite and marble.


These plates will give an idea of the possible appearance of the Forum at the time it excited the admiration of Constantius as is narrated in the article on "Equestrian Monuments" elsewhere in this issue. Luigi Canina, from whose famous work "Expos histotique et topographique du Forum romain" (1834-45) these illustrations are copied, was born at Genoa in 1729 and died at Florence in 1856. About 1829 he went to Florence and became architect in ordinary to Prince Borghese and was employed by him on excavations in the Roman Campagna and the Via Appia. After remaining here several years he passed to Turin and became professor of architecture in the Turin Academy of Fine Arts. In 1842, he was elected Associate Member of the Institute of France. His most important work was "L'Architecture antique décrite et demontrée par les Monuments," in nine volumes, published between 1830 and 1844.

VIEWS IN MILAN, ITALY.—SANTA MARIA PRESSO SAN CELSO; PANORAMA; INTERIOR OF THE CEMETARY, MACCLACCHI, ARCHITECT; ABBEY AT CHIARAVELE; STATUE OF FREDERIC ROHRMOM; INTERIOR OF SAN AMBROGIO. COTTAGE FOR DR. EDWARD WIGGLESWORTH, JACKSON, N. H.; MR. J. P. PUTNAM, ARCHITECT, BOSTON, MASS. A MAUSOLEUM FOR MRS. L. C. HUCK. MR. A. CUDDELL, ARCHITECT. MEXICAN MERCHANTS EXEMPTED FROM MILITARY SERVICE.—There is a law here that whoever will learn to play well on one instrument and play on the plaza one or more evenings in the week shall be excused from military duty. The result is that every little town has a band that any of our large cities might be proud to own, and these public concerts afford one of the greatest pleasures of a visit here. As I write a fine band is at the door of the hotel serenading the black but comely prima-donna of a monkey and dog show who is stopping here. The semi-weekly concerts on the plaza serve the purpose of our fashionable walks and drives in bringing the people together to gossip and exhibit their clothes. The music commences at 9 p.m., and continues till midnight, during which time the plaza is crowded with people, though, to an American, it seems anything but gay. —Exchange.
Mausoleum
for Abolikoff,
St. Petersburg Cemetery.
EQUESTRIAN MONUMENTS. — V±

THERE was a special appropinquity in making an equestrian statue of Caligula, for he was unquestionably extravagantly fond of the animal, and one of the best known of his many mad freaks was proclaiming his horse Incitatus a consul, and endowing him with priestly functions also. Naturally no treatment was too good for so noble and Intellec
tual an animal, and ivory, mar-
gold and golden water-pail were his to use, while the less exalted animals of the imperial stod fared less luxuriously. Although this statue of Caligula favored the British Museum, is but a piece of patchwork — the rider's head, arms and right thigh and the horse's near foreleg and hind-leg, one ear and part of the mouth are pure restorations, while the off hind-leg contains only occasional fragments of original make — it stands high as a piece of art and would stand higher, and in spite of its size — it is only 6 feet and 84 inches high — but for the existence of the Marcus Aurelius. There is no sure proof that the statue really is a Caligula and not some later Caesar: it has, however, been so styled since its discovery in the sixteenth century and will probably always be so known. It is one of eleven marble statues bought for $30,000 by the Museum authorities in 1864 from the Ex King of Naples, and before that time had a place in the Far
nese galleries.

Amongst the less important pieces of antique equestrian sculpture now extant may be enumerated briefly a bronze horse found in the Baths of Constantine and now in the Palazzo Rossiglione at Rome, and another found at Herculanenum and now in the museum at Naples; a group which represents a horse attacked by a lion, found in the best of the Altes, and which very evidently served as the model for a similar group which supports one of the columns in the pulpit in the Cathedral of Sienna; a horse in the grand ducal gallery at Florence which, being found near the spot where were found the scattered remains of the famous group of Niobe and her sons and daughters, is supposed to have borne one of the sons — who is fabled to have been slain by Apollo, while engaged in ex-
creating his favorite horse; a bas-relief in the Villa Hor
gerne at Rome which shows Mar
cus Curtius leaping his horse into a marsh — the fabled yawning chasm—to save Rome from destruc
tion; and another bas-relief of the same hero in the gallery of the Earl of Pembroke at Wilton, England. To here speak of the great number of fragments of professional friezes in which the horse is introduced — Panatheniac frieze, the Phigalian mar
bles, the Giganto-
nachia, unearthed by the Germans a few years ago at Pergamum — and the still greater number of sarcophagi representing horsemen in which appear horses, most admirably modelled, must be left for future treat
ment; but one fragment of an equestrian statue should be men
tioned, the head and shoulders of what is supposed to be one of the horses attached to the quadriga which crowned the famous monument erected at Halicarn
assus in memory of Mausolus, King of Caria. If this bit of sculpture may be taken as a sample of the whole, no one will feel inclined to dispute the right of this monument to a place amongst the seven wonder's of the world. Just when destruction overtook it is not known, but it probably fell a victim to an earthquake in the thirteenth century.

The vague speculations that have been sketchedy presented as to the great losses 2 restorability can charge to the accidents or blunders which have mischance in the matter of sculptures representing animals in definite shape as soon as an attempt is made to give some account of those equestrian statues of which little is left but the mere name, and the name is not a guaranty of the worth of the subject, as more of them are unaccounted for incidently than formally described as art works of prime importance. When it is brought to mind that Roman leaders brought to Rome statues by the thousand 3 — three seem to have been brought to Rome by the year B.C. 100, proof of real prowess — it can hardly be doubted that among them must have been many equestrian. It seems fair to assume that some of these statues were small, perhaps nothing more than travelling gods which were taken in and amongst his impertinent baggage wherever he went, and some of the early statues were probably not imposing in size; indeed, it is recorded that the equestrian statue which was erected to the honor of Claudius at Rome some four hun
dred years before our Christian era stood only 35 feet, so its destruction by fire need not be considered a proof of a very great configuration.

The art of confection may be slow but slow, or else the early Romans did not have a great love for the horse, as it is said to have been a very unusual mark of honor that equestrian statues, at that time "a great rarity," should have been erected to Caius Menenius and Lucius Furius Camillus, the consuls who completed the subjec
tion of Latinum about 338 B.C., but nothing is said as to their being big or little: even the fact that the statue of Menenius was placed on a tripod at the Forum of the Caius Menenius at the Capitol does not give any clue, for though the base was unearthed and identified not many years ago, who can say how big an affair this column was. But earlier than any of these is a record a myth that Romulus him
self created his temple at the Capitol. Amongst the 25~bf's about 700 B.C., a bronze group — himself seated in a quadriga and just to be crowned by a Victory. If this tale be true, this piece of sculpture not only long antedated the first Grecian quadriga which was set up before the Temple of Apollo, Palatine, B.C. 470, but shows how common a thing working in bronze must have been for it to be possible to do such a work in a raw and recently founded nation. To be sure, it is generally conceded that bronze found was known to the Romans at an earlier date than to the Greeks, but two hundred years is a long lead for the less artistic nation to have gained over the other. The horse and rider shown in an equestrian design was the horse and rider, and the many vases which were decorated with im-
cidents that were common in the hippocampi and cireusses, and the knowledge that these great gathering-places were decorated with many statues suggests strongly that there had been found statues of boxers, foot-racers, wrestlers and gladiators, here, too, must have been seen many a statue of a favorite jockey on his no less famous horse, and many a charioteer in biga or quadriga guiding his clumsy vehicle swaying behind the flying steeds. Pre
dents that have come to us are, then, quite as likely to be parts of the ignoble hero of the race-course as portions of some patrician soldier raised to the rank of demi-god in honor of some conquest

1 Continued from page 36, No. 60.
2 The statue at Pompeii.
3 Statues as Prophetic.* — During the siege of Byzantium by Septimius Severus on the citizens "precipitated from the walls upon the heads of the besiegers entire bronze statues not only of standing but of equestrian form."
4 When during the reign of the Emperor Justinian, Theodorus, King of the Goths, in the year 527, led siege to Rome by his general Vitiges and the Emperor Adrian was assailed, the besieged defended themselves by throwing statues down upon the heads of their attackers. — Ver sacrum: "History of Sculpture.".
5 Monument of Ancient Statues." — 150 B.C., M. Pulvinus Nobilior erected the Athenians and Ambrakius, that city which had been the residence of the art
loving Pytches, King of Epirus. From this favored spot, as well as from others in honor to Greece, the Roman general carried off an almost incredible number of bronze groups which should make his name ever revered. It appears, however, that he had prev
ceded, this is told, that he also brought Greek artists with him to direct the artistic arrangement of his celebration. In his triumphal procession were seen two hundred and eighty-five statues in bronze, as well as two hundred and thirty in marble, and many seemed to have been taken from the sculpture of the heroes. At Athens in honor to Socrates, a larger number of statues were represented, many of them being found in the Roman Forum.
6 "From Heberle and Burn's "History of Ancient Sculpture."
7 About two centuries before Christ, the Saracens conquered Constantinople, and so the capital of the Byzantine Empire was removed to Iconium in Asia Minor, where it was continued for many years, and Iconium was afterward called Iconium, and Constantine the Great carried it to the ancient seat of Byzantium, and called it Constantinople. — "From the "History of Ancient Sculpture."".
8 About 1001 A.D., a coin which bears the representation of an equestrian statue on a base pierced by three arches with the legend M. EMMILIG LEP is supposed to indicate the building of the tower of the city. These statues may also be taken as proof that an equestrian statue of the projector finally adorned his completed work.
9 Another coin Interred at MARITURUM AGMAX. was mounted figure supported by the many names of an aqueduct and may indicate that the Marseian aqueduct once upheld an equestrian statue of Quintus Marcius. Men, who in 148 B.C., began to build the aqueduct which when complete measured some sixty-one miles.

Horse from the Tomb of Mausolus.
fancy to bestow on his native town, such as the troop of gilded horses that Scipio Metellus set up in the Capitol; or the four gilded horses which Herodes Atticus, the famous orator, presented to the city of Corinth at a later period in the second century of our era, horses, by the way, which rested or pranced upon ivory hoofs.

The gilding of bronze statues seems a little like refining pure gold and about as ineffective, for to many people there is no pleasure in looking at a bright bronze statue, which is often as effulgent as a fully gilded one could have been, and modern taste requires that the patina of antique bronzes should be simulated by a chemical treatment of the surface. Whether the gilding was applied for the purpose of increasing the decorative effect, or whether it was in-

1 Gilding.—"A quadriga with the Rhodian sun-god, by Lysippus, so pleased Nero, that, in a burst ofahirbrouche enthusiasm he caused it to be covered with gold. But this treatment so detracted from the artistic worth of the work, that the emperor of the precious metal at a later day was considered only to have increased its value, even though ugly scars were left behind."—Mitchell's "History of Ancient Sculpture."

work, as from most points of view it must have been distorted through foreshortening. Moreover, a horse and rider elevated to such an altitude can hardly be accepted as being naturally posed, although there are many European towns where there exist legends that once upon a time such an one rode his horse up the winding stair of such a tower, and after accomplishing his aimless feat rode safely down again. A mounted figure crowning one of these historic towers, such as the Giralda at Seville, or the Church of the Savior at Copenhagen, would account for itself on the ground of symbolic value. Mention has already been made of the statue of Marcus that crowned the Columna Menia in the Forum at Rome, and there are records of others, such as the statue of Probus on the column at Merton, near Mets, erected in honor of his victory over the Germans, and of which the annexed cut is a more or less authentic record. But the most interesting and elaborate structure, one which from its size must have seemed dignified, was the famous column at Byzantium one hundred and five feet high, which was erected near St. Sophia in 438 by the order of Justinian in honor of his victory over the Persians, and is reputed to have existed in a more or less dilapidated condition till as late as the sixteenth century, when, it is likely, the Mohammedans gave it its coup de grace. The artist Eustachius, who is said to have been a Roman, was probably inspired by a recollection of Trajan's column, but in place of erecting a piece of marble sculpture he built a brick core, covered it with bronze plates, and then placed on the summit a bronze statue of Justinian, which is said to have been some thirty feet high, and hence holds a place amongst the largest equestrian figures ever modelled. Other authorities say that the crowning figure represented Theodosius.

What might have been the merit of the equestrian statue of Trajan which stood near to his triumphal column in the midst of his forum may be surmised from the effect it had on Constantius II, when, in 357, he visited Rome and was overwhelmed with the magnificence he saw all about him. Feeding that it would not be possible to reproduce in his Eastern capital the glories of the Western city, he contended himself with expressing a desire to have a replica of the horse of this statue, and for his modesty was most cruelly snubbed

1 From Miller's "Denkmaler der Alten Kunst."
by a travelling-companion, the Persian Prince Hormisda, who sug-
gested that he must first "order a similar stable to be made for him, if that be possible, so that your horse may be lodged as magnificently
as the one we beheld."

In 1878 much interest was excited at Rome and elsewhere by the raising from the bed of the Tiber of fragments of a colossal equestri,

\[\text{Equestrian Groups on the Proscenium-wall of the Paris Opera-house.}\]

\[\text{In the Vatican Museum.}\]

\[\text{From the Gallery of Chariots at Olympia at Wilton.}\]

\[\text{A Persian Prince.}\]

\[\text{Horses of the Roman Cenotaphs.}\]

\[\text{A Persian Painter.}\]

\[\text{A Persian Prince.}\]

\[\text{The American Architect and Building News.}\]

\[\text{125}\]

\[\text{by having in one side a window, from which Menestheus, Teneer and the sons of Theseus peered as if to see whether all Troy yet slept.}\]

The horse and chariot was always a favorite with both Greek and Roman sculptors, and records exist of many such groups, as for instance, the bronze group modelled by Agelidas, the master of Phidias, Myron and Polycletus, which commemorated the victory of Cleis-
thetians at Olympia in 576 B.C., and showed him standing in his chariot, while his driver guided the four horses who shared the immortality of victory by being inscribed with their respective names. While Praxites, the grandchild of his more famous descendant of the same name, modelled the charioteer for a group by Calamis in order that the human figure might not be unworthy of the horses, in the portrayal of which Calamis excelled, while as a sculptor of the human figure he ranked less high. Fliny speaks of his horses as "equis semper sine omnino expressis,"—beyond all compare horns. This chariot is supposed to have been the one which stood on the Acropolis, erected
in memory of the victory of the Athenians over Chalcis in Euboea, and its erection there is testimony to its superlative merit. It is known, too, that Pythagoras extensively loaned it, and that Demosthenes, who spoke its praises to the Greeks in his famous speech on the return of Gla, Ôtia, and the Olympic Games to the victor of the Oenomaus, a native of Cyrene.

In this group the victor was not the only honored with statues. Caius, of Sicily, was also honored with the statues of boys racing their horses, and Diodicus, also, moulded a boy who had just been victorious in the horse race in the same kingdom. The evidence that light-weight jockeys were valued in those days. Another evidence of the popular esteem for horse and horseman is to be seen in the fame of the bronze statue of Simon, a man who not only rode horses, but was also a weightlifter, who was made by Demotrius of Alcpece.

These antique equestrian statues did not all have to be of colossal or even natural size, for Dionysius made a statue in bronze of a famous little mare with her groom beside her: the companion group, a horse and groom, was moulded by Simon, an Athenian sculptor.

VICTORS OF GAMES. — "Gaulia" executed for Genon of Syrakusae a chariot and four horses (quadriga) in honor of the victor in the Olympic chariot-race, and added a statue of the owner, that Stiliac tyrant. 1 — Mitchell's "History of Ancient Sculpture."

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TERRA-COTTA GLADIUSIA. — "On the acrerotation of the temple of Jupiter Optimus Maximus erected by Tarquinius Superbus, stood a quadriga of terracotta, which was transported to Rome with the temple of the Capitoline, and now stands in the Roman Forum, and is thought to have been the prototype of the quadriga of the city." — From Dyer's "History of the City of Rome."

FIVE HORSES. — Lucius Verus when crowned a statue of his horses Volturnia to be set up in the circus.

CALCULAE. — Calas Caesar Augustus, third Roman emperor, son of Germanicus and Agrippina, born A.D. 12; succeeded Tiberius in 37 after the promise of a beneficent reign, gave way to the envy and cruelty of his sons, of whom he had a number of children. His death was mourned alike by senate and people and the enemy presently declared him emperor. His portrait was found on a coin, and his name is still used as an epithet by the Greeks for a beneficent ruler.

DOMITIAN. — Titus Flavius Domitianus. Born at Rome, October 53 A.D.; died 96 A.D. One of the least interesting of the Emperors, he was a weak and vacillating ruler, but his death was a great blow to the Roman empire. His name is still used by the Greeks for a beneficent ruler.

The GREEK ANTIQUITIES SCANDAL. 1

The sensational story last week of M. Primolou's, the universally respected President of the Police Department of the kingdom, is, it is only one of the many examples of the extraordinary revelations of what is now popularly known as the "Antiquities Scandal." 1 — revelations which have spread consternation in every capital of Europe, and which may affect in a manner which is nothing disgraceful to the public institutions of the United States, the whole of the world, and the history of the nation.

Within the past month the Louvre Museum at Paris, the British and South Kensington Museums in England, the Imperial Museums at Berlin and Vienna, together with a host of minor establishments of kindred character, have been forced to surrender nearly all the most valuable specimens of ancient Greek art which have come into their possession during the last eighteen years. In order to realize the effect of this, it is only necessary to remember what enormous sums are annually devoted by the various governments of the ancient world to the protection and increase of their national collections of ancient art. Baron Alphonse de Rothschild at Paris and the Dukes of Sutherland and Westminster in England are only the most prominent of those who have adopted the plan of buying up the works of art of the ancient world and selling them at a gigantic scale, and a ring of the most prominent officials of the country has been formed to implicate in the matter. Among their methods are the direct influence of the various governments on the other national art collections, several of the principal surveyors and directors of the various art schools, the Public Art School committee, and the other auctioneers and dealers who have been implicated in the matter. The thefts have gone on indefinitely had not the attention of a Greek diplomat in London been attracted to the news about the British Museum on the basis of which the police were first asked to inquire into the matter. On the strength of this evidence the police have been able to make arrests on the spot and to recover the stolen goods.

The thefts might have gone on indefinitely had not the attention of a Greek diplomat in London been attracted to the news about the British Museum on the basis of which the police were first asked to inquire into the matter. On the strength of this evidence the police have been able to make arrests on the spot and to recover the stolen goods.

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WHY WE PUBLISHED A CERTAIN ILLUSTRATION.

To the Editors of the American Architect:

Dear Sirs,—Whilst I fully appreciate the trials that beset the editor of an architectural journal and realize that endless patience and tact are required to even approximately satisfy the importunities of agile contributors I cannot help but feel that the endeavors of practical journalism demand that subscribers should suffer the infliction of such reproductions as the “Studies by Architectural Students” in your issue of Sept. 1.

These studies are simply the work of students is no plea for their publication — nor for their suppression. Your paper has in its day published student work of merit, showing ability, good training, etc., and the development of young minds in the study of their calling. But such work in large qualities can be shown in anybody's work — students or practitioners — let it be published; but when none of these qualities are apparent I maintain that to publish the work does a positive harm to the students, to the reader, and most of all, to the journal itself.

I write this in no unkindly spirit, but as one interested in the proper encouragement of architectural training and in the continued good name of your journals.

An Initial Subscriber.

THE SPIRES OF STRASBOURG AND COLOGNE CATHEDRALS.

LOUISVILLE, Ky., Aug. 28, 1868.

To the Editors of the American Architect:

Dear Sirs,—In the article "Italian Cities" of your last issue occurs the passage that the highest piece of masonry, which exists in Europe is the tower of the Strasbourg Cathedral with 426 feet. I have heard it stated with positive authority that there are several towers in Europe; namely, the Cathedral in Cologne on the Rhine, the spires of which are over 500 feet high; they are the highest church towers in Christendom. They were completed within the last fifty years and are still remaining in an active, healthy condition for several centuries. The most remarkable thing about these towers, aside from their height, is that they have been executed from the original drawings, which were found by chance. They are built in stone to the top.

A DISPUTE OVER IMPERFECT WORK.

NEW ORLEANS, La., Aug. 29, 1868.

To the Editors of the American Architect:

Dear Sirs,—We write to ask you to settle a dispute between a building-committee and ourselves. The points in question are these: A flat roof in which rest heavy timbers carrying large water-tanks was built with so little fall that the water lies in the centre and is calculated to rot the bearing timbers. The other point is, galvanized-iron hip-rolls that are so constructed that they leak and will have to be taken off. The building is a very large one covering a piece of ground 150 x 250 feet. We were not allowed a clerk-of-the-works and had to superintend the construction without this aid, and these points escaped our notice. The building was accepted by us and by the building-committee, and now these defects show themselves some months after acceptance of the structure, and notwithstanding the "General Condition" clause of specification which reads as follows: "The builders must give bond for the repair of all work, not done in substantial accordance of his work that may require repairs for the period of twelve months after completion." The building-committee demand that we, at our expense, repair and make good this construction. We hold that the contractors are the responsible parties for defects of this kind.

In the roof-timbers were not properly levelled, it is the builder's duty to make them right. If the hip-roll was improperly made or put on it is for one of a person who made it and not for us to replace it properly. It is absurd to expect an architect to see everything that may be expected. A swindle about a building. If its plans and specifications are skillfully prepared, and he undertakes to make the work up to the standard of excellence, the defects of the usual length, and orders the correction of such mistakes as he sees he has a claim for damage, and the contractors are not for not being com- pensated. His certificate or acceptance of the building does not alter the case. It is well settled that the architect's certificate is simply an expression of his opinion about the building, and not in any way a guarantee of the work. Even if his opinion was a mistaken one, he is not liable for any damage unless the mistake was the result of gross carelessness or ignorance, and an erroneous certificate of the completion of the building was not free the builder in the least from his obligation to complete it according
to construct. Architects and owner would do well to remember that the architects’ duty is to furnish proper and skilfully made drawings and specifications, and all scientific directions; and the builders is to perform the con- tract to the letter. The architect helps the owner by endeavoring with reasonable diligence to detect violations of the contract, but he never in this degree takes the place of the contractor.—For American Architect.

The Claim of Greeks to Greek Antiquities.—Speaking of the plea of ownership in everything dug out of her soil, recently put forward by the Greek government, Mr. Bartolome says: Once the privilege of antiquarian capture, subject, of course, to the proper provisos of the law known as “treasure-trove,” was lost sight of; since then, the Greece, and the part, and each successor, treasure of the country, has been brought to light; but, for the good of the whole thing, mankind, was reduced to the level of a petty thief or a well-meaning burglar, and there would be an end to the study of the past. We should have the Ptolemies crowding from Cairo to claim the mummies of their ancestors, and some Babylonian and Assyrian gentlemen whirling up Babel to demand the wages due to their forefathers’ halls and palaces. Moreover, the situation would become still more complex; indeed, a European war could scarcely be obviated if the Greeks and the Turks were to agree to compete in this field. But the manufacture of her antiquities, and retell the story of the recently con- fiscated Fiden fragments of evidently modern workmanship, which have been announced as due to the mystery of the circles; it is indeed, be it Greek feels that her simple sons are ready to flood the market wish to appear in antiquities, and that she has not of recovering her won- ding dignity. Nor is it needful to reiterate that some of the best “bits,” in Greek collections come from European Turkey and Asin Minor, and, on a large scale to that advanced by the Russians, is being put back by the Government of Constantinople; we rather base our objections to this proposed cry of “Give them back” on the long recognized right of the government of the country where the goods were found, and never on the possible idea that their removal might be compensated by losses, or let investigation, is generally the case, only to be allowed to take place by virtue of a “firm,” or some similar potent instrument. But in the proposed treaty of commerce, arrangement is being made for a scientific sorting of artistic treasures, is a wholly innocuous and ridiculous scheme.

The Accident at Stewi-Cathedral.—Further particulars of the accident at Sheepsgate this morning are not yet known. Land ships are running in and out, and the priests are early this morning about three o’clock in the afternoon when the people of Stewi-Cathedral who lived near the Cathedral (writes a correspondent of the London Daily News) heard the explosion, and are so terrified that it must be a repetition of the explosion of 1884. Soon a cloud of dust filled the air, and those that rushed out were told that one man of the “dust- man” had been blown right out of the Cathedral. The news astonished nobody, as it had been expected. Many, indeed, for the Cathedral is an industrial activity, the foundations of which have been undermined by other buildings. Unfortunately, no one was in the building at the time. It happened to be the hour of the “sisters.” when only those who have something particular to do can go there. It is the custom of one of the sisters who have been in a dangerous state has given way as fast, bringing down with it a considerable portion of the nave over the choir. The firing is the sure sign of the further development of one of the priests near the Cathedral Church before it was transferred to the Cathedral, were much damaged. The architects say that they had repeatedly called attention to the condition of this part of the Cathedral, but that, not expecting any immediate collapse, they had paid more attention to other parts of the church, which are in an equally dangerous condition. Even the lovely Giralds tower is reported to be in a very unsatisfactory state. The Cathedral has been closed by order of the authorities, and it will probably some years before strangers can again visit the great attraction of the Andalucian city.

Berlin, Germany.—Under the heading of “New Berlin,” many interesting particulars of the progress of the Prussian capital since 1871, have been gathered together by Professor Palacky, and contributed as a feuilleton in the Berliner Tageblatt of Friday. The Prussian capital is now no longer a city of mud and brick, containing 93,000 houses and 233 public libraries in Berlin, with more than 100,000 volumes. Vienna’s 26 public squares are compared with 58 possessed by Berlin. Though Vienna has its Prater and Paris its Bois de Boulogne, Berlin surpasses both in its Grunwald, with its immense extent, its hills and vales, its woods and lakes, villas and hunting-lodges. The northern limit lies close to the houses of Charlottenburg, the largest suburb. Berlin expends yearly more than 10,000,000 marks on the poor, and mendi- cant relief. The charitable institutions of the city without reward. More than 12,000 of them are now thus working for the town, while the number of paid officers is comparatively small. The 51 magistrates, upon the direction of affairs in the “Red House” have no salary, though their office is no sinecure. This unselfish devotion to the general well-being is the sure guaranty for the further development of the city, is only four years ago that the Prussian Landtag voted 4,000,000 marks for the increase of the royal museums of Berlin. Several millions of marks have been recently voted for deepening the bed of the Spree and for improvements of the Upper Spree canal, which will greatly facili- tate the trade of the city. The city railway costs enormous sums. The royal palaces, though in palaces and stately mansions, in style, have luxuriant and com- modious interiors. Four monumental post-offices of granite and marble. Polytechnic at the west end of the Tiergarten are the boast of the state. The new palace is transferred to its foundations, and in less than three years it will probably be the greatest ornament of the city. A striking illustration of the pro- gress of Berlin is the almost 12,000 students of the University, who numbered in 1887 no less than 6888. At this moment the University of Berlin is the most frequented in the world; that of Oxford comes next. The town, in the next few years, will receive all foreign pupils in the new Polytechnic number more than 12,000, and all other schools are in a flourishing condition.

Trade News.

Builders complain that they have not been favored with the same con- cessions in prices, in building-materials, that have been made on other manufactured products. The falling-off in building-activity throughout the country is likely to be a considerable one. The demand for new buildings is not more than 50 per cent. In New York State, the building activity is estimated at about 30 per cent, in Chicago at 10 per cent; some authors even naming 20 per cent. In New York State, the total building activity is estimated at about 50 per cent. In New York City, a better condition of things is reported. Most kinds of building material are declining; the supply of brick is far from sufficient, and the price threatens to remain high. The long-continued production, in the hope that a heavy demand will relieve the situation, Nails have reached 2 cents a pound. Good nails have sold at New York and Boston, at 81.75. Lathes are also low, but lumber maintains its average quotations, under a good steady consumption. The reason for this activity is due to the purchase of enormous quantities of white and yellow pine, leaving comparatively empty the Eastern market. The idea of the lumbermen if the quotations are worth giving, it out no more, that a reaction will take place largely upon the returns of all roads between Penn- sylvania and Missouri. Kansas has been doing well very in several of its larger towns; certain sections of Missouri have been active; in others, little progress has been made. In the State of Washington Territory, there has been great activity, especially in railroad construction. The Washington Territory government, is almost a dream of the American capital next year. Montana also is opening up opportunities for enterprise. Railroad construction in the Southwest will be actively pushed. Chicago, Atlanta, and New England States are making railroad schemes, and are anxious to prosecute their work early in the Spring, even against the prior demands of American builders. The iron industry is constantly improving, throughout the country, but the full volume of demand will not be reached until the elements of prosperity are felt in all trades, as above stated, is very active in the West, and fairly so in the East. Between 30 and 40 saw mills are now being erected along the South Atlantic coast, and the building activity in that section is much better than was anticipated. The projected work this September as there has been in any month in the year. In the South, a great demand for capital in the manufacturing of all kinds, are such as to encourage additional capital to enter into the same channels of activity. Speculators are not to fear a future low in the market, but much more likely to fall in the fall. A boom in railway stocks is at all events as impossible. Speculative talent will probably have but little employment in the next few months. Values are too well understood; the earning capacity of railways is thrown before the eyes of the public more freq- uently and thoroughly, that there is but little room for investors to force up values by any kind of false figuring. There is, however, a wide field for new owners who are interested in getting up roads, and there is danger from this source despite the intelligence and alertness of the public. Unpopular as it may be to assert the fact, the growth of trusts at this time, is a sort of curious development; and no legislation, however severe, that attempts to punish the managers of these colossal combinations very careful how they pro- ceed. Without theorizing on the question of the permanency of the enormous productive capacity of the country requires some form of control beyond that created by old trade associations and organizations. Exist- ing commercial and industrial methods; the growth of trusts may, for the present, threaten prices, and bring about the greatest profits to the same. They attempt to saturate the market with goods, and which are sure to follow their growth, will protect the people from harm, and not from profit. At the same time, the manufacturing itself, and such demonstration occurs to the intelligence of many people as are now crying out against them. For all that, the trusts them- selves are not organized for the purpose of doing all they can of what comes within their reach. They will be un- able to identify any large group of men, and to beat them in the market to the one of the cities. The men in the factories are adding daily to their labor force, and orders are daily increasing for supplies for immediate, and also for winter delivery. No industry is in a dangerous condition, but the high prices of raw materials is as- sured in the constancy of the low prices, which the competition of the past month has established. The only improvement in prices is the withdrawal of the very low quotations that hard-pressed merchants and manufacturers have made for the sake of business. Apart from that, there is this further advantage in the low prices, that consumers, because they have confidence that the production of the country is sufficient to supply all wants as fast as they legitimately arise.
THE AMERICAN ARCHITECT AND BUILDING NEWS.

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SUMMARY:


BUILDERS' NOTES FROM LETTERS.

The report of the Commission of Inquiry, appointed to examine into the circumstances which led to the fall of the tower of the new Church of the Covenant in Washington, two or three weeks ago, has just been made public. The Commissioners, who are all experts, commend the general design of the tower, in which, as they say, the various pressures and resistances were carefully ascertained and provided for, but condemn the workmanship, and a part of the materials used. The specifications called for rubble foundations, and for dressed-stone facings to the superstructure, backed with rubble, "well bonded," tied to the ashlar face with galvanized-iron clamps wherever necessary or expedient," and laid in mortar made of "the best Rosendale cement," and a certain proportion of lime and sand. Instead of complying with these requirements, the contractor built the rubble-work mostly of small stones, or rather, as the Commissioners say, of "shapeless chunks and chips," "very badly bonded," tied only at rare intervals to the facing, and laid in mortar which was "practically worthless." The foundation walls were only four inches thicker than those of the superstructure, and built in the same way. The conclusion reached by the Commissioners is that the fall of the tower was caused by the badness of the masonry, and this they lay mainly to the contractor, but think that the architects were at fault in providing for the specifications for any lime whatever in the mortar, for not designing the foundation-walls thicker, and for not having watched the work more closely.

WHAT were the relative proportions of lime and cement specified for the backing they do not learn from the report, but the requirements for the mortar in which the facing was to be laid were that only sufficient lime should be used with the cement "to make the mortar easily workable." Analysis showed that all the mortar, for facing and backing alike, actually contained about one part cement to two parts lime, but it was all of such workmanship that hardly any two stones in the ruins adhere together, and the mortar is mostly in the condition of sand. Although the Commissioners make some judicious remarks about the mortar, calling attention particularly to the fact, which is not always remembered by architects, that it is still less frequently thought of by builders, that the mortar "is the great dependence for strength in rubble masonry," we are unable to agree entirely with them that no lime ought to have been used in the work. The mortar for the church appears to have been made with bad lime and worse cement, and we all know that some Rosendale cement is so very bad that, as the Commissioners say in this case, its use adds nothing to the strength of the mortar; but with good Rosendale cement, and good lime, we have General Gillimore's high authority for saying that "the addition of lime to the cement, up to a proportion of equal parts of lime and cement, does not materially injure the mortar;" while, with any quick-setting Rosendale cement, in the climate of Washington in summer, it would, we should say, be often necessary to add lime to the cement to prevent it from setting in the tubes before it could be used. As to the foundation-walls, the Commissioners say that they would have been sufficient, if laid according to the specifications, but they think that the architects ought to have presumed that the contractor would not keep his promises, and to have provided a wider "margin of safety" by making them thicker.

At the end of the report, the Commissioners say that it appears that "largely for want of the intelligent supervision required of the architects, the contractor's materials and specifications," the mortar "was not of a quality that "therefore the beautiful tower fell," and they say also, that the "deplorable results were due in a great measure to an entire absence of any continuous personal direction, supervision or inspection by the architects or their representatives, other than some occasional visits, for a few hours or a day each, at intervals of some six weeks;" yet in almost their closing sentences they say that "in form and dimensions the tower furnishes a thoroughly substantial and permanent structure, needing but the simplest kind of good materials and workmanship for its proper erection." These two sentences illustrate with unerring the standing controversy between architects on one side, and builders and owners on the other, in the United States, which is every day becoming more serious for our profession. To take what architects consider to be the obvious view of the case, the report states that the architects of the church did the work they engaged to do thoroughly, skilfully and conscientiously; while the contractor deliberately broke his solemn promises, and slurred and neglected his work until the tower fell down, yet the Commissioners leave him gleefully sipping his pockets, in which he has safe the money which he gained by not doing what he was paid to do, and say that they think the "deplorable results of his performances are largely due to the architects, every one of whose wise and skilful directions he intentionally disobeyed. Most architects, we are sure, regard conclusions of this kind as monstrous, and consider it too obvious for argument that the person to blame for not doing what he promised to do is the person himself; and that the individual who ought to restore stolen goods is the one who stole them; yet in building matters the great mass of mankind think with the Commissioners that if a contractor succeeds in pocketing as profit half the amount of his contract by the simple process of not doing what he agreed to do, it is the architect, not he, who is to blame. The ordinary sentiment is in this case well expressed by an editorial note in the Washington Star, which says that "in the mind of intelligent and disinterested persons there can scarcely exist a doubt that the architect is the one who must, primarily and finally, be held accountable, both morally and legally." Other words, according to our interpretation of his remarks, the editor of the Star thinks that the man who was paid for building the tower properly, and did not do it, ought to be allowed to keep the money, while the man who prepared good and skilful plans and specifications for it is the one who ought to make good the damage incurred because his specifications were not followed. That the architect was paid a small sum for "watching" the building might not, in the professional mind, alter the case at all, for the reason that he knows that it is absolutely impossible for any architect, in the visits of supervision usually made, to detect a hundredth part of the contractor's omissions and mistakes, any more than to the builder. And he cannot conceive that any sane man should expect him to do so; but, on the other hand, the public generally assumes that by paying the architect a tiny fee he becomes individually responsible for all the contractor's work, and can be called upon at any
So far as this country is concerned, the latter idea is altogether too well founded for the good of our profession. No matter how limited the contract is in size, if the work is properly handled and the supervising work under his charge, he is exonerated from liability on account of the contractor's failure to follow the specifications, it is far otherwise if he is found to have neglected that "due diligence" which a jury may find to have been required under the circumstances. In such a case, although the contractor is clearly the person at fault, the law in this country is that the owner may, if he chooses, recover damages in full from the architect, leaving the latter to get reimbursement from the contractor, the real person at fault, if he can. If there were any standard of the due diligence required of the architect to guard against such failures, one would be always provided, at the expense of his client, to watch the workmen from day to day, see to the mortar-mixing, report to the architect, and, in general, to do just what would have served, in the case of the Washington church, to detect the bad work in time to have it pulled down and done over again. Here, on the contrary, most architects are their own clerks-of-works, and are compelled in consequence to devote themselves, for fear of the terrible penalties which may punish a few days absence, to unremittling toil, while their more fortunate neighbors, the doctors, lawyers and merchants, are enjoying vacations all about them. Occasionally an architect is found who refuses to submit to such a burden. The late Mr. Richardson generally demanded, and received, two and one-half per cent in addition to the regular five per cent on the cost of the building, in cases where his clients wished for more careful supervision than that which would be given in a monthly or bi-monthly visit; and it is not very unusual in the large cities for architects to call upon their clients to furnish clerks-of-works, to keep up the minute daily supervision which they do not consider it their own duty to furnish. There is no question that they are right. It is for no one's real advantage that the architect, the planner, the designer, and the deviser of rules of construction, should be compelled to waste his time day after day in seeing mortar mixed, or bricks laid, so as to be sure of the exact quality of the work, nor can any architect pay half his commission to some one to do it for him. If architects are to be bound by supervision of this sort, they must be paid for it; if not, it must be generally understood that their clients, if they desire it, must furnish it themselves. There ought to be no great difficulty in getting this understood, and acquiesced in, by the public, and it would not be, perhaps, too soon for the Conventions of October and November to take up the subject.

We suppose that the American Public Health Association wishes for nothing more earnestly than as full a discussion as possible of the subjects to which it gives its attention, and we therefore make no apology for commenting, and inviting comments from other people upon certain matters which we find in its prize essay upon "Building a Home," by Professor Vaughan of Michigan University. After some very judicious remarks on soil and situation, Professor Vaughan gives us a full list of material to which exceptions are made to its rules that might with advantage be noted. The first rule is that all cellar walls ought to be "air and water tight," and this quality is to be secured by filling in a foot of "gravel or clay" all around them. If the foundation-walls are of "solid concrete," it is, "two or three inches from the main wall, and the floor is in all cases made of concrete about six inches thick covered with Portland cement or asphalt." That such a construction will be expensive, Professor Vaughan admits, but he thinks that it should be insisted upon, "even if it becomes necessary, on account of increased cost, to deprive the superstructure of some of its ornamentation." How many jig-sawed brackets it would be necessary to dispense with in the cornice to pay for such a cellar as his essay demands, Professor Vaughan does not say, and we doubt whether he has made an accurate estimate of the cost. If he has, it is evident he has not seriously proposed a structure of that sort as the only one suitable for the dwelling of persons of the class to which the essay is addressed.

In regard to the "perfectly water and air tight" cellar walls we suppose that the recommendation of the essay is intended to be taken with a liberal allowance, the cost of a cellar wall really water-tight, enclosing a given area, being not much less than that of an ordinary complete house covering the same area. Professor Vaughan, however, although he has seriously proposed a suitable structure of that sort as the only one suitable for the dwelling of persons of the class to which the essay is addressed.
BUILDERS' HARDWARE.—VII.

HINGES.—HASPS AND STAPLES.

WROUGHT-IRON h asps and staples are not properly to be classed with hinges, but it seems convenient to introduce them at this point. Ordinary wrought-iron staples are made in thirteen sizes, from one inch to six inches long. They are made both in plain and galvanized iron and are used in building operations chiefly in connection with wrought-iron hasps. Figure 59 shows the commonest form, a plain hasp with two staples. Hasps are made in even inches from five to twelve inches in length. A variation from the common hasp has a latch on the hasp which catches into one of the staples in place of a padlock, as shown by Figure 60. A natural simplification of this device is to do away with the hasp, connecting the staples by a wrought-iron hook, the staples being either driven independently, as in the previous examples, or riveted to plates, as shown by Figure 61. There is also a form of hasp and staple intended to be secured with a padlock, the locking-staple being swivelled on a back-plate which is screwed to the jamb.

In place of the ordinary wrought-iron hasp and staple, Figure 59, hasps are made bent at right angles at the middle so as to lap around the edge of a box or a door, if necessary. Rent hasps can be had in the market from five to ten inches in length. Besides this, there are numerous special forms which are made by a few manufacturers, and as hasps are always of wrought iron or steel, they can be bent to any desired shape.

The connection between hasps and hinges can be readily illustrated by Figure 62, representing a hinged hasp. This is a natural outcome from the common hasp and staple, the hasp being hinged in the middle, one end screwed to the door or box-top, while the other end has a slot through which is passed a staple for securing the padlock. The figure shows one of these, with an ordinary staple attached to a wall-plate. They are also manufactured with swivelled staples. These hinged hasps are made three, four and one-half, six, eight, ten and twelve inches long. The price is the same for either the plain or the swivelled staple. Some manufacturers have in the market varieties of hinged hasps made in brass or bronze for fancy work. These are, however, not used very extensively, and the form is more strictly for rough work.

A form of hinge-hasp shown by Figure 63 is sometimes used for extra-heavy work, and for trap-doors. In this, the hasp works upon a solid link of wrought-iron, and considerable gain of strength is so acquired.

STRAP-HINGES.

Hinges, proper, may be divided into two general classes: First, those which are placed on the face of a door or shutter, and are known as strap-hinges; and second, those which are mortised into the butt edge of the door and against the frame, and are, consequently, designated as butt-hinges. Figure 64 shows the commonest form of a strap-hinge, such as is seen on barn-doors, etc. These hinges are made in even sizes from three to sixteen inches long, measured when opened flat. They are made in various ways and widths to suit special necessities. A variety of strap-hinge is made by the Stanley Works, with the same sort of solid link that has been described for Figure 63. This form of hinge can be used only where there is plenty of room both on the door and on the jamb for attaching the leaves of the hinges. When the width on the jamb is restricted, as is often the case, a T-hinge, Figure 65, is used. In some cases it is necessary to have the fixed plate bent, a form known as the chest-hinge being then used, Figure 66. The latter costs considerably more than the common form. The T-hinges are about the same price as the ordinary strap-hinge. The Stanley Works manufactures a T-hinge with a braced leaf, which is very useful in some cases. This is shown by Figure 67.

There are several special makes of strap and T hinges, which are reinforced so as to afford greater strength. One of those is the Wells patent hinge, Figure 68, in which the metal of each leaf of the hinge is carried completely around the bend and back onto itself, so that it would be almost impossible to tear it away. The Hart patent hinge is reinforced by a double thickness of metal about the pin, and the Record hinge is strengthened by two flange-plates, which are bolted to each leaf and attached to the pin, as shown by Figure 69. The prices of these reinforced hinges are the same for the different kinds.

Figure 70 shows a hinge which is used when it is desired that the pin should be well out from the door or shutter, so as to throw it open away from the jamb. This hinge is made in sizes from six to eighteen inches long.

The following table gives the average retail prices of the foregoing hinges, in a few of the leading sizes.

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1 Continued from No. 604, page 130.
TABLE OF WROUGHT-STEEL STRAP-HINGES.
Prices per dozen pairs.

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Name</th>
<th>3 inch</th>
<th>6 inch</th>
<th>10 inch</th>
<th>12 inch</th>
<th>16 inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>Hasp and staple</td>
<td>0.55</td>
<td>1.00</td>
<td>1.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Hasp and staple with double hook</td>
<td>0.26</td>
<td>0.59</td>
<td>1.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>Hook and staples on plate</td>
<td>1.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>Hasp and staple with swivel staple</td>
<td>1.51</td>
<td>1.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>Solid-link hinged hasp</td>
<td>1.31</td>
<td>1.75</td>
<td>2.50</td>
<td>3.40</td>
<td>4.50</td>
</tr>
<tr>
<td>64</td>
<td>Strap-hinge</td>
<td>2.19</td>
<td>2.99</td>
<td>3.99</td>
<td>4.99</td>
<td>5.99</td>
</tr>
<tr>
<td>65</td>
<td>T-hinge</td>
<td>1.63</td>
<td>2.17</td>
<td>2.95</td>
<td>3.52</td>
<td>4.03</td>
</tr>
<tr>
<td>66</td>
<td>Cheers-hinge</td>
<td>0.68</td>
<td>0.93</td>
<td>1.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>67</td>
<td>T-hinges with braced leaf</td>
<td>1.70</td>
<td>1.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Webster's patent hinge</td>
<td>2.10</td>
<td>4.05</td>
<td>7.00</td>
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<td></td>
</tr>
<tr>
<td>69</td>
<td>Hasp's patent hinge</td>
<td>2.30</td>
<td>4.05</td>
<td>7.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>Record's patent hinge</td>
<td>2.10</td>
<td>4.05</td>
<td>7.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>Raised strap-hinge</td>
<td>2.03</td>
<td>2.05</td>
<td>2.05</td>
<td>2.05</td>
<td>2.05</td>
</tr>
</tbody>
</table>

1. These are made as small as 1 inch.
2. Prices given are for light strap-hinges. Heavy strap-hinges are sold by the pound at 12 to 14 cents.

Figure 71 shows a special form of hinge manufactured for trap-doors, permitting the door to be hung from the under side, leaving the upper side free from obstruction, and flush with the floor, while at the same time the use of the full size of the trap can be had when the door is up: the hinges will hold the door in position. The working of this hinge will be seen by the figure. The retail price is $1 per pair. It is listed in the catalogues of several of the hardware manufacturers.

Figure 72 illustrates a species of rude hinge used quite frequently for barn and warehouse doors, consisting of a hook to be driven into the door-post and a bar with an eye at the end to be bolted through the door. These are made of iron $1/4$, $3/4$, $1$, and one inch thick, and are sold by the pound, and at 25 cents for $1/4$ and $3/4$ inch, and $20$ cents for the other sizes.

BLIND-HINGES.

A variety of hinge which may not be called a strap-hinge, but which, nevertheless, partakes of its nature, is manufactured in a great many forms for outside blinds. The practice of hanging blinds differing in different parts of the country. In the vicinity of Boston the blinds are generally hung on the outside of the casing, and the hinges consist of a simple half hinge on the blind and a hook driven into the face of the casing. In New York the blinds are, almost invariably, set flush with the outside casing, requiring a different style of hinge. Through-out the West a number of forms of cast-iron hinges are used, which, in a measure, lock the blind when open or shut, as will be hereafter noticed. For blinds hung in the Boston fashion, the commonest way is simply to attach a half hinge to the blind, as previously stated. These half hinges are made in two sizes, two and two-and-one-half inch, costing $5 to $7 per hundred sets. They are mortised into the edge of the blind. If additional strength is required, a longer strap-hinge is used, which is screwed onto the face of the blind. There are various forms of these strap-hinges used for this purpose, all of which are too commonly known to require description. Another variety of the same kind of hinge is made so as to throw the blind well out from the casing and away from the moulding. These are made with a two-inch throw, and others with a four-inch throw are also in the market for use in connection with brick buildings.

For the blinds attached in the New York manner, some of the foregoing forms can be used, if the butts are set out sufficiently to clear the face mouldings of the frame, but generally speaking strap-hinges are used, in most cases, of the form shown by Figure 73, the strap, which is bent so as to strengthen the frame of the blind as well as support it, being secured both to the rail and the style. Instead of the hook shown by the figure, some form of drive hook is often used, and the hinge, instead of being bent, sometimes consists of a straight face-plate or strap. Figure 74 is a form of malleable-iron hinge used for blinds hung in the New York style. The hooks which are used for blinds are mostly made of malleable-iron. There are several varieties. A plain hook to drive into the wood, shown by Figure 75, is made three and a half inches long with a shorter length of the same style for light blinds hung flush with the casing. Figure 76 shows what is designated as a drive brace. Figure 77 is a form sometimes used, an iron screw-hook: and Figure 78 is the most common form of screw brace.

The advantages of the styles of hinges previously described are that they are mostly made of wrought-iron and are not apt to break, while there is absolutely nothing to get out of order about them. The disadvantages are that they contain in themselves no principle which will hold the blind open or shut, and when it is secured in the ordinary way it takes considerable bending and twisting to close the blind after it is opened. To overcome these difficulties a number of forms have been devised, most of which are used more freely in the West than in the East. All of them are arranged to keep the blind from closing itself.

They are generally made of malleable-iron, a feature which
would be an objection in the eyes of Eastern builders. One of the simplest forms is the Seymour hinge manufactured by P. & F. Corbin. Figure 74. The essential principle in this hinge includes a raised cone on the house hinge working into a socket on the blind hinge. The hinge is shown partially raised and in the position it takes when the blind is

Fig. 78. Screw Brace Blind Hinge.

Fig. 79. Seymour’s Blind Hinge.

closed. When the blind is thrown back a lip on the upper hinge catches on to a protection on the lower hinge and holds the blind firmly in place, so that it can be released only by raising the blind hollily.

The Shepard Hardware Co. of Buffalo manufactures a number of varieties of window-blind hinges which are used quite extensively. All of them are double hooking and arranged so that the blind can be lifted off the hinge only in one position, thus obviating any upsetting of the blind when trying to close it. Most of the Shepard hinges close by gravity when once raised; that is to say, the surfaces of the upper and lower hinge are bevelled so that the blind will slide down of its own weight and so close. Figure 80 shows one of the best of these hinges and illustrates also the manner in which it closes by gravity. This hinge and nearly all of the Shepard make are planted on the face of the blind rather than mortised into the edges. A very simple form and one quite good in its way is shown by Figure 81. The two parts of the hinges are shown separately so as to represent it more clearly. The fold on the right is attached to the blind and the hook rests in the socket of the other fold of this hinge. The bottom of the socket is contracted to an ellipse and by reason of the lug on the blind hook, the blind can be lifted off the hinges only when standing at right angles to the house. When the blind is open the lug A catches into B and holds the blind securely. In order to close the blind it is lifted bodily until the lug clears the catch. Figure 82 is another variety of the Shepard hinge which can be used in case the blind is set on the face of the casing. The two arms of the hinge being unequal in length. All of the Shepard goods are very nicely finished and seem like very durable and serviceable articles. There are many varieties but the foregoing will answer for the purposes of general illustration. They retail at ten cents per set, or fifteen cents with screws.

Fig. 80. Shepard’s Noiseless Blind Hinge.

Fig. 81. Shepard’s Standard Blind Hinge.

Fig. 82. Shepard’s Gravity Blind Hinge.

[To be continued.]
completed design to the approval of the impatient trans-Potomac art-patrons. The young architect, while thoroughly appreciating the absurdity of the transaction, did not happen to be in such a position that he was willing to refuse the interviews, when asked for any legitimate object that would sufficiently recompense him, and having a certain capacity for effective sketching, by the aid of such models as he could immediately lay his hands upon, he produced a hastily conceived design, of which, however, he reluctantly took the further commission of bearing it to the art-committee and revealing to them its occult merits, met with unqualified admiration from the stonemason. It was, however, submitted to the committee, and received with a very prudent reserve, non-committal of either approval or disfavor, and their future action has only been vaguely gauged by certain questions to the mason, which seem to suggest that he may only be required to furnish a pedestal for a "masonic" statue from a manufacturer who keeps them in stock. Under what different auspices was undertaken the somewhat analogous scheme of ereciting monuments commemorating the battle-fields around Paris, after the Franco-Prussian war, may readily be seen by referring to the pages of "L'Intime Club," where are shown the numerous designs submitted for the purpose in competition by many of the leading architects of France; and as regards Giustiavoli, I may feel that the probably numerous insults to art, resulting from most of the monuments erected there, are largely compensated for by the gain to the world of thought and literature in Mr. Curtis's grand oration on the occasion. While we are in the spirit of poetical criticism we are tempted to refer to a recently published article from a Washington correspondent, headed "An Artistic Building." The following extract is taken from a mass of quoted and coddled description of decoration, which (having some belligerent omens) would seem to fittingly apply to the Hoffman House restaurant, perhaps, rather than to the State, War and Navy Building of a great nation. In redundant and superfluous writing the author fairly rivals Mr. Rider Haggard in his own field of "the Horrible."

"Nearly fifty artists have been busy at work decorating the rooms in a restaurant which a Mr. Hyman, a Swiss, is about to open, which are to be occupied by the Secretary of War, and the higher officers of the army. The result is a series of apartments which for richness of ornamentation cannot be equalled in this country. Nearly every color known to the painter's palette has been brought into requisition, and the designs being all original and appropriate have been prepared with an eye to rich and sumptuous effects... Mr. English's artistic Boston palette will certainly be gratified when he enters these rooms... they are gorgeous chambers. The ceiling itself is almost covered with a wealth of frescoing in gorgeous colors, which will fairly describe the effect which the highly colored splendor of these rooms produce (sic) upon the visitor. Another room on the same floor is a symphony in purple... a little gem of a room in the third floor; its mantle is of red marble, and the dado is such a perfect imitation of the stone that it is hard to tell where the mantel ends and the painting begins. Thousands of dollars have been spent in beautifying these offices, and when completed each will be an art gallery in itself. Let us hope for the sake of our national art reputation, and also for the possibly dangerous influence upon our future war transactions, that these descriptions are not accurate."

"RE Coordinate label of the London Standard of nearly four years ago (December 27, 1884) Eliot's Letter appearing in London as a "Continental nation." England cannot be considered now, as it was in earlier times, "a group of islands, possessing great resources and potentialities, which may either be islands or surrounded, at least, by barbarians, which were easy to repel and too easy to conquer." After saying that, "obeying the impulse which drove us to the establishment of colonies, not only one power, but a nation," which "very intelligently estimates the power of nations in streams either of conquest or colonization which must come in contact with what we have hitherto considered as our natural development," the article goes on to show the result of this movement which is that the English have been pushed almost all over the world with one another or the other powers. In India we have Russia on our very borders. In Austria and at the Cape Colony we find ourselves side by side with Germany. "Even without the question of colonization in Egypt, we are unquestionably face to face with France. She is establishing herself at the mouth of the Red Sea and she categorically opposes our presence there."

"If England holds certain detached fortresses in the Mediterranean, France is creeping around the mainland and endeavoring to turn the "grand masters of Europe into a French lake." It is then urged that the standards of both England and the rest of Europe at this time, and so it concludes by saying that "what we have to do as a nation is to grasp the idea that the future hope of Great Britain and her empire will be a frank acceptance of Imperial Federation established on a firm basis."

Four years have passed away and we see that this is more than ever true, and in no part of the empire is there a more important country, strategically, than the United States at this time. Recognizing the importance of the position that Canada must take as a portion of this "Continental nation," the Imperial Government has decided to erect a national monument to the memory of the "continent." The building is to be made in a real type of Canadian architecture and the proportions of the design are to be as perfect as possible. The colonists of America and Polynesia—these are all works which bring men and materials, and they are destined to be preserved, transported and preserved, and so the country "goes abroad."

"It is the gigantic enterprise of the Canadian Pacific Railway which has enhanced the value of Canada in the eyes of England, for the Hon. J. A. Chaplain, of the Canadian Parliament, (February 25, 1885) England has learned that Canada is no longer a child, but has reached maturity and can be made use of, and can make herself of use. We propose to complete the Canadian Pacific Railway by a route which by a Westerly direction, as well as in an Easterly, we have a highway to the East. Heretofore, the Easterly route, the Soo Canal, has been the only one, and it—a slender one at best, and now, on the farthest extent of the continent, we have a canal easily snapped—a canal, than which nothing would be easier to obstruct and destroy, but of an importance to England of unyielding value. And so it has come to pass that a tide of British imperialism appears to have set in for Canada. Look where you will, all hands are engaged in the work of development. Strange, if a country of its possibilities should not ultimately be able to hold its own against the commercial despotism of the nations, such as Russia, and perhaps, England itself, should we learn that there is no country that might be the better for such thing for Canada, it has made us open our eyes to the fact that we can do without the States; we can improve existing means of transit, and it is a great beginning. And the difficulties, and, in fact, it would be rather an advantage to Canada if the additional to its length. The action would quicken the work of developing the resources of the country."
Designs for Mantlepieces, R.H. Robertson, Archt.
Designs for Church & Chapel, 2nd Ave. & 72 St., N.Y.

R.H. Robertson, Architect.
Church of the Covenant, Washington, D.C.

J.C. Candy & Co., Architects.
House for... A. Edward Rogers:
Roxbury Mass

Nuray Smith, Arch.: Boston.

First Floor Plan:
- Parlor
- Library
- Hall
- Dining R.
- Kitchen

Dr. A. G. Curtiss - Elmwood Ave, Buffalo N.Y.
...that any step should be taken in the right direction likely to be of any real advantage.

The Toronto Trades and Labor Council and the Minister do not agree on the subject of manual training in schools, as proposed by Mr. Ross (Minister of Education) for the advantage of those who have to do with the skilled labor. The Trades and Labor Council sent a deputation to Mr. Ross—whom their case before him, but failed to convince him by their arguments. The Secretary says that a course of manual training, if it be not of further result, will result in no good commensurate with the amount of certain harm in an aggravated form, which must ultimately cause to all who live by mechanical callings in Ontario. This dictum is somewhat vague, but the "ultimately" saves the Secretary’s bacon, post-haste.

The plumbers’ strike is as far away from a settlement as ever. Many of the men truly adhere to their own opinions, each side being convinced that in the long run it must be successful.

The by-law enforcing examinations for masters and men before practising the trade, and granting certificates to those who successfully pass, have been in operation for only a few months. The examiners are at present exercised over a clause in the by-law, which states that licences or certificates shall only be granted to Canadians either by birth or naturalization. They consider they have nothing to do with a man’s nationality, and that if he passes a good examination, he is entitled to ply his trade. If this clause is enforced, it would hardly be consistent with the notion of a highly-skilled craft.

It is satisfactory to note that there is some attempt at association of architects now being made in Toronto. The Toronto Architectural Guild, a somewhat informal institution of about twenty-five members, of whom much is not known, is soon likely to be the nucleus of a body of architect workers. It is the first organization of its kind in Canada. There is a membership clause, and any architect who is not a member must pay a certain sum into the fund. The Guild has a Managing Committee of three members, one of whom is Secretary and Treasurer, and to whom, as I understand, the origin of the Guild was principally due. Mr. S. G. Ongania, one of the Architects of Toronto, had something to do with the arrangement of the conditions for the Board of Trade competition, and has made its influence felt in connection with the proposed reduction in the size of bricks by the Brickmakers’ Association. The brickmakers finally agreed that their brick should be 8½" x 4½" x 2½", the architects being satisfied as these dimensions were very close to theirs. Members of the Guild agree to specify not less than 80 per cent of all bricks used in their work to be hard brick.

The profession is apparently in a far more healthy condition in Toronto than elsewhere in Canada. The Minister of Education intends to appoint a lecturer on architecture in the School of Technology. The Canadian Architect and Builder says "there are so many untrained men in the ranks of the architects, and the public are not able to judge good architecture from bad that they have received but little recognition, and that only from the cultured few." This is saying a good deal, perhaps a little too much, for all the men who have been practised in the trade for many years feel the after the few good men cannot fail to be recognized and are now widely. An untrained man may make a considerable income out of his business, and always remain unknown, whereas a trained man is bound to maintain some fame.

There is also in Toronto an Architectural Draughtsmen’s Association for the mutual improvement of draughtsmen and students. These efforts on behalf of the profession are highly commendable, and it would be well if other places would follow suit.

In Montreal architects are frequently jealous of each other. The English are jealous of the French and vice versa, and the English are jealous of each other, and the French likewise. An architect was introduced to another by a mutual friend a little while ago as "a brother professional," and was greeted with the blunt remark, "Oh, they do such things in this country."

Students in the offices of members of the Toronto Architectural Guild come in for considerable encouragement. They are invited to compete this month for a prize of $5 in books, for the best set of mystery plans. The students of the University of Toronto, building in round-arched Gothic, with some rather intricate details.

Toronto can boast a better library of professional or architectural books than any other city in Canada, and it speaks well for the intelligence of the city that they do not freely encourage the study of art and do all in their power to help students. The Free or Public Library is an excellently managed institution, and the Free Library, with the United Architects, the largest building in round-arched Gothic, with some rather intricate details.

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*CONTRIBUTORS ARE REQUESTED TO SEND WITH THEIR DRAWINGS FULL AND ADEQUATE DESCRIPTIONS OF THE BUILDINGS, INCLUDING A STATEMENT OF COST.*

ENTRANCE TO THE CONVERSE MEMORIAL LIBRARY, Malden, Mass. Mr. H. H. Richardson, Architect.

[Hello-Chrome, issued only with the Imperial Edition.]

GOTHIC TOWERS AND SPIRES, PLATES 25, 26 AND 27.—LINCOLN CATHEDRAL; ST. MARY’S, STAMFORD; ALL SAINTS, BUCKWORTH; ST. PETER’S, ALDWINKLE.

[Issued only with the Imperial Edition.]

RUINS OF THE CHURCH OF THE COVENANT, WASHINGTON, D. C.

MESBISH, J. C. Cady & Co., Architects, NEW YORK, N. Y.

See the “Letter from Washington” elsewhere in this issue.

DESIGN FOR CHURCH AND CHAPEL AT SECOND AVE. AND 72D ST., NEW YORK, N. Y. MR. H. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

MANTLEPIECES. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

HOUSE AT BRIGHTON HILLS, Newton, Mass. Messrs. WATK. & CUTTER, Architects, BOSTON, MASS.

HOUSE FOR DR. A. G. CURTIS. MR. E. A. KENT, ARCHITECT. BUFFALO, N. Y.

RICHMOND MEMORIAL LIBRARY. MR. J. G. CUTLER, ARCHITECT, ROCHESTER, N. Y.

HOUSE FOR A. EDWARD ROGERS, ESQ., RICHMOND, Mass., Designed by MR. MURRAY SMITH, BOSTON, MASS.

**SUIT OVER A RETAINING-WALL.**

H. SUIT was recently decided by Judge Drummond of the United States Circuit Court for the district of New York in favor of the United States Government against the estate of Mr. S. G. Ongania, the architect of the Smith estate at New York, on account of the Smith estate erecting an eight-story office-building upon the United States Government building, with an alley ten feet wide separating their building (which was one hundred feet long) from the Government building.

Mr. Smith’s wall went down twenty-one feet below the curbstone and three feet six inches wide at the bottom, carried up a distance of ten feet, with batter of six inches, and the remaining height of the wall was built of a uniform thickness of two feet six inches.

This wall acted as a retaining-wall and was carried around on Walnut Street as well as on the alley. The wall on Walnut Street stood all right, and is still standing after a lapse of some two years, but on the alley the wall for a distance of about fifty feet in length fell in before it was fully completed, and in falling carried all the earth in the alley clear back to the Government retaining-wall and undermined their sidewalks, which was made of Portland cement. This sidewalk stood for some two months afterwards, self-supporting, but finally, owing to one cause or another, broke off and fell, and this suit was for the payment of this sidewalk.

It should be that when the caving of the alley took place the filling which had been made by the Government was composed of all sorts of rubbish, such as street scrapings, tin cans and what-not, for a depth of some six feet below the grade of the alley. Below this point the filling was of the proper material, to wit, gravel. The Government paid about $500 for the filling, took out the two deep footings under the University, a building on the alley one foot thick at the bottom, and was off-set on the alley side in steps of about four feet in height and from nine inches to twelve inches thick. Mr. Smith’s defence against the action of the Government was that they should not have built their building in such way just described had made all the filling in the alley act as a wedge against the Smith wall, thereby throwing on his wall the entire burden of the support of the alley, and the defence further claimed that the Government wall did not support any of the alley
filling. The defendant Smith claimed that the Government in building their wall in off-sets did not tend to support the alley at all. They say, having been partly destroyed, these offsets in their wall simply supported so much of the earth as would form a triangle on each ledge, which virtually amounted to nothing, and that all the rest of the filling, as has been stated, was thereby thrown against the outer wall and its entire liability. They did not desire to sustain too weak to sustain its proportion of the filling in the alley, and that the defendant should have taken in all the surroundings and should have tackled his wall in the manner of the building-commissioner. The building-commissioner thought the defendant had been too weak to sustain the wall in time or to be quite safe in time, and took the defendant to the building-commissioner, who a subdivision of the wall indicates the wall filled. The plaintiff's attorney was the defendant had been properly filled; that the plaintiff's wall was built as such walls are usually built; that the defendant seemed to have needed all diligence and care in the building of his wall, and that he was not compelled to build his wall thicker than was necessary to hold up one half of the alley, supposing it to be properly filled and the plaintiff's wall properly built. He therefore decided in favor of the defendant.

The conclusion of the evening was that the defendant had a right to suppose that the wall had been properly filled; that the plaintiff's wall was built as such walls are usually built; that the defendant seemed to have needed all diligence and care in the building of his wall, and that he was not compelled to build his wall thicker than was necessary to hold up one half of the alley, supposing it to be properly filled and the plaintiff's wall properly built. He therefore decided in favor of the defendant.


THE FALL OF THE CHURCH OF THE COVENANT'S TOWER.

ON the morning of August the 23d it was started by the information that the Church of the Covenant had fallen. The evening before about seven o'clock I had passed along Connecticutt Avenue, and it was standing intact, apparently strong and firm. Shortly after hearing of the disaster I visited the church and in the condition of the tower is shown in the illustration. A Committee, or Commission, consisting of Bernard Green, Civil Engineer, assistant to Colonel Casey, Thos. B. Entwistle, Inspector of Buildings, and Clifford Richardson, Inspector of Asphalt and Cement, was appointed by the District Commissioners [our executive rulers] "to investigate all the circumstances connected with and pertaining to the fall or the falling of the tower of the Church of the Covenant." It is not worthy that no architect was appointed on this commission, and that a chemist was the third man where we would have expected an architect.

The report of the Commission was handed in on September 6. The long delay being necessary to have the debris cleared away so that the architect's specifications could be examined. Although the Commission was poorly constituted, the report was full and clear.

The specifications and methods of construction called for by the architect's plans were described, and then the method of construction and materials used by the builder.

Although cracks and slight failure were noticed months before, only a few were aware of this at the time. The tower was one hundred and thirty-five feet and three inches above the concrete footing. The description is full, and most of their conclusions seem to be correct.

The projections of the tower had been finished excepting a few pieces of the last or coping course of sill, and the remainder of the structure, including the tower from the sandstone tablets down into the foundation walls. The growing uneasiness of the contractor and building-commissioner on this account became, during the last week or two before the fall, hardly less than a matter of urgency. They sent Supervisors to notify him to stop work, to make his examinations and assuring reports, as we show below, and who allowed the work to proceed.

Eventually, in the afternoon of August 21, a large stone in the south door-opening on the first floor, was heard to crack with a loud report, followed from hour to hour by other cracks, and especially a vertical one in the west jamb of the same door-way, which opened on the west side of the building. The doorway was seven inches, the vaulting at this point was two inches thick. This was observed at its maximum about nine o'clock in the evening, and several small pieces of mortar and stone were heard to fall from the highest point of the tower, and the plastering inside the vaulting was shaken. Thoroughly alarmed by this time, the contractor and a member of the building-committee caused the sidewalks and all approaches to the stairs to be barricaded, and directed the watchman to remain outside of the building during the night. High wind gusts had occurred at intervals during the day and again about the middle of the night sufficient to have produced a slight jarring effect upon the tower, and undoubtedly hastening the crumbling observed. The watchman heard occasional cracks during the night until 4:30 o'clock in the morning. While he stood on the N Street sidewalk, between Eighteenth Street and Connecticut Avenue, in company with a policeman, the two men heard cracking sounds continued sounds of crumbling. These sounds were followed quickly by the falling of several pieces of stone within the tower, and in a few moments observed the lower portion of the upper arch crush and judge, and the plate above it to coincide upon its own base, crumbling into a pyramidal heap of stones and sand, and filling the air with a dense cloud of dust. It is significant, if not the sound of the fall was heard by few persons in the neighborhood, being more like that of an average gunpowder shot and sand than of a strongly coherent stonework requiring much force to break it up. The eye-witnesses say that the bellry came down intact and erect until it reached the hanging pile, where it went to pieces and was scattered uniformly over it.  

"It must be said that the specifications and design themselves are also at fault," first, in specifying rubble-work for the walls held in a mixed lime and cement mortar, and then not making the foundation walls much thicker and stepped up near the top with a capping of stonework that stones to reckless and unsafe, they are dangerous. Furthermore, the masonry should have been required to be done with extraordinary care and skill, such as to raise it well above the class of ordinary rubble-work. Although quite aware that excellent mortar can be made of a mixture of lime and cement, we depreciate the use anywhere, in a tower of this sort, of any but the best pure, hydraulic cement mortar. In usual practice it is difficult enough to get even this properly made and used, not to complete the work by admixture of lime. Therefore, while the statement would be untenable that the tower, and even the foundation walls in question, could not have been built of the given dimensions with great security even had we used masonry-work, by using the rubble-work as the base we must regard an ordinary specification, such as the one now under consideration, quite inadequate for the purpose. A higher class of materials, workmanship and care, and on the part of the builder been specified, involving, of course, a somewhat greater cost, but none the less essential on that account. Rubble masonry is the lowest and poorest class of mortar stonework and a fabrication entirely by the mason. The stones are not prepared and assigned to positions for him. The foundation walls should have been of hard-burned brick, squared stone, or thicker in high-class rubble, as stated, and the ashlar backing of hard brickwork or excellent stone masonry, all laid in best hydraulic cement mortar. With proper and more constant inspection, direction and supervision, very much better work than was done would have been secured, even under the specifications as they stood, and the tower would not have fallen, but yet the margin of safety in it would have been too narrow for a really substantial and permanent structure.

To shorten, the specifications as to the tower masonry at least, were too general in their terms, not even distinguishing between the comparatively dwarfed and lightly-loaded church walls and the lofty, heavy, storm-beaten tower. They dwelt too briefly upon the details relating to strength, durability, and left the matter as in the stipulation of the contractor, local building-practice and the specified supervision of the architects. The clause that the ashlar shall "be done after the manner of the most approved method" is a means to refer to the appearance it shall present to the eye rather than to its bond as an integral part of the wall. Nor did the drawings supply details of construction of the rubble or the ashlar masonry.

They contained no indication how far the extent the work should be bonded, or the sizes, shapes and distribution of thorough or other bond stones, or the kinds and frequency of mortar.

Even the specifications as they stood, however, were not complied with by the builders, in several particulars, seriously affecting the strength of all masonry. Thus the rubble work was not well
bonded,' and the mortar did not contain 'best brand of Roseendale cement.' Neither did the stones of the ashlar fill in, in a proper sense, the specifications as to minimum thickness, depths and heights. It is true that a considerable number measured somewhere within those ugly shapes the full thickness required, but very rarely at the points meant; namely, on the bed and build joints, and in almost no instance on both in the same stone. The stone averaged less than the minimum sizes, a large number being mere sharp-edged shles difficult to secure well in place without iron anchors and incapable of good bond with the rubble backing. The specifications of minimum sizes implied a poorly number of larger stones, but these were almost entirely wanting. The specifications to use 'galvanized iron clamps, wherever necessary or expedient, to the ashlar and backing together,' was also practically disregarded throughout.

'Therefore the work was not 'first class; of the best kind,' nor 'well and sufficiently erected' the tower 'agreedably to the specifications, in a good workmanlike and substantial manner,' 'entirely of good bond with the rubble backing.' The manner of its fall and its complete reduction to a solid heap of small stones and thoroughly disintegrated mortar showed its general weakness so plainly that the wonder was not that it fell, but rather that it stood so many weeks erect.

'Thus, in brief, it appears that the architects' design of the foundation walls and specifications for the construction of the tower were faulty; that, largely for want of the intelligent supervision required of the architects, the contractor's materials and workmanship were inferior and unsuitable, and that, therefore, the beautiful tower fell. The manner of its fall and its complete reduction to a solid heap of small stones and thoroughly disintegrated mortar showed its general weakness so plainly that the wonder was not that it fell, but rather that it stood so many weeks erect.

'In form and dimensions the design of the tower furnishes a thoroughly substantial and permanent structure, needing but the simplest kinds of good materials and workmanship for its proper erection. There is no reason on this score why it should not be at once restored. Its proper construction involves no unusual difficulty or expense. Its height is but moderate, for there are numerous entire buildings of equal height in the large cities. The remaining walls of the church were, of course, built in the same defective manner as the tower, more pains being taken with their exterior appearance than their strength. Being very low and comparatively thin, however, and having but little weight except their own, we cannot say that they are not perfectly safe, but we recommend an examination at a few points to fully put their condition beyond question.'

The want of constant inspection necessary, of course could not be expected from the Building Inspector of the district, but as the character of the stonework, the shape of the rubble, and the bevelled beds of the ashlar and the character of the mortar and cement used was continuous from the footing to the capping stones, it seems that either the architects or Building Inspector, particularly the architects, should have noticed its faulty character, if not in accordance with the plans and specifications, and called a halt. The defects were not in some one piece of construction that could be covered up in an hour, a day or a week, but the same faulty masonry was continuous for nearly a year.

The report tells us that the strains were properly calculated for the best character of rubble. I do not think that much dependence could be placed on rubble piers two feet by eight inches thick at the base of a tower over a hundred feet high. The corner projection had a vent-flue allowing a wall one foot thick around it, including ashlar and backing. After the tower was up some distance this was filled with concrete by order of the Building Inspector. Instead of strengthening, this concrete by expansion may have weakened the stability of an unstable pier.

The weights as given seem excessive to impose on rubblework. Kibler says the resistance of common rubble to erasing is not much greater than the mortar it contains. The weight on these piers was 140 to 190 pounds per square inch, increased to 220 pounds in case of winds, according to the calculations of the Commission. So a strain of 15 tons per square foot was liable to bear on some one of those piers. Kibler says the granite piers of the Saltash Bridge (presumably masonry of squared stones) sustain nine and one half tons per square foot, while the highest pier of the Requefseau stone aqueduct, Marseilles, sustains a pressure of 134 tons per square foot. Mr. Louis de Coppet Berg in his table, article "Safe

responsibility (of 'absolute control of the building and work') without using our own judgment as to when and how often we should visit it; so we propose to make such visits according to our judgment, and the committee can pay whatever portion of our traveling expenses they see fit. We had much rather assume a burden of our own than to have it assumed by others in this way (although it is entirely contrary to professional practice) than to run the risk of so important a building misapplying. And so this arrangement has continued from the beginning to the present time.

Masonry to be smitten for a tower of this kind, and above all a rubble masonry, should have been constantly by a competent inspector. In this case it was all left to the masons excepting one inspection when started on the concrete footing, a second when the piers were finished, a third at a few feet above the door-way arches, a fourth when the tower was at half height, and so on. The stone-cutters, masonry-makers and masons had their own way the rest of the time.

While the cracks appeared and as they increased, the architects were sent for and came and made examinations, which they reported upon to the committee. Thus, the following resolution was sent to the committee on January 16th last: A resolution was sent to the architects by the building-committee notifying them that they had learned that the cement and mortar used in the building was not of the quality called for, and in some other respects the work had not been performed in a thorough and workmanlike manner, and of course the contractor did not 'well and sufficiently erect' the tower 'agreedably to the specifications, in a good workmanlike and substantial manner,' 'entirely of good bond with the rubble backing.' The manner of its fall and its complete reduction to a solid heap of small stones and thoroughly disintegrated mortar showed its general weakness so plainly that the wonder was not that it fell, but rather that it stood so many weeks erect.

When the work had reached the cellar stage, reported 'that there was no danger, that the tower would certainly not fall, nor any portion give way suddenly without some warning,' and on June 13th, that they 'considered it safe to proceed slowly with the tower and to finish it according to the original plan, except, perhaps, in the matter of the heavy stone cornice at the top and the heavy tile termination, for which a lighter material may be used to lessen the weight.' From this time until the fall they relied on information, at short intervals, from the contractor, that the cracks were not increasing much and there was no cause for alarm.

"Thus, in brief, it appears that the architects' design of the foundation walls and specifications for the construction of the tower were faulty; that, largely for want of the intelligent supervision required of the architects, the contractor's materials and workmanship were inferior and unsuitable, and that, therefore, the beautiful tower fell. The manner of its fall and its complete reduction to a solid heap of small stones and thoroughly disintegrated mortar showed its general weakness so plainly that the wonder was not that it fell, but rather that it stood so many weeks erect.

"In form and dimensions the design of the tower furnishes a thoroughly substantial and permanent structure, needing but the simplest kinds of good materials and workmanship for its proper erection. There is no reason on this score why it should not be at once restored. Its proper construction involves no unusual difficulty or expense. Its height is but moderate, for there are numerous entire buildings of equal height in the large cities. The remaining walls of the church were, of course, built in the same defective manner as the tower, more pains being taken with their exterior appearance than their strength. Being very low and comparatively thin, however, and having but little weight except their own, we cannot say that they are not perfectly safe, but we recommend an examination at a few points to fully put their condition beyond question."
Building” (in the American Architect, July 3, 1888), gives as crush-
ing strength of Bowensville sand-hills 414 pounds per square inch, or the safe load as 125 pounds per square inch. Nearly double this weight was liable to come on the piers and this only allows a factor of safety of a frac-
tion less than four to one, while Kidd and Travish line call for a factor of safety of from six to ten. Using a factor of safety of six (the lowest for piers), the weight that the piers should have borne would have been 125 pounds per square inch, a weight that was actually on them according to computations made by the Commission.

Whether the work is still an unsettled question, and it is a question, I think, that the courts will be required to settle.

The subject being an unusually interesting one I have necessarily lengthened my letter. The accompanying sketch of the church between the piers was purchased of the American Architect for $1. (the royalty having been paid). With the short ground of the fallen portion will show the extent of the ruin.

![Image](null)

**Edgewater Improvements**

**EVEN** Chicago people scarcely realize the wonderful rapidity with which the little old suburban city is growing and making a name for itself in the country within a radius of fifteen miles from the court-house practically one great city, even if not under one central administra-
tion. A street of 2,000 yards from the Broadwell railroad to Evanston (fifteen miles to the north) has brought into the market a long stretch of country directly on the shore of Lake Michigan, which was previously accessible only with great difficulty. To many people the lake shore has irresistible attractions and is above all else to be desired as a locality for residence, and, as a result, numer-
ous little villages have either sprung suddenly into existence or else been stimulated to lively growth by new railroad opening.

Most of these new suburbs are as like as possible to imaging, with their little wooden cottages built upon twenty-five to fifty feet of ground. However, one of these towns has started out on a decidedly higher level than anything attempted within recent years in the vicinity of Chicago, and a very large sum of money has already been expended in really permanent and desirable improvements at Edge-
water, as the place has been called. A Philadelphian syndicate pur-
chased quite a large tract of land at this point (which is something like seven or eight miles from the centre of the city) and two years ago commenced a series of improvements which have caused several of these acres to be taken from waste land and barren sand-hills into pretty country-places, each house having all the most modern conveniences. The scheme has been to make a model town and, as a result, rules and regulations abound and flourish to such an extent as to seem somewhat distasteful to those who would like to buy a bul, while little freedom is left for those who fondly imagines that in buying a piece of property he buys the right to do about as he pleases with his land. Here, however, the building regulations are so soundly thought of as to have been given to understand that he is a mere infant and that all his needs will be properly attended to by the parental corporation which knows what he should have and what he should not have. But how ever the rules and regulations may effect the feelings of the inhabit-
tants, the results attained are extremely attractive to the eye of the observer.

If something like a quarter of a mile from north to south the sand-hills have been levelled, streets laid out, water-pipes and sewer age put in, and a town blocked out. Not only have the streets been merely staked out, but they have been covered with stone and, at an evidently great expense, abandoned. Gooseneck trees have been planted at each side and broad stone sidewalks put down, so that the roads within the improved district are similar to the city boulevards. Water is brought from the water-works of the town of Lake View at the south, but the sewerage system is for the village only and empties into the lake, a condition of affairs that will undoubtedly eventually require some serious attention and probably a change.

The idea of the promoters of this enterprise has been to make a thoroughly first-class suburb, and with this aim in view they have laid out large lots and refuse to sell to parties who do not guarantee to build houses equally as good as those of the already erected. The only or two exceptions all the work here has been under the supervision of a single architect. The buildings are all extremely picturesque in outline, having a strong touch of the colonial, which is well car-
ed and never looks lathier than it is in reality. This is another mark this part of the country. The railroad-station itself is a neat little struc- ture of wood, mostly covered with shingles, and while quite unpretentious at the same time has a certain prettiness about it that elicits remark. This station has a handsome and well-kept lawn, with flower-beds at two sides, while the name “Edgewater” is spelled out upon the green in beds of foliage plants, thus making a strong contrast to the adjoining stopping-places and in a certain way giving

The key-note to its superiority. Moreover, it is a superiority that is carried out all through the town, and all daily everything is done for effect, but it is not with a splurge, for all is quiet, dignified and in extremely good taste, breathing a spirit of refine-
ment which is truly refreshing. Most of this effect is no doubt due to the ability of one man, for, as noted before, one architect has done the work.

The houses all seem to be well built, most of them having the first story of either red or yellow brick and the second story of wood with staidly shingled. The interiors are principally finished in the natural woods, California redwood and Georgia pine predominating. Most of the houses are structurally good, but two or three are notably so on account of their particularly quiet effect and the appearance and the charming outline. Had they been built any where but in a widely-advertised suburb they would have attracted much general attention and would have been more just appreciated.

In all, about thirty buildings have been erected by the syndicate and they have been offered for sale at terms unquestionably reason-
able, apparently, quite a large number are still unoccupied and rumor has it that the projectors feel considerably discouraged by the small number of sales during the past year.

To an ordinary observer it would seem as if the experiment of putting upon the market so expensive a suburb was several years in advance of the demand, and it cannot be greatly wondered at that many of these houses remain vacant, for there is still an immense choice of land for suburban homes in the vicinity of Chicago. People willing to pay from six to ten thousand dollars or more for a house are not attracted to an absolutely new locality with all the possi-
bility of malaria and the discomforts of being removed from friends, churches, etc., whereas the same price for a house in the proper suburbs that for that same money can offer nearly as much elegance, and a certainty of agreeable society and good markets.

The就像 its running from north to south, and here, with the regularity of a line of little boxes, are widow boxes, all of exactly the same shape, size and color. These alleys are particularly intended to be used by the butcher, baker and can-
dle-maker, so that all disagreeable traffic will to a very great de-
gree be kept off the streets.

One of the great features of Edgewater, as the place is now brought into the village, but the streets and all houses are lighted on the inexpensive system by electric-light, and the whole extent of this at present is done at the expense of the syndicate. When everything is lighted up the effect as viewed by the passengers on the train is certainly extremely striking.

The lake beach at this point is unusually broad and composed of a beautiful yellow sand. Eventually this must be one of the features of the place and evidently the syndicate is of the same opinion for at present it is impossible to buy any property directly upon the lake shore. One street, however, runs down to the water's edge, and at that point there is a tiny little park which serves as a post of observa-
tion for those who wish to see the lake or the inhabitants of the town when they take their swim in the surf of the lake.

Edgewater has four public institutions: the town store, the stables, the electric-light building, and, last but not least, the lawn tennis court. The townhall, if it can be called a building, is the centrepiece of the freeborn of the little town who fondly imagines that in buying a piece of property he buys the right to do about as he pleases with his land. A references to its shore, church, theatre, post-office, public market, central administra-
tion, the assembly-room in the second story is a fine feature of the place allowing for a considerable growth of population before the inhabitants will find themselves crowded at their gatherings. A somewhat similar remark might apparently be made in reference to the law-
tennis courts for they never seemed to be thronged, but, just the same, notices are very conspicuous as to the kind of shoes that players must wear, as if with such a host (generally four people once a day), com-
mon shoes would at once destroy this public institution.

At the extreme south end of the town is another of the public in-
sstitutions—the stables, for no one is allowed the privilege of having a barn on his premises, but all the animals must be kept at the pub-
lic establishment and telephoned for when wanted. This barn has a court in the centre which is reached through a broad archway, and around this court are arranged the carriage-houses, stables and car-
riage-wash together with necessary apparatus for the keeping of the horses. The exterior of the building is very simple with brick below and shingles above, but the effect is decidedly pleasing, and everything about it seems to be kept in as neat and orderly condition as it is possible.

At the extreme end of the town is the fourth of the public institutions, the electric-light building. It is conveniently located for receiving coal, etc., from the railroad and while built out of the commonest material still shows the dignity and artistic effect as the other buildings. In fact, with but one or two exceptions each and every building in the place when viewed individually, is well designed and the whole collectively, the continued use even in varied forms, of exactly the same material in the same style, causes an involuntary wish for a change. As other architects commence to build here this criticism will cease to have a foundation and in due time there will develop a much more harmonious whole, than in any other suburb, since the start in this case has been so exceptionally good that future builders must take the fact greatly into consideration when making their designs.
SAFETY FROM FIRE.

The terrible loss of life by the conflagration at Springfield, Mass., a few months since, has aroused the public mind to a degree never before witnessed to the constant peril to which the people of all places and conditions are exposed from fire, and in consequence the last Legislature, in response to the call of the public, passed some laws for the further protection of the many people from destruction by fire.

The importance of the subject of protection from fire cannot possibly be overestimated, and the anxiety of the public in reference to it is justly very great, and now that the Legislature of the Commonwealth has raised the matter of safety in hand and passed laws in reference to it, requiring the use of certain kinds of fire apparatus to be provided and used for the saving of life at fires, it behooves all to well examine the character of the various kinds of life-saving apparatus which the laws prescribe shall be provided and used by each and every organized fire-department in the State, and to do so is the object of this communication.

In Chapter 416, stringent regulations are made in relation to the means of escape and escape from buildings. Here there are many occupants and working people — as boarding-houses, hotels, apartment-houses, tenement-houses, factories, etc. — all of which are to be kept under the most rigid inspection by the authorities appointed for the purpose, and these laws, if thoroughly enforced, will go far to prevent in the future the fearful holocausts of the past.

Chapter 310 is an act to require the equipment of fire-departments with apparatus for the saving of life at fires.

The act provides the apparatus to be used by all the organized fire-departments of the State, and it consists, first, of a "gun or other suitable device capable of shooting or throwing an arrow or other missile with a cord attached thereto over the top of a window of any building within such city or town, together with all needful appliances for properly working the same."

This arrangement is for the purpose of equipping the owners of the chambers of buildings on fire to establish communication with the fire-department in the street, and to draw up a rope or any other means by which to facilitate their escape from destruction. The act requires the use of "jumping nets."

The plan of communicating by the "gun and arrow" has long been known, several devices of the kind having been invented at different times in Europe. But doubtless the best one of all was invented many years ago by Mons. Delvigne, for use in the French coast wrecking service. A full account of this invention was published quite a number of years since, and of its adoption into our own wrecking service by Hon. R. H. Forbes, whose earnest, long-continued and successful efforts in establishing means of saving the lives of shipwrecked persons have long been known and appreciated by the entire nation.

In an address upon the subject at a meeting of the Massachusetts Technological Institute, some ten or more years since, Mr. Forbes gave a full description of the gun and arrow invented by Delvigne, and of its value in our wrecking service, and also proposed its use by the fire-departments of the cities for the purpose of sending a life-line to persons in danger in the upper rooms of buildings on fire.

Had this, or some similar device — as a powerful bow and arrow — been used at the burning of the Southern Hotel at St. Louis several years ago, and on other similar occasions, a very large number of lives might have been saved, for in almost all cases of escape from large buildings and similar structures there has always been time enough to bring the gun and arrow, with life-line attached, into use.

The act of the Legislature further requires that there be provided, as follows: "A chute, so called, made of canvas, or other suitable material, rendered uninflammable, of sufficient length to reach at a proper angle of inclination from the ground to any window in such building, said chute being provided with proper means of fastening the upper end thereof, and having a flexible ladder attached thereon."

And the act requires that each organized fire-department in the State shall be provided with one or more of each and all the pieces of life-saving apparatus above mentioned, and that the members of the various fire-departments shall be periodically practised and trained in the use of the same.

It has been demonstrated in thousands of instances that a canvas chute is of all things the best and safest as well as the quickest of means by which persons may descend from the windows of high buildings.

But the difficulty in using the canvas chutes is that they will quickly be set on fire and destroyed by the showers of burning cinders and the flames emerging from the windows around and below them during the conflagration.

It is well-known that the most powerful fire-engine will not throw anything like a solid, unbroken column of water high from three to four stories. Above that distance the streams break up and scatter. Consequently all portions of the canvas chute which extend beyond three to four stories will quickly be set on fire and consumed by the showers of burning cinders and the rush of flames from the windows beneath it.

Nor can the canvas chute be thoroughly wet and kept so even to the distance of three or four stories, for the point of danger is of course, on the under side, where it can only be exposed. In fine, even the rush of flame from the windows beneath it, for unless every part of the chute is kept constantly wet the flames would quickly dry the cloth in places and burn holes in it large enough for persons to fall through to the pavement below.

To be able to wet the chute with the hose pipe from a ladder is at best a difficult thing for fire has an ugly habit of "marching on" — and any moment may run away from you and set the firemen, with their hose pipe, from the ladder and leave the chute to be consumed. A few weeks since, at a large fire in Detroit, Mich., several firemen were operating against the fire; all at once the flames burst through the window, and the hose was obliged to slide down the ladder with all possible speed, and got quite badly burned at that. Similar instances are constantly occurring at large conflagrations. All they demonstrate how little reliance it is placed upon the idea that the firemen can generally wet the canvas chute constantly and effectually from ladders.

The act of the Legislature, Chapter 310, prescribes, under penalty, the use of an "uninflammable canvas chute."

The language employed is, we think, highly misleading. Almost every one would suppose that the term "uninflammable" signified that the cloth could not be set on fire. This is a great mistake. It means only that the cloth will not burn with a flame.

This is a point of very little importance indeed. The uninflam-

mable canvas chute, when exposed to contact with flame, will take fire readily, will smoulder and be quickly destroyed with-ining, its alleged "uninflammable" character.

The thing the public must have for safety is a fireproof canvas chute. This alone will meet their want. If any "uninflammable canvas chute" exists or can be produced which is really fireproof, the fact can readily be shown by exposing it to the contact of a good-sized fire and letting the flames envelop it for the space of half an hour or more. The top end of the chute will be black and can be applied. We would remark here that the application of carbolic acid gas, etc., to make a canvas chute fireproof, would necessarily be most violent in effect and practically valueless.

There is one thing only which will make a canvas chute non-igni-

table, non-combustible and absolutely fireproof, and that thing is water, constantly and thoroughly applied to each and every portion of the chute at whatever height it is placed and throughout the time of the longest conflagration.

The act, as we have said, requires also the use of "jumping nets," hold up by several men on the street upon which the persons in danger in the chambers of buildings on fire are to stand, where, we believe, this mode of escape was first introduced, the soldiers of the army, who largely constitute the fire-departments of the cities, have long given exhibitions of skill and daring by leaping from the windows and roofs of high buildings and alighting safely on the "jumping nets" or "canvases," and there have been successes-

ful instances of the same skill and courage also given by the brave firemen of Boston and other cities.

But it should always be remembered that to perform these acrobatic feats in broad daylight, when no conflagration is in progress, is a very different matter from the fire in a building where the fire is in full blast, the flames leaping upward and around and rapidly approaching, the stifling smoke obscuring the sight, the showers of burning cinders filling the air and the tumult going on below.

At such a time the most daring man in the upper window would need all the nerve and self-possession which he has to take the fearful leap, and the most consummate skill would be required to clear all obstacles below and reach with certainty the "jumping net."

What, then, would be the "jumping net" to women and children, and even to men, who are aroused at midnight and amid the scenes we have described to leap down from the dizzying height to the "jumping net" below? True, there may be instances in which it could be used successfully, and therefore, to meet these possible cases, by all means let the "jumping nets" be provided.

The truth is that the public are too easily satisfied and altogether too superficial in their investigations. They stand by and see "fire
RUSSIAN BOOK COLLECTORS.—It will be news to half the world that the Murom Library contains a number of books and manuscripts. Prince Woronzoff, for instance, has a library of 12,000 volumes in St. Petersburg, and possesses another equally large at Alupka. The Prince's library contains nearly 15,000 books, most of which were collected by her father, Bibikoff. In Slavonic literature it is especially rich, and it contains about 4,000 volumes on numismatics. The late Minister of Justice, Count Paunin, had a library of 11,000 volumes, which was remarkable for an encyclopedic series of works. The most important of the present European States has also considerable libraries in the Crimea and at Marsieu, near Moscow. The library of Count Schermejeff, the foundations of which were laid by himself, contains 662,600 volumes, is valued at 662,600 rubles, and is a perfect treasure of ecclesiastical music. The present owner has himself increased his great literary heritage by the addition of many rare books. He has been a constant student of science, and is said to have a deep interest in the whole field of academic knowledge.

DESTRUCTION OF STAND-PIPES.—About a year ago (January 7, 1887) an account was given of the destruction of a stand-pipe by an upward thrust due to a fancy design in building a stand-pipe larger at the base than throughout the main shaft. Two stand-pipes have recently burst in America which, although in different cities, by a strange coincidence belonged to the same man and burst on the same day with-in an hour of each other. In one instance the stand-pipe was a sixty foot wide and a hundred and thirty feet high, thirty feet in diameter, containing 630,000 United States gallons, and made of boiler-plate five-eighths of an inch thick. In the other it was sixty feet high, containing upon a stone masonry platform made of three courses of rubble masonry placed on cement. The structure was not provided with any braces, guys, or supports. The bottom contained 1,200,000 pounds per square foot on the foundation. It has been computed that the truss stress per square inch of net section on the lower plate amounted to 25,000 pounds. As usual in such instances, it is not known what was the exact cause accomplishing the destruction of the stand-pipe, but as water was flowing from the top of the pipe a short time before this, it is probable that the foundation was somewhat disturbed by the water flowing over it and in that manner there was produced an unequal distribution of stress. In the other instance the tank was forty feet in diameter and thirty-five feet in height. The static head on the water-work system furnished by this tank, which was situated on the hill, being insufficient, it was raised forty feet and two circular brick walls constructed underneath it, the outer one being thirty-six feet in diameter and the inner one being twelve feet in diameter. The tank was placed at the top, thinking it at the top of the water would be more secure, 800 feet thick at the bottom, and were further strengthened by buttresses; the tank was also secured by wire guys made of wire rope. The water was supplied or withdrawn from the stand-pipe through a single pipe entering at the bottom, but neither that nor the foundation appeared to have been designed in a manner consistent with any wall of the cause of the accident. The reservoir of water in Arkansas lately burst just two hours before the formal dedication of the new works, discarding more than 30,000 gallons of water over the area which would have been occupied by a large concourse of people a short time later. The wall was built of stone laid in cement, being twelve feet wide and 50 feet thick as at the top, 60 feet thick at the bottom, and five feet in height. It is apparent that all those cases which have resulted in the destruction of property, in interference with all conveniences, and in danger to life and property, are due to a failure of the tank to remain balanced under the strain of the water and the risk of danger to life, were caused by a lack of sufficient material to give sufficient stability to the structures. The accidents would certainly have been obviated by an employment of competent engineering services.—Engineering.

The outcome of the utilization of natural-gas up to the present time has been the inventing of a number of systems for the manufacturing of artificial fuel, and the building of the factories necessary for the production of these products. There are at least a half dozen new processes with which are associated the question of artificial fuel, and in hundreds of establishments the change has been successfully made. It has been estimated that artificial fuel is now used in establishments employing upward of 300,000 horses. Almost every day new shops and factories are adopting one of the many new systems which are inventing of the day, and do not remember that it is one thing to "play have a fire" and quite another thing to face the stern reality, involving the risks of life or death to many and perhaps to hundreds of human beings. Whatever is adopted for the further security of human life from destructive efforts is something which is as possible real and trustworthy. In this question there is no room for any inefficient and uncertain "fire escaping apparatus." There must be no trifling with priceless human life. — "Safety," in the Boson Journal.
THE DECECO SEAT-SUPPORTS.

(Patent applied for.)

Our device for hanging water-closet seats we believe to be the best in use. It consists of a pair of nickel-plated brass crutches in which the trunnions at the rear of the seatrest when the seat is down, and in which they turn when it is raised, and two supports of the same material on which the front of the seat rests when it is down.

The setting here shown is in marble; it may be of other material, as wood, tile, slate or enamelled iron.

The advantages of this arrangement, beside its attractive appearance, are:
First, the seat can be instantly removed, for any purpose whatever, and as quickly replaced.
Second, when turned back, there is nothing in the way to prevent the thorough cleaning of the space around the closet.
Third, there is no woodwork needed in front of or around the closet to become stained with sloppage.

We manufacture seats to be used with these supports. They are hand-made, of an improved pattern, consist of five pieces mortised together, made of different woods, and are furnished in different thicknesses and lengths, according to requirements.

This method of seating is applicable to any modern closet.

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MONUMENTS AT TURIN, ITALY.

Sardinian Colour-bearer. V. Vela, Sculptor.

Monument to the "Green Count."

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With this material, woodwork can be thoroughly protected from fire at a cost of less than one cent per square foot.
It can be had in all colors at 30 cents per gallon.
Send for Anti-Pyre circulars and samples.

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ALSO SOLE MAN'FR. CREOSOTE SHINGLE STAINS.
TOMBS.

Common Form of Indian Taps.

Tomb of the Foscherari, Bologna.

Tomb of Theodoric, Ravenna, Italy.

Tomb of the Passeri, Bologna.
MR. CHARLES W. WHITCOMB, the Fire-Marshal of the city of Boston, has just issued his Second Annual Report, which is as interesting as the first one. There is a special value to the observations of an independent expert on matters which are generally studied only in the interest of the insurance companies, and Mr. Whitcomb's statements in regard to incendiarism, and other causes of fire, deserve to be carefully considered by the statistics compiled by the insurance journals. For example, the insurance statistics present incendiarism as the cause of a large proportion of the fires that occur, while spontaneous combustion occupies in them but a comparatively small space. The Boston Fire-Marshal finds, however, that in the city under his charge there were last year more fires from spontaneous combustion than from incendiarism, and only an insignificant percentage of either. The "defective flue," moreover, that arch enemy of the underwriters, which is, we believe, credited in insurance statistics with being the cause of more than half the recorded fires, plays a very small part in Boston conflagrations. In fact, Mr. Whitcomb does not ascribe any fires during the year to this dreaded agency, as commonly understood, but classes together all the cases of fire arising from the ignition of wood furring placed in contact with chimneys, floor-timbers running into or near chimneys, or woodwork exposed to heat from a furnace or stove smoke-pipe placed dangerously near them, under the head of "Defective Construction," and attributes to this about four per cent of the fires of the year.

The cause to which conflagrations in Boston are most commonly due is, we learn, not the "defective flue," or the manipulations of the "incendiary," but the mistakes of matches, which are the source of twenty per cent of the fires. About three-fourths of these come from careless handling of the matches, either by children or by those who ought to know better, and the others are brought about by rats, which carry matches to their nests, and gnaw off the outside of the paraffine or paste at the end. It is a little startling to be told that rats playing with matches cause more fires than either defective flues or incendiaries, especially as many experts refuse to believe that rats gnaw matches at all; but Mr. Whitcomb settled this point during the year by putting three rats in a large cage, and placing matches in the cage at night. The floor of the cage was invariably found the next morning to be strewn with partly-burnt matches, and one of the rats actually gnawed the phosphorus end of a match held in the Marshall's hand until it was ignored, so that he considers his opinion as to their destructive tendencies well founded. Although, as Mr. Whitcomb says, an "autoply after cremation" is liable to some uncertainty, his method of investigation seems to be searching and accurate, and in certain special classes of cases, such as those due to incendiarism and spontaneous combustion, his observations shed a curious light upon subjects about which very little is accurately known. He acknowledges that the proportion of incendiary fires in the rural districts is far greater than in cities, so that the man under his own jurisdiction afford only a partial view of the matter, but he has tried to enlarge his knowledge by investigations extended over the State, and has been led to some interesting conclusions. The most important of these is the opinion, which is entirely supported by evidence, that the "malicious larcenies" which insurance officials talk so much is very nearly a myth. An American insurance authority, he tells us, ascribes ninety-nine per cent of incendiary fires to plots to cheats the underwriters by over-insurance, and, in his first report, falling into the prevailing current, he stated that a majority of incendiary fires undoubtedly originated in this way. During the past year, however, finding reason to doubt the truth of even this moderate statement, he sent to the county prosecuting attorneys of New England, to the directors of penal institutions, and others, for information as to the motives which were shown by the accused in trials for arson and the like. To his surprise, he found that, instead of over-insurance, the motive for the crime, in seventy-five per cent of the cases occurring through a long period of years, was simply a desire for revenge; while, of the remaining twenty-five per cent, about one-third were due to the men ascribed to general depravity, and only the remainder, about one-twelfth of the total number, to a desire to rob the insurance companies. In the cities, however, the proportion of insurance robbers is greater, and Mr. Whitcomb finds in Boston, as has been found in other cities, that a large part of them are Jewish men of the meaner class, to whom an attempt to insure worthless goods at a high valuation, and then destroy them, often seems a legitimate speculation. Although the honorable and upright Jews cooperate heartily with the authorities in endeavoring to put a stop to these frauds, they continue to be perpetuated, and Mr. Whitcomb says that there are among the speculators men who make a business of setting fires for their over-insured friends, receiving payment by a commission on the amount of insurance collected. These useful individual works, we are told, with some sort of "volatile chemical," which is to Mr. Whitcomb mysterious, but has the property, when scattered over the premises, of damaging the entire stock, although the fire may be trifling. We suggest that the "mysteries" of chemical reminds us very much of a solution of phosphorus in bisulphide of carbon. This solution is very innocent in appearance, is easily scattered over inflammable substances, and produces to visible effect until it is exhausted by being rated: when this has disappeared, however, the phosphorus left behind begins to smoke, and soon bursts into a flame, together with the combustible object on which it has been sprinkled.

In regard to spontaneous combustion, the fires of the year in Boston have furnished some new observations, of considerable importance. In one case, a quantity of feather dust in a boding manufactory took fire without apparent reason. It was found, however, that a piece of thick glass had been lying on the feathers, and the sun's rays, concentrated in some way by the glass, had set fire to them, although the day was a cold one, in the month of March. In another case, a number of tarpaulin hats were lying, packed together, in a window. The high temperature, with, perhaps, the close packing of the hats, caused them to burst into a blaze. Two other fires were caused by putting paraffine paper, such as candy is wrapped in, into a refuse-barrel which contained a little sawdust; and a third, which destroyed twenty thousand dollars worth of furniture, was occasioned by putting greasy paper, which had been used to wrap lunches in, into a wooden refuse-barrel, which happened to contain some sawdust and sweepings.

We have before mentioned the scheme by which Messrs. C. A. Pillsbury & Co., the proprietors of the largest flour mills in the world, proposed some time ago to share their profits annually with their men. The plan was put in operation in 1884, and a considerable sum was divided at the end of the year. The next year was less prosperous, and at the end of it the Messrs. Pillsbury & Co., instead of a dividend, sent out a circular, explaining that there were no profits to
divide; that their own capital had brought in no interest, and
their work and care had been totally unrewarded, except by the
consciousness that their men had been kept employed, and
that no reduction in wages had been made. The next year
there was no boom in the business, and no dividend; but
during the fourth year, which is just completed, the profits
were large, and the firm has distributed forty thousand dollars
among its employees, as their share of them. A flour mill
does not require many hands, and the dividends vary, in accor-
dance with the season of the year where they are
found; and in connection with the building, the final judge as to the cement
to be employed in it, and if he did not consider the cement
offered him to be suitable, it was his duty to reject it, no matter
how many experts might have testified to its high quality.

ALTHOUGH most intelligent workmen, in discussing the
profit-sharing systems, willingly accede to the idea that
losses should be shared as well as profits, and consider it
hardly fair or manly to accept one without helping to bear the
other, it is not the case that, in most instances, money
must be divided among the men, to the extent that, if the year's business
results in a loss, no dividend will be paid until this loss has
been made good by subsequent profits.

We imagine that most of our readers are rather at a loss to
understand, from the unintelligible accounts in the daily
papers, the exact nature of the charges which have been
brought against Representative Stahlhecker, of New York, in
connection with the Congressional Library building, and are
now under investigation before a committee of Congress. In
general, the movement against Mr. Stahlhecker appears to be
a manoeuvre on the part of the friends of Mr. Smithmeyer, the
Library Commission, and the existing state of things, to meet
the sudden assault made upon them by the opposing party a
few weeks ago, and so far as we can see, the tactics employed appear to be about equally creditable on both sides. It will
be remembered that the principal grounds of complaint which
the House had against Mr. Smithmeyer, as distinguished from
the Library Commission, under whose direction he worked,
were that the execution of his design would cost ten million
dollars, while the House had been led to suppose it would cost
only three million, and that he had refused to use certain
cement in the building which he thought was unsuitable, but
which several other people thought was suitable. The answer
to the first of these accusations was that as the Library building,
according to Mr. Smithmeyer's plan, is to be three times as
large as the State, War and Navy building, which cost three
for our millions, it was obviously absurd to suppose that it
would be built for a smaller price. As for the second,
House on this point, if it existed, must have arisen from a
misunderstanding of the estimate given by Mr. Smithmeyer
and the Commission as to the expense of erecting a portion of
the structure for temporary use; and the second was met by
the statement that Mr. Smithmeyer was by no means adverse
in connection with the building, the final judge as to the cement
to be employed in it, and if he did not consider the cement
offered him to be suitable, it was his duty to reject it, no matter
how many experts might have testified to its high quality.
EQUESTRIAN MONUMENTS.—VI.
The Dark Ages.

The installation of statues of leaders, military and otherwise, was a common practice during the Dark Ages. The history of Italy under Odoacer and Theodoric shows that after a period of upheaval and turmoil, a season of comparative peace and quietness, and a revival in some measure of the polite arts, strongly flavored with Byzantine influence, Rome at this time was no longer the home of the alien rulers: their rugged natures demanded a more bracing atmosphere and found it at Ravenna, which in time became a rival in no small degree of the city on the Bosphorus. Odoacer was more than a military leader, to be sure, but he was a successful one, and the Roman practice of honoring such men with monuments had not become wholly obsolete in the peninsula, so that it is not surprising that a people accustomed to being surrounded by works of art, when peace was restored, on looking round and finding that the invaders had destroyed the familiar monuments of earlier days, seek to do something to replace them so far as their unostentatious hands might do, and what more natural than to seek to curry favor with the despots by erecting a monument in his honor?

The accompanying cut from the "Papier Sceurtharium" (1505), by Jacobus Guala, represents the so-called "Regis," erected at Pavia upon a column or columnar pedestal of brick. To be sure, some authorities call it a Lucius Verus, others a Marcus Aurelius, others an Antoninus Pius, and again others an Odoacer, and for our purposes we prefer to accept this last supposition. At all events, the statue stood at Pavia until 1315, when it was torn down by the Milanese who had captured the city, broke in pieces and, seemingly, carried off as a trophy. The Pavians, however, duly appreciated this venerable landmark, and taking up a subscription succeeded, in 1335, in rescuing the fragments of the gentleman who had himself done so much damage to works of art, and patching the pieces together regilded the whole and set it up once more on its former pedestal where it remained until 1785, when it was temporarily dismantled and then restored to a new pedestal. It would have been still in existence had not the fates sent a new horde of modern Vandals into Italy—the French, who effectually destroyed the monument in 1796.

The identity of the equestrian statue of Theodoric, the Ostrogoth, that was originally erected at Ravenna, rests on somewhat better authority, for it is first mentioned by the Priscianus Aegnellus in church records written about 838, about the time it was removed and carried off to Aix la Chapelle, where Charlemagne was building a magnificent palace into which were brought all manner of columns and sculptures brought from Italy. It is supposed that Charlemagne, when he passed through Ravenna, after having been crowned by the Pope at Rome, was impressed by the beauty of this statue, and when he felt a need for something of the kind sent especially to Ravenna for it. As the Gothic king is described as wearing a shield on his left arm and a spear in his right hand, the statue evidently did not belong to the strictly Classic school, but seems to indicate that art had taken a new departure in the direction of realism. It is thought that this monument was destroyed, but it is not supposed that it did not long survive its removal to Aix, possibly falling a victim in the same century to the bigotry of the Catholics, who, perhaps, vented on the statue their distaste for the Arian doctrines upheld by Theodoric, notwithstanding that during his rule in Italy he did not meddle with the Romish Church and its practices. In support of this possibility may be cited a poem, a panegyric on Louis the Piou, the successor of Charlemagne, by Wulfred Frabo, a monk, in the course of which the poet expresses the belief that this monument to an Arian was the work of the devil. During the Dark Ages, when the Christian world was preparing for the final cataclysm, on the sufficient-for-the-day is-the-end-thereof principle, little heed was taken for the care and preservation of statues and still less for the production of new ones, so that the period between the fall of the Roman Empire and the dawn of the Renaissance was one which probably witnessed the disappearance of many a piece of sculpture that would have added interest to this inquiry, we probably have to mourn the loss of few created within this time.

Whether or no during this debasing and filibustering period the peaceful arts had outside of the cloisters any practitioners, and these any clients who cared to encourage them by entrusting to them commissions for large works of sculpture, it is certain that the Church kept the arts alive if others did not, and amongst the works of art which have been preserved from destruction are assumed to be works anterior to the Renaissance of arts.1

1 From Jacoby's "Monbulk, Traces de l'Art Francais aux Mues.
2 The Disappearance of Post-Roman Sculpture.—As M. Juste Laffitte so justly remarks: "In the European museums there exist no works of the sculptor that have been attributed to this fair epoch of Byzantine art. Nevertheless it does not seem possible that the human number of statues cut under the rule of the successors of Constantine not one should have survived to us. One is tempted to believe that some of the works that have been preserved from destruction are assumed to be works anterior to the Renaissance of arts." - "Histoire des Sculpteurs Francais," par Marqueci de Pissarro, 1856.
churchmen must be sought the connecting links that unite the art-works of the Roman Empire with the works of the early Renaissance; and in the illuminated missals may be traced the continuance of the traditions that later found expression in the mosaics at Ravenna, and the crude sculptured work of early ecclesiastical buildings where the horse and rider were introduced, as in the sculptures about the doorway of St. Zeno, at Verona, where, on the right, is illustrated the chase of King Theodoric, a subject of some importance, for here, first, according to Maffei, a horseman is shown riding in stirrups. If, then, there were carvers capable of fashioning such work as this, there may have been others who did better and larger work at the same period, or even before.

The relics that in chronological order naturally attract attention are to be sought in the ethnological museums of France, which have made a specialty of collecting Gallo-Roman remains; and though it is difficult to fix precise dates, probably many of the finds date from a period somewhat subsequent to the Roman domination. Amongst those are to be noted the rudely sculptured reliefs which bear, after true Classic manner, the figure of the horse, the sepulchral emblem of the departing soul. Then, too, are to be noted amongst the household gods, which the peasants cherished, it is said, invariably, each but having a niche or cupboards in which the tutelary deity was bestowed, certain mounted figures such as that shown in the annexed cut which represents the goddess of Nôtre-Dame of Abundance, which, from its distinctly Roman type, cannot be of very late date, and is credited to the fourth century.

The thoroughness of the Roman civilization in the north of Europe, which is attested by the magnificence of the ruins of villas where are so frequently identified and uncovered in these days, is also proved by the vogue which the practices of the Roman religion also obtained, for relics that clearly show the impress of Classic myth are quite as common as Druidic remains, which they superseded in a measure. In the rude fragments which is known as the Hercules of the Vosges, is a proof of the adoption of some obscure and possibly local myth which united Hercules and the horse, here shown trampling on a human figure which terminates with a serpent's tail.

This trampling of a rider over a prostrate foe is common to sculpture of all times and peoples. The statues of Justinian, trampling on a Persian, and Probus riding down a figure of the Rhine, have been mentioned, and similar episodes are recorded in the bas-reliefs of Assyria and Egypt, but in no place is this incident more frequently introduced than in the carvings of churches of the eleventh and twelfth centuries, as at St. Etienne-le-Vieux, at Châlons, St. Croix at Bordeaux, St. Pierre, Ardagny, and at Autun, Parthenay-le-Vieux and elsewhere. Explanations of this symbol are as varied as there are instances. Now, it is St. George, St. Martin or St. Michael; now, it is Pepin-le-Bref riding down Waifre, duke of Aquitaine; now, the Charlemagne; and now the angel driving Heliodorus from the temple. But, perhaps, the most general and applicable interpretation is that, it represents the terrible rider of the Apocalypse with his dread white horse. But between these sculptures and those of Gallo-Roman times, lic centuriae of whose work little is known, and less is left.

Perhaps the earliest equestrian statues of the Medieval period which is known, and which, fortunately, still remains to us, is a bronze statue of Charlemagne, now in the Musée de l'Hôtel Carnavalet, at Paris, and which is credited to the ninth century, and furnishes proof that secular sculpture was not wholly neglected; though it seems as if it could not have flourished with much luxury, since, in honor of the greatest potentate of his time, it seemingly could only produce this crude and miniature presentation. Of the early history of this statue nothing is known, but Alphonse Vennat, who, in his "Charlemagne," credits it to the ninth century, gives some facts concerning its modern history. It was at one time preserved in the Cathedral at Metz, and later fell in some way into the possession of M. Albert Lemoir, and later formed part of an English collection, but finally was purchased by the City of Paris. After the Commune it was, in June, 1871, picked out of the ashes of the Hôtel-de-Ville, and, fortunately, was seen by some one who recognized it, so that it fell once more into the hands of the proper authorities, who, on the formation of the collections at the Hôtel Carnavalet, placed it there.

The general collapse of art during the ninth and tenth centuries, for one thing and for another, the fact that Charlemagne could not find any one sufficiently skillful to engrave for him a seal of state, so that he habitually used a seal engraved with a head of Marcus Aurelius, or another which bore the head of a bearded Jupiter, seems to make it doubtful whether it is possible that this statue really is as early as the critics try to maintain.

But art does not proceed by great jumps and bounds; effort and struggle, trial and experiment, and opportunity, and practice are the essential elements of the advance of art. But the last century, and the early work of which, though now destroyed, there is good record, must be many steps which have left no trace. Until 1572, there stood in the choir of Notre-Dame of Paris, an equestrian statue of Philippe le Bel, eleventh ruler of the House of Capet, who caused its erection, it is said, in fulfillment of a vow such as were so often made in those times by persons who, in a moment of bodily peril, vowed that, should they have safe deliverance out of their ill-plight, they would go on a pilgrimage to the shrine of Saint Thib, or bestow a silver candlestick upon Saint Thib; and as the story goes that this statue showed the king clad as when he repulsed the last attack of the hussars of Ghent and Bruges, that is armed only with helmet, gauntlets, sword and shield, but without coat-of-mail or greaves, it looks as if he had nearly been the victim of one of the night attacks the stalwart citizen-soldiers were so fond of making, and being in sore straits vowed he would erect a statue in honor of Our Lady — and to his own glory. The legend has it that on reaching Paris, he, still halfarmed, rode his horse into the Church of Notre-Dame, and there rendered up thanks for his escape, and in further token of his gratitude granted an annual allowance of one hundred pounds for the celebration of the anniversary of the event, and gave orders for the erection of his statue. A Latin inscription on the pedestal vouches for the truth of this legend and the sanctity of the King's armor; but a woodcut published in 1575 gives the lie to both one and the other, for it shows the King in full armor, but without sword or shield, while horse and rider are quite obliterated by the embroidered surcoat and caparison of holiday full-dress.

But the same story is told of a later ruler, Philippe de Valois, who made the vow at the battle of Cassel, in 1328, and caused the erection of the statue. Of this statue, also, there exists an early print, here reproduced, which in some ways seems most...
A NEW ENGRAVING OF DA VINCI'S LAST Supper

The first exhibition of Stagg's engraving of the "Last Supper," which is in the artist's atelier in Amsterdam, is being eagerly hidden for by collectors. Galliard, who worked in competition with Professor Stagg, died last year, so that the engraving adds the advantage of an undivided field of attention to its other qualities. His work, which he showed at Rome last year, has been shown in Charles the Fair. In consequence of the old he gave Robert Bruce, King of Scotland, the tail of a gold eagle, and two of the feathers of Stagg's work was in the possession of the English, he gained the province of Dauphiné. Married Blanche of Navarre in 1200.

the picture was destined to be constantly exposed, as a decoration of a crowded dining-hall. The French occupation of Milan, moreover, was brief, so brief as to be ridiculous when compared, so far as injury to the painting is concerned, to the four centuries of dampness and dampness, and the ravaging it. The incident can be legitimately mentioned, but it is folly to place too great an emphasis upon it. The painting in the Louvre is so well known in oil and not of faces, so that it held it in itself the elements of early decay. Vasari and Lomazzo both describe it as being, even in the middle of the sixteenth century, lamentably wasted. Since the beginning of our times the utmost efforts of art have been directed toward the possibility of keeping it in a condition to preserve it a blotched and ghost-like vision. Not even the little that is still visible is all Da Vinci's; much is lost in the ancient and fading. The picture has been washed, varnished, and had its edges cleaned. So widely spread as engravings of the "Last Supper" are merely it is safe to say than any work of art in the Christian civilized world—nor one is a production made direct from the wall itself. Though the works of Van Dyck or Rubens are in style, and the copper engravers of the sixteenth century are in style, and the copper engravers of the sixteenth century are no real attempt. The municipality of Milan built the required scaffolds and set no limits to his examination of the substance of the wall, to his instruments for photographing the drawings, and by the Oratorian's photographing of sections and use of lights; while he was favored by the Grand Duchess of Weimar, who considered the undertaking to be at last a rare promise of historic importance, and for the first time the technical study of the drawings has been undertaken and by the directors of the public museums in Venice, London, and Vienna.

The original material for study consists of heads drawn by Leonardo for his painting, hand and feet, and sketches of the composition of the whole or portions. Of these the most important are the pastel drawings at Weimar, which include the studies of the head of Christ and two of two of the apostles. It is not more valuable than their common reputation, which was founded, not on the original drawing, but on bad photographs and prints of the drawings. The missing head of Christ exists as a red-pencil sketch in the Brera at Milan. The studies for Simon and Thaddæus have always been reported as being in an English collection. Professor Stagg, however, exploded this tale, the drawings are not in Eng-
the painting and here they are faint or wholly erased. Of the right hand of Judas and the left hand of James the Elder, several sketches exist, each a little different from all the others. But it is impossible to record the countless small points of difficult decision that must have accompanied and new discoveries were made by Stang that need to be noted.

The first of these is the fact that, contrary to what Morghen's and all other authorities, the background of the original painting was light. Instead of the eye falling on the white stretch of table cloth, as we have got used to, it fell, in Da Vinci's picture, upon the dark figure of Christ. The air was the lightest colored portion of the final delineation in S. Maria delle Grazie, goes far toward accreditation the sketch as Leonardo's. He studied from life and modified from a sense and an ideal of beauty and grace. Modifying, however, is not tainting, and it is tainting that Morghen is seen to have been guilty of. His mind and taste were possessed by the classicism of the time and this mistaken classicism caused him to stamp a sort of stereotyped anti and the expression of most of the apostles in place of the exquisite individualization of Da Vinci.

The discoveries made in respect to minor points were first that the table cloth was not the paper of folds and that the salt-<br>cellar, represented as overturned by the right arm of the frightened Judas, was an introduction of some late engraver inclined to genre. It is not found in the original painting, nor has it ever been represented. Why Morghen, or rather, why d'Oggionne, should have introduced the folds it is in vain to guess. That they were studies from nature is quite probable. I once saw precisely the same singular spectacle which the cloth makes in Morghen's engraving, on an artistic tour, when our small steamer shipped a sea and the table was deluged with water from above, and again in Italy, where our hostess hid a cloth yet damp from the mangle. As the drapery of the table by dishes in plain in the "Last Supper," the richness of folds added a modest variety of line and small shadows to the stretch of flatness.

The richness of Leonardo's engraving is one more point to be noticed in it, for, while having the same length as Morghen's, it is over an inch higher. Morghen was influenced to reduce his print to agree with an engraving of Guido Reni's "Aurora," with which it was exhibited. Stang's print, besides being an improvement, is in accordance with the proportion of the original, in which the ceiling does not press so near upon the heads of the apostles as is usually represented.

The whole length of time spent by Professor Stang over his work was within two years as long as that which Leonardo is said to have used in producing the original, or fourteen years—from 1874 to the present.

CO-OPERATIVE BUILDING IN THIS COUNTRY.

This subject is no new one to members of the Social Science Association. It was first brought to the notice of the Meeting by the late Josiah Quincy, of Boston, who wrote copiously on the questions involved in that year and in 1875. It was investigated by committees of our social science department from 1874 to 1876, and the publication of the facts collected in a report made by Robert Treat Palme, and the late John Ayres, at our Detroit meeting, in May, 1875) attracted much notice, and was followed by several other discussions by societies and individuals. Our association continued the matter by a paper read at the Brighton meeting of the Social Science Association in October, 1875; by an extended report read at our Boston meeting of January, 1876; by several papers (which were published) and a discussion on our New York meeting in June, 1876; and finally by reports at the Boston and Cincinnati meetings of our association in 1878. At this last named meeting, the facts concerning co-operative building associations in Cincinnati were ascertained, as they had been ascertained and made public for Philadelphia in 1875-6. Philadelphia was the first breeding-ground of these associations in the United States, and was, in a suburb of that city, about 1851, and by 1874 had increased in number to at least 400; while they had also spread into New Jersey and Delaware, and from Maryland had been transplanted into Ohio, but with a system of management, and ultimate ownership, somewhat different from those of the Philadelphia associations. In Cincinnati, in May, 1875, we found there were at least 15,000 members of these building associations, paying in weekly not less than $2 a week, and the associations had been increasing in spite of the "hard times," from 1876 to 1878. Meantime the building-associations of Pennsylvania and Michigan had been suffering from these "hard times," and from certain defects in their state laws, involving judicial decision unfavorable to the whole system. In the light of these facts the State of Massachusetts at the suggestion of Josiah Quincy, General Bradford, Robert Treat Palme, and other members of our association, and with the hearty support of many persons of small means, who were desirous of forming such a society, passed its act of 1877, defining and regulating "co-operative savings-fund and loan associations," as they were briefly termed in the Massachusetts law. There had been much opposition in 1875-6, to the enactment of such a law, the old savings banks being fearful that these new organizations would injure them; but such has not been the result. Scarcely had the organic law been passed—May 14, 1877—when, in July, 1877, the first of these corporations in Massachusetts, the "Pioneer Co-operative Bank," was established, with our financial associate, General Bradford, as president, and D. Eldridge as secretary; and we now have from these two gentlemen—Messrs Bradford and Eldridge—a report on building-associations in Massachusetts, which practically covers the whole of New England, and may be summarized as follows:

In January, 1879, Josiah Quincy, writing to Mr. Sanborn, said: "The co-operative fund and loan associations are, I think, fully established in Massachusetts; there are a dozen in the State that I understand are doing well. The two in Boston (the Pioneer and the Homestead) have nearly 1000 members and loan $5000 or $6000 a month. This was nearly 10 years ago. Today, according to the reports in Massachusetts, 64 co-operative banks of which 13 have been organized since October 31, 1887. The 51 previously organized are reported by the State Savings Bank Commission as having 20,735 members, an average of 400 each; with $1,066,144 shares, and assets amounting to $4,311,949. The present assets of the 64 banks exceed $5,000,000, the yearly increase being nearly $1,000,000 in Massachusetts. Of these 64 Massachusetts banks, the Pioneer Co-operative Bank is the oldest, and presumably the richest. On the first of April, 1888, it had assets of $298,133,68, an increase during the year preceding of $22,724, or more than 10 per cent. Its receipts during the year from all sources were nearly $60,000, of which more than $56,000 was from dues and fines. It has 77 members, with 59,555 shares, and 170 of these were borrowing members—a little more than one-fifth of the whole membership. The total series of shares, upward of 1700 originally, only 35 remained outstanding; while of the nineteenth series issued in October, 1887, 15 are outstanding .

4 A Report from the Special Committee on Provident Institutions, read at Saratoga, September 7, 1886, by E. B. Sanborn, secretary of the Committee, and published in the Springfield Republican.
Of the other 63 banks, about 10 are in Boston, and the rest are well distributed throughout the cities and larger towns of Massachusetts, there being 3 in Worcester, 3 in Taunton, 2 in Fall River, 2 in Haverhill, and 1 each in Lowell, Lynn, New Bedford, Cam- bridge, and Springfield. There are 2 in Maine, 3 in Rhode Island, 5 in New Hampshire, 1 in Vermont, 4 in New York, and none in Delaware, Maryland, or Pennsylvania; for it was in two or three of these States that they were first started, and have been spreading gradually for more than half a century. It was not until 1849, however, that the first incorporated building-association in Philadelphia was chartered; although several of the banks of that city were chartering at that time there from 1831 to 1849. After 1849 their growth was rapid, for 148 were chartered in the 10 years, 1850-60 inclusive, 317 in the 6 years, 1851-66 inclusive, and 450 in the 17 years, then that the building-associations were chartered in Philadelphia alone, and at least 450 of these were in active operation in 1876, when the great Centennial Exposition took place in the city of Philadelphia. Probably in the whole country, at that time, there were many thousands of such associations, for central banks had been founded since 1806 and had been chartered in the United States in 1876. There are now probably more than 1000, outside of Pennsylvania; and M. J. Hamill of Philadelphia, estimates the number in all Pennsylvania, now, as 900, or 450 in Philadelphia, and 450 in the rest of the State. In New Jersey there are probably about 140 associations; in Delaware, 30; in Maryland, 50; and in the State of New York at least 200. This would make more than 1200 such associations in the five Middle States.

It may be asked what amount of capital is invested in these associations in Pennsylvania, and in all Pennsylvania. M. J. Brown has undertaken to answer this question, and his figures, though partly estimates, have great value. He examined the sworn accounts of 120 building-associations with the following results: Aggregate capital, $8,749,387; average capital, $72,911; aggregate shares, 154,650; average shares 1264. Applying this ratio to the 330 Phila- delphia associations, their capital becomes $32,819,017, and the number of shares, 705,800. It must be remembered, however, that all Pennsylvania there are now nearly 1,000,000 shares, in these associations, and that they represent a cash value of at least $60,000,000. The whole savings-banks funds in Pennsylvania hardly reach this amount. But it is probably safe to say that the building-associations are continually passing out of their hands into those of the shareholders, in the form of occupied houses, it will be seen that most of the capital of these associations must be greater than their capital at any one time. In 1876, Joseph Doren estimated this sum at $50,000,000 in Philadelphia alone, and by this time it must exceed $100,000,000, for mortgages were then making at the rate of 3,750 a year, at an average of $2,000 each. This would show an investment of $7,500,000 each year in mortgages, which in 12 years would be $90,000,000, and of this sum at least $60,000,000 must have been lent out by the associations. It is therefore probable that $150,000,000 is none too much for an estimate of the existing savings effected in Pennsylvania by the building-associations. No other State can probably show half as much.

New York has only of late begun to develop the system on a large scale, although some building-associations have existed there for more than thirty years. The old law, under which they organized was passed in 1851, and in the next year, 1852, the first Rochester association was organized and continued in operation for a few years. No other appeared in that city for nearly twenty years, when many sprang up in once shadowy and practically non-existent, by the growth of the better kind, then so numerous in Pennsylvania. But in 1882 the Rochester associations began to "loom," as the phrase is, and have been growing ever since. There are 125, in the city of Rochester, of perhaps 125,000. InBuffalo, with a population of 225,000, the number of building-associations is nearly as great as in Rochester, but the largest of these being the Erie Savings and Loan Association, there are less than 5000 shares of semi-annual series, and now receives more than $10,000 a year in dues and fines, and more than $8000 a year in pro- visions. In the other cities of New York, — in Elmir, Syraucuse, Utica, etc., these associations have also been forming rapidly of late, and the Chenango Valley Mutual Loan Association of Elmir, has existed for thirteen years, and now has assets to the amount of $175,000, and about 450 shareholders. In the city of New York and Brooklyn, new associations have been fast forming for two years past, and now for the first time the sys- tem is actually planed in that great commercial and manu- facturing centre.

The New York Star has been devoting a column a day to the ex- position of the building-associations, and one of its editors, C. P. Southard, has prepared a small manual showing the business of these associations and of members of these companies. It is impossible to say how many of these associations now exist in the State of New York, but they must be counted in thousands. They are organized under the old and family law of 1851 (Chapter 122) and there is an unfounded impression that the more carefully drawn act of 1877 (Chapter 156) will somehow accommodate their work under it. At the State Conference of Building Associations, held at Rochester, May 17-18, 1888, the impression seemed to be shared by a majority of the delegates from about 100 associations there repre- sented. A debate on this subject and a draft of resolutions should be examined by the officers of the State Banking Department, and it was over this question that the conference had its only heated discussion.

A resolution calling upon the Superin- tendent of the State Banking Department to make such examinations was introduced but subsequently withdrawn, and no official action on the question was taken. The settlement of the great majority of the delegates was that such examinations, made annually or oftener, would be both expensive and useless. The law of 1875 does not provide for such examinations of loan-associations as are made of banks, but it does provide for an examination, upon the request of not less than 50 shareholders, of their books and accounts, for all that was needed. It was further said that the business of the loan- associations is conducted publicly at regular weekly meetings, that the examinations are held in the presence of the members, and that the policy is to let well enough alone. There is force in these arguments; but the advantages derived from State supervision and public report far outweigh the disadvantages, and any extension of these exami- nations in any State should be accompanied with ample protection for the investors by frequent reports from some public office and State supervision of methods.

In New Jersey these associations have been reported on by the State Labor Bureau, from whose reports it appears that there are in the State no less than 140 building-associations, with a capital of $50,000 or over, in New Jersey, 140; in Delaware, 30; in Maryland, 50; and in the State of New York at least 200. This would make more than 1200 such associations in the five Middle States.

For various reasons, some of which are stated by R. T. Hill, of Texas, in his report concerning provident institutions in the extreme Southwest, there have been few accumulations of savings in the form of money in the greatest part of the South. The number of savings banks there is small, and building-associations are recent and, as yet, comparatively few. The advantages of the latter are that there are fifty in Texas, which is probably more than in any of the former slave-holding states, unless Maryland be an exception. They are numerous in Arkansas, Mississippi, Kentucky, Tennessee, Louisiana, Alabama, Georgia, and Virginia. From these States, however, the committee have only scanty reports. There are twenty or more associations in the city of New Orleans, several in St. Louis, St. Paul, Kansas City, St. Louis, Key West, Flia., one at Pensacola, one at Selma, Ala., one at Fort Smith, Ark., one at Lafayette, La., one at Parkersburg, W. Va., one at Gus, North Carolina, one at Waco City and College Station, Texas, and Massachusetts, and no doubt many others in the above-mentioned States. In Louisiana they are used for all purposes, and the building-associations as early as 1873 a building-association was formed, which ran its course in ten years and divided its profits among the members. But the first one in the city of New Orleans, organized in 1854, continued to exist till 1888, and has since been very prosperous, having now about 600 members, who have built or purchased more than 100 homes during the last six years of its existence. There are others of the 20 or 30 New Orleans associations have from 300 to 500 members, and in one of the associations organized in 1880-90 and in 1885, in order to defend law to better advantage, formed a State union, which, at a meeting held in the City of New Orleans on the 12th of this month, and four or five others in different parts of Tennessee. There are now five or six in Chattanooga, which during seven years past.
have provided homes for 250 families, and in all Tennessee there must now be upward of 30 associations.

In Missouri the number exceeds 40, and may be much larger. An act passed during the last session has led to litigation to test its constitutionality. The act in question was passed March 31, 1887, to govern the formation of these associations, and in many respects differs from the Illinois law. It has also co-operated with the courts in such associations to be benevolent associations, and consequently exempt, as mentioned in Article 10, Section 31, of the State Constitution, from the taxation of real estate (2) that the buildings and other property of the associations are used for charitable purposes. The first determination by the court of the question of the legality of that part of the act of 1887. Under this arrangement 34 associations deposed with the State Treasurer the amount of the tax on the capital stock, aggregating $96,000. If the court sustains the associations, this money will be returned to them. This question in Missouri was earlier raised in New York, and has there been practically decided against taxation, because in that State saving banks are not taxed. There are States, however, such as Massachusetts, where savings banks are taxed, and there seems no reason why building-associations may not be. In this respect the act of 1887 has several advantages.

The whole number of building-associations in the former slave-holding states, exclusive of Delaware and Maryland, at 206, but they are fast increasing.

Dr. Keck, of Cincinnati, Ohio, and especially Cincinnati, was the pioneer in establishing building-associations. Dr. F. A. Keck has the credit of beginning the first one in that city and the first one now in existence in Ohio. Dr. Keck wrote an account of his work in Cincinnati, in course of which he said: "There are too many building-associations. At the time I started the system I thought that five or six societies would be enough to carry out the work in the City of Minneapolis. The general public may that I think a great many people suffer by it — the butcher, the baker, the doctor, the tenant, and almost every body else. Some of the members of these associations are losing their debts, put their weekly earnings into these associations and get their dividends every year. It is my opinion that these societies nowadays pay too much in the way of salaries and expenses. It is true that there are a number of these associations which have in these societies exist. It is supposed that Ohio stands next to Penn- sylvania in the number of its building-associations, and that they exceed 600 in Ohio, while there may be 1000 in Pennsylvania, large and small, and that the amount of capital that can be collected and the amount of weekly payments of all sorts is reckoned at $1, 500,000. A further estimate gives $200,000,000 as the amount in- vested in seven banks in the whole of the southern States, at least. The amount is probably excessive. They far outstrip the savings banks of Cincinnati in the amount of their investments, however, and in the number of their depositors. The majority of these are German, or of German descent, but there are also Irishmen, Americans, negroes and men and women of every race among them. The Ohio law was amended in 1868, after much discussion, but the financial system there pursued is open to some criticism from Pennsylvania and Massa- chusetts."

Illinois comes next to Pennsylvania and Ohio in the number of its associations, there being nearly 300 in Chicago alone, and exceeding 400 in all the State, with an average capital of $300,000 at Galesburg, and the unique schedule prepared by him with great labor, throws more light on the operation of these Illinois associa- tions than his modesty has allowed him to mention. It appears that the 200 or more associations in Chicago alone have a much higher average number of shareholders than the 250 or so which exist in the rest of Illinois. Thus 15 Chicago associations average 369 shareholders each, while the average of the 7 associations outside of Chicago average only 24 shareholders, of whom only 54, or but little more than 22 per cent are women. The average of the 250, or so, in Chicago alone is over $20,000; while in 53 other Illinois associations they average only $82,092. The average loan to a member in Chicago is $1329, while the average loan in the rest of the State is $250. The average amount of Chicago buildings is $24 associations is $5,056,758, and in 53 outside associations it is $2,866,000. It is probable that the most prosperous associations make reports, so that the average of loans to the amount of $108,350 in each association is doubtless too high for the whole 400 in Illinois. But if we call the average loan only $90,000 in a year, this would give for Illinois alone an aggregate of $86,000,000 for the worthy amount lent to share- holders by these associations. This is twice the amount of savings- bank deposits in the State, according to Professor Jenks, while the number of associations are increasing their business much faster than the savings-bank business of the bankers of the State.

The early building-associations mentioned by Professor Jenks as existing from 1847 to 1865 were rather speculative real-estate companies, and were not to be compared with the association model. Such began to be formed in Illinois before 1860, and the oldest now in existence dates from 1874. It was about the same time that the first associations were organized in New York. It is believed by Indians, lying between the two States of Illinois and Ohio, did not have building-associations much earlier than 1870. The number in that State can only be estimated, and our member, Mr. A. W. Jenks, in a report of 1887, gives the active number as between 100 and 200. From Iowa we have no returns, and can- not reckon her building-associations at more than 100. The first associations at Burlington in 1873, the second and third at Kooker and Oakleas in 1872. Michigan seems to have had an earlier experience with these socie- ties, and one which for some years previous to 1875 gave the legal and financial leaders of that State a very unfavorable impression of their nature and results. Consequently the law of 1877, under which perhaps 15 or 20 building-associations now exist, was far less favorable to their formation than the laws of Pennsylvania, Ohio, and finally of Illinois. This state of things was changed in 1887, by the passage of a law more satisfactory to the association members than the old law had been. Under this new law about 40 new associations have already been organized, and the number in the State may be about 50. Laverne Bassett, of Ann Arbor, who has collected what information he could (in place of Professor H. Beers) about the Michigan associations, claims a membership of 180, and their "average authorized capital" as $52, 367,000; one of them having an authorized capital of $5,000,000, which now and small investors are invested in the real capital.

Minnesota though later of development than Michigan, has reached a much larger number of building-associations—probably not less than 125 at present, and fast increasing. A well-known journalist, Albert Jenks, of Minneapolis, in his "History of the Savings Bank of the United States" (published at Johns Hopkins University, the following statement: "Several of the most flourishing building and loan associations in Minnesota are the following, and even in the neighboring cities of Minneapolis and St. Paul, and they have been the means of providing many hundreds of workingmen's families with pleasant homes of their own." He mentions eight of these associations first, of which the most important is the Minneapolis Savings Association, which has a capital of $1,000,000, and members of the whole State of Minnesota, as we are informed by a citizen of St. Paul, there are nearly 120 of these associations, and nearly or quite as many of these at St. Paul itself, making a total of over 200 at the old time.

From 8,000 to 10,000 houses in St. Paul have been secured to their occupants by this new system of borrowing and guaranteeing. Whatever the figures of invested capital may be, they are changing so fast, from one day to another, that they give little real indication of the present state of things, still less of the accumulations that have really been made under the method of saving. As an experienced writer (J. M. Brown, superintendent of the Savings Bank of St. Paul) says: "It is fair to suppose that about one-half of the money received by building associations for dues, etc., is now being paid out on account of matured shares and withdrawals, for many of these societies are regularly paying out six percent of the capital each year, and the amount increases largely until the shares begin to mature, but when that point is reached, new shares admitted from year to year do not augment any more shares; for the only new capital is that from old or newer retiring shares. In the Philadelphia associations the cash in- come is more than half the capital, which would indicate an enormous capital growth; but the outgo is largely for matured shares and withdrawals, resulting in almost a fixed sum for the capital. This is really a factor in favor of the societies, for they are now distributing millions of dollars every few months to the members who have been saving for years for some cherished object."

What is true of Philadelphia has long been true, in this respect, of Cincinnati, and is now true of Chicago and St. Paul. The number of associations reported in the last named city three months ago was 100, with a capital of $86,000,000, or a value of $50 a share. Assuming that this is true of the 120 in the whole State, this would give an investment of $18,000,000 in Minne- sota alone; but this may be an estimate. The deposits of the Minnesota savings banks hardly exceed $5,000,000, and the rapid growth of these associations has certainly checked the growth of savings banks there, as it has in Rochester, N. Y., in Buffalo, in Pittsfield and in every other city of any consequence. From Wisconsin we have no information leading us to suppose that there are 50 building-associations in the whole State, although not less than 20 are known to exist. Wisconsin has been a State since 1849, though their great development has been since 1880. They exist in Nebraska, in Dakota and Montana, but from these we have returns. In Kansas they have lately made a very rapid growth, and exceed 100 in number at this time.

California has had these associations for some years, and for a time maintained a monthly newspaper devoted to their interest. In 1887 there were in California 11 building-associations with 30,000 shares and with assets of $2,552,488. This indicates large oper-
California, which is very apt to appear in that State or elsewhere when the small estates are going on actively. The reports of some of the California societies show average loans of $2,000, which is much above the Chicago rate, and, we believe, higher than the Philadelphia rate. But we have nothing to expect that California business is unsafely done; and there are few States where there is greater need of some method to increase the number of small estates owned by their occupants. From the other Pacific States and Territories we have no returns at all.

From all the information attainable by the committee, there is no reason to doubt that there are now 3,000, perhaps even 5,000, cooperative building and loan associations in the United States, and that they provide for, at any given time of, not less than $300,000,000. The accumulated investments in the form of houses and land, which have been paid for by the occupants or their families, represent millions of dollars, and in 10 years, must be much greater than $300,000,000. Twelve years ago Mr. Doren, a competent authority, estimated this accumulation at $2,100,000,000 for Philadelphia alone, where the annual payments then exceeded $37,000,000. There must, therefore, be an accumulation in Philadelphia alone at this time of $180,000,000 at least, and in the whole country there are now more than six times as many associations as in Philadelphia. We may, therefore, safely estimate the whole accumulations made by the aid of building-associations at from $500,000,000 to $750,000,000 in a period of 40 years. The savings banks of our country have provided for much greater accumulations in the same period, but it must be remembered that they are much older than the building-associations in the wealthiest portions of the United States.

At the rate the building-associations are now gaining, the time may come when their accumulated savings at any one time will exceed those of our savings banks, immense as Mr. Townsend's report shows that they are and will be. It is doubtful if any system for savings has ever been devised which has such a tendency to produce a frugality among persons of small income as the building-association methods. There is nothing to repel and everything to attract such persons who are paying rent or interest, and wish to avoid doing so. Borrowing, which in the ordinary form is apt to discourage or demoralize the poor man, is here an incentive to industry and economy, for he must earn and save money to keep this investment, from which he is taught to expect greater profits than are usually returned to him in cash. But the return he gets in relief from rent-paying is itself a profit, which also appears to his imagination greater than it commonly is. The employment of letting, the pleasure of house-building, the companionship and competition which he finds in belonging to such a society, all lure him forward in the way of economy. There are drawbacks and there are dangers in these petty financial ventures which in the aggregate are so vast; but these are no more than attend the usual investments of money. We must, therefore, expect such associations to increase in number and to absorb more and more of the earnings of the people, just as life insurance absorbs more and more of the surplus income of classes a little more prosperous than those who make up the great body of shareholders in the associations we have been enumerating.

**The Life of an Iron Roof.**—The Cincinnati Corrugating Company, in a letter from Mr. W. F. Meninger, of Covington, Ky., who has had upward of thirty-five years' experience in the roofing trade in that vicinity, on the life of an iron roof, stated that in 1856 he put up a corrugated-iron roof on what was then known as the Clayton Young House, at No. 33 West Fifth street, Covington, which is now occupied by the Sisters of Notre Dame as a school. This roof did first-class service and gave good satisfaction until about ten years ago, when, upon some changes being made in the building, it was taken off. The material composing it has been kept in different parts and now in several sheds, stables and other small buildings in Covington and vicinity. In 1891 Mr. Meninger covered the Charles Whitehouse home, adjoining the Fourth Street Presbyterian Church, with corrugated-iron. This roof is doing perfect service to-day. The expense for reconstructing it upon painting, had been hardly worth mentioning. In 1893 he put a similar roof of corrugated-iron on a brick building erected for Mr. George Phillips, who then owned the property, the lot being now occupied by the Fourth Street Presbyterian Church. Mr. Phillips manufactured and prepared the material himself in his rolling-mill. The building has been used as a dwelling house most of the time since then and its appearance is one of a taste in the simple and modest, and its preservation is one of the monuments of that good state of preservation, considering that it has had no attention in the way of repairing for a number of years. Mr. Meninger also cited the history of a number of old-time iron roofs with which he is personally acquainted. The old Howe warehouse on Market street had over it for over thirty years an iron roof. A fact that they provide for the investment, at any given time, on an almost flat surface, it was removed about three years ago. The Licking Mill, a corrugated-iron roof which has been on it for over twenty-five years, and to Mr. Meninger's certain knowledge, there never had a coat of paint since it was first put on. The Kentucky Cornstalkt broads in Covington were originally furnished with a corrugated-iron roof, which remained for over 25 years in a good state of preservation, and was only recently removed on the occasion of some repairs and changes. — *Iron Age*.
of the thirteenth century carrying life into all the provinces, covering the soil with structures of all kinds, original, logical, free, fit dwellings for a nation full of brilliant qualities — this blood, clear and pure, has been revived again under a second invasion of changed conditions, and has become once more Roman, and under such Romans! Symmetry has replaced logic; the phantom of a dead art stands in the place of the native originality of our country. False methods, persistently taunted with a taken form, roll, and an infatuation which comprehends and no one explains, because it cannot be explained to minds naturally clear and logical, has replaced the innate taste for that pure art, in the midst of which we feel at home. The house of the Middle Ages in France is the dwelling of one born upon the soil. The house of our day is a stereotyped dwelling, alike for the lawyer, the soldier, the lady of fashion, and uniformly inconvenient for all. There can be no comfort in such houses, and the passer-by observes only that the fronts are nearly identical and that we ought already to be dead of boredom, if that malady were ever present in France. But there is still hope in the fact that our time is not the first wherein they have tried to mould, let us say, the dwellings of a city into the semblance of a box of boxes set in a line and standing still. The evaporation of the Middle Ages and the stand a little better than our modern magistrates the canons of art, but they did not hinder the nation from developing its talent. The English rulers especially do not seem at this period to have appreciated the French talent, but in their position as strangers they were perhaps excusable. "In the last half of the thirteenth century, a time of peace and prosperity," says M. Felix de Verrénil, "a little corner of one of the provinces was covered rapidly by new towns called, in the ancient language of the South, bastides. Alphonse de Poitiers, brother of Saint Louis, had become, through his marriage with the heiress of the Counts of Toulouse, the nominal Lord of Guienne." As such, and notwithstanding that his sovereignty was often reduced to a mere title he endeavored to secure his direct authority by building a capital city, Villefranche de Rouergue. In Guienne d’Agest and the neighboring counties, importance "bourgs." In Perigord, where he had some possessions, he also built "bastides." These walled towns or "bastides" were built on ground given gratuitously, laid out like the plans of engineers, and enjoyed a liberal franchise. By this means he brought entire populations under his rule, and the scheme succeeded notwithstanding the protestations of rulers and the excommunications of the bishops.

"On his part," continues M. F. de Verrénil, "Edward I as duke and afterward as king, multiplied endowments of this character, which are among the best claims of this great prince on the remembrance of the ancient duchy of Guienne: Labourne, among others, owes its existence to him (1280) . . . ." Beaumont was also built for the profit of the King of England in 1272; Marshal Jean de la Linde commenced on his own domain the bastide of La Linde. The town of Montpazier was built in 1284.

The plan of Montpazier has never been altered. Like all the towns of this period in Guienne and Perigord, the town of Montpazier was not only laid out with perfect regularity, but all the houses were of equal dimensions and similar plan. A group of these houses (Figure 17) shows with what cellular uniformity they were built. The regularity observed in modern towns, such as Napoleon-ville and certain towns of Algeria is mere disorder as compared with this absolute symmetry. It would seem that all the people who came to live in these free "bastides," which were a sort of refuge offered by the sovereign, stood upon an equal footing; however that may be, it is certain that they submitted to levelling conditions of fronts and ground-plan, since these towns were built all at once and had attained a very high relative degree of prosperity soon after their construction. From which it would appear that those ideas which are now supposed to belong to our time, to "working cities," and to centres of population established on a basis of absolute equality, are not new after all; and that the Middle Ages had even attained a practical application of them far beyond what we have done.

However modest these dwellings may have been, they were, at least, suited to the wants and habits of the period. They were all composed of a single floor, and some very soon after their construction. From which it would appear that those ideas which are now supposed to belong to our time, to "working cities," and to centres of population established on a basis of absolute equality, are not new after all; and that the Middle Ages had even attained a practical application of them far beyond what we have done.

The planners of medieval towns proceeded. Corners were cut off the houses at the angles of the squares, to allow vehicles to enter the "place" easily on market-days. Figure 18 is a plan of a quarter of the "place" of the bastide of Montpazier; and Figure 19 is a perspective view of the entrance to the "place," taken from the point A of the plan, showing how the angles of the houses are carried on cornicles over the cut corners which give a diagonal entrance to the "place." The houses of these bastides at the end of the thirteenth century were built of stone, brick or rubble masonry. Wood was not used for the fronts. Wooden houses were very rare in the Southern provinces, though from the end of the thirteenth century we see them becoming more and more frequent in the provinces of the North. For the only upper story was built in wood, then soon the ground-floor alone was in stone; and, finally, during the fourteenth century and the beginning of the sixteenth, the entire fronts were not only built in wood, but often entirely covered with boards, like great pieces of furniture, without an apparent trace of masonry. Over and above the taste which the people of the North have always preserved for wood-construction, and the influence which the traditions brought by the Northern invasions from the forest lands exercised on the people, wood-construction presented advantages which attracted all the inhabitants of the populous towns of the French provinces, properly so-called, to the employment of this method. In the large cities of the North, such as Paris, Rouen, Beauvais, Amiens, Troyes, Caen, etc., the "place" was rarely found. As the walled towns could not grow by spreading out as in our day, they tried to gain in height the space they lost in the ground-plan, and the houses encroached as far as possible upon the public street by projecting the upper floors on cornicles. Wood-construction alone lent itself easily to this arrangement, imposed by necessity. The fronts were sheltered by overhanging roofs, whether they built guttered fronts or gables on the streets. The thoroughfares became narrower and narrower as the cities became richer and more populous, the windows were enlarged so as to obtain the greatest possible amount of light.

It is worthy to note that while in our time, and with good reason, we try to gain plenty of light for our rooms, the old town-house houses had comparatively narrow windows which admitted very little light, the inhabitants seeking darkness in their interiors with as much care as we seek light, adhering in this to ancient traditions.

In the thirteenth century they began to enlarge their windows, at least in the salon. This tendency increased as active life, industry and commerce gained more importance among the city people, who needed the daylight for their avocations. The house was no longer
the closed refuge of the family, it was also the work-room, and from the beginning of the fourteenth century the houses in manufacturing towns opened on the street. Notwithstanding the liberal fenestration in the fronts of that period, it is wonderful how certain industries could be carried on in narrow streets crowded with overhanging fixtures; it is impossible unless we see, for example, the weavers of Lyons working on the most delicate tissues in rooms where one can hardly see to read. The slight accumulations itself to obscurity, and the excessive narrow, light that we require every day to-day is not a necessary condition for works of great fineness.

However that may be, from those medieval workshops, which seem so dark to my today, came work of the goldsmith and embroi dereries and fabrics whose delicacy we do not easily attain with all our modern illumination. It is all so much a matter of habit that an artisan accustomed to work from his infancy in a doublight full of smoke and heat, and without the intervention of a "third" of Corinelle by candle-light, we must not assume that they appreciated less vividly this chef-d'oeuvre of the dramatist.

This is, however, aside from the question of art; that the architect ual quality of a house does not depend upon the greater or less width of the street on which it is built, is already proved.

To be continued.)

LEAD PLATES IN MASONRY.
WASHINGTON, D. C., Sept. 29, 1888.

To the Editors of the AMERICAN ARCHITECT:

Dear Sirs,—In your number of Sept. 29th, I read an article headed "Effect of Lead Plates in Masonry," in which references are made to actual tests of compressive strength of stone in 1855. It speaks of a test on marble (14-inch cubes), which showed a compressive strength of 60,000 lbs. per square inch without the intervention of lead plates between the steel plates of the testing apparatus, and a compressive strength of only 30,000 lbs. with the intervention of lead plates. The writer explains the difference of 50 per cent of resistance secured as being somewhat obscure and one not mentioned article. The stone cube under pressure will in either case and all cases give away at the weakest place first, which is at the sides, the central portions being held firm by the outer portions until the latter give way. In case of interposed lead plates or any other more or less elastic bodies the question at once becomes a combined one of compressive strength and tensile strength. The lead plate under compression yield to a more or less degree; this yielding must result in a flow of the metal toward the sides, where the lead plates will then visibly protrude. This side motion of the cubes of lead under the enormous pressure incident creates also an enormous friction on the surfaces of the stone cube and the side plates. It is the friction on the stone cube which acts from the centre of surface in opposite directions (radial) and tends to tear the stone cube asunder, the smallest amount of beaded being 6000 lbs. to each of those who had only been five years in his factory. After the death of the testator his nephews found another will in which no mention was made of legacies to the employees, and this was dated 1884 invalidated the first document. M. Bord had, in fact, disinherited his workmen, because they had struck for more wages in 1854. The workmen therefore have in the course of the last 30 years made an attempt to contest the validity of the second will, and out of 500 of them 100 have been dismissed from their employment.—New York Tribune.

RED TAPE AT THE PANAMA CANAL.—The Panama Canal seems to be suffering from red tape. One of the dredges is 160 miles and 200 miles of travel for vinegar for some lubricating oil, which was laying alongside of the dredges for which it was intended; and those dredges had since received $3000 a day until they could get the oil. Upon another occasion it took seven days to get five cents' worth of vinegar out of the basement of the building in which it was needed for a few small instruments of precision to prevent rusting.—Philadelphia Press.

A PECULIARITY OF GLASS EYES.—"The Rubb family of Venice have been famous glass-blowers for nearly four centuries," says the Rev. F. A. Vidal, in his "Jetons and Medals," "and it is a rare work in which they make in all varieties of quality. Common glass eyes, such as are made for hospitals, are easily made, and cost about $2 each. But fashionable people are not satisfied with these; and some of the a-dozen eyes manufactured for them before they are satisfied. Then they require at least two sets of eyes, one for evening wear, with larger pupils than the day ones, because the pupil of the eye is larger by night. The horror of the lady whom some accident has forced to wear a glass eye, on finding, after she had entered a ball-room, that she had put in the wrong eyes and was going about with pupils of different sizes. The effect would be as bad as a squint, or even of chronic wink."

PERUVIAN WHISTLING JUGS.—The silvadoras or musical jugs found among the burial places of Peru are most ingenious specimens of handicraft. A silvador, in the Washington collection as Phila delphia consists of two vases, whose bodies are joined one to the other, with a hole or opening between them. The neck of one of these vases is fitted with the exception of a narrow rim. Because our fathers saw the inserted leading to the body of the whistle. When a liquid is poured into the open necked vase the liquid from the inside, and in escaping through the narrow opening is forced into the whistle, and gives the vibrating producing sounds. Many of these sounds represent the notes of different birds in the Clay collection, Philadelphia, Pa., imitates the notes of the robin or some other member of the thrush tribe possessed of Peru. The closed neck of this double vase is modelled into a representa tion of a bird's head which is closed by a whistle, which imitates the disgusting habit which this animal possesses of ingesting its saliva when it is sick. The whistle section of the vase seems to have been some what imitated. A black tube of earthenware ornamented with a grotesque head in low relief, to which short arms are attached pressing a rounded arius to its side. This is a peruvian clay whistle. And water vase in the same collection, representing a llama, imitates the disgusting habit which this animal possesses of ingesting its saliva when it is sick. The whistle section of the vase seems to have been some what imitated.

PERMEABILITY OF PORTLAND CEMENT MORTAR.—A recent number of the Annales des Puteaux, in the August number of 1891, presents a discussion on the permeability of Portland cement mortars, by Messrs. L. Durande-Claye and P. Bobry. In conducting a series of experiments on samples of cement mortar taken from some of the principal buildings in France and Belgium, the authors observed that all these mortars were permeable. A block of the material placed in an earthenware dish in such a way as to divide it into two equal compartments was penetrating by a 5 per cent solution of magnesium sulphate poured into one compartment while the passage of the side of the block being prevented by a water-tight joint of plaster. As the solution in that compartment gradually decreased, and in the next 18 days a figure of 3 or 4 centimetres long appeared in the block, and on the 31 day of the crack was seen, the block swelling in the process. It was then deter mined to carry out a number of experiments with ordinary water, a solution of chloride of magnesium and one of sulphate of magnesium. The arrangement finally adopted was to close one end of a glass tube about 4 inches in diameter, with plugs of the cement mortar, the other end of the tubes being closed with caoutchouc stoppers, through which passed glass tubes about 40 in. in length connected with Mariotte flasks containing for different solutions, or compounds of solutions, in each instance, of one part by weight of cement to four parts of sand mixed with quantities of water varying in different cases, from 37 up to 120 per cent to the total weight of the sand. The solutions used in all the experiments had a rate of filtration at first somewhat rapid, but diminished as time went on becoming finally extremely slow. The glass tubes invariably cracked after some days owing to the swelling of the cement plug, thus putting an end to the experiments. Three series of experiments were made: in the first a 10 cent solution with 8 per cent of water was the least permeable, that mixture was placed in a 25 cent that prepared with 11 per cent. In the second series the best results were obtained with 11 cent per of water and in the third series with 10 per cent. The action of the chloride of magnesium, which was 10 per cent solution, was much less injurious than the solution of magnesium sulphate, which was of the same composition. The chemical analysis showed that the cement after being acted on by the latter solution had been reduced from 75 to 80 per cent of sulphuric acid, showing that in the double decomposition taking place in the following reaction: MgSO4 + Ca(OH)2 = Mg(OH)2 + CaSO4, a portion of the calcium sulphate remained in the body. However, it is this fact that the authors are disposed to attribute the dislo cation of Portland cement mortars when exposed to the action of sea water, for whilst the magnesia produced in the statics water of a thin cream without consistence, the sulphate of chalk solidifies more or less completely in the crystalline form and considers internal stress.—Engineering.
FRANKFORT-ON-THE-MAIN RAILWAY STATION. — On Saturday the 15th ultimo, the main railway station at Frankfort-on-the-Main was opened to public traffic. It is claimed that Frankfort is now in possession of the largest railway station in Europe and possibly also in the world. The station is 920 feet long and 299 feet broad, and is situated 1,999 feet above sea-level. It is mentioned in the news that the station is surrounded by an iron fence which is 18 feet high. It is said that the station is capable of accommodating 15,000 passengers at one time. The station is equipped with all the latest facilities, including a signal box, a large concourse, and numerous offices and shops. The station is connected with the main lines of the German railways, and is expected to play an important role in the transport of goods and passengers between the different parts of the country.

Some Deserted Cities of India. — Those who found it difficult to believe in the possibility of such a deserted city as that described by Mr. Richard Green in his article in The Times, may, if one may judge from the recent Times letter, prepare themselves for greater wonders in the architectural line, even if he should confine himself to simple description of actualities which he has seen in India andj its environs. A letter to the Times states: "One of the strangest things in India is the multitude of deserted capitals. There are three old Delhi, three successive capitals of the Mogul Empire, all close to each other, all south of the present city. One of the third is Tuglakabad, a magnificent city on a hill, roofless, and absolutely deserted. This city was founded by Tuglak, the third of the Tuglak dynasty, and is said to have been inhabited by 100,000 people. There we ate the best grapes we found in India, ripened naturally in February, square-sided, black, delicious. Thither it was Taglakabad, the Tuglakabad of India, that the traveler came to see the ruins of a city that was once a capital of the world, springing aloft like a living organism, and in the oldest mosque in India, the Kutub Mosque. There is Daulatabad, in the North, a fort a mile away from the city, on the site of an ancient city.

Inquiries made among the managers of the great manufacturing establishments, bring out the fact that there is a large amount of contracts now coming in sight. The builders of hydraulic-mining machinery and water-wheels, of iron foundries, and of large machinery-factories, are having more work coming in upon them this September than they have had at any time in the last ten years. The smaller establishments employing from 100 to 300 hands are about as well fixed. There are establishments in the New England States, and in the South, and in the Great Lakes region, and even in England, that are now at work on contracts for machinery which will be completed before the end of the year. There is every indication that the building of new industries is not only going on, but that it is going on at a very rapid pace.

The American Architect and Building News. [Vol XXIV. — No. 666.]
THE DECECO SEAT-SUPPORTS.

Our device for hanging water-closet seats we believe to be the best in use. It consists of a pair of nickel-plated brass crutches in which the trunnions at the rear of the seat rest when the seat is down, and in which they turn when it is raised, and two supports of the same material on which the front of the seat rests when it is down.

The setting here shown is in marble; it may be of other material, as wood, tile, slate or enamelled iron.

The advantages of this arrangement, beside its attractive appearance, are:

First, the seat can be instantly removed, for any purpose whatever, and as quickly replaced.

Second, when turned back, there is nothing in the way to prevent the thorough cleaning of the space around the closet.

Third, there is no woodwork needed in front of or around the closet to become stained with stoppage.

We manufacture seats to be used with these supports. They are hand-made, of an improved pattern, consist of five pieces mortised together, made of different woods, and are furnished in different thicknesses and lengths, according to requirements.

This method of seating is applicable to any modern closet.

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MONUMENTS DESIGNED BY R. E. LAUNITZ, SCULPTOR.
With this material wood-work can be thoroughly protected from fire at a cost of less than one cent per square foot.

It can be had in all colors at 30 cents per gallon.

Send for Anti-Pyre circulars and samples.

--- SAMUEL CABOT ---

70 KILBY ST. BOSTON, MASS.

ALSO SOLE MAN'FR. CREOSOTE SHINGLE STAINS.
ENGLISH CHAIR.

Fig. 1. Carved Oak Chair, 16th Century.

Fig. 2. Chair with Arms, 17th Century.

Fig. 3. Child's Chair, 18th Century.

Fig. 4. Oak Chair, 19th Century.
M DIEULAFOY, the explorer of Susa, has published a book on Persian antiquities, in which he presents some interesting suggestions on the origin of the mediæval systems of architecture, and its relations with that which existed in Persia three or four hundred years before. M. Dieulafoy was once an assistant to the late Viollet-le-Duc in his labors in the restoration of mediæval monuments, and was very closely associated with him, so that his opinions upon the sources of the architecture of the Middle Ages are worthy of the highest respect. As we know, Viollet-le-Duc recognized the similarity, in many points of construction and decoration, between the French churches of the twelfth century and the Syrian buildings of the fourth century, and supposed that they were due mainly to the influence of the Oriental ideas and objects which were brought back to Europe by the returning Crusaders, although the way had not been pointed out for them by the Venetian traders, who maintained a constant traffic between the Atlantic and the Mediterranean coasts of France. M. Dieulafoy, however, finds the mediæval system of vaulting, by means of a skeleton of ribs, filled-in with panels of stone, in Persia, and he has adapted his construction dating from the fourth and fifth, and even from the second century, that he is compelled to find some way of accounting for what cannot be a mere coincidence.

It is a matter of history that, after the conquest by the Musulmans of the region on both sides of the Straits of Gibraltar, and perhaps long before that time, the passage of the Straits was so unsafe for merchant vessels, on account of the pirates who infested the place, that the Venetians, prevented from reaching their richest customers, the English, by sea, established a caravan route from Augus-Mortes, then one of the best harbors on the Mediæval maroon coast, to La Rochelle, on the Atlantic, where they embarked with their goods and carried them to England. On the long route across France, some five hundred miles, they had regular halting-places, and one of these, Limeges, with the neighboring town of Châlons-sur-Marne, became the great distributing point for such of their wares as they might sell in France, and soon filled with Venetian merchants. The Venetians, who traded continually with Constantinople, brought spices, jewels, embroideries and other Oriental goods with them, and Persian and Eastern bric-a-brac became tolerably current in the houses of the rich and the treasuries of churches. Naturally enough, the smiths and carvers in that region, when they wanted an idea for a new ornamental design, would often take a hint from some Oriental work that they happened to see, and the route of the Venetian caravans is marked to this day with tolerant clearness by the palm-leaf patterns and the interlacing curves, imported from Persian embroidery, and cut in stone on the old churches. There were other routes by which Persian wares entered France. One frequent road was certainly through Switzerland, probably over the Saint-Bernard pass and through the Rhone Valley, and the church of Saint Maurice, between Martigny and Geneva, still possesses a Persian water-pitcher of the seventh century, probably bought of a Venetian or Greek pedlar twelve hundred years ago. The traffic between the East and the West, indicated by these remains, was very flourishing long before the first Crusade and it seems more than likely that some description of the Persian vaulted style have reached the ears of the architects of that day. In fact, as they were quite familiar with Roman vaults, the fragments of which still covered the soil of Southern France, the account of vaults differing from the Roman principally in the use of ribs at a great height, but having features which they would recognize as readily as we should the advantage of the skeleton of ribs and the light filling of the panels. In the year 717, on the accession of the iconoclast Emperor, Leo the Isaurian, a great many artists and artisans fled from Constantinople and took refuge in France and Germany. Many were hospitably received by Charlemagne, and these emigrants, familiar with the art and architecture of Asia Minor, which was to a great extent copied from that of Persia, must have done much
to spread the knowledge of it in Europe. Under Charlemagne and his immediate successors the country was too disturbed for building, but M. Dienaloff thinks that the artists, and particularly the architects, exiled from Byzantium must have found congenial companions and attentive listeners to their instructions, and that answers to this question have been written to their new friends they probably took written notes of what their new friends told them for future use, without knowing when they might be of service.

Nearby three hundred years later, in the midst of Burgundy, where, ten generations before, Charlemagne had settled his colliers of exiled Byzantines, an abbey church was built, which still stands unaltered, and presents so close a resemblance to two Syrian churches of the fourth century that M. Dienaloff believes that the monk who designed it must have found in the convent library the plans and jobs laid down by some exiled Byzantine architect, and that the Eastern way of building not only is the system of vaulting completely Asiatic and not Roman, but the details of the columns and capitals are Oriental.

Only in the porch, where the architect's courage seems to have failed him, is there any return to the Roman system of construction which had hitherto been regarded as the foundation of all art. A few years later similar experiments were made elsewhere, and the new system of concentrated forces, framework of ribs and light filling between them, which was unknown to the Romans, but had been familiar to the Persians and the Syrian and Egyptian architects, was carried over to France.

If the way had not been prepared for it to some extent by the previous intercourse of the people with the Eastern traders, it may be doubted whether it would have made its way so rapidly, and even now it is not always easy to distinguish whether certain medieval forms are derivations from Oriental patterns or are only accidentally similar.

A CORRESPONDENT makes, in La Semaine des Constructions, the observation which is now to us, and has a very considerable importance for those who are obliged to build in soft soil. The common idea of architects is, as we know, that soft soil is bad, and that the pressure shall be the same under each square foot of the ground covered by the footings. In Chicago, where the art of building on yielding ground is carried to great perfection, the footings of piers and walls are calculated with precision, so that the load on each portion shall be supported on an area of soil proportionate to the load. It seems, however, that buildings planned in this way do not always show the perfect uniformity of settlement expected of them; the smaller piers, although transmitting the same load as the larger ones over two square feet of ground under them, sinking considerably less, so that the whole wall above is left cool, and connected only as a result of the columns through the middle, the side walls settle more than the foundations of the columns, leaving all the floors higher in the middle than at the sides.

In 1864, some experiments were made in France to determine the cause of this phenomenon, and to settle the question of the distance of the soil directly compressed under the footings, a good deal of sustaining power was derived from the friction of the surrounding soil. Of course, the amount of friction is proportionate to the perimeter of the footings, and this is greater, as compared with their area, in small piers than in large masses of masonry. Thus a footing one square foot in diameter, which has given place to a given area of three-quarters of an inch in depth the area of a foundation five feet by ten, under a pier of twice the size, loaded with double the weight; but the perimeter of the first footing is two-thirds as large as that of the second, leaving a surplus of frictional resistance in favor of the first. We may hold it up, while the neighboring pier, much less than twice the height, supported by twice the area of subsoil, is sinking. Just what is the ratio of the sustaining force exerted by friction to that due to the direct reaction of the soil, we are not informed, but in important structures it would be of interest to know; and we hope that some one may pursue the investigation, which will add much to our knowledge of the resistance of the soil to a vertical pressure, is a very important one.

We all know that a footing of a given area exerts a greater sustaining power, the deeper it is set below the surface, although the compressibility of the soil may be the same at all depths. The reason for this is a well-known one, the lateral escape of earth from beneath its foundations than from the direct compression of the soil, and anything that prevents this lateral escape of earth assists its resistance. In very loose or sandy ground, the lateral escape is prevented by sheet-piling, but in most cases the only check to such a movement is the friction due to the weight of the column of earth pressing upon that just bordering the footings, and tending to keep it in place; and the deeper the footings the greater the resistance to any lateral escape and, consequently, the greater the stability of the foundation.

The British Architect quotes from the Estate Clerk-of-Works his discussion on the relative advantages of different sorts of roof-covering for farm-buildings. Most of the participants in the discussion approved of good tiles, as being handsome and durable, and giving, when well laid, a very perfect roof. One person, however, prefers slate to tile, for the reason that tiles retain moisture, and rot the woodwork under them, while the timbers under slate roofs last almost always, and also, he says, look very well and dry perfect. Another speaks of oak shingles as forming a good roof material, which when well nailed with zinc or copper nails will last for centuries; while a third recommends roofs thatched with reeds, which remain good for fifty years or more, and form a covering which warms in winter and cools in summer, and is well adapted for stables and cattle-sheds. Another roof which is mentioned is, we imagine, new in this country, and consists simply of tarred felt, whitewashed outside. The whitewash is made with lime and skim-milk, and is renewed every spring. During the summer it reflects the sunlight, keeping the rooms of the house cool, and in winter the same results from the weather, besides, no doubt, checking in some degree the radiation of the interior warmth. So far as we know, shingle roofs are the only sort which are ever whitewashed here. These are occasionally treated with lime-wash and alum to preserve them, but the off-white effect in repeating the heat is the sun is little thought of, although the hot summer's practice of painting roofs white, as is done in China, and in Southern France, would certainly be advantageous.

We hope that the next step in profit-sharing enterprises in this country will be taken in connection with the building trades; these industries are now regulated by associations which have quickly grown to a position of great responsibility, and the United States, with its enormous demand for small dwelling-houses, offers a particularly favorable field for similar associations. For work of the cheaper sort, two carpenters, a mason, a plasterer and a general helper could associate themselves and carry out houses complete, contracting only for materials, and arranging their work so that each might be constantly employed. It is true that the mason, in a small company, would have to be a bricklayer and plasterer also, but this combination of attributes, although it is looked upon with horror by the building trades' unions, is often found in former country workmen, and it is among men trained in the multifarious duties of country practice that such companies must be recruited. Once organized, it seems to us that an unlimited business would await them. The advantage to owners of finding the necessary men always at command to carry their buildings along to completion without interruption, instead of subjecting them to the intermittent delays, carelessness and indifference of sub-contractors, would be so enormous that the work of a band of cooperating mechanics might well command a premium, while the economy of time and labor secured by men acting 'together, understanding each other's work and wishes, and knowing exactly when their work will be ready for them, must be very considerable.

We imagine that most architects would say that one-third, at least, of the time for which workmen in the building trades are paid is consumed in waiting for some one else to do something else. The time the collar is dug until the house is occupied there are always persons in or about it waiting for "the boss to come," or "some one to set them at work," or "the stock to get there," or the "tools to arrive," or "the carpenter to cut a hole in the floor," or "the mason to furnish a chip to level up with," or a thousand other things, while the workman is idle. It will thus be very important, and to the interest of all, that some one should be responsible for the work while the building is being put up, as this plan of waiting for some responsible sub-contractor to fulfill his promises. A carefully-organized though small association would save the whole of the time spent in these useless delays, and would put in the pockets of its members the money represented by that time. It will be regarded as a fine thing that the building trades' Unions, who desire anything rather than to see men independent and self-reliant, but, if successful, it would open a prospect of employment and comfort to thousands who now look for either in vain.
ARCHITECTURAL EDUCATION IN THE UNITED STATES.—III.

CORNELL UNIVERSITY.

CORNELL University is one of the State Universities founded under the Act of Congress which endowed the several States with thirty thousand acres of land for each senator and representative, and enabled a few struggling colleges to rise at once to the rank of universities. The University of Illinois, the Institute of Technology, Boston, and Cornell University were all founded under essentially the same conditions. Cornell was incorporated in 1852, and opened in 1868. The architectural department was created in 1871 through the efforts of President White, who collected the greater portion of the library, and was personally much interested in the subject of architecture. The department was placed in charge of Professor Charles Babcock, who had received his earlier architectural training in the office of Mr. Richard Upjohn, of New York, and also had considerable experience in teaching, aside from pure architecture. Professor Babcock had begun his studies with Mr. Upjohn in 1847, and was for five years a partner with his master. After having virtually abandoned the profession for a number of years, he was drawn to it again through the opening of an architectural course in Cornell University. The department started with seventeen pupils. At first, Professor Babcock was obliged to do all the work himself, as the school was but scantily endowed with money and equipments, but in 1869 some outside aid came to hand and the College of Architecture was placed on a more secure footing, more liberally endowed with books, photographs, etc., and Mr. C. Francis Osborn was appointed Assistant Professor. The department has also at present two assistants to aid Professors Babcock and Osborne in the purely architectural studies of the course. The greater share of the work having to do more especially with applied construction and designing is under the immediate direction of Professor Osborn, who has developed many of the methods in use for awakening interest on the part of the学生 and inducing to a continuance in studies; while the theory of architecture, aesthetics, etc., as well as the general management of the whole is supervised by Professor Babcock.

Students in architecture are required to follow a course extending through four years. For the benefit of those who were unable to take, or did not feel the need of, so extended a course of study, there was formerly a special course, but at the close of the past school year, it was decided to admit no more special students in architecture, and the course has, therefore, been discontinued. This change was made from a conviction that the advantages of a school-training for architects have become generally appreciated, and that the time is quite ripe for the University to take the position that its graduates must be thoroughly equipped, so far as preliminary training is concerned, to rise to the highest positions in the profession.

The regular course in architecture, leading to the degree of Bachelor of Science, is as follows.

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| MECHANICS AND HEAT | CHEMISTRY |
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| DRILL | PHYSICAL TRAINING |
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| FALL TERM | WINTER TERM |
| MECHANICS, STRUCTURES, MATERIALS | MECHANICS, STRUCTURES |
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| EGYPTIAN, GREEK, AND ROMAN ARCHITECTURE | BYZANTINE AND ROMANESQUE ARCHITECTURE |
| 6 | 6 |
| DESIGNING | DESIGNING |
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| WATER-COLOR DRAWING | 3 |
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It will be seen by this statement that in the first year there is only a very slight admixture of anything pertaining directly to architecture in the course. Practically, there is nothing except linear drawing and projection, which occupy six hours a week during the winter term. In the second year drawing is taught with considerable thoroughness, and during the third and fourth years it is combined with designing; so altogether the student gets considerable experience in drawing, besides which there is always considerable opportunity for any one who is willing to work to get a great deal more practice in architectural training. The drawing-rooms are open nearly all the time, and the students are encouraged to spend there all the time they can.

*The number of each study indicates the hours per week devoted thereto, each lecture counting 1, and 3 hours of drawing, designing, etc., counting 1.*
Analyzing the college course with reference to the time given to each study, it will be seen that under the head of pure mathematics, algebra, trigonometry, analytical geometry and calculus together occupy 250 hours. Applied mathematics, such as descriptive geometry, mechanics, etc., occupy 242 hours. The theoretical study of construction occupies 192 hours. Languages, limited to either French or German, 180 hours. The theory of architecture, including history, acoustics, ventilation, etc., 356 hours. Drawing is nominally allowed 280 hours, and the general college studies, such as hygiene, rhetoric, drill, geology, chemistry, etc., together take up 475 hours, making the total number of hours for the whole course, 7945. It will be seen by this summary that 58.2 per cent of the time is given to drawing, and 770 hours or 19 per cent to studies which are purely architectural in their character, so that altogether 77.6 per cent of the students' time is occupied entirely with architecture, while 22.5 per cent of the entire course is given to studies which do not bear directly upon the profession in one way or another.

The course is in no sense practical. The College does not consider it essential, as it is not thought that an architect will ever be called upon to use it in actual practice, and in any case the time of the students would be too limited to undertake any such study except by taking time from subjects which are considered much more important.

Construction is taught chiefly by lectures illustrated by a very complete set of models, together with a liberal reference to various text-books. A great deal of thought has necessarily been devoted to methods of teaching drawing. Most of the students come to the University quite unprepared; indeed, the majority of them are not in any way qualified to begin an architectural course, having had no previous training in any kind of drawing. In the first year nothing is attempted but a little line work and freehand sketching. In the second term of the second year some general lectures on building-construction are given, to prepare the way for an understanding of what the student will have to do, rather than to exhaust the subject. In the third term of the same year, the student is taught the rudiments of working-drawings, and is shown how to construct a simple house. A larger building is then worked out by the student, the construction being drawn in detail, and the working-drawings being elaborated to a certain degree. No part of this year's work involves design; the drawings being nearly all copied from models provided by the department, and the attention of the students is confined entirely to construction and to the preparation of working-drawings, specifications and contracts, with a view to the establishment of a thoroughly practical basis for the subsequent work, as also to enable the students to enter during their next summer vacation into practical office-work, which is regarded as a necessary supplemental to the course.

During the first term of the Junior year considerable attention is given to analysis of the general principles of house-planning, porches, entrances, halls, etc., with illustrations drawn from actual work of the best architects in the country. About once every week, the ideas which have been suggested during that time are put into practical shape in a design; the problem being laid down, pretty carefully in detail and the students required to bring in sketch-plans at one-eighth scale, which are criticized before the class. During the latter part of the term, approximately thirty minutes being allowed for the exercise, to develop the student's capacity of getting his ideas into shape in the least possible time.

During the second term of the Junior year, there are lectures on the general theory of design as applied to portions of exteriors, such as arches, walls, courses, roofs, etc. These lectures are given once a week, and special problems are selected to illustrate the individual features. The practice is to gather a number of illustrations from various architectural publications, together with all available photographs, to illustrate the given feature under consideration, and to bring these up in class, criticizing them, pointing out why they are successful or how they fail, teaching the pupil the raison d'être of the various solutions. During this term there is also instruction given in perspective drawing, with a view to general proficiency.

During the third term of this year the students are required to work out a complete problem in design, including all plans, elevations and sections of some large building of a public character. These are not put into the shape of working-drawings, but are prepared as eightieth-scale studies, together with two finished perspectives of the interior and studies of the interior design. During the Senior year the work in designing and drawing is planned to give the student a practical acquaintance with the historical styles. The first term is occupied with the study of the so-called Romanesque, together with sketches for important buildings in that style and the preparation of essays, illustrated by sketches, showing the development of some one feature in its relation to the growth of the style in general, each student being assigned a different feature. In the next term the pointed Romanesque, or

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A Student's Design.

Gothic is similarly taken up, while the spring term is given to the study of Renaissance.

Perspective designing is practised once a week, beginning with small subjects, with limited conditions and in a specific style, in order to give the students exercise in sketching and to strengthen them in a knowledge of historic styles. During all the quarter the students are constantly urged to read and to use photographs freely in connection with their work, and, so far as possible, attempts are made to recognize individual talent, distinctions being made in that the classes each year are grouped according to the ability of the individual, and more extensive problems are given to those who show greater ability. In this way a student who manifests a peculiar talent for architecture is enabled to advance just as rapidly as his own ability will permit. Practically, however, this distinction is given the students in regard to their ability is not made until the Senior year, as the most of the time up to that year is occupied by drawing as distinct from designing.

As an adjunct to the Department of Architecture of the University is the Department of Industrial Drawing, in which those who choose can obtain excellent practice in drawing from the flat copy and from models. The students in architecture are required to devote two hours a day to free-hand drawing during the first three terms of the Freshman year, and two hours a day during one term of the Junior year.

The history of architecture is taught entirely by lectures prepared and delivered by Professor Babcock. These are illustrated by photographs, slides, drawings and models. The department has an excellent equipment of photographic apparatus, and is supplied with stereopticon. The lecture-room is fitted with tightly closing blinds, so that after the main theme has been elaborated, the shutters are drawn, and the best buildings in the world, having connection with the subject in hand, are thrown upon the screen and explained to the pupils. Besides this, Professor Babcock has a number of printed notes on the history of architecture, which the students obtain and use in following the lectures, and the library is made very available and is always open to the students, so that those who choose may extend their reading, under direction.

There seems to be no definite requirements in regard to vacation work. The students are encouraged, whenever possible, to spend the vacation in some architect's office and to supplement their theoretical training by a degree of practical experience, which can be given them in the University, and we believe that many of the students spend the greater portion of their vacation in this kind of occupation.

In addition to the models, etc., previously referred to, the architectural department has a fine library which was presented by President White, embracing over a thousand volumes pertaining to architecture and kindred branches. The architectural collection
AMERICAN WINDMILLS.

Here and there in New England, upon the brow of some windy hill, there stands a low gray tower, from the top of which four long latticed spars, set in the four sides of a great shaft, stretch out against the sky. It is the wind-mill of our forefathers. The tapering form of the graceful tower, the radiating arms, the quiet color of the mill-sheets, make of this hoary ancient an architectural accessory of charming value in the landscape. The utility of most of them is a story of the past, the inventive genius of buster times having long since replaced their cumbersome machinery and comparatively-expensive construction with lighter and cheaper, as well as more effective windmills. The modern appliances have not, it is sadly evident, inherited the beauty of form distinguishing the older types, and the architectural treatment of the "patent" windmill still offers a problem of some interest for the future.

On a hill-top behind the town of Nantucket stands a fine old gray windmill tower, and I well remember the keen pleasure I felt on first catching sight of it from the house-tops. I hurried off to hunt up the fascinating bit of antiquity, if one may use such a term of anything American, and climbing the hill by a queer little cobbled lane through the rear premises of some old houses, I was rewarded, on reaching the top, by a scene of quips and restful beauty. On a turf of freshest green stood the old mill upon its base of crumbling field-boulders. Beyond a group of old farm-houses rose the modest elevences of the historic Popoquach Hills, and to the right lay the heathered "plains," stretching away on the surf side from "Sconset to Great Neck. The sun was nearly set, and in the clear purple light the soft gray tones of the old shingled tower were wonderfully in harmony with the color of the whole picture. On a piece of broken millstone under the door I read the inscription: A.D. 1746.

The tower is eight-sided and has a roof, with two gables, the roof bulging at the eaves to cover the widest part of the tower in quasity irregular fashion. The top is movable. Through one of the gables comes the shaft to which the arms are attached, and from the other extends to the ground a long timber, the boom, with a wheel on the ground-end by which the whole top is turned about to bring the sails in proper position to catch the wind. The old mill is a favorite subjec for amateurs, and the inhabitants, perhaps divinely, have none of them been painted on big and little ciamels than has this sea-ringed veteran of old Nantucket.

The folded prowess of windmills seems to have dwindled since that memorable day when the mighty arm of the wind giant unhorsed the knight of La Mancha. Trampling about one bright fall day among the hills of Orleans on Cape Cod I found three windmills of very good form, in a landscape which is admirably adapted as a setting for them. The hills are gently rolling and generally bare of trees upon the tops. Down between them lie pleasant little

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October 6, 1888.]

Piper Made by Electrolysis.—Steam pipes of copper are now made by electrolysis from a solution of copper. The process is formed on an iron core in the depositing bath, and the deposited copper is pressed by a moving tool as it is deposited, so as to give a fibrous structure to the cast-lined copper. After the pipe is thus formed it is subjected to hot steam, which expands the copper shell, or pipe, clear off the iron core, thus separating the two. These pipes have no joint, and are said to be very strong, tests showing that they break with strains of from twenty-seven to forty-one tons per square inch. — Exchange.
valleys, with winding roads, a sedgy pond or two, and pretty farm-
houses under groups of handsome trees. The golden rod was glori-
ous among the scree fall glasses. The coloring in the fields and the
trees was everywhere delightfully warm. As I sketched away in
great content at a very interesting conical-roofed tower near the
village, a mill on the high hill beyond made sail, and I watched its
white wings flashing in the sunshine as the great arms flew round in
the freshening breeze.

At the north end of East Hampton stands the old mill-tower which
has become famous on canvas since the summer tide of artist life set
ward the Hamptons. The picturesque scene of which it is the
centre has been somewhat marred since the advent of summer board-
ers and modern improvements in the sleepy old place. Two brightly
painted new houses disfigure the foreground. In old times there
was a low, mossy-roofed, tumble-down house, with its front smoothed
in climbing roses. The mill stands on a little hillock. The road,
passing on the left, descends into a group of ancient oaks. In the
middle distance roll away the long brown backs of the uplands and
beyond are the blue hills of the North Shore. The shingled walls of
the tower have a wonderful charm of color. The edges of the long
old cedar shingles have crumbled away with age, the lines are all
softened down, and on the silver-gray ground-tone of their weather-
beaten surfaces are countless irregular patches of lichen, in gray-
greens and brilliant reds and yellows, producing a mellowness of
color over the whole tower which is quite indescribable. This
efflorescence of lichen is so thick on a mill which stands among the
houses of Amagansett as to lend the tower an effect of having had a
wash of burnt sienna.

At Bridgehampton I found a tall and stately mill-tower, with a
conical roof in swelling lines of very happy effect. This mill is
active, and when I saw it there was quite a busy air about the place.
The great spars, with their brown canvas full spread, were sweeping
round in majestic measure, while from out the tower sounded the
deep rhythmic rumble of the shafts and wheels. On a platform at the
door was a door of well-filled flour-bags, which a quaint old islander
was loading upon his farm-wagon. The air was pleasantly filled
with a floury mist, and a glimpse into the dusky interior revealed a
wonderful harmony of great dark-toned timbers vailed in a maze of
dusty cobwebs.

The westernmost wind-mill of all the Hamptons stands at the head
of Town Pond in Southampton. Down under the hill are grouped
some fine old willows, under whose shade is the much-begrimed vil-
lage smithy. Beyond some cat-boats and skiffs ride at anchor.
Down along the sloping green shores of the narrow pond are some
very picturesque modern cottages, rich in the russets and yellows,
faded greens and gloomy browns of shingle-stains, tones exasperat-
ingly unlovely in the eyes of the natives, who have a strong affection
for paint in brilliant hues.

I saw the mill at work, with old ragged stalls stretched upon the
latticed spars which slowly moved before a light easterly draught.
The tower was silvery gray in the sunshine, with here and there a
darker blot where the old shingles had been patched. Going in
through a door in the stone base, which is about eight feet high from
the ground, I climbed from floor to floor until I stood up under the
roof where the great beam turned by the revolution of the spars
comes in through the side and sets in motion the shafts and wheels of
the rude machinery. On the upper side of the plate is a strap-
iron rail upon which the mill moves on little iron wheels when pulled
round to the wind. The hewn oak beams of the tower are large as
well as old and tough, and the construction has an appearance of
great solidity.

From an upper window, through the cobwebs and
dust which have been accumulating
for generations undisturbed, I caught
a glimpse of the arms of another windmill peeping over the house-top
at the lower end of the pond, and I shortly made my
way thither. It turned out to be the original of a
sketch of "Wind-
mill Cottage" by Mr. Smedley,
printed in Har-
per's not long ago.

This mill was hauled over from its ancient site in the Shinnecock
Hills and set up here on the meadow behind the dunes, where it has,
for a windmill, a somewhat meagre and smothered look. The arms are
still in place, and a number of pipes showing about the roof suggest
their use in pumping water up into the tower for domestic purposes.

A porch over the door and a two-storied, commonplace cottage on
the other side have not added to its beauty.

An old windmill looking out from the hill over Wellfleet Harbor
on Cape Cod has also been metamorphosed into a dwelling and a
very nice adjunct it makes, no doubt, to the house. Shorn of arms
it has lost much of the old grace, but still groups effectively among
the houses and trees on the hill-top.

Down along the shores of Pamlico and Currituck Sounds in North
Carolina one meets some curious old windmills rather absurdly
perched upon one leg, upon which the whole house turns with the
boom. At Dam Neck Mills, on the Virginia Coast below Cape
Henry, are a couple of them, picturesquely grouped on a wide sand
plain by the sea. But, though interesting, these mills have not the
charm of the New England towers.

How well the Block Island mills fit into the characteristic land-
scape! Green-turfed downs dotted with low stone houses, white
hilly roads winding between rough walls of field-boulders, here a
 lumbering ox-team creaking along the way, there a squad of bising
In the Lebanon, and far away on the breezy hillside a tapering gray tower, with wings outstretched against the sky and hanging ropes drawn from arm to arm in a sort of cobweb motive. So will always remember them.

For description see the American Architect for June 23.

**Illustrations**

[Contributors are requested to send their drawings full and adequate descriptions of the buildings, including a statement of cost.]

**THE MONUMENT TO MARIA THERESA, VIENNA, AUSTRIA.**

[Gelatine Print, issued only with the Imperial Edition.]

For a CATHEDRAL BY MR. J. B. HAMME. A THESIS DRAWING.

This presents one of the theses drawings required of graduates from the Architectural Department of Cornell University.

**DESIGN BY STUDENTS AT CORNELL UNIVERSITY.**

**DESIGN FOR A COUNTRY HOUSE. MR. E. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.**

**HOUSE FOR CONRAD SKIPP, ESQ., CHICAGO, ILL. MR. A. CUDELL, ARCHITECT, CHICAGO, ILL.**

**BUILDING FOR THE SOCIETY FOR SAVINGS, CLEVELAND, O. MESSRS. DURHAM & ROOT, ARCHITECTS, CHICAGO, ILL.**

**PRACTICAL APPLICATIONS OF IRON AND CONCRETE TO RESIST TRANSVERSE STRAINS!**

**CONCRETE** composed of broken stone, fragments of brick, pottery, gravel and sand, held together by being mixed with hydraulic lime, cement, asphaltum or other binding substances, has been used in construction to resist compressive stress for many ages.

The Romans used it more extensively than any other material, as the great masses of concrete, once the foundations of large temples and palaces and baths, the domes, arches and vaultings still existing, together with the core or interior portions of nearly all the ancient brick-faced walls found in Rome, testify.

In modern times, however, until the introduction of Portland cement, concrete construction has taken a more prominent part, and has advanced regularly with the perfection and general use of that valuable material, until not only foundations but the entire walls of buildings, piers and arches, floors and roofs, have been constructed of it, while molded trimmings and ornamental blocks are cast of it and set in walls similar to cut-stone.

The cheapness, in most places, of the aggregates composing concrete, together with the fact that mixing and placing may be done with cheap and unskilled labor, under intelligent direction; its endurance and its fire-resisting qualities, together with its great compressive strength, all recommend it for use in permanent constructions. Its low tensile strength and liability to fail without giving warning, under tensile or transverse strains, has hitherto prevented its use for beams, lintels or floors, unless supported by iron beams or other means.

For thirty years or more, so-called fireproof floors have been constructed in England, and some parts of this country, by means of rolled-iron beams, with concrete or brick arches turned from the top of the lower flanges, and levelled over the top, as shown in Figure 1.

This method of construction fulfilled all requirements of strength and safety, except that for which it was especially designed: protection from fire. When subjected to the test of hot fires, its failure was conclusive and the cause apparent. The lower flanges of the iron beams, as the thermometer, and the most vital, being exposed directly to the heat, expanded with it, causing the beams and floor to sag with every increasing degree of heat; at the same time it lost its tensile strength, and failed utterly.

The next step, and the one generally practised at this time, was to encase the lower flanges of such beams with terra-cotta, plaster-of-Paris or other non-conducting materials, as Figure 2.

Among other methods devised was that shown in Figure 3, where the beams are entirely encased in concrete, extending two or more inches below and above the beams.

While contemplating this method of fireproof construction some twelve years ago, in England, the well-known inventor, Thaddeus Hyatt, was led to consider if the iron used in the lower flanges of the beams could not be so united to the concrete as to work in unison with it and form a compound beam or girder, the iron to serve only as the tie or tensile member, while the concrete formed the compressive member and connecting web.

Mr. Hyatt made many experimental beams, with the iron in various forms — as straight ties, with and without anchors and washers; truss-rods in various forms; flat pieces of iron set vertically and laid flat, anchored at intervals along the entire length. These experimental beams were tested and broken by David Kirkealy, of London, and the results published by Mr. Hyatt in a neat form for private distribution, in the year 1877, for the use of which the writer is indebted to P. H. Jackson, a member of this Society, who, in a paper read before it on August 16, 1884, gave many of the results of Mr. Hyatt's experiments in detail, together with some of his own. The final conclusion of Mr. Hyatt, well demonstrated by his tests, was that iron could be perfectly united with concrete, and could be depended upon under all conditions for its full tensile strength.

The method Mr. Hyatt fixed on as the best was to use the tie-iron, as thin vertical blades placed near the bottom of the concrete beam or slab, extending its entire length and bearing on the supports at both ends; these vertical blades to be anchored at intervals of a few inches by round wires threaded through holes punched opposite each other in the vertical blades, thus forming a skeleton or grid-iron, as shown in Figure 4.

This combination effected a saving of about two-thirds of the iron required in the method shown in Figures 1, 2 and 3, as the entire web and top flange was dispensed with, the same amount of concrete serving the double purpose. Although this valuable discovery was given to the world ten years ago, it has not been generally adopted or extensively used either in this country or in England, at least such use has not come to the writer's knowledge, and this from not from any failure in the application of the system, but from the general disinclination to adopt new and novel methods of construction, however meritorious they may be.

For several years past Mr. Jackson, of this city, has experimented with this system, and with variations of his own suggestion, the testing of which has been witnessed by the author with great interest. The results of three of such tests will be given in detail from notes made at the time. The first test was made on January 16, 1884, on a tile of sidewalk-lights 12" x 24" and 1/4" thick. This tile consisted of four rows of ball's-eye glass, ten in each row, with five blades of iron, 4 x 8 inches, extending lengthwise, and eleven wires of steel 3/8 inches in diameter, threaded across. The concrete consisted of one part Portland cement to one part fine screened gravel or coarse sand, and had been made forty-one days. This was tested by being supported on one-inch bearings at each end, leaving one foot ten inches between bearings. The test was suspended from a steel bar, held in plaster, across the centre of the tile.

The collection was accurately measured at frequent intervals as the load was applied, and recorded in 6ths of an inch.
### TEST OF HYATT LIGHT SLAB, No. 1.

<table>
<thead>
<tr>
<th>Load, Lbs.</th>
<th>Deflection, 25ds.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>445</td>
<td>2</td>
<td>442 pounds to 1-64.</td>
</tr>
<tr>
<td>1138</td>
<td>5</td>
<td>138 pounds to 1-64.</td>
</tr>
<tr>
<td>1375</td>
<td>8</td>
<td>153 pounds to 1-64.</td>
</tr>
<tr>
<td>1815</td>
<td>8</td>
<td>204 pounds to 1-64.</td>
</tr>
<tr>
<td>1906</td>
<td>10</td>
<td>Fine crack observed.</td>
</tr>
<tr>
<td>2017</td>
<td>12</td>
<td>72 pounds to 1-64.</td>
</tr>
<tr>
<td>2150</td>
<td>15</td>
<td>Fine crack observed.</td>
</tr>
<tr>
<td>2250</td>
<td>16</td>
<td>22 pounds to 1-64.</td>
</tr>
<tr>
<td>2909</td>
<td>17</td>
<td>Breaks by chiseling the concrete and glass near the center bar, none of the iron rods breaking.</td>
</tr>
<tr>
<td>2983</td>
<td>19</td>
<td>311 pounds to 1-64.</td>
</tr>
<tr>
<td>3081</td>
<td>21</td>
<td>250 pounds to 1-64.</td>
</tr>
<tr>
<td>3201</td>
<td>23</td>
<td>23 pounds to 1-64.</td>
</tr>
<tr>
<td>3270</td>
<td>25</td>
<td>Broke by chiseling the concrete and glass near the center bar, none of the iron rods breaking.</td>
</tr>
</tbody>
</table>

Fine cracks were first discovered when the load was about 2,300 pounds and the deflection 1/4 inch. These cracks were directly under the cross-wires near the center. The centre load of 2,750 pounds is equivalent to double the amount distributed, or 3,000 pounds for each square foot of surface between bearings, or a safe load of 500 pounds per foot, with factor-of-safety of 6.

Two tests on these tiles with quite similar results, satisfied the writer of the strength, and he has not hesitated to use them in practice. The sidewalk-lights around the Fireman’s Fund Insurance Company’s building are constructed in this manner.

The next illustration of the strength of this combination of iron and concrete was recorded on January 19, 1884, at the Industrial Iron Works in this city, where a slab 4’ 6” x 4’ 6” x 3’ thick, made by Mr. Jackson, was tested. This slab had nineteen wrought-iron blades 2’ x 1’ placed 3’3” on centers extending through the slab in one direction and near the bottom, threaded by nine wires 1/8” diameter 6” apart. Concrete cement Staub Portland cement to two of sand, and sixty-two years old, supported by bearing 3” at each end, or at ends of blades, and loaded with pig-iron. Deflection noted in 32ds of inch.

### TEST NO. 2.

<table>
<thead>
<tr>
<th>Load, Lbs.</th>
<th>Deflection, 25ds.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,047</td>
<td>3</td>
<td>Or 3626 pounds to 1-32.</td>
</tr>
<tr>
<td>11,183</td>
<td>4</td>
<td>1521 pounds to 1-32.</td>
</tr>
<tr>
<td>13,282</td>
<td>5</td>
<td>Fine cracks first observed.</td>
</tr>
<tr>
<td>21,419</td>
<td>10</td>
<td>4422 pounds to 1-32.</td>
</tr>
<tr>
<td>30,805</td>
<td>14</td>
<td>Or 3533 pounds to 1-32.</td>
</tr>
<tr>
<td>20,554</td>
<td>16</td>
<td>Broke by parting all the iron blades on the line of wire nearest the center; the concrete did not crush.</td>
</tr>
<tr>
<td>22,174</td>
<td>18</td>
<td>Or 3220 pounds to 1-32.</td>
</tr>
<tr>
<td>26,753</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

In loading the pig-iron core was taken not to bond it by laying any bars in the direction of the length of the blades, and therefore the pile assumed a somewhat a pyramidal form near the top, thus throwing more weight toward the center of slab. A fine crack was first observed when the load was about 18,000 pounds and the deflection 1/2.” This breaking load was equal to 2,600 pounds per square foot, or safe load of 533 pounds per square foot, with factor-of-safety of 6. But one other test of this method will be given, and this was made on the 31st of August, 1885, at the Industrial Iron Works.

Mr. Jackson had prepared a beam 7’ x 14’ in section and 10’ 6’ long. Near the bottom were seven vertical blades of iron extending the entire length; three of these were 1’ x 1’ and four were 1/2’ x 1’, with 1/8” wires threaded through 3”. Near the top were bedded two cast-iron rope moulding bars, to assist the compressive strength of the concrete (an unnecessary precaution). The concrete at top and bottom, for about 4”, was one part cement to one of sand; centre portion, one cement to two of sand. The beam was supported by 2” bearings at both ends, thus leaving it 3” in the clear between bearings. It was loaded with pig-iron piled across the beam and bonded only with thin hoop-iron. Several architects and engineers were present at this test, among others Professor Sand of the State University.

The writer had received from Mr. Jackson, a day or two before, all the data in reference to the beam, including its age (about five months). He had estimated its strength based on a tensile strength of 60,000 pounds for hoop-iron, and expressed his confidence in several gentlemen that the beam would require about 27 tons to break, and that it would deflect an inch before breaking.

The result shows nearer than could be expected from calculation on the strength of any materials. Deflections are here noted in 32ds of an inch.

As will be seen by the above, the breaking load was 26.8 tons and the deflection just before breaking 11/4”. Fine cracks were first observed at two or three of the wires near the centre when the load amounted 45,000 pounds and the deflection 1/4”.

This breaking-load of 53,554 pounds was equal to about 6,000 pounds per foot, or 1,000 pounds per foot with factor-of-safety of 6, which would evidently be a perfectly safe permanent load, as the deflection with 9,000 pounds was too slight to observe.

These experiments, together with the results of Mr. Hyatt’s tests in London, should satisfy the most sceptical of the practicability of obtaining the full tensile strength of iron as a tie in concrete construction.

The only objection to be urged against the practice of this method is that, by punching holes for the cross-wires, the effective area of the tie metal is reduced by the amount of the diameter of the holes and the labor of punching holes and threading wires is quite an item of the cost.

While these experiments were going on Mr. E. L. Ransom, also a member of this Society, and a very skilful worker of concrete, was experimenting with a different method of obtaining the same result.

For several years he had used old wire cables as a bond in concrete walls, the irregularity of the wire ropes, caused by the twist of the strands, preventing the possibility of slipping when imbedded in concrete. This probably suggested to him the idea of twisting square bars of iron or steel and imbedding them in the bottom of concrete girders or flat slabs, as shown in Fig. 5.

It was evident that this method would be a great improvement over that invented by Mr. Hyatt. The twist in the bar would cause it to be held securely at every point along its length, instead of at intervals of several inches; no metal would be wasted by punching holes, and no extra iron required for anchors. The labor of twisting the cold rods would be but a trifle, and the entire sectional area of the iron could be placed just where it would be most effective.

Mr. Ransom promptly patented his improvement and since 1885 it has been used quite extensively in this city [San Francisco].

The results of two tests of this method, witnessed by the writer, will be given, together with several different applications he has made of it in practice.

The first test was of a slab 12’ wide, 6’ deep and 18’ long, composed of one part Portland cement to five parts gravel and broken granite, with six twisted rods 4” x 4” imbedded near the bottom. When about four months old, the slab was tested by being placed on blocks bearing 12’ at each end, leaving 16’ between bearings, loaded uniformly with sand piled on planks that were fixed to a slab without ties could hardly be expected to sustain its own weight. The deflection was noted in 4 of an inch.

---

1. It has been demonstrated by experiments that the process of twisting the bars to the extent desired strengthens the rods instead of weakening them, as might be expected.
The results of this test were given in a meeting of this Society, as before stated, on August 10, 1884, at which time a fragment of the slab was exhibited, showing the position of the rods and the quality of concrete.

The result of the test next, although very interesting, cannot be given in detail, as it extended over several months, and was visited but two or three times by the writer. It consisted of a full-size section of a sidewalk arch and beam, as shown by Fig. 5, 6, 6' 6" wide, 15' deep at beams and 6" thick at centre of elliptical arch, and 16' between bearings. At 2" from each side of the slab, forming the beam, were 15/4 x 1/4 twisted rods, one in each side. As it was evident this would require a very heavy weight to break in compressive stress was made by laying four thicknesses of 2" plank across the top of slab, and projecting several feet on each side. On this platform a strong frame was built, 15' long (from bearing to bearing) and 11' wide (just double the width of slab). The sides of the frame-work were not attached or secured to the plank platform, so as to assist in any degree in supporting it. The frame-work was filled with clean sand, confined by planks, and the weight estimated by the cubic foot of sand at 90 pounds per cubic foot.

<table>
<thead>
<tr>
<th>Load, Lbs.</th>
<th>Deflection, Inches.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>about 8</td>
<td>Cracks on under side about 12 inches apart in centre third.</td>
</tr>
<tr>
<td>25</td>
<td>4</td>
<td>Cracks extending about 4 inches up.</td>
</tr>
<tr>
<td>90</td>
<td>6</td>
<td>Several cracks 1 inch open at bottom and extending to within 2 inches of top when last seen by writer.</td>
</tr>
</tbody>
</table>

After standing in this condition for two or three days, more sand was added, when the concrete crushed near the centre.

Before analyzing the remarkable results of this test, let us consider the proper method of estimating the strength of such composite beams.

First, we must consider what is to be the effective depth of such a beam. It is evident the centre of the tie-rods must be taken as the centre of lower member, but the centre of upper member is not so easily located, though it must lie near the top of the concrete.

It is evident that all the concrete above the neutral axis is subject to a greater stress than the lowest 1/3 of the total surface and diminishing regularly to the centre. It is also evident that as a beam deflects (and concrete, as is well known, yields very little to compression) nearly all the strain must be met by a comparatively thin portion at the top.

It has appeared reasonable to the writer to assume the centre of the top member as one-twelfth of the distance from the top surface to the tie-rods, and to consider that the concrete (2/3 of the depth) above and below this line must be sufficient to meet the compressive stress. Thus, if a beam is designed with a total depth of 15" and the centre of tie-rods placed 3" above the bottom of concrete, it would leave 12 3/4" as the entire depth from top surface to centre of lower member. One-twelfth of this distance would be 1 1/4" as the centre of top member, thus leaving as effective depth of the beam 11 1/4" and the thickness of top member 2 1/4". Then if a 1 1/2 x 1 1/2 bar, with tensile strength of 25 tons, is used for the lower member and concrete that will crush with one ton to the inch at the top, the beam should have a width of 12 1/2" to equalize the strength of the iron and the concrete 1 1/2 inches above. This is the rule the writer has used and believes it errs on the side of safety.

Now, taking the sidewalk arch, as given above, and applying this rule and the usual formula for the strength of iron beams, we have as follows:

Length of beam between bearings (10 feet) = 10 feet.
Depth of beam to centre of rods (12 inches) = 12 inches.
Area of beam (10 x 12) = 120 sq. inches.

Then the formula for breaking-weights at centre of iron beams = Depth x area of iron in inches x 80 = W in tons.

12" x 12" x 80 = 1,800 pounds to 1.
80 x 1/4 = 200 pounds to 1.

As the formula is based on the breaking strength of iron at 20 tons per square inch of section, and good grade of iron will require at least 25 tons to break by tensile stress, we may add 25 per cent to this result, and consider that from 50 to 60 tons load on the arch and beams should break the rods with tensile strain. Applying the formula for strains with 60 tons load we have this result: 60 x 1/4 = 120 tons tensile strain on 4" iron; also, 120 tons compressive strain on 132 square inches concrete, composed of one of cement to five of aggregate and five months old, which might reasonably be expected to carry one ton per square inch, and it is evident that as deflection increases in beams of this construction the neutral axis must move upward or nearer the top member, thus making less proportional strain on the lower and more on the upper member. This was very apparent in the last test noted, for when last seen by the writer, the cracks due to extension had reached to within two inches of the top of this slab, showing conclusively that the neutral axis must be still higher.

Now, while this may account very satisfactorily for the iron rods not breaking, as they then had a leverage of at least ten inches from the neutral axis, it does not account for the concrete not crushing as the entire area of concrete then above the neutral axis could not be more than 100 and its greatest leverage about 1 1/2", the stress would amount to the entire load of 48.5 tons per inch for 60 tons load and 7.2 for 90 tons. It is incredible that concrete of such quality could resist such stress for a moment. It appears to the writer that some of the compressive strain must have been transmitted to the four thicknesses of plank forming the bottom of platform, and some of the load by friction at the sides. If this be so, it renders this experiment worthless so far as the ultimate strength is concerned, but could not affect the early stages of deflection. This arch and beam were designed to carry 400 pounds a square foot, or total load of 16 tons with safety. When loaded

Fig. 7
In one other case, while constructing a brick building of two stories on very soft ground near our city front, the twisted rod and concrete combination was applied in the manner shown in Fig. 11. The footings of the side walls were not allowed to spread out on the ground property. Cross walls of concrete, 8" wide on the bottom and 3" high, with two 1/2" twisted rods in each near the top, as it is evident the tensile strain would be in that member, the center of these crossed by a strip to form the girdler of second floor, while the first floor beams are parallel with the side walls and rest directly on the cross walls, thus distributing the weight of first floor and its load over the entire area. Some settling took place during the concrete has set and several of the cross walls were cracked before the building was finished. No settlement has been observed since and the brick walls have not cracked. The results of this building were as good as could be expected with a great depth of soft mud below. In such situations the entire area of the building should be covered with concrete and the rods placed as high as possible.

Steel rods of iron or steel imbedded in concrete walls, floors, and ceilings of buildings form a good burglar-resistant substance, as well as being fireproof. On one occasion, while building a concrete bank-vault in an interior town, several tons of worn-out steel plow-shears were placed in the concrete in such positions as would be most likely to discourage burglars in attempting to cut through the wall.

Enough has been said to show the practical character of such combination of iron and concrete in building construction, while many other applications will suggest themselves to the architect and engineer, as in the construction of dams, spires in churches in bridges, dams, aqueducts and reservoirs it could often be used to great advantage in strength and economy. To suggest one great national undertaking where the writer believes better results could be obtained at less than half the cost of the present Eddystone Light-houses, both as built by Smeatone and the one recently completed. When one considers the great expense of the intricate dovetailing of the stones together, the trouble applying and dowelling such masses and the comparatively shallow depth of the anchorage, and then consider that if built with concrete and iron it could be anchored with any number of twisted rods extending to any desired depth into the rock and grouted in with concrete laid at the lower end like the deep and spreading roots of a tree, while at the other end the rods could reach to the very summit, holding with an iron grip the cap-stone to the lowest depth; for less than one-third the cost of stone, worked as was the stone in the Eddystone, Bellrock and other light-houses of that class, a concrete could be prepared of Portland cement, dense stone and iron shavings that would be 30 to 50 per cent heavier than granite and better to resist the action of water, while the trouble and expense of placing in permanent or temporary iron curving would not be so great as handling the cut stone. It has been demonstrated on this coast that good concrete foundations for large engines are much more satisfactory than those built of brick or stone. Now, the writer would suggest that the bolts holding the engines to such beds could be of twisted square or round bar imbedded in concrete, and then taking a brick pile at all points through their length and not simply at the lower end. For setting anchors, bolts or other fastenings in concrete, it is only necessary to make a square or flat bar of iron and imbed with concrete, iron thus imbedded in Portland-cement concrete, with sufficient thickness of cement around it, is perfectly protected from rust as well as fire, and cannot deteriorate with age. The writer believes the discovery to be of great value to the building world, and that its application will extend as its merits are appreciated and before many years will become general.

**Fig. 9.**

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was made after consultation with many of the leading contractors. No such consultation was needed, it being evident to the architects themselves that a readjustment of prices was necessary in order to ensure a fair remuneration for architectural service.

The architects present at the dinner were Messrs. Fassett, Stevens, Cobb, Dorritics and Thompson, of Portland, and Mr. Coombs, of Lewiston. Letters were read from Mr. Lewis, of Gardiner, and Mr. Moreau of Bangor, expressing their readiness to adopt the schedule agreed upon at the meeting. — Portland Sunday Telegram, Sept. 23, 1888.

SCHEDULE OF CHARGES ADOPTED BY THE ARCHITECTS OF THE STATE OF MAINE.

For full professional services, exclusive of time lost in travelling and travelling expenses:

For new work costing: over $5,000, 5 per cent on cost; 3-1/2 per cent for plans.

For warehouses and factories, 3-1/2 per cent on cost; 2 per cent for plans.

For new work costing between $4,000 and $5,000, 6-1/2 per cent on cost.

For new work between $2,000 and $4,000, 5 per cent on cost.

For new work costing less than $2,000, 4 per cent on cost.

For fixed interior woodwork, 15 per cent on cost.

For purchase of materials, the charges shall be the same as those for new work.

Preliminary studies for work costing over $5,000, 1 per cent on cost.

Commissions are reckoned upon the total cost of the work, including personal fixtures necessary to render it fit for occupancy, whether these be selected by proprietor or architect, valued as if executed entirely by new labor and material.

For purchase of materials, the charges shall be the same as those for new work.

Travelling expenses to be added to the charge.

Wire drawings, per ten feet, 3-1/2 per cent on contemplated cost, is due on completion of the general drawings and specifications.

Drawings will be made whether the work is carried out or not.

Drawings and specifications are instruments of service to the property of the architect.

Builder or contractor must compete all quantities. No bills of quantities will be furnished by us, as this is not within the province of the architect.

Specifications and conditions of such occasional visits may be necessary to ensure the conformity of the building to the design indicated by drawings and specifications. We do not agree to exercise the close supervision of workshops and to be responsible for the failures of mechanics to conform to the standard of workmanship called for by drawings and specifications.

ARCHITECTURAL LEAGUE.

At the first fall meeting of the League, held October 1st, over fifty members sat down to dinner. In the absence of the president, F. Crowntinshield presided. The Committee on Current Work announced that the annual architectural excursion had been postponed to the winter season, and that Washington, D. C., had been chosen for the place of meeting. It is arranged to take short trips around New York once a month till the League members have an opportunity to see some of the best interiors the city can boast of.

It was voted to incorporate the League at once, in order that all subsequent meetings of it shall be at leisure and under auspices suitable to the character of the league.

Definite action in regard to the club-house project was postponed until the November meeting.

BOSTON ARCHITECTURAL CLUB.

At a preliminary meeting held in the office of Messrs. Cabot, Everett & Mead, August 27, this committee was appointed to prepare suggestions and make necessary arrangements for the organization of an architectural club. The committee would therefore report as follows:

The object of this organization is primarily to create and foster artistic tastes among those who are interested in the subject of architecture, and to aid the members of the profession toward a higher standard of thought and design. The aims are therefore sufficiently comprehensive to embrace not only those who are engaged in the study of architecture, but also those engaged in other branches of the fine arts, as well as the larger class who would be one with us in instinct and tastes though engaged in other professions. We hope to recognize, in other words, an artistic club, whose chief direction shall be in the lines of architecture, the mother art. But that our growth be large and liberal in its scope, we need the association with the painter and the sculptor, who view art from a purely aesthetic standpoint, no less than with the educated art patron, who often judges of the work of our profession entirely by its practical efficiency. It is the belief of the committee that only by so wide an extension of the range of our work can we ever attain to a permanency, or acquire the influence which we should all desire for it.

It is not the intention that this club shall be in any sense a rival of the Boston Society of Architects. We are working on entirely different lines and seek to unite and not to compete with this organization. The main purpose of the club, for which it is hereby organized, is to promote an interest in architecture, and to give that culture and training which the progressive members of the profession are seeking for, but which is not to be had in our own organization.

It is believed that it would be a mistake for the club to involve itself in any extended machinery or to indulge in any more red tape than is absolutely necessary for the purposes of the organization. Let the first thought be that of artistic intercourse, the mingling of kindred souls, the rubbing of bright ideas against each other, the cultivation of architectural sociability, and the constitution and by-laws will take care of themselves. Then, as the need thereof makes itself felt, we can have within our midst classes in sketching, life classes, or competitions in design; all of these, however, being purely voluntary, and limited therefore to those who feel a real interest in such things and are willing to give the time to it. In this way the work will perhaps be small in quantity, but it will be earnest and faithful; and when the interest flags, the life of the club will not be seriously diminished, and it will be the case with this club, which were restricted to sketches and competitions, for those who have no time for studies, we hope to have pleasant reading-rooms, with all the architectural papers of the world on file, with ultimately a library and a good collection of original plans. There might be also, as a possibility, a comfortable lounging-room where the members can meet in the odor of architecture, smoke friendly pipes, sandler each others' latest productions and gossip over the architectural societies; while the architects, who feel the suffering of the disposal of visitors from abroad, who could make their headquarters with us. Besides this the club would have receptions at stated intervals, with occasional exhibitions, parties, etc. All of these ideas are entirely in embryo, as yet, but are perfectly natural developments of a club established on such principles as this.

The influence of such an organization, if faithfully carried out, cannot be too highly estimated. What has been possible with the Royal Institute of British Architects and the Architectural League of New York can surely be accomplished in Boston. There is no lack here of a vacant field or public sentiment. All we have to do is to start the ball rolling in the right track.

At a meeting held September 18, at which nineteen persons were present, this report was adopted and the committee elected to the offices named. It was voted to call the organization the Boston Architectural Club, and to take such steps as might be necessary to intensify the profession generally in the enterprise.

The club has the refusal of rooms at 70 Fairfield Street, No. 6 Hamilton Place, where a meeting was held Thursday, October 4, at 7 P.M., to consider further action. All interested are invited. C. H. Blacker, President. Richard G. Schmid, Treasurer. W. T. Partridge, Secretary.

MODERN HOUSE DRAINAGE.

To the Editors of the American Architect:

Dear Sirs,—Probably no change in the art of house-construction during the past ten years has been so great as in the relative importance attached to the subject of apparatus and convenient holding of water for its several uses and its speedy and safe removal after such uses.

Formerly the planning and construction of a plumbing of a house was left entirely to the plumber. To most house-builders, the including of plumbing with religion and thoroughness, as subjects too sacred to be talked about, would have been readily acquiesced in. The theory that hedges should be planted around a well-laid ladle was rarely sought to be penetrated. It is still true to-day that less is known by the owner of the drainage of his house than of any other subject of it, but the necessity for some knowledge is much better recognized than formerly.

The recent great awakening in regard to general sanitation has borne fruit. This fruit is seen in the greater interest which housebuilders take in their local drainage systems. There is an increasing importance attached to the subject by architects, in the very considerable literature which has sprung up about it, and in the rise of a new profession of men who make a specialty of house and town drainage under the general name of "sanitary engineers."

The foundation of a system of drainage is the soil-pipe, the main artery. The fixtures in the house should be so grouped as to give
The least complication and the shortest runs of waste-pipe, the connection between the fixtures and the soil-pipe. The soil-pipe itself should be run full bore through the top of the roof. As a rule, all pipe-lines for waste and sanitary purposes should be run where they can be seen. Concealed work is apt to be poor work. Also, in case of damage by frost or otherwise, the immediate and accurate location of such injury is important and economical. The soil and waste pipes should be so located as to make them easy to ascertain. The setting out of a drain should be open, with no confined space about them.

Wash-bowls should be without concealed overflow or plug and shall have sufficient water pressure in connection with standing overflows to make the latter the device only proper one.

Bathtubs should be of sufficiently heavy copper or other material to make them durable. The standing overflow and waste to the exclusion of the concealed overflow and plug and chain, is here of even more importance than in the case of wash-bowls, and the size of the outlet should be so large as to deliver the water from the tub into the drain and sewer system rapidly with all the securing effect of which such a large body of water is capable.

Shanks should be large enough to give ample room and should have special provision for preventing the clogging of their waste-pipes by congelled grease. The so-called "grease-traps" do this partially, but only by providing another receptacle to become clogged.

Where set-humdy-bury are used they should be of some number and size.

Each fixture (except the water-closet, whose trap should be in its bowl) should be trapped, as close as possible to its outlet, with a trap of good seal and not subject to siphonage.

SCHOOL ARCHITECTURE.

SCHOOLS IN THE MISSOURI VALLEY.

To the Editors of the American Architect:

Dear Sirs,—Will you kindly inform me where the work on School of Science and Art, Kansas City, is? As the time in your issue Sep. 1st, can be obtained and the price of the same.

Yours respectfully, T. SQUAIR.

(Signed through any bookseller, or write to H. T. Bateford & Son, 520 Main St., Chicago, Ill.)

SUIT OVEN A CLOCK.—The case of Mrs. Amy C. Cohn vs. Misses Laura A. and Emily Wheeler (better known as the Sharon hall cases) was tried before the superior court, with Judge Torrance presiding, at Litchfield, Conn. The suit was filed by Misses Wheeler, who had moved from New York and having a summer residence in Sharon, leased from Henry J. Taylor a small parcel of land in the village of Sharon, directly in front of the mill. The Wheeler family occupied this amount with enough to cover pasture, they will send it by mail, and the day of the auction is not fixed.

The clock began striking in October, 1886, at a time when the guests of the hotel had returned to their homes in the city. In the spring and summer of 1888 it was ascertained that the very loud noise made by the striking of the clock was annoying to the guests of the hotel. In the spring of 1887 the Misses Wheeler consulted that the striking of the clock should be discontinued during the summer months. In July, 1887, Judge Torrance ordered that the striking of the clock should begin on the 1st of August, 1887. The strike of the clock had begun at 8 o'clock at night, which would be a great disturbance for the hotel guests.

PINE TIMBER AT QUEBEC.—It is reported that a slick of square white pine remains unsold in the hands of lumbermen at Quebec, Canada, all that is in lumbermen, and it is expected to arrive having been passed into the hands of shippers—a condition of things never known at that market before. It is also said that there are only 30,000 feet of wanyo pine yard yet unsold, and that is this year's cut. The

It is probable that the smallest stocks on record will be wintered over. This will be an incentive toward reasonable activity in the woods, but it is believed the most of the lumbermen will take care that the market will not be overstocked with unneeded stock, and will not be overstocked with unneeded stock. It is also believed the most of the lumbermen will take care that the market will not be overstocked with unneeded stock.
ITALIAN CAPITALS.
The exterior of this house is stained with CABOT'S CREOSOTE STAIN for Shingles, Fences, Clapboards, etc.

G. Edward Coover
N.Y.

These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply:

No Stains contain no water and are the only exterior Stains that do not contain kerosene:

Prices are 50, 75, and 75 cents per gallon according to color.

Send for Samples on Wood and Circulars.

SAMUEL CABOT
70 Kilby St., Boston, Mass.
OCTOBER 13, 1888.

Entered at the Post-Office at Boston as second-class matter.


No. 668.

SUMMARY:

The Architect the Natural Enemy of the Librarian.—The
Proper Site of the Custom-house in New York.—Al-
leged Defects in the New National Capitol.—The Tran-
ing of Self-pipes.—The Annual Competition for the Medals
of the Architectural League, A Key to Btuscan Inscrip-
tions found in the Baal putek.—The Sayl of
and bad Ancient Mortar. Builders' Hardware.—VII.

ILLUSTRATIONS:
The Redpath Museum of Natural History, Montreal, Canada.
—Tenement-house, Roxbury, Mass.—Young Men's Rich-
ardson Association Building, Los Angeles, Cal.—The Hôtel
de Ville, Paris, France—Scenes on the Pont Neuf, Paris,
France.—The Royal Hall, Medford, Mass.—Country,
House.

THE Italian Royal Line at the "Plantation" Medford,
MASS.

Not content with this, the Convention went on to "riddle" Richardson's library designs in general, declaring that they afford "little indication" that he ever "gave any thought to the object for which his buildings of this sort were intended," and that he "appears to have been satisfied if he drew a beau-
tiful design, and to have left it to some draughtsman to fit
in the books and the service;" and concluded by inquiring earn-
estly for "an artist who will plan for use first and beauty
next, who will see where his book-shelves and his reading-rooms
and his work-rooms ought to go for the highest efficiency, and
will then mould his library building around them." Consider-
ing that no two librarians appear to be agreed as to "where
book-shelves and reading-rooms and work-rooms ought to go for
the highest efficiency," and that any plan advocated by one is
generally laughed at, the result is, it is not surprising that
architects have not yet invented any arrangement which suits
everybody, and that if they succeed in drawing a "beautiful
arrangement," which gives the accommodation that the owners want,
and holds the requisite number of books in a convenient and
accessible disposition, they are apt to be content, without
troubling themselves about whether all librarians would unite in
a concert of praise over their work. To point of fact, Richard-
son, although he liked to draw "beautiful designs" for libra-
ries, and generally succeeded in doing so, was very far from
careless as to the object to which his building was to be put.
As in all his work, the requirements of the case, so far as he
could understand them, dictated the plan, and this suggested
the rest, and to improve the arrangement he was never tired of
ceasing the methods of lighting, heights and widths of shelves,
case of access to the several portions, quiet for the reading-rooms,
and space for the movement of the public. Although the librarians
in his work no indication that he had
studied these points to give the facts, we will answer for it that
other people do, and there are few persons, not librarians, who
do not find an attraction in Richardson's comfortable, cozy
reading-rooms, with their open fireplaces and separate tables,
which the table-oh'tole arrangement of ordinary libraries, how-
over well adapted it may be for celerity of movement behind
the chairs of the readers and for slamming piles of books sud-
ddenly between them, fails to present. Nor, although we speak
modestly of the arrangement of book-shelves, as a matter about
which the most profound little knowledge, does the Richardsonian plan
of successive alcoves, with no shelves leading from the floor, each brightly lighted by a window, and all communication
by convenient doors through the shelving, seem utterly bad in
comparison with that adopted in libraries which have not been
mo
ducted by architects. Not long ago we had occasion to look
for books in the Bowing Green, and we were directed to a
certain room and set off in search. The way to the place pro-
erated was up a narrow spiral stair. This ended in a small
alcove, encumbered with a table, a chair and some portable
steps. Thence, the path led along a balcony, some eighteen
overwhelming the reading-room below, and guarded by a railing about the height of a parapet. At intervals the
way was obstructed by furniture, which had to be heisted up
and deposited behind one to allow a passage, and the balcony
ended in another spiral stair, which led to a room filled with
book-shelves in stacks, with only room enough to pass between them. After examining all the stacks, we came to one which
seemed to contain books relating to the subject in which we
were interested, and the next operation was to find the one
we wanted. There was a window, or a skylight, somewhere in
the room, but only a few rays of light struggled so far as our
stack.

We could read the names of the books on one or two shelves,
but there were other shelves filled with books, the titles of
which were invisible, while the books themselves, even if
the names could have been read, were out of reach, except from
steps, of which there were apparently none nearer than the
balcony. We suppose that there was some virtue in the
arrangement, as the "librarian's enemy" certainly had nothing
to do with it, but as compared with the roomy, light,
accessible shelving provided by Richardson and many other
architects, the collection, to the layman's mind, was clumsily
and awkwardly accommodated.

Owing to the smallness and inconvenience of the buildings,
and the value of the site for business purposes, the Custom-
house and Sub-Treasury, on Wall Street, in New York, are
to be sold, and more spacious buildings erected in some other
place. What that place shall be is not yet decided. Mr.
William F. Fryer, the skilful and experienced Superintendent
of Repairs of the United States public buildings in New
York, has made a report on the subject, in which he recommends
that the site should be taken either in the Bowling Green, or on
Battery Park, but he prefers the former. The Engineer-
ing and Building Record seems to think that Mr.
Fryer proposes to appropriate the open space of the Bowling Green
for buildings, which we trust is a mistake. It is hardly credible
that the City of New York could convey, or the United States
acquire, the right to erect a monumental building in the middle
of the modest expansion of Broadway where is the name of
the Bowling Green, and the obliterating by the Government
of this little breathing-space, to save the cost of such land as
private individuals would have to buy, would certainly cap
the ironies of the wanton meanness with which our Government
sees fit to conduct public business. The other site proposed
—that bounded southerly by the Battery Park, and westerly
by West Street, with the open expanse of the Hudson River
beyond, and extending easterly to Greenwich Street, closing
upon Washington Street from Morris Street southward, is in most
favor than the other. Overlooking, as it does, the whole expanse of the bay, the new building would form an
architectural termination to the city which is much needed.
Until within a few years, the traveller approaching New
York by sea was greeted by a shabby common, occupying the head-
land in the midst of which stood the huge, but dilapidated shed
of Castle Garden; the great buildings of the city showing
their blank party-walls through the window, and the boat
mile or so away. Since the extension of the elevated railway
the grass of the Battery Park has been kept in better order, but
the black treaties of the railroad have made the whole effect
worse than ever, and the great Field Building beyond them is
rather too tall, and minute in detail, to be imposing. With,
however, an immense Government building next door, the
Field Building would show to advantage as a part of a very
This the associated manufacturers refused to do, and the plumbers have now advertised in the newspapers that they wish to find some maker of iron pipe who will test the goods before delivery, and, if such a manufacturer is found, they promise to buy of him hereafter. For the interest of the public, we hope that this movement of the Plumbers’ Association will succeed.

The manufacture of plumbers’ cast-iron pipe, as now carried on, is disgraceful to those who control it. There is certainly no more difficulty in casting double-thick soil-pipe, which the New York law now requires to be used everywhere, as evenly, and with as few flaws, as water-pipe, and if the makers of water-pipe can, under proper tests, they can just as well afford to test plumbers’ pipe, which is sold for a much higher price. The requirement of strength to resist five pounds per square inch is absurdly small. Such pipe ought to be tested, after putting it into the house, at thirty to forty pounds to the square inch, and each piece should be washed out. Only one hundred pounds were before being allowed to leave the foundry. Nothing short of this will secure safety from the leakage into houses of sewer-gas, which is now proved to carry scarlet fever and diptheria infection, as well as the germs of other diseases; and if this cannot be had with cast-iron pipe, the sooner the use of such pipe is forbidden the better. Already wrought-iron pipe has to a great extent superseded that of cast-iron for plumbers’ use, and a general public announcement that the makers of cast pipe had resolved not to take the trouble to have it strong enough to resist a pressure equal to that exerted by a man blowing into it would soon close the market permanently against it.

We publish elsewhere with much pleasure the circular of the Architectural League of New York, calling attention to the second annual competition for the gold and silver medals of the League, open to all residents of the United States, under the age of twenty-five, who may desire to try their strength in design and drawing. The subject for the present year is an admirable one. Nothing could be better calculated to test the real artistic capacity of the competitors, independent of the effective tricks learned in offices, and we have faith enough in American talent to believe that the exhibition of the competitive sketches will be well worth seeing.

Many persons have seen something of Etruscan monuments or sculpture, and probably know that until within a few years the inscriptions accompanying the sculpture had never been deciphered. Although the eueniform writing of Mosopotamia, consisting of characters entirely different from those of any known language, has been understood there seems to be no key to that of the Etruscans. Very recently, however, a key has been found, strangely enough, in a modern language, or at least, one which is still spoken by six hundred thousand people; and not only has this well-known language of the Basque province of Spain served to interpret the writing of the people which was written in the north, the Basques of Navarre and Béarn on the Capitoline hill, but the relationship seems plainly to connect the modern Basques with the Pelasgi, those strange wanderers whose settlements extended from the Euphrates to the Atlantic. Singularly enough, the Basques have no ancient inscriptions or manuscripts, their language having been written only for four centuries and the portions of the Etruscan inscriptions are selected by comparison with words which have been preserved by oral transmission only for at least three thousand years.

A CORRESPONDENT of the Builder describes an analysis of two samples of mortar, one from a wall about two hundred years old and the other from a neighboring wall of about one-half that age. The mortar in the latter was very hard, while that of the other was soft, crumbly and easily crumbled by the hand. By analysis, the two mortars showed almost precisely the same composition, the harder specimen having a little more lime and somewhat more silicate of lime, as if a chemical action had taken place between the lime and sand in one case, but not in the other. A microscopic examination revealed, however, that the sand in the good mortar was in the form of angular grains, while in the other the particles were rounded, as if they had been taken from the seashore or the bed of a river.
Butts.

As previously stated, a butt is properly a hinge which is screwed onto the butt edge of a door. The arrangement of the parts of a butt is governed somewhat by the direction in which the door is to swing, and in order to distinguish properly doors, and consequently the corresponding butts they are designated as being right or left hand. This distinction is not always clear even to those who are somewhat familiar with the subject of builders' hardware; but a very simple way to remember which is right and which left, is to bear in mind that when a door, in opening, turns on its hinges in the same direction as is followed by the hands of a clock, it is a right-hand door, and contrariwise a left-hand door. In other words, the distinction is the same as is made in physics between positive or right-hand, and negative or left-hand deflections.

All of the commonest forms of butts are so made that the two leaves cannot be separated, the pin being riveted in place. This constitutes a fast-pin butt. Nearly all of the strap-hinges previously described are fast-pin. Such a form is not available for nice work, as it does not permit the door to be removed without unscrewing the hinge. The better class of butts are, accordingly, made with a loose pin, Figure 85, which can be readily withdrawn if the door is to be unhinged. A fast-pin butt would have exactly the same appearance as this when put together. Figure 86 is a third variety, known as a loose-joint butt. In this the pin is cast or attached solidly to the lower hub, working in the hollow hub of the other leaf, as shown by the dotted lines of the figure. This form permits the door to be removed with the greatest ease, it being simply swung clear of the casing and lifted bodily off of the hinge-pin. This style of butt is usually preferred in New England, though elsewhere the loose-pin butt is more generally employed.

The obvious advantage of the loose-pin butt is, that the amount of bearing-surface is increased to a maximum, and as the pin is distinct from the leaves of the hinge, it can be made of a metal which will stand more wear than the ordinary bronze or iron of the butts. The loose-pin butt illustrated has eight bearing-surfaces. There are never less than four, but, even then the butt has a considerable advantage over the form shown by Figure 86. On the other hand, the loose-joint butt is more readily attached to the door and unhinged, and it costs less, though the difference in the latter respect is but slight. The difference in the amount of bearing is, in a measure, lessened in the best makes of loose-joint butts by accurately adjusting the length of the pin so that it will bear at its upper end against the top of the socket, which is usually closed by the false tip. Figure 87 shows an improved form of loose-pin butt made by the Yale & Towne Manufacturing Company, in which the pin and all the bearing-surfaces are of steel.

It will be readily understood that, even with the most multiple form of loose-pin butt, the bearing-surfaces would soon give out if not reinforced with some more durable material than bronze. Accordingly, in all but the cheapest kinds of goods, the bearing-surfaces are fitted with some form of steel washer. In loose-joint butts the washers are exposed, as shown by the figures, and, besides taking up the wear, are useful in adjusting the butts to the doors, as two or three washers may be used on a butt if necessary, though, of course, a first rate mechanism would fit the butts properly without any washers. Loose-pin butts may have washers in the same manner, but the mechanical custom is for the joints to be bushed, or provided with washers which are countersunk in the hubs of the butt, so as not to appear externally. The Yale & Towne Manufacturing Company has a device by which the bushings are imbedded in plumbago, enabling the joints to lubricate themselves by their own motion. The pair of hinges so prepared has been attached to a wooden door, and turned back and forth a number of times equivalent to the use of over thirty years, without showing any signs of wear.

Butts are made of a variety of metals, the commonest grades being of malleable-iron. The next grade is of wrought-iron or wrought-steel. Iron and steel butts are left either with a plain bright finish, japanned, bronze-faced, Bower-Barfield, or nickel-plated. For nice work butts are made of brass, bronze, or silver. All of these styles of finish are in the market, and the different manufacturers so closely agree in their goods that it would be impossible to make any comparison. There are great variations in finish and design of the portions of the butts which show, and of the tips of the pins. Some of these will be considered in a subsequent chapter.

The best butts for common or cheap work are made of wrought-steel. The following table is compiled from the catalogue of the Stanley Works, which is about the largest manufacturer of goods of this description. The figures given are the average retail prices in Boston:

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<td>4 x 4</td>
<td>7.84</td>
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<td>8.17</td>
<td>3.28</td>
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<tr>
<td>6</td>
<td>4½ x 4½</td>
<td>8.55</td>
<td>3.44</td>
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<td>6</td>
<td>5 x 4½</td>
<td>9.40</td>
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<td>5 x 5½</td>
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<td>12.68</td>
<td>5.76</td>
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<td>5½ x 7½</td>
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<td>6 x 6</td>
<td>14.02</td>
<td>6.72</td>
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The finer grades of butts include such as are used for nice interior work. The pin is sometimes made of the same metal as the butt, but is better made of steel, rigidly inserted in the lower hub. Butts were formerly finished by hand almost entirely, but some most interesting machinery has been devised for centring, drilling, turning and finishing the work with almost mathematical precision. The following table gives the average retail prices of the butts manufactured by some of the principal firms in the country. The goods referred to are perfectly plain, with simple ball-tips. Figured patterns are apt to be somewhat cheaper, though the designs vary too greatly to admit of any fair comparison. The prices are for two butts with the necessary screws. All of Yale & Towne's goods are hand-made. The others are machine-made. All of the butts are supposed to be steel-bushed or have steel washers.

1 For washers add from 25 to 50 cents per dozen pairs of butts.
TABLE OF LOOSE-JOINT, BALL-TIP BUTTS.

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<td>$ 95</td>
<td>$ 1.00</td>
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<td>90</td>
<td>1.13</td>
<td>1.35</td>
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<tr>
<td>4 x 4</td>
<td>1.00</td>
<td>1.42</td>
<td>1.50</td>
<td>1.25</td>
<td>3.00</td>
<td>3.25</td>
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<tr>
<td>4 1/2 x 4 1/2</td>
<td>1.20</td>
<td>1.70</td>
<td>1.75</td>
<td>1.75</td>
<td>3.25</td>
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<tr>
<td>5 x 5</td>
<td>1.50</td>
<td>1.92</td>
<td>2.00</td>
<td>2.00</td>
<td>4.00</td>
<td>4.50</td>
</tr>
<tr>
<td>5 1/2 x 5 1/2</td>
<td>1.75</td>
<td>2.42</td>
<td>2.50</td>
<td>2.25</td>
<td>5.00</td>
<td>5.50</td>
</tr>
<tr>
<td>6 x 6</td>
<td>2.00</td>
<td>2.00</td>
<td>2.75</td>
<td>2.75</td>
<td>6.00</td>
<td>5.00</td>
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Butts are also made in irregular sizes, that is, to say, of such dimensions that when opened out they will not be exactly square, and are commonly employed, however, as close as the square sizes, as given above. Larger sizes than 6 x 6 are seldom used, as it is found better to increase the number of butts, rather than the size. The Robinson butts listed are so made that the ball-tip can be unscrewed, to permit of greater ease in putting the bearings, and the pin is made to bear on its point against the head of the socket.

The Yale & Towne butts here listed are of the ordinary loose-joint pattern. The special makes are sold as follows, the prices referring to a plain, ball-tip butt, in either bronze or Bower-Baffled iron:

TABLE OF YALE & TOWNE BUTTS — SPECIAL PATTERNS. PRICES PER PAIR.

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<tr>
<td>3 x 3 1/2</td>
<td>$ 90</td>
<td>$ 1.13</td>
<td>$ 1.35</td>
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<tr>
<td>4 x 4</td>
<td>1.00</td>
<td>1.42</td>
<td>1.50</td>
<td>1.25</td>
<td>3.00</td>
<td>3.25</td>
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<tr>
<td>4 1/2 x 4 1/2</td>
<td>1.20</td>
<td>1.70</td>
<td>1.75</td>
<td>1.75</td>
<td>3.25</td>
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<td>5 x 5</td>
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<tr>
<td>5 1/2 x 5 1/2</td>
<td>1.75</td>
<td>2.42</td>
<td>2.50</td>
<td>2.25</td>
<td>5.00</td>
<td>5.50</td>
</tr>
<tr>
<td>6 x 6</td>
<td>2.00</td>
<td>2.00</td>
<td>2.75</td>
<td>2.75</td>
<td>6.00</td>
<td>5.00</td>
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</table>

Too much care cannot be given to the selection of the butts or hinges which are to be used in the interior of a dwelling-house, for there is hardly any hardware about a building which is subjected to such constant and extreme wear as the door-hinges. Nor is there any department of house-trimmings in which so many poor grades of goods have been introduced, always excepting, however, locks. Even the best manufacturers have been forced to meet the competition in cheap goods, and oftentimes two butts will be sold by the same house, of which one will be poor and the other first-class, though, to a superficial inspection, they present exactly the same appearance. The whole secret, aside from mere questions of design and external finish, lies in the nicety of adjustment of the bearing-joints; and as the only sure test is that of actual wear, a poor butt looking as well when new as a good one, the wisest plan for the architect is to select his butts entirely from samples. A reference to a catalogue is not sufficient to ensure the proper quality of goods, unless one possesses an acquaintance with the hieroglyphics of the trade — which few architects ever acquire.

To be sure, many clients want cheap goods, and some would prefer periodical visits with an oil-can to all the squeaky hinges in a house, rather than to pay the extra price for such articles as the Yale & Towne self-lubricating butts. Still, the obligation is no less on the architect to acquaint himself with the best of everything, as well as to know how to get it.

(A to be continued.)

ALUMINUM ALLOYS. — Interesting experiments were made this week at the Briss Laboratory, at Lambeth, with aluminium and steel. A quantity of broken cast-iron, smouldered with clay and a special flux, was transformed in the furnace into excellent steel, containing two per cent of aluminium. Under the influence of the flux the iron combines with the aluminium in a nascent state. The metal thus treated is highly sonorous and susceptible of a high polish. — New York Evening Post.

EQUESTRIAN MONUMENTS.—VII.

PERILOUS MONUMENTS.—THE FRENCH REVOLUTION.

HISTOIRE DU ROY HENRY LE GRAND

Composé

Par

E. Henriot

An Etienne Fragonard.

Petit Chemin, joli chemin,

Doux am Mourir, doux am descendre,

Blanc plus petit que Brouque,

Tu portes un plus grand qu'Alexandre.

It is not to be supposed that if an equestrian monument were erected to Philippe le Bel similar memorials should not be created in honor of succeeding French monarchs, and in the relics of Louis XII over the entrances to the Château de Blois and the Hôtel-de-Ville at Compègne we have halting-places between the thirteenth and the seventeenth century.

The unstable Gallic nature knows no middle ground in the matter of likes and dislikes; its hero of the moment is a demi-god or even greater, and the enthusiasm with which Frenchmen of the time (1889-1610) regarded Henry of Navarre, the Bernese hero, knew no bounds, and so long as it existed the statue of Henry IV, placed on an abutment built out on the west side of the Pont Neuf at Paris, was an object of special regard. This place was selected for the statue because the bridge was built by the order of the king himself.

Concerning the statue itself there are many traditions, each varying from the rest in some particular, but all agreeing that its career was uncommonly varied and romantic. According to what seems to be the best supported tale, it was determined about 1604 to erect an equestrian monument of the king, and a Flemish sculptor, Fracavilla by name, prepared a sketch in wood, but seems not to have been considered a man of force enough to carry it out, and it was accordingly decided that the work should be carried out in Italy by Giovanni da Bologna, whose fame as the sculptor of the equestrian statues of Cosmo and Ferdinand de' Medici was well known to Marie, the wife of Henry. It is possible that the decision may have turned on the fact — if fact it be — that Giovanni had at that time on his hands the unfinished model of a horse for an equestrian statue of himself which had been ordered by the Grand Duke Ferdinand, but was not completed because of his death, and his successor, Cosmo II, instead of going on with the work, presented it to his cousin Marie. Be this as it may, Giovanni da Bologna was selected for the work in spite of his eighty years, and for a time he turned his attention to so transmitting his idea of an Italian prince that it should answer for a French monarch; but the little work he was able to do before his death was mainly bestowed upon the horse, which was essentially his. At his death the work fell to the care of his pupils, Pietro Tacca and Pietro Francavilla, who did not finish the statue for some years after Henry's assassination by Ravaillac in 1610. Completed at length in 1623, this statue was embarked at Leghorn, but suffered shipwreck off the coast of Saragossa, and was supposed to be a total loss. It was, however, recovered, placed in another ship and proceeded on its interrupted voyage to Le Havre, where it was transferred to a flat-boat and towed up the Seine, reaching the Pont Neuf, July 24, 1614.

1. Continued from page 146, No. 606.

2. Improved by Théophile on seeing the model of the statue of Henri IV.

3. After the death of the Grand Dauphin, the people used to leave their petitions at the feet of the statue on the Pont Neuf.

4. Man and horse measured about 5.50 m., and the total weight was 12,516 French pounds. The slavers about the pedestal were larger than nature.
The Original Statue of Henry IV, on the Pont Neuf, Paris.

was found the proue verbal drawn up by Francaisville himself and deposited there at the time of the erection of the monument, and when people found time to read it, it was found to give the lie to many of the fictions relating to the history of the creation of the monument. The truth concerning its sufficient beauty is clear.

A similar account was later found placed under one of the horse's feet. The four chained slaves, the hands, the left leg of the king and of the horse's feet, now in the Louvre, show that the king is rumored to survive in some private collection. The bas-reliefs represented the Battle of Arques, the Battle of Ivry, the taking of Amslen, the taking of Montemual and Henry's entry into Paris. The Latin inscription was as follows:

HENRICO. MAGNO. FRANC.E. ET. NAVARRE. REGI CHRISTIANISS. VICTORI. CLEMENTISS. GALLIARUM. RESTAURATORI. ORDIS. CEREMONIAI. DEC. CATOII. LOCY. AVITAM. PERSIST. HON. JONCTIONEM. UTIRILS. QUE. LILI. FRANC. ET. TUSCI. SEM. FLORENTIS. FERDINANDI. MEDICANS. IN. TUSCI. DUX. CERIT. COSMII. EJUS. ABSOLVT. H. KERNUM. RELICCI. VERTIT. IPNNIS. MONUMENTUM. MARIS. GALLII. REGENS. TANTO. CONJUGUE. HEN. PARISSCHIO. SUBLAT. MUMES. HIC. RECEPT. LUDOV. XIII. M. PARENT. MAGISTRUM. PER. MAGISTRUM. URBICINS. CONSIST. POP. URBICINS. MONO. DEUS. A. S. M. D. C. X. IV.

Two other anecdotes serve to illustrate the feeling that was held toward this statue and its original, one told by Carlyle of an ancestor of Mme. de Staél who, a member of a troop passing by on its way to the ceremony attending the erection of a statue of Louis in the Place des Victoires, raised his spontoon to his shoulder and "bawled out, "Friends, we will salute this one; he deserves it as well as the other six of his monarchs!" The other is told of the equestrian statue of Louis XIV, who, one day, seized with a historic frenzy or overcome with artistic admiration, threw himself on his knees before the statue and was lost in contemplation, till at length Peron, who had become the centre of a wondering crowd, cried out to them, "Qu'avez-vous vu? me regardez! Quitiez-nous tous," at which adjuration the crowd in place of obeying him followed his example and prostrated themselves before the statue.

After a time-hallowed custom this statue was made to play a rôle in some of the pageantries of the time, or mazarinades, as they were called in France, the interlocutors being the statue on the Pont Neuf and the statue of Henry's son, Louis XIV, in the Hotel de Ville, the date of one that survives being the night of March 26, 1649.

Of the artistic character of the monument, the illustrations give some information, and the present monument which is that of Louis XVIII—the metal used being, through retributive justice, obtained from the statues of Napoleon from the Colonne Vendôme and the one at Boullogne, and the statue of Desaix in the Place des Victoires—was intended to be, so far as possible to make it so, a replica of the original. The fragments in the Louvre aid, moreover, in completing the mental picture, for the present pedestal lacks the artistic perfection of the original, the view from the front is that of the queen's testimony that the likeness of the king was excellent, and this is confirmed by contemporary artists that the king was a better work of art than the horse, while the horsemen of the day protested that the best thing about the monument was the horse. The human figure represents the monumental character of the two horses at Florence, and so is probably not unlike the original modelled by Giovanni. Some critics maintained that the man was too small for the horse, and this defect has given the suggestion that if the statue was modelled in Italy and the man in France, a score of years later.

Another indication of the popularity of Henry and the persistence of the traditional love for him, is that when Louis XVI, from whom the people hoped so much, ascended the throne, some one inscribed on the pedestal of the monument on the Pont Neuf the word "Regnum vetustum," while, to mark the antithesis, on the tomb of Louis XV at St. Denis was scrawled, "Hic jacet Deo gratias!" During the Revolution, and probably about the same time, was destroyed the bas-relief of Henry IV—on a background of black marble which was over the main entrance to the Hôtel-de-Ville, at Paris, and over which was written, in the true trinitarian spirit, "Magnus felicius urbis," an inscription which might be supposed to indicate the approximate date of its execution were no other fact establishing it preserved. Worn on the Hôtel-de-Ville, which has been begun in 1833, was actively resuming during the reign of Henry, and completed by the Italian Domenico di Cortona, Miron, the Prefect des Marchands, as the funerary now known as the Prefet des Marchandises, exhibited at the Salon of 1834. The main entrance, the modelling being the work of Pierre Brid, who succeeded, was the best portrait of the popular original. It is doubtful whether even a noble metal would have withstanded successfully the unkind treatment meted out by fate and revolution. The last effort made by the Frondeurs, Condé marched against Paris, and sympathizers within the city threw open the gates to his forces, and during the ensuing days of tumult siege was laid to the Hôtel-de-Ville, in other words of obtaining access to the building falling

Among century.

Pierre Hardi fils, when pupil, was restored, to also restore the sculpture, and this piece of rejuvenation was fairly successful; and, though not so good a portrait as before, was allowed to keep its place till the Revolutionists destroyed it.

The illustration shows a portion of the façade of the Hôtel-de-Ville as it existed before the Commune, and over the door in the place once occupied by the work of the Biards may be seen another bas-relief of Henry, executed by Lemarié. This, of course, was destroyed by the Communists in 1871, when they blew up the building and set it on fire.

In the new building, dedicated a year or two ago, the space over the door is differently treated, but none of the later bas-relief have reproduced the female figures which in the work of Biard attended the footsteps of the monarch.

The Present Status of Henry IV on the Pont Neuf.

The Pont Neuf.—The second bridge built over the Seine and the longest in Paris was begun in 1678 by Henri III and finished by Henry IV, according to different authorities, in 1689, 1696 or 1697. It was rebuilt in 1838 and injured by a fire in December, 1853.

Hubert Robert, "Painter of the People,"—"The King of Brave Men,"* King of France and Navarre; founder of the royal house of Bourbon; born at Paris December 14, 1733; educated by his mother in the Protestant faith; married Margaret of Valois, sister of Charles IX, and narrowly escaped the massacre of St. Bartholomew; became king of France, 1601, on the failure of the house of Valois; was opposed by the Duc de Mayenne; defeated the Roman Catholic League at Arques in 1669 and at Ivry in 1670, became a Catholic in 1670; entered Paris, 1674; proclaimed the edict of Nantes, 1686; divorced from Mlle. de Valois, 1686; married Marie de Medicis, 1690; encouraged manufacturers, agriculturists and learning associated by Revolt, 1685.

John of Bohemia.—Born at Douai, Flanders, in 1525. He went to Italy at an early age, after an apprenticeship at Antwerp, and studied sculpture in Rome and France, founding his style upon that of Michelangelo. A prolific artist and a master of his time. His best work is the "Flying Mercury" at Florence. Others are the "Rape of the Sabines," "Heracles and Nausicaa," "Venus chains Vix,""the colossal " Jupiter Flora" at the Villa Medici at Rome the pediment at the bologna, Florence, Petura and other places; "Samson killing a Philistine;" the doors at the Cathedral of Pisa, and a monument to Ferdinand in the same city; "Venus" and "St. Luke;" and the equestrian statues of Cosimo and Ferdinand de' Medici at Florence and of Philip III at Madrid.

Ferdinand I at Loghorn (by G. dell'Opoza and his best) the equestrian statue of Philip IV, Madrid.

In this he was assisted by a wooden model made by Benvenuto the Younger.

THE FRANCILLA DE PIERRE DE FRANCLAVILLE.—Franclaville or Franclaveille (Pierre de), sculptor, painter and architect. Born at Cambrai, 1548; studied in Rome, 1568; studied in Florence, 1568; in Brussels, 1570; to whom he was (on a fellowship-countryman) well received. He studied under him for some time, the palace at Brussels of the sculptor, and later assisted to John of Bohemia, whom he assisted to fire Henry IV, who gave him the work on the pedestal of the statue of Henry IV. He also made a pedestal statue of Henry IV, and a pedestal of Louis XIII for the church of St. Peter at Paris, and a bust of John of Bologna.

Pierre Leblond.—1529-1609. Studied in Italy. Sculptured a Christ on the Cross, and other figures for the chapelet of St. Eulienne du Mont. He was also a painter.

Guillaume Duber.—Born probably at Paris; died at Paris about 1655; a medalist and coin-founder; not much renowned as a sculptor.

Philippe-Henri Lemarié.—Born at Valenciennes, 1728; died 1785; pupil of Cartellier; Prix de Rome, 1781; first exhibited at the Salon, 1782. His "Head of Parnassus" (1784) is at the Louvre. His best works are in the large decorative group in the trumpanum of the Madeleine. His other important works are statues of Louis XIV, Klibat, Oand; and Hoche for Varilious, Marcell-Hoche for Verdun, Napoleon for the Bourre at Lille, Provoart for Valenciennes, etc. Louis bourron—l'empereur vainqueur alliant les combats de la Genss (composition des fronton de l'eglise St. Isaac, &c. &c.); and a relief of the "Death of Marat," Bourse for the Arc de Triomphe, and one of the superintendent of the Legion of Honour.

Francois Freyter. Baron Lehou.—Born at Louis, 1771; died at Paris, 1817; pupil of dejean; Prix de Rome, 1781; Member of the Institute; professor at the Ecole des Beaux-Arts; one of the leaders of the Legion of Honour during his time. His works are: "St. Jerome," "Panneau ou l'empereur vainqueur allant les combats de la Genss" (composition des fronton de l'eglise St. Isaac, &c. &c.); and a relief of the "Death of Marat," Bourse for the Arc de Triomphe, and one of the superintendent of the Legion of Honour. Also a group of "La Religion contente a venger Marie Antoinette" for the Chapelle Expiatoire, and two allegorical figures which accompanied the trophies of St. Marks during their sojourn on the Arc de Carrousel.

[To be continued.]

MILLVIIATION.
The old: ROYAL MANSION: Medford: Mass:
INCENDIE DU CORPS DE GARDE SUR LE PONT NEUF.
Le 29 Août 1832.

Ce jeudi matin, les exercices d'Honneur que se passaient le Renseigne et le Génie à pied, et le Cheval, que le départ des deux troupes
faisait durer le temps, se terminèrent en mettant le feu au Corps de Garde. Il brûla sur la place Denfert-Rochereau des Misère-
Précieuse. La Révolution, en forme de Button avec les Garde et autres légendes des différentes Parties de la Garde, de l'Empire, et des Clercs.

RASSEMBLEMENT SUR LE PONT-NEUF.
Le 16 Septembre 1833.

Depuis plusieurs jours le peuple se rassemblait sur la place du Pont-Neuf. Il faisait calme et encore à nouveau les journées décantes.
The Hotel de Ville, Paris, before the Commune.
The building when complete will cost in the neighborhood of $70,000. It has all the appurtenances of a Y. M. C. A. building with reading-room, library, reception-hall, recreation-room, class-rooms, auditorium 68' x 41', the space under forming the gymnasium. There are also lockers for 600 in basement besides swimming-bath, private baths, etc.

The hotel de ville, paris, before the commune.

See article on "Equestrian Statues" elsewhere in this issue.

Scenes on the post neap, paris, france.

These Illustrations are reproduced from "Tableaux Historiques de la Revolution Francaise," in connection with the article on "Equestrian Monuments."

The ROYALL HOUSE, MEDFORD, MASS.

For description see elsewhere in this issue.

COUNTRY HOUSE DESIGNED BY M. R. E. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

The ISAAC ROYALL HOUSE, OR THE "PLANTATION," MEDFORD, MASS.

FLOQUENTLY do these fine old houses of the past, some charged with momentous associations of the Revolutionary era, some adorned and enriched by a nobility or associations of their age arrest our observation as we hurry by in these mercurial days. How capricious and offensive appears the intrusion upon their old acres of the speculative builder of today, and what a mockery the display of crazy art in the encroaching villas of the city clerk and commercial money-grubber. We hail with pleasure the slow awakening of local authorities to their duty of withholding the destroying hand and the preservation of their historic and architectural treasures.

Look at the house in question, with everything to commend it as a fine specimen of domestic architecture of its period. We now see its enriched cornices, bold fluted pilasters and entrance doorways crumbling away for want of a coat of paint. The old-time blinds hang tremblingly aslant on their rusty hinges. The boundary wall with its two gateways is gone. The drive-way a public street, and the noble elms, which once were the glory of the place, reduced to kindling wood. Look at Elmwood, Cambridge,—that also is to be laid out in building lots. There is a fine old house in Dorchester now completely encroached on by a belt, not of its own parishical foliage, but of puffy, cheap "suburban residences," while several fine remiscent buildings in the same district are in the last stage of dissolution.

In contrast to these note the Fairbanks House, Dedham, now in the hands of the Dedham Historical Society, the Rumford House, Woburn, similarly cared for, and the Vassall House, 1759, (Longfellows) is, we believe, to be put into the hands of trustees for preservation to future generations. All honor to this movement, not at all too early. New England and the Bay State especially should be in the van to rescue her crumbling memorials of Revolutionary times and of the men associated with the proudest chapter of her history. At club-houses or museums many of these buildings could be readily, appropriately and economically converted to local requirements, with the advantage of possessing intrinsic merit in their historic associations.

Isaac Royall, a descendent of William Royall or Royall—mentioned by Hazzard as being sent over to this country as a cooper, or cleeve, in 1629—after an arming fortune in Antigua, most probably in the traffic of Antigua rum, on returning to New England selected Mystic, now Medford, as a resting-place for his declining days, and buying the estate, built his house in the year 1737. In the laying-out of the estate is manifested a refined taste,—so perceptive in the house itself that it appears strange that it should not be associated therewith. Alas, will the name of the architect ever be of any account in this world? Why should the fat and flourishing builder who pollishes off all such problems alone be considered of mention of with the proprietor in the criticism of the daily press? Were the name of the architect duly and justly appended to the building itself, would not a grand stimulus be offered for his best efforts?

Returning to the house, we find it built of brick, though sheathed on three sides with wood. The court-yard front faces west and also the garden proper, which is a large enclosure directly opposite. A vast front lawn, named "the parade," is enclosed partly by a stone wall, which slopes gradually down to the street, which used to be the old Boston road. Why is it that we now-a-days find the term "parade" so lose its former meaning and that every thoroughfare must be everlastingly called a "street"? There is a broad walk to the entrance on this side, and a visitor arriving by carriage either alighted at the central gateway or passed by the drive which bounded the estate on the north or south, under the elms, and went to Medford and beeches to the court-yard and principal entrance. It is a curious fact that the house literally turns its back to the public road and its principal front demurely hides its face in the privacy of its own acres.

Emerging from the western door, we can readily picture its good-meaning proprietor mounting the steps of the family coach and rolling up to the Boston 2nd street, where the General Court, he long served his fellow-citizens of Charlestown. He it is here mentioned that Isaac Royall, the builder of this mansion, died close upon its completion, his widow surviving him only eighteen years and also dying here. Isaac Royall the second, an owner of considerable property in Boston and Medford, and whose wealth was also to a considerable degree accumulated in the traffic of Antigua rum, appears to have justly estimated his patrimony and taken good care of it. We may be sure his sideline would be a battle for free land and the hearty old-time hospitality dealt out with no niggardly hand.

There appears a very perceptible distinction in the architectural treatment of the two fronts. The west is more the present, as presenting a genial look of invitation and welcome, the western front assuming a severe austerity which seems at once to bespeak the civic magnificence.

The interior reception-rooms are very similar to the guest chamber, with more height, and whose deeply-recessed windows, with their ever-accommodating seats, seem still to whisper secrets of old-time gossip or sacred trysty here in their ample seclusion. Here we may picture George Erving or Sir William Phipps, paying his court to the merchant's two daughters with all the gallantry of that age. May we not follow them out into the hall, past the handsome old staircase with its richly-turbaned balustrades and newell, across the pebbled court, through the quaint square garden, with its box-edged flower-beds and walks, to the summer-house (now demolished), a structure of no mean design, with its fluted Ionic pilasters and fan- shaped pediments. How well it became the alien amongst the columbines, sweet-scented briar and rosemary "pledged to remembrance."

No brick builder at all the court of the end of the court-yard formed the quadrants of the box of twenty-seven slaves Isaac Royall thought it good to bring with him from his tropical home; and until lately was to be seen the large arched fireplace and oven, now altered for the use of maple syrup, but substantial, possessing the peculiar charm of an old fire-place, and a wonder of the days of long ago.

Colored, or Isaac Royall the second, who served in King Philip's War, made the greatest mistake of his life in evading the service of his country during the time of the Revolution. His heart was here and bound up in her future welfare, but, because of an insurmountable dislike of contention and conflict, he left his estate, and after declining to serve as councillor, though summoned by mandamus, he managed to get away to England, only to have his new home and well-cultivated grounds confiscated. Drake, in his "Landmarks of Middlesex," from which his history has been deduced, sums him up in a kindly and very honorable paragraph: "Peace be with his memory, and in the world to come, and with all who knew him, for his name is well-meaning, but shockingly timid old Tory. He would have lived in amity with all men and with his king too, but the crisis engulfed him even as his valor forsook him. His large-hearted benevolence showed itself in numerous requests to which he was alien only in name. The Royall professorship of law at Harvard was founded by his bounty. There was a town (Royalstone) in Massachusetts named after him, and he is remembered with affection in the place of his former abode."

It is noticeable that Penelope Royall, sister to Isaac, married Major Henry Vassall, whose brother, John Vassall, had commanded his regiment in the Revolutionary war, the New Hampshire "rangers" pitched their tents in Medford, Col. John Stark found Madame Royall and her accomplished daughters hailing the house, and they willingly took him in as a safeguard against insult or any rough handling of the soliderly. Her confidence was not misplaced, for the bluff old ranger, we learn, paid her and her daughters every respect in return for their hospitality. Not long after his arrival at the camp, General Lee took up his quarters in the Royall Mansion, whose echoing corridors suggested to his fancy the name of Hobgoblin Hall. Washington required him to remove nearer to
his command. After Lee, Sullivan, attracted by the superior comforts of the old country, fell into the same error and was
replied to his dispatch by his chief.

In 1810, the mansion came into the possession of Jacob Tidt, in whose family it remained for half a century, and is now better known by the name of the Tidt house than by the old royalist's name. En-


courage yourself in any corner of the estate and look at it how you will, a dreamy quiet will steal over your senses, while your imagination runs riot in recollecting its tapestries and carpets, its echoing parlors and chambers with a quaintly-costumed company, who seem to look askance at your look of surprise, yet bid you welcome to their memories and assurance. You may, as a writer with a sense of

pain that the iconoclastic hand of to-day should be so ruthless in its haste to remove the old landmarks of our earlier country.

AUTUMN JOURNEYS IN MEXICO. — II.

VERA CRUZ.

We the Mexican, Vera Cruz speaks of wealth. There was some-
thing prophetic in the name given by the Spanish conqueror to it in 1519 to the city which he proposed to build on the spot where he had landed his men on Good Friday of that year — La Villa Rica de la Santa Vera Cruz — the Rich City of the Holy True Cross. Circumstances caused the removal of the city four times, but the fourth removal brought it back in 1590 to the original site selected by Cortez, and there the city was planted, and there it grew. It became the chief city indeed, representing for the most part the wealth of the country to which it belongs. It is the principal port of entry in the Republic. Before the Independence of Mexico (1821) its ex-
ports and imports aggregated about thirty millions annually, from which Spain derived a large revenue. The business of the port has decreased since railway communication with the United States has diverted the course of trade, but it is still an important commercial town. It has something over twenty thousand inhabitants. At one

time, in the history of the Republic, when the country was over-

staked with presidents — one of them being angrily enounced in the big presidential chair at the capital — the other one set up his gov-

ernment in Vera Cruz, and supported it out of the revenues of the port until he could defeat his rival and open the way up to the capital.

Vera Cruz being reached after dark, there is no chance until the next morning to make observations of any of the features of the city excepting the hotel. The cool breeze is blowing off the Gulf, but the fac-
t that the traveller is in the hot lands is obscured upon him by the construction of the hotel. It is the "Hôtel de Mexico," fronting upon the mole and custom-house, and looking out over the water of the Gulf of Mexico. It is of four stories — an unusual height for a building in Mexico — and the floors of the immense halls from the ground to the top story, and the roof as well, are of iron gratings thus ensuring the greatest amount of ventilation possible. But these iron gratings give to the traveller as he passes over them a sense of insecurity. Crossing the hall caverned in the fourth story, he is apt to be filled with sudden alarm, when upon looking down he see the floors below him. He appears to be standing upon a skylight and makes haste to get off. Even familiarity with these gratings fails to overcome the nervousness. It lasts as long as the traveller remains in Vera Cruz.

There is one feature of the dingy Hôtel de Mexico which won my admiration, and is worthy of imitation in other countries: the baths were of blue-and-white figured, glazed tiles. How clean and cool they looked! The bath is a feature of every Mexican town, but those tile-basins were the most attractive of any I saw in the country.

These iron gratings serve up for supper, were the redeeming features of the Hôtel de Mexico.

There may be time after supper for a stroll in the main plaza, which is particularly attractive at night when the band plays and the Vera Cruzans come out for a promenade under the watchful eyes of maquis or aged dienas. One's first impression of the Vera Cruzans is that they are more voluptuous looking than the ladies of

the other cities. Mexican ladies generally are of slight build, but the Vera Cruzanas are fully in accord with the vegetation of the tropical land in which they live. They adhere more closely to the typical dress of Mexico — the mantilla of lace in place of hat or bonnet than the ladies of the capital, where French plucking and millinery have entered within the past few years. On the plaza

of Vera Cruz one's first lessons in the different races composing the population of Mexico, may be taken. All are represented in Vera Cruz. The "whites" are the European residents or their descend-

ants. The Indians, or natives, are the opposite class. Negros abound and these three races are mixed as follows: "Mulattoes," whites and negroes; "mestizos," whites and Indians and "zambos," Indians and negroes. Even at night the difference between Vera Cruz and the inland cities is quite marked, in population and other-

wise. There is a resemblance to the West Indian cities is striking. The Spanish spoken is more like that of Cuba than that spoken in the interior of Mexico.

By day the first object to which the attention is directed, is the fortress of San Juan de Ulloa, situated at the foot of the city, and the traveller will not fail to take a boat and go over to inspect it. It is built upon an island on which the great conqueror landed the day before he established Vera Cruz, but the island has entirely dis-
appeared under the Masonry of the fort, which now seems to rise directly from the bottom of the sea. It was begun in 1569, and not finished until 1633. It is considered the strongest fortress in the western hemisphere with the exception of Quebec, yet, it will be re-

membered that General Scott, in 1847, got behind it and landed his troops in Vera Cruz. It is now used principally as a prison, and the prisoners set upon the traveller immediately upon his landing and try him to buy grotesquely expensive souvenirs of which they expend all their time. An intelligent guide is detailed to show the visitor about the fortress and point out the light-house, the weather observatory, and, most curiously of all, the black and dismal dungeons in which the worst classes of prisoners are kept, below the level of the sea.

Nothing on this continent could be more beautiful than the view of Vera Cruz from this great fortress: it is suggestive of Venice.

If the day be clear, the mountain ranges back of the low line of buildings close to the water's edge, will be in full view, and among those will be the beautiful snow-covered peak of Orizaba.

The city presents little that is architecturally interesting. There are no more churches worth visiting, and churches are generally the most interesting features of Mexican cities. The Reform laid a heavy hand on the Church in Vera Cruz. It was from that city that the famous "Reform" decree was issued, and many of the churches have been turned to secular uses. One church tower has been turned into a light-house, and bears the name of Juanrez, the author of the infamous decree confecting the property of the Church. A former monastic building is used as a city-hall. The business houses

near the mole are substantial, but otherwise unpretentious. In the outskirts of the city the houses of the poorer class are built of bamboo and thatch. They are of the class of houses known as "pueblos" in Mexico. There is a suggestion of a northern seaside resort in the same sort of masonry and the residences out a short distance from the business portion of the city.

The Alameda is the most picturesque feature of the Vera Cruz. It is long, the fountain which stands in the center, all of masonry or a sort of concrete, are sadly dilapidated now, showing that they Alameda is no longer a fashionable resort. But the rows of cocoanut palms on both sides form a beautiful picture.

Vera Cruz is considered the cleanest of Mexican cities. In my next paper I shall mention a cleaner city — Jalapa — but, neverthe-

less, Vera Cruz is remarkably clean. The streets are built on a hillside, and have a drain running through the mizzle. But to the turkey bazaars, constantly lowering over the city, is due most of the credit for the city's cleanliness. It is well that Vera Cruz is clean. Without its drains and its turkey bazaars, the comito would

Continued from No. 653, page 366.
be much more severe than it is, and the unhealthy season would be longer. This is, it is true, perfectly safe; but the climate is not pleasant. The towns of France, indeed all others are wanting in taste; but inasmuch as all women and children, from the shop-keeper down to the street flower-girls, feel it incumbent on them to display their new hats and gaudy garments upon the top of their dirty hats, the supply of common and cheap flowers is necessary. A girl who loves finery, and can give eight cents for a flower, obviously cannot give fifty cents, even if she and the taste to prefer such a sum expenditure. And the same remarks apply to all art-trades, for there is scarcely an industry in which the superior taste of the Frenchman does not show itself. The Anglo-Saxon is ingenious and can produce excellent cheap articles, but of fancy and artistic articles he can produce but little. His work is strong and solid and good, or cheap and common and bad; but in either case wanting in artistic feeling. Therefore, for all art products, the Frenchman never sells a garment or accessory of his own, or of any comparison between those of France (and I ought to add Italy) and those of England, America and Germany? Apropos of fans, how many persons dream of being divided of fans in that trade? It seems incredible, but M. Cousin tells us that as many as fifteen and twenty persons are engaged in the production of one.

The result of the enquiry was the establishment of technical schools which should take the place of the old system of apprenticeship. In these, boys and girls are taught trades professionally; the technical classes of the other schools only being intended to make the children useful and skilful with their hands. But in the écoles sociales ouvrières, and the écoles d'art en ménage there is a boy or girl trained for the service of the home. After three years, earns a certificate of proficiency in the trade. And here again, division of labor is as much as possible abolished. The apprentice learns his trade, and is trained to do a man's work, whether it is on the farms or in the shops near by or in the factories. And that is required in the different trades is made in the workshops. The result of this teaching will be seen in next year's Paris exhibition, as the pupils of the various schools are now engaged in fitting up an entire room, and making all its contents by hand.

A great deal of the teaching is oral; and the pupils in addition to the subjects already mentioned, study designing for textile fabrics, and drawing in general, in addition to their work as carpenters or masons. As M. Cousin says, "of what use is a good design, if the designer be ignorant of the processes of re-production? The motive of decoration must be appropriate to the material. How can an artist design wall-paper if he does not know the process of paper printing?" "Faisons un génie, le résultat sera nul, et quand on lui montrera l'effet produit par son ouvrage, le dessinateur n'en voudra pas croire ses yeux.

Between the ages of thirteen and sixteen, enter these schools by passing a simple examination. The course of instruction at the École Diderot (which is typical of the others), consists of the following: the study of Greek and Latin literature, the Latin and Greek languages, music, mathematics, technology, history, geography, book-keeping, and the elements of physics, mechanics, and chemistry. The technical course consists of blacksmithing, engineering, carpentry, turning and various other mechanical trades. The student commences work at the age of twelve and works for four hours a day and three hours a week. The daily work occupies six hours in the workshops, and four in the class-rooms for the first two years, and eight hours in the workshops, and three hours in the class-rooms, the third year. At present Paris only possesses five of these technical, or apprentices, or middle classes schools, but it is intended to open more, and to include book-making (printing, binding, and the making of types) lithography in colored or black ink, and bookbinding, for in all these trades, the process of production is so thoroughly carried out that the workman is, at present, only a human machine. A draughtsman designs a chair, a carpenter makes it, a carver decorates it, or rather one man does the whole work, while another by the same system comes the upholsterer to stuff and cover it—and not one of the men knows anything of the others' work. It is said to be better for this reason, that the one gets no fewer advantages from the cheapness of production everything? Are there not many industries in which it would be gain to all persons concerned, if the products were fewer and more expensive? Besides, is man to be sacrificed to the product, or the product to man? If a man turns out an entire piece of work, if a woman makes an entire dress or bonnet, both feel a pride in their handiwork; but imagine the dreamers of always making the legs of a table, the sleeves of a dress, or the foundation of a book! It is true the man is but a blacksmith in his system; but if the men choose to educate themselves to be craftsmen instead of machines, the masters will have to put up with it. But if no workmen or masters who do not fear ambition, if they see the charm of carrying out their own designs as did the old craftsmen, they will be ready enough to change their system, and abolish specialists.
per annum; rather an unfair arrangement considering that the women work as hard as the men. The budget is based upon an economical foundation, but still the expenses are high, mainly from the fact that most of the instruction is free.

Mr. Cougny’s book gives a list of subjects for examination, an account of prizes to be won, and various other details; and closes with a hope that before many years pass away, each school may have a museum attached to it. As at present organized, there is some truth in the saying that “Les musées ne sont que les citadières de l’art, des catacombes où l’on range dans une promiscuité tumultueuse les restes de ce qui a vécu; une Venise voluptueuse à côté d’une Vénus mystique; un sépulcre à côté d’un saint.” Luther au regard du pape; un tableau de bonheur en pendant à un tableau d’anteil, (Théophile Thoré); and Viollet-le-Duc gives vent to a similar sentiment. "Aucuns Musées sont faites bien plus pour la manière que pour l’étude." This is only too true; but many town-councils have acknowledged the fact, and created what might be called industrial museums attached to technical schools. Mr. Cougny gives an account of the one at Berlin, which is a type of those existing at Munich, Nuremberg and other German towns.

In conclusion, who will not endorse the words of J. J. Rousseau; “Savoir se servir de ses désirs est une supériorité dans toutes les conditions de la vie.” Why annual work should ever have been despised, it is difficult to say; but the days when trumpery clerkship is considered a more gentlemanly calling than a skilled craft, are probably numbered.

S. Hale.

ARCHITECTURAL LEAGUE COMPETITION.—ANNOUNCEMENT.

The Architectural League takes pleasure in announcing that it has, in connection with its exhibition, an annual competition of drawings for the architectural design of the United States under the age of twenty-five, the object of such competition to be the promotion of good designs and the improvement of draughtsmanship. As prizes it offers to the designer first a gold medal, to be known as the Gold Medal of the Architectural League; and to the design placed second, the Silver Medal of the Architectural League.

The conditions for admission to the competition are:

1. That the design shall be the work of residents of the United States, and under the age of twenty-five; and

2. That the drawings shall be made in conformity with the following programme, and, in all parts and portions entirely by the hand of the competitor.

The drawings will be judged by the jury appointed for the purpose.

The successful drawings, and such others as may be thought worthy, will be hung at the exhibition, the first and second prize drawings being so indicated, and these latter shall thereupon become the property of the league.

Frank A. Wright, President,
John Beverley Robinson, Secretary,
47 Liberty Street, New York City.

PROGRAMME.

For the second annual competition the following programme has been arranged:

The drawing shall exhibit The Tomb of an Illustrious Architect.

The base-course of the tomb not to exceed in area 444 square feet; the size of the plot, 25 X 25 feet.

Each contributor to exhibit two sheets of drawings; one to contain plans and elevations at the scale of one-half inch to the foot, and one to exhibit a perspective view. The plan and elevation sheet to be finished in line with India ink and the lining- pen. No brush-work on this sheet, except sections. No shadows to be cast.

The perspective to be rendered. Each contributor to be reduced to the uniform size of 24 x 32 inches, and to be white card or Bristol board, or Whatman paper mounted on a stretcher. No colored borders to be used; all will be the same size.

Each sheet must be distinguished by a motto or cipher. A sealed envelope bearing the same motto or cipher must contain the name, full address, and date of birth of the author, and be mailed to the office of the Secretary, Mr. Frank A. Wright, 47 Liberty Street, New York City.

Drawings are to be delivered flat, carriage paid, on or before December 5th, 1888, to Frank A. Wright, Secretary, No. 305 Fifth Avenue, New York City. They will be returned at the close of the exhibition at the expense of the contributor.

Charles T. Mott, Chairman.
Ernest Rollin Tilton, Secretary.
Frederick Crownsbield, Esq.,
Committee.

AMERICAN INSTITUTE OF ARCHITECTS.

The Twenty-Second Annual Convention of the American Institute of Architects will be opened at the Buffalo Literary Building in the City of Buffalo, New York, on Wednesday, October 17th, 1888, at 10 a.m. The Genesee Hotel (within two blocks of the meeting hall), is suggested as the headquarters.

Rates to the Institute members, $5.00 per day, American plan, or rooms without board, $1.00 per day and upward. This hotel furnishes a “Heathquarters” parlor free to the Convention.

Please notify Committee at Institute office, 18 Broadway, New York, by return mail, what papers you propose to read.

W. W. Carlis, Chairman.
A. J. Bloom, Secretary.
Committee of Arrangements.

WILL SOMEONE ANSWER THESE QUESTIONS?

By C. H. Simmons, Secretary.
72 Market Street.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—Your paper has been taken in the office of this Company for many years. It has been useful to myself and to the experts who are employed in the supervision of mills for fire purposes or who are engaged in making plans and specifications for the safe construction of mills, works and mill store-houses. Your paper has contained many valuable treatises, accounts of scientific investigations, forms of contract and the like. May I be permitted to suggest, however, that the weekly illustrations and inspections of many buildings, such as churches, college-buildings, school-houses and the like would be very much more satisfactory if they were accompanied by such plans or working-drawings of the framing and of the interior construction as would enable one to know whether they would be safe and suitable buildings or whether they might not be examples of the common practice of combustible architecture.

It is seldom that one finds either in your paper, or in any other publication devoted to architecture, such a plan of the construction, specifications, and description as would enable a student to decide whether the building had been or would be well constructed or not; whether the timbers were rightly computed and adjusted; whether the computations on which the floors and columns had been specified had been considered with a view to a true factor-of-safety; whether or not the timbers had been single or double framing, by mortise and tenon or other device for weakening the strength at critical points; whether or not there were suitable cut-outs in the walls to prevent the passage of sparks or of fire behind the framings or in the partitions; whether or not the building might be a cellular structure in which all the wooden floors from the cellar to the hollow roof were well connected so as to assure the maximum of loss from the minimum of cause, together with the unobstructed range for incendial rats and mice.

Why is it that churches are, as a rule, bad fire-risks even when the outer walls are of brick or stone? Why is there customarily an open window flap from hall door to hollow roof? Why do we burn two hospitals, asylum or almshouses every month, with a large loss of life every year? Why is it that within a radius of half a mile from the Old South Church, including what may be called the section

1 A copy of the above circular can be had by applying to R. R. Tilton, secretary of the Medal Committee, 52 Warren Street, New York City.
of Boston to which the attention of architects has been given more than to any other, there is not one building in ten, probably not one in fifty which if moved out into the centre of a ten-acre lot, detached from all other buildings and fitted with all its present appliances for the accommodation of man, would not be refit in all of the Mutual Insurance Companies if asked to insure it without an almost complete reconstruction of the interior?

Why is it that cotton and woolen factories, paper-mills and woolen mills are much safer than the average church, hospital, asylum or college building?

Why is it that there is grave distrust on the part of those who profess to live in apartment rooms or other buildings for industrial purposes, of the competency of most of the professional architects?

Why is it that when due regard is to be given to strength, to safety from fire, and to the disposition of the timber in the best manner to accomplish the ends of economy in the construction of a house, that the average architect is seldom consulted at all, except to fit a design or outside elevation, to the conditions of the structure already determined upon without such previous consultation? What lies in the practice of those who do not adopt the rules for industrial buildings, because they have not been previously consulted, I have again been painfully impressed with the costly and wasteful system under which the art of combustible architecture is still practised in many places. — Edward Atkinson.

[...]

A SCULPTOR'S STUDIO-GARDEN.

Commend to me a garden seat,
A quiet modest small retreat,
With shrubs and flowers to vary now and then my hours,
And cheer the mind and rest the eye.
With art and science somewhat mixed out,
Where, from my studio close by
With Nature I can walk about,
And rest and muse a little while,
And from my porter's lodge escape.
From end to end — t'will make you smile,
For that is all its space embraces,
With gravelled walks, and little beds
Of flowers, and green bushes, and grasses,
And little shrubs — for none are tall,
And vines and jasmine the lime wall.
No outbuildings, nothing outside.
The gardens of Nobility,
With vast variety clade
In all their vegetable state;
Yet, let us not be too magnificent,
Each flower scarcely known by sight.
And most but at a distance viewed,
Acquaintship by far too slight!
Oh not for me is so great,
But rather a homely lect-cie-le
With the few I love to tend,
Where every plant's my intimate
And every flower my friend.

J. B.
During the war of the rebellion attempts were made to burn New York City, as the result of a conspiracy, fires being started in several hotels; but the buildings were all of iron and stone, and the rooms were so tightly that the fires were smothered. At an hotel in Woonsocket the steam-pipes caused a fire in the spaces in the walls of the building, which was extinguished for want of air to support combustion. The time of the fire is unknown, as its occurrence was not discovered until some time afterwards, when in the progress of an alteration to the building the fire was noticed. The workmen were building up a large party of the treatment. It was found that in this instance the steam-heating service was ordinarily used at a pressure of about 4 lbs., to the square inch during the coldest weather, and that it was thought that the pressure could not exceed 10 lbs. A spark of static electricity proceeding from a belt, ignited leaking gas and this in turn set the fire on fire, which is one of the many instances of the fire being known to have been saved.

-Engineering-

The Biggest Flumes in the World. - The total length of the flume, when finished, will be thirty-five and three-quarter miles, and the thirty-four miles is now completed. The redwood came from Humboldt and Trinity Counties, in Northern California. It was used exclusively for the purpose. The amount of lumber has been estimated at 45,000,000 feet. The average cost of the flume is $150 per 1000 feet, or $15 per cord, and it is expected that the total cost of the flume will be $6,750,000. This is a very conservative estimate, and in all probability considerable more will be used. It is estimated that the amount of lumber can be divided into the flume, and would load nearly forty large ships. A tree that will supply 1,000 feet of lumber can be cut down and would carry nearly 20,000 tons of lumber. The number of trees as can be readily be made, would make quite a forest. In the course of the flume there are 315 treestops, the length of which is 1,700 feet in length and eighty-five feet high. Its construction required 250,000,000 feet of lumber. This is the Los Cochos treestop. The Sweet water flume is the long one. The Canyon flume is the one that is longest. The number of timbers used in these treestops is 10 x 10 and 8 x 8. They were put to the ground on the raised to their position by horse-power. The maximum length of the course of the flume is 2,200 feet in length. The tunnels are 6 x 6 feet in size, with convexly shaped roof. Each mile of the flume required, on an average, 250,000 feet of redwood used, and the redwood used for the flume is all of the best quality. The San Diego flume is pronounced by men experienced in such enterprises to be the largest ever built in the world. So large is the construction that it will be necessary to guard the river in 120 miles of the flume, and to do the work, it was decided that it could not be built. Every obstacle has been now overcome, however, and by the 2d or 3d of September the last spike in the flume will be driven, and then the water will be brought to the reservoirs, about six miles from San Diego, from which point it is proposed to pipe the water to the city, in regard to the mechanical work done in the construction of the flume, all who have examined it declare that it is first-class in every particular. Engineers have fixed the grade every mile in order as near as possible to insure perfection in that important particular. The flume has a uniform grade of four and seven-tenths feet to the mile. An idea of the difficulties that have been overcome in the construction of the flume is apparent from the fact that much of the lumber had to be milled 700 and 800 feet up the sides of steep and rocky mountains. The lumber was loaded on cars that were 100 feet long, and driven up to the flume by the cable. The motive power was furnished by a portable cable engine. The flume is now completed, and as the work of laying the pipes from the dam to the city, it will not be necessary to raise the water from the great flume will be flowing into our city. - The San Diego (Cal.) Sun.

Recovery of a Long-lost Tapestry. - "When Marguerite of France was married to Victor Amadeus of Savoy, she took with her to Italy twenty pieces of the very finest Gobelin tapestry, illustrating events in the life of her grandfather, Louis the Sixth, who was of immense value, disappeared mysteriously when Napoleon invaded Italy, for it had been hidden away in case the French might be able to find it. That it had been so carefully concealed that after some years, when calm was restored, it was found impossible to discover it, and the two officials who had put it away were both killed. The tapestry had been almost forgotten till about a month ago, when the Marquis Villamarama, the master of the royal household, was making a thorough investigation of the palace at Turin from roof to cellar, and behold some huge chests in a storeroom in the highest story he found a secret chamber, in which was concealed the long-lost tapestry, and it had been very little injured by the damp and dampness of the storeroom. The tapestry is to be carefully repaired and cleaned, after which it is to be sent to Rome and hung in the Quirinal in the apartments which the Emperor William is to occupy during his visit next month."
The Dececo Goods.

A Plumber's Opinion as to the Puro Washbasin, and his estimate as to the comparative cost of the DECECO CLOSET.

PERSONAL ATTENTION TO SANITARY WORK.

JOHN WORTHINGTON, PLUMBER AND GAS FITTER,
No. 1721 CHESTNUT STREET.

Plans Prepared for Drainage and Ventilation of Drain and Soil Pipes.


THE DECECO CO.

Gentlemen,—After using the Standpipe Overflow Basins amongst our best work, we concluded, upon examining the "Puro" basin, to give it a trial, and we are convinced of its superiority for the following reasons:

First. It is without any regulating screws.

Second. The strainer is in the standpipe, and is vertical in place of horizontal, thereby avoiding choking from lint, which will sometimes catch upon the strainer.

Third. The working parts being below the opening of the waste outlet, it is necessarily cleaned each time the waste discharges; also the opening is much larger, giving quicker vent and scouring of trap and waste.

In respect to the difference of average cost between Dececo closet and tank and washout closet and tank, in answer to your query, I reply that we consider the difference in favor of the Dececo closet.

The prices are—Dececo and tank, $11.50. Washout and tank, $10.00. But in fitting up the Washout closet we are compelled to provide the anti-siphon pipe for trap, which increases the cost on an average of about $1.00 per closet; this work is never necessary in connection with the Dececo closet, hence it is the cheaper of the two by three dollars and fifty cents ($3.50).

After having used about two hundred of the Dececo closets, we would always give it the preference, even if the difference of cost were not in its favor, as it has given universal satisfaction, satisfying even those who were never satisfied before.

Yours truly,

J. WORTHINGTON.

The Dececo Company,
12 High Street,

NEWPORT, R. I.
The Pilgrim Monument, Plymouth, Mass.


Mr. W. R. Emerson desires us to publish the fact that he is using our stains continually, and that he has never pronounced them inferior to any other in the market.

These Stains are very durable and give a much more artistic effect than paint; while they are cheaper, and very easy to apply. 

Our Stains contain no water and are the only exterior Stains that do not contain kerosene:

Prices are 50, 50, and 75 cents per gallon according to color.

Send for samples on wood, and circulars.

Samuel Cabot, Sr.
70 Kilby St., Boston, Mass.
MEXICAN SKETCHES.
SUMMARY:

BUILDERS' HARDWARE. — IX.

ILLUSTRATIONS:

THE Sanitary News gives the substance of Dr. Edwin Chadwick’s recent address before the Association of Sanitary Inspectors of Great Britain, which contains much food for thought. One point which is particularly noticeable in this, as in most other reviews of the progress of sanitary science, is the certainty with which the death-rate can be diminished in a given locality by well-known sanitary measures. All illus-

October 20, 1888. Entered at the Post-Office at Boston as second-class matter.

THE Wiener Bauindustriezeitung is strongly in favor of painting the outside of brick or stone buildings, as a means of repelling dampness from them. It acknowledges that many scientific persons oppose the painting of walls of masonry, on the ground that ventilation through them is thus prevented, but it believes that when the inner surface of the walls is made, its value is more than counterbalanced by the facility with which the masonry becomes saturated with moisture. In support of its observations, it cites the example of two houses, standing side by side, facing the rainy quarter of the compass. One of the houses has the front painted in oil; the masonry of the other is left bare, and after a heavy rain is almost black with the water which it has absorbed. In this house dwells a family of persons not constitutionally subject to rheumatic or some effect, but, to judge from Dr. Chadwick’s figures, the money spent in this scheme, if used in abolishing the cesspools and “fosses” of Paris and other French towns, and in administrating soap and water to the inhabitants of the villages, would increase the population, by saving French lives, more in a year than the seventh-child device would do in a decade. So closely connected are cause and effect in these matters, that Dr. Chadwick suggests that an experienced sanitaryian might make a contract for the reduction of death-rate, as the contractor for the reduction of death-rate, as the contractor of Manchester, which is now twenty-seven in the thousand, to sixteen per thousand, receiving suitable concessions in the way of permission to build sewers and disinfest houses. The city would gain enormously by such a contract, not only in the saving in population, but by the increased health and ability to work of all citizens.

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pulmonary complaints, or catarrhs, but since taking possession of the building every member of the family and inmate of the house has been ill with rheumatism or catarrhal affection; while the aspect of the air in the rooms is indicated by the printing off of the paper from the walls, and by the persistent smell of tobacco-smoke, a certain sign, we are informed, of a moist atmosphere. The painted house is inhabited by a family of consumptive tendency, yet no member of it, or other inmate of the house, has suffered from pulmonary or rheumatic disease, although, after a very heavy and continued rain, the cellar has been flooded with water. So far as ventilation by open windows is concerned, the two houses have been similarly treated, and the only difference between them appears to consist in the paint on the outside walls.

The same useful journal also mentions a device for keeping walls dry which may be of value. Where a brick wall, plastered on the brickwork like all walls in Vienna, shows dampness on the inside, after being exposed to rain, the plastering should be removed, the mortar scraped out of the joints of the brickwork to the depth of half an inch, and the whole then painted over with hot coal-tar or asphalt. After this is hard, a new coat of plaster may be spread over it, and finished as if there were no coal-tar under it. If the new plaster should not adhere to the asphalt, as often happens, a repetition of the process at the end of a week will make it adhere. If the asphalt is still warm, or, we might add, by throwing hot sand at it even after the coating had become cold and hard. This gives a texture to which a hard-finish, or other second or third coat of plaster will cling indefinitely. If coal-tar is used, with ordinary plaster over it, the disagreeable smell of the coal-tar or asphalt will permeate the plaster, coming through the wall into the room, but this may be prevented almost entirely by mixing the plaster with cement or hydraulic lime.

The Massachusetts State Board of Health once made an investigation into the effect of the construction of dwelling-houses on consumption, and found that the proportion of consumption was greatest in stone houses, next brick houses, and smallest in wooden houses. Dry as our climate is, therefore, it is by no means impossible that paint might with advantage be applied more to masonry with us than it now is. A hundred years ago it was fashionable to paint brick houses white, and many charming old structures remain to attest the value of the coat of paint in preserving the masonry, and its pleasant and homelike effect as a foil to the vines and shrubs with which even city houses are now commonly adorned. If it should prove, as might easily be ascertained, that the painted brick houses preserve their inhabitants more from consumption than the unpainted ones, it would be worth while to revile the ancient fashion, and, with our greater resources in the way of materials and ideas, exterior coloring might become as important an accessory to the architecture of the twentieth century as it was to that of the twelfth and thirteenth.

We have received the announcement for the coming season of the Art Schools of the Metropolitan Museum of Art, which are to be, as before, under the management of Mr. Arthur Lyman Tuckerman. Mr. Tuckerman, in addition to the general supervision of the schools, conducts the courses in Architecture, which are so arranged as to prepare pupils who desire it, in three seasons for admission to the Ecole des Beaux-Arts in Paris. For those who wish only to perfect themselves in drawing, design and mathematics, while regularly engaged in offices, lectures and exercises are arranged to occupy only one-half of each day. Besides the courses in architecture, the schools provide classes in elementary chiefly by painting and drawing from the antique and the round, as well as from life, and in modelling and sculpture; any or all of which the young architect might pursue with great advantage. The instruction is the best that can be obtained in New York, the hours are divided between forenoon, afternoon and evening so as to accommodate as many persons as possible, and the cost of tuition is extremely moderate, the fees for the whole course in Architecture being but twenty-five dollars for the school year, or forty dollars where pupils attend both the morning and afternoon classes.

We are so pernickitably called upon by politicians to wonder and rejoice at the extreme prosperity of our own country that it does not often occur to us to look about and see whether any of the nations which live under a less admirable government ever dream of omitting American enterprise and development; and if any of us happen to notice a foreign undertaking, such for instance, as the Trans-Caspian Railroad, and to observe that it is intended to be about five times as long as our Pacific road, and has been built about four times as fast, he is so drowned upon and decried by the professed mouth-pieces of public sentiment that he finds it safest to conclude that the enterprise is an unwarrantable expense, which he and his neighbors are supposed to be enjoying at home. For all this, there is instruction to be derived by sensible men in looking abroad once in awhile, and it is curious that, whereas America was once the chosen land of "booms," real estate speculations, and mushroom towns, while Europe was all conservatism and fixity of values, the conditions are now rapidly changing, and while land throughout most of the United States is stationary or retrograding in value, Europe is full of real estate "booms" and speculations, and towns spring up and grow with a vigor rarely approached here. To say nothing of the excitement of the financial world, we find a curious excitement among the old and ancient capitals of the world, around the Caspian Sea, which followed the development of the ancient Baku oil-wells by the Nobel Brothers, many other portions of Russia, Germany, France and England are rapidly outgrowing the geography. The Black Sea, particularly, in its changes which are taking place on the site of the ruined cities of our own lakes, with their great ports of internal commerce. Odessa, which now attracts attention alternately to the ferocity of its Christian inhabitants, its fondness for anarchist plots, and its great commercial importance, was, ninety years ago, a miserable little Turkish village, with a few hundred inhabitants, but no harbor or shipping. Now it has a population of two hundred and fifty thousand, and four thousand vessels enter its port every year. Its harbor, famous as it is, is almost purely artificial. A century ago the indentation of the coast on which it lies was open to all winds from the southeast to the northwest, and the waves driven by the southeast wind which is the most violent one in the Black Sea, swept the bay from end to end. In 1794, under the Empress Catherine, the first stone was laid of a small breakwater at the southeast corner of the bay. The work went on slowly and roughly, but every stone added to the mole gave shelter to a few more inhabitants, and traders kept pace with the safeguarda provided for it. Improvements were demanded, and made, one by one, until now the southeast mole has become a magnificent work, one hundred and forty feet wide and nearly two miles long, with stone pavement, cut stone revetment on both sides, and a high stone parapet on the seaside. This, however, is but a small part of the engineering which has made the present harbor of Odessa. At the opposite extremity of the city another mole projects about half a mile northeast into the Black Sea, then turns, forming nearly a right angle, and continues until it nearly meets a third mole, projecting about three miles northeast from the shore, including a harbor and two more miles of less length divide the water-front of the town into four distinct harbors, all protected from the southeast winds by the great Quarantine Mole and its extension, and from the east and northeast by a work hardly less important, the huge breakwater, a mile long, which completely shelters the entrance to the harbor, leaving only a narrow protected entrance at each end.

I think that the Keely motor, which, after a very profitable experience of several years in this country, suffered, a few weeks ago, a cruel blow in the shape of a court requiring that the principle of its operation, or non-operation, should be explained, has sought consolation for this injury abroad, where its manoeuvres in connection with its shareholders' pockets can be carried on without interference from Pennsylvania courts. Since the appearance of its appearance in France it couples it with Commandant Renard's balloon, which it is said to have made perfect by supplying the necessary motive-power; but we do not find that any one has yet seen the motor driving a balloon through the air, and imagine that many French stockholders will bleed severely at the pocket before this anticipation is realized.
BUILDERS' HARDWARE.—IX.

SPECIAL HINGES.

Parliament-butts are shaped like Figure 88. They are intended to be used on very thin doors or shutters where considerable space is needed for the screws. They are made in several varieties of design and finish. Figure 89 is a hinge used almost exclusively for washtrays. Figure 90 is a form of chest hinge somewhat similar to that shown by Figure 67. There are also several forms manufactured for hanging inside-blinds. Figure 91 is the common form for ordinary blinds in two folds. The same is made with either fast or loose pin, and there are several varieties with ornamented surfaces. They are more specifically designated as “shutter flaps.” Figure 92 is a form of shutter-hinge used for shutters which fold back over each other, as shown by the cut. Figure 93 is a hinge which is very convenient to use for water-closet seats, double-hinged lids, etc., the central flap being screwed to the seat, while one of the outer flaps serves for the seat cover and the other is attached to the frame at the back.

Figure 94 is a pivot or centre hinge to go underneath and above a door. Figure 95 is used for much the same purposes. Figure 96 is a form of wardrobe hinge. Besides these there are many special forms of hinges used in connection with furniture and a few for more strictly building purposes, none of which, however, are of any special value or interest, except the hinges used for double-acting screen-doors, that is to say, doors which swing both ways. Most of these are fitted with springs and will be considered later on, but the form represented by

Figure 97 is peculiar to itself. It is rather hard to appreciate it clearly from the drawing, but the sectional plan will make the arrangement more easily understood. The figure shows the hinge as it would appear when opened out. It really consists of three separate double-acting hinges, such as shown by the plan. A similar hinge is made with two sections instead of three.

Figure 98 is even more puzzling, at least, no drawing can illustrate it clearly, though the thing itself is easily understood. Its action is on exactly the same principle as Figure 97. The curved connecting pieces are between the two main hinge plates when the door is shut. For clearness the hinge is shown both in sections and put together. If the plate C be fastened the door frame, when the door is opened towards the left the plates D and B will revolve together about the axis 1, 1, taking the position shown by the figure. If, however, the door is opened in the contrary direction, the revolution is about the axis 2, 2, the plates D and A turning together.

SPRING HINGES.

One of the simplest forms of spring hinge is that shown by Figure 99, consisting of a single spiral coil spring about a hinge pin, so arranged that when the door is opened the spring is twisted more tightly, and by its resistance tends to close the door. The lower flange is secured to the door frame, and in setting the hinge the spring is brought to a proper tension by turning up the hinge pin, holes being pierced in the bottom of the pin, as shown, to facilitate the use of a lever, while a shoulder, dropped into one of the holes, bears against the fixed flange and prevents the spring from uncoiling. Figure 100 is

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Footnote: 1 Continued from No. 608, page 166.
a spring hinge to be planted on the face of the door and the door frame, the spring being turned up by using a bar in the hole through the bottom of the pin, and kept from uncoiling by the ratchets shown in the lower portion. Both of these hinges are for single swinging doors.

Figure 101 is a light form of double-acting spring hinge suitable for fly doors which are set up from the floor, and do not extend to the top of the door frame. Its action will be readily understood by reference to the figure.

Figure 102 represents a double-acting spring butt of the same general form as the single-acting butt, Figure 99. The springs are turned up and secured in casually the same manner and the appearance is the same. This form really embodies the principles of nearly all the varieties of spring hinges, the differences being in appearance and in compactness of construction rather than in the workings. Two styles, the "Empire" spring hinge, Figure 103, and the "Star" spring hinge, Figure 104, will fully serve as types of a great variety of double-acting spring hinges listed in the catalogues of the various manufacturers. In the "Empire" spring hinge the coiled springs are exposed to view, and are tightened by inserting a lever in the cogs at the bottom of the hinge and drawing it around until the catch \( A \) on the top of the hinge pin is held by a little projection on the hinge plate. In the "Star" hinge, the springs are concealed, though they are set up in essentially the same manner. Both these hinges are excellent of their kind and are about as good as anything in the market.

Figure 105 shows the "Crown" hinge, a form which permits of a little nicer adjustment than the others in that the ratchets about the spiral spring are quite close together and the tension can be increased to any desired strength. This is a strong and durable hinge, although none of the foregoing hinges should be used for outside work, as they are liable to rust and clog.

All of the preceding double-acting hinges necessitate two coil springs. Figure 106 shows a form of double-acting spring butt in which the force is derived entirely from a single strong coil, which is concealed when the door is closed, working in the thickness of the door. This hinge has generally proved very satisfactory in use and is much called for, being very neat and tidy in appearance, and it is especially adapted for light interior doors, where it is desirable that the hinges shall be as inconspicuous as possible.

The simplest double-acting hinge, however, is the "Champion" spring hinge, shown by Figure 107. This is about as convenient and satisfactory a door-spring as is in the market, consisting of a single spring operating for either swing of the door. A catch on the hub of the lower jamb plate resists the door in one direction, while a corresponding catch on the upper plate resists the tension in the opposite direction. These hinges look neat in place and are very easily applied, and, having no compli-

cated machinery about them, are not likely to get out of order.

A hinge which has the appearance of considerable complication is the Jewett spring butt, shown by Figure 108. This butt, however, has many excellent qualities. It consists of four separate springs, two on each side. It will be seen by the plan that when the door is opened the tension is brought on the springs by aid of the push-bar or pin, \( A \), which fits on the shoulder between the two springs and on a ratchet attached to the central hinge-plate. The springs can easily be released from their tension without taking off the door, by simply removing the push-bar, and, owing to the manner in which the springs are attached, they exert their greatest power when the door is closed, the force gradually decreasing as the door is opened. Another good quality is that, as there are four springs, if their combined power is too great for the door, any one of them can be released singly, without affecting the action of the others, and the tension of the spring brought to any point. It is also possible to replace a spring without taking the butt off the door, something which can be done with very few other makes. The only objection to the hinge in our mind is that it is complicated in its appearance and also that the springs are held in place by a moveable push-bar, which, under some circumstances might be knocked out of position and lost, in which
case the hinge would be practically useless. On the whole, however, it is a most excellent hinge.

The "Union" spring hinge, Figure 109, is a form in which the resistance is derived from the band springs. The peg shown above the spring is moveable, and by turning up the hinge-pin

![Fig. 109. Union Spring-hinges.](image)

the peg can be set in any of the holes in the pin, as may be necessary to retain the desired resistance. One end of the band spring is fastened to the hinge-pin and the other hooks into a slot on the adjoining hinge-plate. The hinge illustrated is intended for light doors. For heavier work a hinge is made with four such springs, two on each hinge-pin.

Figure 110 shows a form of spring butt which depends for its action upon the torsion or twisting strain in a steel rod, which is carried from the bottom to the top of the door.

The disadvantages of nearly all of the forms of spring hinges previously considered is that they are apt to cause the door to slam, and the door cannot be kept open except by placing something against it. Spring hinges which will keep the door open or cause it to close are peculiarly an American invention and one of the most ingenious of its kind.

There are four leading styles of hinges which have a holdback feature. They are the Hero, Figure 111; the Nickel, Figure 112; the Devore, Figure 113; and the Wiles, Figure 114. All of these hinges are necessarily single action. They are alike in that they are planted on the face of the door and door frame, and are delivered ready to be set, with the tension fully applied. The principle on which they work is simply this: The spring is called about a shank entirely disconnected from the pin of the butt and either united to the butt plates by top and bottom pieces which hook on the opposite sides of the hinge, as in the Nickel and the Wiles hinges, or with the springs themselves directly hooked onto the hinge-plates. In the Devore hinge two springs are used, the ends caught at the centre on one leaf A, while the outer ends catch on hooks at B, B. In this way, it will readily be seen that as the hinges open, the hooks to which the spring is attached are separated from each other, and consequently the spring is drawn tighter. But as soon as the hinges have passed through about three-quarters of the distance they are to swing, the horizontal distance between the points of attachment, at top and bottom of the spring becomes less, and the tendency is to draw the door open and hold it so. It is very difficult to show this action by a diagram, but Figure 115 may help to make it understood.

Let A represent the jamb and B the door; C, a double turn of spring wire hooking on to the two arms, D, D, fastened respectively to the jamb and the door. When the door is opened, the ends of the spring are forced apart, but at the same time the spring forces itself out of centre, turning on the hooks of D, D, until, when the door has moved through 180 degrees, it is evident that the spring has both moved and turned so that the ends tend to draw the arms D, D together, rather than to push them apart.

In order that the springs should be free to move, as just explained, the hinge-pins cannot extend through the butt, and the strength depends entirely on the flanges of the plates to which the pins are attached. As these cannot be made very large without rendering the hinge clumsy in appearance, it follows that the hinges can be used only for comparatively light doors. The "Hero" hinge is rather heavier and apparently simpler in construction, and also has the advantage of having the hinge case, though all the hinges are on essentially the same principle.

The metal used for the springs in connection with double-acting butts, is usually steel, in which case it is advisable that the spring should be nickel-plated, to guard against rust. Phosphor-bronze is the best and most durable material to use, all things considered, though we are unable to state any
particular hinge in which it is employed. Some compositions of brass, bronze, etc. are used with varying success. The different hinges are generally made with but one kind of spring throughout, so that a choice in the metals is implied in a choice of a hinge. The metal is, however, nearly always steel, as just stated. The following table gives the retail prices of the spring butts and hinges previously described. For purposes of comparison, the figures represent the prices in each case of the size of hinge necessary for an ordinary door, from 3 to 1/14 inches thick; excepting, however, that the price for Figure 101 is for a light screen-door hinge. The hinges are in general made in a number of sizes from those for the lightest kind of screen-doors, to those required to move doors weighing several hundred pounds.

### TABLE OF SPRING-HINGES.—RETAIL PRICE PER PAIR.

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Name</th>
<th>Bunched or Duplicated Item</th>
<th>Nickel Plated</th>
<th>Brass Plated</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>Garden City single-acting</td>
<td>$0.60</td>
<td>$1.60</td>
<td>$4.80</td>
</tr>
<tr>
<td>100</td>
<td>Garden City single-acting</td>
<td>$0.75</td>
<td>$2.25</td>
<td>$7.50</td>
</tr>
<tr>
<td>101</td>
<td>Kenee's saloon-door hinge</td>
<td>$1.20</td>
<td>$3.60</td>
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</tr>
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<td>Garden City double-acting</td>
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<td>$6.00</td>
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<td>103</td>
<td>Empire spring-hinge</td>
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<td>Star spring-hinge</td>
<td>$3.00</td>
<td>$9.00</td>
<td>$27.00</td>
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<td>105</td>
<td>Crown spring-butt</td>
<td>$3.25</td>
<td>$9.75</td>
<td>$29.25</td>
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<tr>
<td>106</td>
<td>Chicago double-acting</td>
<td>$3.25</td>
<td>$9.75</td>
<td>$29.25</td>
</tr>
<tr>
<td>107</td>
<td>Champion spring-hinge</td>
<td>$4.25</td>
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<td>108</td>
<td>Jewett spring-butt</td>
<td>$4.50</td>
<td>$13.50</td>
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<td>109</td>
<td>Union spring-hinge</td>
<td>$5.00</td>
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<td>110</td>
<td>Torsion spring-butt</td>
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<td>$18.00</td>
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<td>Hero spring-hinge</td>
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<tr>
<td>112</td>
<td>Nickel spring-hinge</td>
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<td>113</td>
<td>Devore spring-hinge</td>
<td>$10.00</td>
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<td>114</td>
<td>Wiles spring-hinge</td>
<td>$11.00</td>
<td>$33.00</td>
<td>$102.00</td>
</tr>
</tbody>
</table>

1 We are unable to state any prices for these hinges, as they are not found in the Boston market. They would probably sell at the same prices as the Garden City Butts, Figure 100.

[To be continued.]

### Illustrations

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]"
LES BUSTES DE Mme D'ORLEANS ET NECKER PORTÉS À LA PLACE LOUIS XV.

1er 12 Juillet 1789

M. DE LAMBESC ENTRANT AUX TUILERIES, AVEC UN DÉTACHEMENT DE ROYAL-ALLEMAND

1er 12 Juillet 1789.
Building for Edwin C. Burt & Co.

Grant & Leonard Sts, New York

Del. Lien & Cordes, Architects
became quieter the place, now named no longer Place Royale, but Place des Vosges, was adorned with a bronze fountain which remained there till, just before the Revolution of 1830, another equestrian statue of Louis XIV was erected in the year 1829. This time the statue was of marble, and was the work of Dupaty and Cortot.

The day on which destruction overtook the great equestrian statue of Louis XIV in the Place des Conquetes, or de Louis le Grand, now the Place Vendôme, is by some given not as August 11, but as August 14, 1792, the day on which Louis XVI and his family were transferred to the Temple; and, further, that the work of destruction was going on as the carriage containing them came up and a halt was made that they might have full benefit of the sight and understand the love that their loyal lieges bore to the royal family and its belongings.

Later in his "Travels in France" [1898] says: "This colossal of brass is yet in the very place where it was cast; it is surprisingly great, being twenty-two feet high, the feet of the king twenty-six inches in length, and all the proportions of him and the horse suitable. There was 100,000 pounds weight of metal melted, but it took not up above 80,000 pounds; it was all cast at once, horse and man. Monsieur Girardon told me he wrought diligently, and with almost daily application at the model eight years, and there were two more years spent in the moulding and furnaces, and casting of it. The king is in the habit of a Roman emperor, without stirrup or saddle, and on his head a French large periwig à la mode. Whence this great liberty of sculpture arises, I am much to seek."

This statue which was the work of the sculptor Girardon was one of the largest bronze statues of modern times and it was all the more remarkable that horse and rider were cast in one piece by a Swiss founder, Jean Balihazar Keller. It was erected August 13, 1691. The pedestal which supported it was of white marble.

Although Girardon's statue of Louis XIV was very effectively destroyed, records exist which show the merits of this, one of the most famous of modern equestrian statues: first, there is a model some three feet high in the Louvre which is said to be exact and authentic; next, there was exhibited in the Palais du Trocadéro, in 1878, a statuette of cast-iron, gilded and damascened, which is not only interesting because it, too, is said to be a good miniature copy of the original, but because it is one of the earliest pieces of cast-iron work, at any rate of a sculptural character. It is the work of Maximilien Titon, an armorer who had a celebrated shop on the Place de Bastille; and because of his connection with the Government it was probably cast in the Arsenal, where was congregated all the knowledge and experience of the age in the matter of working metals.

In connection with Girardon's work, the story is told that he made and set up first another statue which was found too small for the site, and so was given to the Marshal de Boufflers, who subsequently gave it to the city of Beauvais, a gift which was received with enthusiasm by the young men of the city who went out to meet

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↑ From Claver's "Musee de Sculpture antique et moderne."
* From the Gazette des Beaux Arts.
it, and, during the last few miles of its transit, dragged it in trium-
phal procession with their own hands.

Another bronze statue, believed to have been made during the
existence of the original, is also known and varies only slightly from the
original.

There was also found in the cellars of the Louvre, which still
store many a forgotten treasure, a small plaster model of an equest-
rian figure clad in the costume of a cavalier of the period, and to this
has been assigned, on no very satisfactory authority, the name of Louis XIV.

RICHELIEU'S INSRIPTION FOR LOUIS XIII.

Pour la gloire de mon illustreMonte Carlo et tres-
invincible Louis le Juste, XIIIe du nom, roi de France et de Navarre.
Arreau Cardinal de Richelieu, son principal Ministre dans tous ses
affaires et grand esprit; Comble d'honneur et de bienfaits pour
et bienfaits pour tous les peuples de la Monarchie, lui a fait faire
ceste Statue: pour une marque éternelle de son zele, de sa fidélité, et
de sa reconnaissance, 1638, (repeated in Latin).

Sonnet by Jean Desmarests de Saint-Sébain of the Académie, en-
graved in Latin and French on the remaining faces of the pedestal:

Que ne de la vert, que ne peut le courage j'ai découvert. J'aimais l'héroïque en son fort; Du Tige imperieux j'ai fait trembler le bord. Et de l'Étoile j'eus l'Honneur accro mon héritage. J'ai sauvé par mon bras l'Europe d'esclavage Et, si tant de travaux n'eussent barri mon sort, J'osse attaqué l'Asie, et d'un pleur effort J'acce du Saint Tombeur venge le long servage.

ARMAND, the grand ARMANDE, Fame of mes exploits. Il m'a laissé m'y retourner et mes urnes Laix Et donna tout l'éclat aux rayons de ma gloire.

Enfin, il m'êce ce pompeux monument.
On, pour rendre à son nom mémoire pour mémoire.
Je veux qu'au mien il vive inaccesse.

DANIELLE VOULTRAINE, whose right name was Danielle Bolletta, was born in 1600 at Bordeaux. By her first marriage, with Jean Bolletta, she was the mother of Pierre de Voultraines, or Volland, and by her second marriage, with Jean Bolletta, she was the mother of Anne Bolletta. She died in 1661.

RICHELIEU'S EQUESTRIAN STATUE of Louis XIV, from an engraving by Nicolas de Largillière.

European. The works include the well-known monument to Cardinal Richelieu in the Sorbonne and a "Equestrian Statue* in the Gardens of Versailles.

MINERAL PRODUCTS—CANADA—TORONTO COURT-HOUSE.—QUEEN'S PARK, TORONTO.—THE ROYAL VICTORIA HOSPITAL, MONTREAL—A COMPETITOR FOR COMPETITION ON ACCEPTED DESIGN.—THE TRAFALGAR GYMNASIUM CONTEST, MONTREAL.—VANCOUVER.

The annual report upon mining and minerals of Canada for the year 1887 has just been issued, and furnishes us with some inter-
resting statistics of use of the mining industries of Canada.

The total value of the products all told is, in round numbers, about $15,000,000.

The following are some of the items taken from the alphabetical list:

<table>
<thead>
<tr>
<th>Product</th>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brick, thousands</td>
<td>351,581</td>
<td>$206,690</td>
</tr>
<tr>
<td>Building-stone, cubic yards</td>
<td>252,592</td>
<td>552,597</td>
</tr>
<tr>
<td>Copper, pounds</td>
<td>3,289,844</td>
<td>342,345</td>
</tr>
<tr>
<td>Lead, square feet</td>
<td>11,520</td>
<td>1,106</td>
</tr>
<tr>
<td>Granite, tons</td>
<td>21,217</td>
<td>142,590</td>
</tr>
<tr>
<td>Nickel, tons</td>
<td>504,903</td>
<td>146,193</td>
</tr>
<tr>
<td>Marble and serpentine, tons</td>
<td>304,895</td>
<td>9,223</td>
</tr>
<tr>
<td>Limes, bulkheads</td>
<td>289,677</td>
<td>264,503</td>
</tr>
<tr>
<td>Pig iron, tons</td>
<td>61,527</td>
<td>366,192</td>
</tr>
<tr>
<td>Silver, tons</td>
<td>7,507</td>
<td>8,000</td>
</tr>
<tr>
<td>Steel, tons</td>
<td>1,549,199</td>
<td>321,199</td>
</tr>
<tr>
<td>Tin, thousands</td>
<td>14,038,788</td>
<td>209,698</td>
</tr>
</tbody>
</table>

* Not fully reported.
all the drawings were rejected because it was agreed by the committee that none of them could be carried out for the stipulated sum of $200,000. The tenders for the buildings, those already accepted by the Committee, amount to $1,255,034, in addition to which an additional sum of $200,000, the cost of providing steam-heating, for which no tenders were received; also $25,000 for contingencies, and $75,000 for furniture and the architect's commissions, etc., making a total of $1,454,034. To meet this the Toronto and Montreal, where it will enter both cities by a less circuitous route than at present. Nearly all the land has been purchased and the required facilities from the city will be given, and we may hope soon to see those much needed reforms take place.

It will be remembered that in a former letter an account of the serious trouble existing between the city and the University of Toronto over the unfulfilled conditions on the part of the city, of their lease of the Queen's Park, which is the property of the University, and how, for a time, the lease was hopelessly cancelled by the University, thus depriving the public of the use of a considerable area laid out as a park and taking away two principal thoroughfares that happened to cross this property. The University authorities have certainly behaved well in the matter, and have succeeded in what they set out to do, to alter the provisions of their lease, and the energetic action of the mayor, terms have been arranged by which the Queen's Park will remain as it is for the rest of the lease. It is the opinion of the Committee that some expense of trouble has been expended naturally, time and money in legal advice, and so on, but it has finally agreed that the pending action of the University against the city shall cease. The following action of the University, the College of Architects, Corporations, shall be restored. All previous breaches of covenant on the part of the city shall be waived, and all existing street opening on the site of the original lease shall be allowed to remain without objection being raised on the part of the University. This secures again to the citizens for 970 years (the remainder of the term of the original lease) the Queen's Park as it is. The University is to devote its efforts to the two avenues where it has been absolutely necessary, as it is at present a main thoroughfare. And sundry clauses of agreement have been arranged, and the city has been thanked the University Corporation for their courtesy in allowing a settlement of the question on so amicable terms.

The Toronto Free Library has on its shelves some two dozen volumes of great interest recently "found" we are told by the Librarian. They consist of MSS. containing records in connection with the Government of the Province of Ontario, from its earliest days down to the present, and the Canadian Parliament.

These books were originally the property of a Mr. David W. Smyth, surveyor-general of the Province in those early days: they contain every property with which he was connected, and the plan is given of the city of Toronto and also the first known plan of any building in Toronto; namely, the house of this Mr. Smyth, with elevation in color and the plan of the garden and stables. But what is more, he has proved to the city that it proved to be a waste of money and the new plan for controlling the city to be arrived at, when, apparently, it was for them to dictate terms and in their power to demand what they chose.

The Toronto Free Public Library has on its shelves some two dozen volumes of great interest recently "found" we are told by the Librarian. They consist of MSS. containing records in connection with the Government of the Province of Ontario, from its earliest days down to the present, and the Canadian Parliament.

The Toronto Free Public Library has on its shelves some two dozen volumes of great interest recently "found" we are told by the Librarian. They consist of MSS. containing records in connection with the Government of the Province of Ontario, from its earliest days down to the present, and the Canadian Parliament.

Mention of Vancouver, reminds me that it is the youngest city of the Dominion, and a child of great promise it appears to be. Four years ago it had no existence. In July, 1885, it had a population of 1,290, July, 1888, that had increased to 3,900 which leads some statisticians to hazard the remark that by July, 1889, the population will be 29,000. It certainly has a great future before it. As the terminus of the Northern Pacific Railway and the Panama Canal, it is a city of great importance. In connection with Canada, China, India and Australia, it ought to rise rapidly and in time become a very important city. In connection with this I may mention that I found on the Lakes, the inland port in the route from east to west, mentionable after the last great change in improving according to this morning's papers. It is stated "owing to the increased traffic on the Main Street, the Town Council have decided to make a proper condition the street along the east side of the river," etc., this ought to be of considerable progress.

DURING the past season several extremely heavy buildings have been completed, in the city of Toronto, with very good results, in their footings and foundations one cannot but be impressed with the changes that have taken place during the last ten years in this branch of building.

Owing to the fact that the soil under that part of the city where the heaviest buildings have recently been erected is unusually poor for heavy foundations, probably more experiments have been made and more careful experiment made in this city than in any other part of the country together. In general way the soil in this part of the city may be said to consist of three strata, of which the first is sand for a depth of some eight or ten feet. This sand is generally quite clean and fairly sharp, of yellowish color, and evidently a deposit formed under the water when in some, not very remote
ADALPHIA

A PLEA FOR EXPERT ADVICE IN DECIDING COMPETITIONS. — THE DREXEL BUILDING. — THE INCREASING USE OF STRUCTURAL IRONWORK.

It is not to be supposed that the complete satisfaction given to everybody connected with the Art Club Competition recently brought to such a successful close by Professor Ware will change at the existing system of holding competitions in Philadelphia. The architects can do much, however, by taking a firm stand in the matter at the first opportunity. No competition, as such, can be started for the building public, and from these architects who rely on their powers of persuasion rather than on their powers of design; but one can easily see what immense good would result to the city if invited architects would refuse positively to go into any competition not based upon expert judgment. This Utopian method of deciding on the relative merit of designs submitted in competition will be slow of adoption and will be resisted by laymen, but it is the only way to have a high opinion of its own judgment in such matters. In America people are in the habit of criticising a new building with as much assurance as though it were a new book. In the case of a book the average American's opinion would be worth something. He has grown up among books as he has among buildings, but with this important difference, that, whereas the buildings lie he is obliged to see for the most part, he may or, at least, will never, without merit, it will be clear to himself what the books he reads shall be of the best or of the worst that the world has ever produced. Ignorance of the classics of literature is more or less a matter of choice; to know the classics of architecture is for every American to have time and money in plenty. When we consider that besides this the amateurs of architecture are comparatively few, it is all the more surprising that men, even sensible, hard-headed business men, who would not be willing to stake much on the correctness of their judgment as literary experts, have of late adopted the plan of holding competitions for important buildings, and appointing themselves judges of the designs, when so far as the probability of their choosing the best design is concerned, a jury of shoemakers would be quite as likely to choose the best out of half-a-dozen landscapes, or a congress of dentists decide on the merits of a steam engine. The folly of this kind of decision becomes all the more apparent when the other requirements of the competition are subordinated to the usual "handsome front" clause of the programme. But it is unprofitable to speculate as to what kind of de- sign the least effort will be judged by laymen, and this discussion on the harrowing subject of competitions would be unprofitable if we were not for the hope that some architects may be found willing to demand the simple right, one that is not accorded, but insisted on by the public in all professions and arts except architecture — the simple right of having their designs judged by experts. When this ideal state of affairs shall have come to pass that corporations about to build shall put their work into the hands of some architect of established reputation, or shall call in an expert to aid their judgment by pointing out in the competitive designs the merits and defects that only a professional would notice, as the building was under design and not before, and that such competitions in which the architect's judgment is not blurred by the influence of circumstances where the award is made to the man who has the strongest "pull."

Some months ago, in speaking of the causes that led to the dissolution of the Knights of Labor, I had occasion to mention the immense amount of marble used in the Drexel Building. This is one of the latest of Messrs. Wilson Bros, & Co's works. It is just completed and as it is the largest building of its kind in Philadelphia, a notice of some of the special features of its construction will not be out of place. In size it is very nearly the same as the Equitable Building in New York, covering rather less ground, but being three stories higher. The plan is like a huge letter H, and the dimensions — according to the Public Ledger, which is authority for many of the following points as well — one hundred and forty feet by two hundred and sixty, and there are in addition two smaller buildings, a basement story, ten other stories and an attic, bringing the roof to a height of one hundred and thirty-five feet above the pavement. On the west is Fifth Street, on the north Chestnut, and on the east and south Custom-House Place and Library Street. In the middle of the Chestnut Street front (the upper half of the "H")

the year have been practically the same as during the last few seasons, we have the pleasing surprise to find that a new scheme entirely new scheme tried, for every one is on the lookout to see if something still better and at the same time less expensive is not possible.
stands the Independence National Bank, occupying the only part of the block not owned by Mr. Drexel, who has torn down to make room for his new building, the Law Building, as well as the old Philadelphia Library, and the old post-office, the quarters of the last two having been swept farther up town by the irresistible westward tide of business. The space below the cross of the " **suit** " building corresponding to that occupied by the Independence Bank is left as an open court.

The effect of the Chestnut Street front is somewhat marred by the little bank tucked in between the two towering marble wings of the Drexel Building, more especially as, owing to some disagreement about the terms on which light might be taken for the new building above the bank roof, there are no windows in the marble facing of the party wall.

That such a large building should have been finished so quickly as this one is almost phenomenal, for it was only seventeen months ago that the work of excavating was begun. The unusually open weather of the first part of last winter was of the greatest help, as was the narrow covering-in and heating of the building during the progress of the work, but a new method of construction — almost unknown before in this city — should have the largest share of the credit for the greatest amount of light and room, the windows were made as large as possible, and the piers as small. Up the middle of each pier runs an iron column, and on these columns rest the floor girders, so that the masonry has nothing but its own weight to carry.

The four largest ( **arake** ) spaces on the south side of the country were kept busy during the work, but even they could not supply material fast enough, so that the building would have been seriously delayed if it had not been possible to go on with the iron framing and masonry as the work proceeded.

In fact, the floor beams were in position four stories higher than the top of the walls. The south-east corner of Fifth and Chestnut Streets was, and still is occupied by the banking-house of Drexel & Co. It was desired to incorporate it in the new building, and this has been done with the utmost success, from an engineer's as well as from an architect's point of view. The ceiling of the banking room reaches the fifth floor of the new building, and the problem was to support the six upper floors and attic of the latter on top of it. Girders of sufficient strength would have been greatly in the way, and no columns could be set up in the banking-room without being a serious disfigurement.

The floors above are, therefore, held up by enormous trusses, running up through four stories, where they help to make partitions between the offices. The iron boxes on which the ends of these trusses rest are, to be sure, on the side, and not in line with the banking-room wall, but as they were put up at night and after banking hours in the daytime, their erection in no way interfered with business, and their covering of colored marble makes them rather an interesting feature than an eyesore.

The rooms above the Board of Trade room (which is on the second floor of the eastern wing) are supported in the same manner. In the new building for the Provident Life and Trust Company, by the way, that is just begun a little farther down Chestnut Street, Mr. Farnsworth adopted a similar method of construction, where a higher truss even than this, the shape of the lower part of a letter "A" holds floor upon floor supported from its upper.

In spite of the enormous advantages that the modern use of iron gives to the architects of to-day in such cases as this, so that, as in the case of the Combination Building, we may have, with a comparatively limited ground area, four buildings, each consisting of a solid core, and without an ounce of combustible material in their construction, it is to be doubted whether this increasing use of constructional ironwork is an unmixed blessing. As to its artistic effect, it will certainly be hard in the future, if experiment continues to open to us new combinations of ironwork, to design a building that shall be really good if we are to keep getting the stone shell of it divided into smaller and smaller piers at the base, and the building itself towering higher than ever before.

Perhaps it is not too conservative a wish to hope that the same causes that have led the Pennsylvania Railroad management to divide the height of the future, to the immense relief of people who have the slightest regard for landscape beauty, will bring about the abandonment of the wholesale use of iron in our city buildings.

In the free library at the Sheppard Asylum, the public is welcomed at any time by the graceful figure of Miss E. C. Brown, available to instruct the public in the use of the written word, and to point out the ways and means of acquiring that valuable instrument of personal improvement. The reading room is large and commodious, and the books are a valuable addition to the public library.

The building, of stone and brick, is about sixty years old, having been erected in 1809. The rooms are light and airy, and the interior is in good taste, with an agreeable combination of the severe dignity of the old classics and the comfort and convenience of the new.

The collection of books is not very extensive, but it contains a variety of subjects, such as history, biography, travel, art, music, and science, and is well arranged for easy consultation. The library is open daily from 9 a.m. to 5 p.m., and is under the charge of Miss Brown, who is an intelligent and capable instructor. The library is free to all, and is open to the public in the daytime.

The building is situated on a corner lot, and is of two stories in height. It is of brick, with a stone basement, and is in good repair. The windows are large and well-let, and the light is good. The rooms are spacious, and the furniture is comfortable.

The library contains a large collection of books, mostly on literary and scientific subjects, but also including a few on art and music. The books are arranged in a convenient manner, and are well catalogued. The library is open daily from 9 a.m. to 5 p.m., and is under the charge of Miss Brown, who is an intelligent and capable instructor. The library is free to all, and is open to the public in the daytime.

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TRADE SURVEYS

Merxton has been made of the rapid utilization of artificial fuel in the manufacturing establishments of the country. Quite a competition is in progress between them. There are ten or twelve methods in use, all of which are based on the same valuable principle, but vary in specific gravity, in the method of mixing and handling, in the fuel and illuminating gas produced, in the size and number of the plants, and in the quantity of coal fired and the amount of gas manufactured. The average charge for gas is 75 cents per thousand cubic feet, and the price of artificial fuel ranges from 3 cents to 5 cents per gallon. Within a year the cost has been reduced to 2 cents, and the products have been greatly reduced, and the price and consumption of coal have been reduced by still further reducing it. Another interesting feature is that artificial fuel is not only a source of revenue, but also a factor in the cost of the price of manufactured goods in the country. In a comparatively short time ten manufacturing concerns within a radius of a hundred miles have been organized, and a pipe line has been laid a distance of five miles, and is the largest in the world; this pipe has been laid in the city of Pittsburgh. Another line has been laid from Murmann to a distance of several miles where it has been joined and twelve steel pipe have also been laid. A twenty-five pipe, twelve miles long, connects another line with a town called Graven, which produces iron, is the steel iron, and industrial central. Two ten-inch pipes have just been laid across the Alleghany River, near Pittsburgh. By the year 1870 another company has been organized to extend the city of Philadelphia, where they will have to be laid at once to reach the nearest manufactur- ing centers, there is no declining tendency. The cost of labor in nearly all industrial centers will be reduced by the use of artificial fuel. The cost of iron, steel, lumber, petroleum, leather, coal and wood products will be reduced. The manufacturers have been reduced by the use of this product, and the tendency of artificial fuel to push the prices of manufactured goods to the point of depreciation, has been reduced.

The railway companies are coming in and railroad companies are in a position where they will be able to place large cars at the demand of the company. The railroad situation is better upon the surface than beneath it. The gross earnings are large, but the net earnings are small. The bills have been increasing for three months to so manipulate stocks and railroad returns, as to induce the outside public to have in and seek to buy. They have accepted the invitation to speculate this fall by the outside public. A good deal of mercurial arises on account of the modern customs. The long run of prices will be controlled by the great institution, in the fulfillment of its mission, will make them less unhealthy.

THE AMERICAN ARCHITECT AND BUILDING NEWS. [Vol. XXIV. No. 699.]

NOTES AND CLIPPINGs.

Under Ground Four Miles to the Theatre. — In some countries it would seem strange for a party going to see a theatrical entertainment to make a dive into Mother Earth, travel four miles under the mountains, and then dart up to the surface within a stone’s throw of the ticket office, but it is after such a fashion that some of our people go to their regular dose of drama, comedy and art. Last night a party of friends from the city on their return home, discovered some notoriety. The "Two Johns" at the opera-house, took the subterranean cut. Starting at the mouth of the subway tunnel, at their own door, they came up the tunnel to the C. and C. shaft, a distance of a little over four miles. Dismounting from the cars they then boarded the cages in the shaft and ascended to the surface in the cage, a distance of a little over two miles. This way of going to the theatre is as much fun for our ladies as going to a picnic. It is really a pleasure, but until a lady has become accustomed to life in the mines it requires a little nerve. The air is fine and cool the whole four miles under ground. The cars will not soil even the most delicate dresses of silk and satin, therefore there is no trouble of changing clothing. In her room at the mouth of the tunnel a lady may stand before her mirror and give the finishing touch to flower or feather, and in just such shape as she turns from her glass she is shot up in the surface in this city, ready to take her seat in the box in the opera-house. — Virgin City Enterprise.
The Dececo Goods.

A Plumber's Opinion as to the Puro Wash-basin, and his estimate as to the comparative cost of the DECECO CLOSET.

PERSONAL ATTENTION TO SANITARY WORK.  
JOHN WORTHINGTON, PLUMBER AND GAS FITTER,  
No. 1721 CHESTNUT STREET.  
Plans Prepared for Drainage and Ventilation of Drain and Soil Pipes.  

PHILADELPHIA, Oct. 6, 1888.  

THE DECECO CO.  
Gents:—After using the Standpipe Overflow Basins amongst our best work, we concluded,  
on examination of the “Puro” basin, to give it a trial, and we are convinced of its superiority for the  
following reasons:—  
First. It is without any regulating screws.  
Second. The strainer is in the standpipe, and is vertical in place of horizontal, thereby avoiding  
chokage from lint, which will sometimes catch upon the strainer.  
Third. The working parts being below the opening of the waste outlet, it is necessarily  
cleansed each time the waste discharges; also the opening is much larger, giving quicker vent and  
scouring of trap and waste.  

In respect to the difference of average cost between Dececo closet and tank and washout closet  
and tank, in answer to your query, I reply that we consider the difference in favor of the Dececo closet.  
The prices are—Dececo and tank, $41.50. Washout and tank, $40.00. But in fitting up the  
Washout closet we are compelled to provide the anti-siphon pipe for trap, which increases the cost on  
an average of about $5.00 per closet; this work is never necessary in connection with the Dececo  
closet, hence it is the cheaper of the two by three dollars and fifty cents ($3.50).  

After having used about two hundred of the Dececo closets, we would always give it the pref-  
eration, even if the difference of cost were not in its favor, as it has given universal satisfaction, satis-  
fying even those who were never satisfied before.  

Yours truly,  
J. WORTHINGTON.  

The Dececo Company,  
12 High Street,  
NEWPORT, R. I.
the condition that "the income and the principal is to sustain the institution."

The whole amount of the estate realized was something less than $36,000. The difference between the expenditure and the income paid, has been about $24,000 per annum, all of which has been expended in the purchase and improvement of the property, and the erection of the buildings. In 1858, a farm of three hundred and seventy-seven acres, about six miles from the city on Charles Street Avenue, was purchased for $70,000, and there has since been expended on the buildings, and improvements of various kinds, $79,699. The first stone was laid in 1862, and the last brick on the main buildings in 1879. In addition to this, a separate building has been erected for the water-tower, heating, ventilating and laundry purposes, communicating by a large tunnel with the main building in all parts of the building, in which are placed all the necessary pipes, radiators, etc.

The Asylum proper consists of two buildings separated by about one hundred feet of open space, each a building of 25,600 square feet and each three full stories and basement in height, designed for the separate accommodation of the two sexes. It is claimed that the buildings are as fireproof as iron stairways, brick-sashed ceilings, steel doors, etc., on make them.

The work has reached the point towards its final completion when the plastering and flooring is about finished. All the woodwork fitting-up of the interior remains still to be done, also all the details of heating, ventilating, plumbing, draining and lighting. It is maintained, too, that what has already been accomplished is much more thoroughly done, and is the best possible of its kind, both as to the materials used and the refusal of such as have not been more than under the conditions of a fixed and limited annual expenditure. The possibility of hastening active operations by borrowing, and allowing all the state one wing was taken into careful consideration, but finally abandoned as not advisable; and it is now stated that it will require about four years' additional income to complete the entire scheme. So that a review of the entire undertaking and all the facts, it appears that the institution will be ready to enter upon its good work with an invested endowment of considerably over half a million of dollars and with donors and friends representing nearly twice that amount.

For a long time its roofs and towers have been familiar and interesting features in the landscape. Having grown so slowly, its more immediate surroundings, its gate lodges, its drive-ways and its shrubbery, have grown around and with it, have lost all look of crude newness, and almost seem to be old landmarks. Only the idleness and loneliness about the place seems unnatural and weird, but perhaps not more so than, when in the future, it will become a busy and attractive spot, a steeply-travelled center, but, let us hope that this great institution, in the fulfilment of its mission, will make them less unhappy.

NOTES AND CLIPPINGS.

Under Ground Four Miles to the Twin Cities. — In some countries it would seem strange for a company going to see a theatrical entertainment to actually go to the theatre, and then get into Mother Hubbard's closet, travel four miles under the mountains, and then dart up to the surface within a stone's throw of the ticket office, but it is after such a fashion that some of our people go to their regular dose of drama, comedy and tragedy. Last night a party of ladies and gentlemen of the town of Sutro, who wished to see "The Two Dobs," got into a car on the St. Louis and San Francisco railroad at the Sutro tunnel, starting at the mouth of the Sutro tunnel, at their own doors, they came up the tunnel to the C. and C. shaft, a distance of a little over four miles. Disembarking their luggage on the last step of the platform they stepped on the escapes in the shaft and were shot upward to the surface, a vertical distance of 1,040 feet. This way of going to the theatre is as much fun for our ladies as going under ground in a mine or in a tunnel is for any miner. The ladies have become somewhat accustomed to it in the mines it requires a little nerve. It is fine and cool the whole four miles under ground. The cars will not stop at any station, but move through the mine without a break, and no trouble of changing clothing. In her room at the mouth of the tunnel a lady may stand before her mirror and give the finishing touch to flower or feather, and in just such a shape as she turns from her glass she is shot up to the surface in this city, ready to take her seat in the box in the opera-house. — Virginia City Enterprise.

TRADE SURVEYS.

Mention has been made of the rapid utilization of artificial fuel in the manufacturing establishments of the country. Quite a competition is in progress between the different manufacturing cities, to see which of them are most successful in the use of artificial fuel and those who are using them in the most economical manner. The statistics of the consumption is very considerable, but the consumption of artificial fuel in the foundries of Chicago and the other large manufacturing cities is much larger than in any other city. The consumption of artificial fuel in the iron and steel foundries of the country is, however, much larger than in any other city.

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After having used about two hundred of the Dececo closets, we would always give it the preference, even if the difference of cost were not in its favor, as it has given universal satisfaction, satisfying even those who were never satisfied before.

Yours truly,
J. WORTHINGTON.

The Dececo Company,
12 High Street,
NEWPORT, R. I.
DESKS AND TABLES.
The American Architect and Building News. 

Vol. XXIV. 

October 27, 1888. 

Entered at the Post-Office at Boston as second-class matter. 

THE NEW YORK TIMES has recently published an editorial article upon the price of iron beams, which shows the severity of the tax paid by American consumers of these all-important structural members, partly through tariff legislation, but much more through the combination of manufacturers, less forcibly than it deserves. The duty upon rolled-iron beams is now a specific one, of twenty-eight dollars a ton. This the Times calls equivalent to an ad valorem duty of eighty per cent. In Belgium, it is nearer one hundred and fifty per cent, as is easily shown. The latest quotations we have at hand for rolled-iron beams, "fers à planchers," in France and Belgium, date from the latter part of September, 1888. In these the French current price for such beams is given at thirteen francs per hundred kilograms, or a little over fourteen dollars per ton. One hundred and sixty pounds equal three-quarters of a ton, and one ton is one hundred and twenty pounds, or a ton and twenty pounds. This, reduced to American standards, is eighty-four hundredths of a cent per pound. We do not know whether the United States Custom House calls a ton two thousand or twenty-two hundred and forty pounds. If the former is the rule, the duty of twenty-eight dollars a ton amounts to one hundred and sixty-seven cents per cent on the original cost of Belgian beams; if the import be reckoned on the "long" ton, it is about one hundred and fifty per cent ad valorem, the average being nearly double what the Times calls it. It is understood, of course, that we have nothing to say of the propriety or impropriety of imposing such a duty. That is a question of the development of native industry, with which we have nothing to do; but while the matter is under discussion it is important to have the facts correctly stated. The Times further mentions that, as we all know, the American rolling-mill combination has fixed the price of its beams at three and three-quarters cents per pound, or about four times the cost of similar beams in Belgium, and that, after paying duty, freight, insurance, brokerage and charges, the foreign beams can be delivered in this country at about six-sevenths the price of those rolled here. It seems to this writer, an accurate, if a year is rarely stated, in the mills, take, many tons of them being used in the seaports cities every year. They are easily distinguished, being, as a rule, less care-fully rolled and smoothly finished than the best American beams, and may be found in many new buildings by those who are curious enough to look for them.

GOOD illustration of the worthlessness of official inspection of buildings is to be found in the report of the inquest on two workmen who were recently killed by the fall of the fifth floor of a building in New York, upon which they were at work. The first witness called was the deputy su-

spector in charge of the district, who testified that he went every other day to the building where the accident occurred, and that ten days previous to the accident everything was going on properly. The coroner appeared to know something about the work on the day of the catastrophe, and questioned him, when it appeared that he had two hundred and ninety buildings to inspect, and that he only gave a hasty look, two or three times a week, at each building. Although it is obviously impossible for any man to see much of what is going on in two hundred and ninety buildings at once, the New York inspectors acquire a remarkable quickness in judging of what they do see. Another inspector, being called in the same case, testified that the fall was caused by piling too many bricks on the upper floor. The foreman doubted this, and ascribed the accident to the "jarring" caused by the hod-elevator; but by further evidence it appeared that the hod-elevator had been hired by contract, and the contract, of course, expired that day, so that it seems altogether probable that the last moments of the lease were utilized to hoist as many bricks as possible to the upper floor, and that the inspector's surmise as to the result was the correct explanation of the accident.

REMARKABLE, not to say suspicious, story of archaeological discovery comes from Saba, the ancient Sidon, in Phoenicia. According to the narrative, which La Semaine des Constructeurs quotes from the Bosphore Egyptien, a certain M. Durighello was recently digging in the ruins of Sidon, when he came suddenly upon a wall, buried several metres below the surface of the earth. There was nothing whatever on the surface to indicate that anything of interest lay beneath, but M. Durighello, pursuing his investigations, came upon a door in the wall, which had been blocked up with masonry, and, on being cleared, admitted him to a very strange and curious place. He found himself in a long corridor, in the floor of which were inlaid the figures of war-like warriors, and other figures of the worshipers, had built up the door, no one had entered it until M. Durighello's good fortune had brought him to it. On breaking through, he found himself in a long corridor, partly filled with earth which had fallen in from above, and lined with niches, in which were fourteen marble statues, representing twelve of the principal Phoenician gods, and two of their supernumerary worshipers, the explorer passed through the corridor, and found himself in a "circular hall," covered with a polygonal dome, springing from twenty-four coupled columns. In front of each pair of columns was an altar, and by each altar a sort of marble bed-stead. The altars were ornamented with the figures of the zodiac, sculptured in low relief, and on the walls, between the pairs of columns, were represented scenes very inappropriate to the stern military vogue enjoin upon the disciples of Mithras. Around the room were scattered candelabra, in marble and bronze, of wonderful beauty, and the floor was paved in mosaic and colored glass, flowers, which the explorer stood up a gigantic bull of marble, with horns covered with gold plates, and in front of the bull was a staircase, which led down, through a narrow opening, to seven consecutive subterranean apartments, each of which was a little smaller than the preceding one, while the walls of all were almost completely covered with statues, and ornaments of marble, ivory, silver and gold. It is clear, necessary to add that a choice selection of these objects is now on exhibition in Paris, and that a wealthy amateur might possibly be able to secure specimens. So far as architects are concerned, while few of them could afford to buy such costly miniatures, they may pay something for information as to how the priests of Mithras managed to construct a "vast polygonal dome" underground, without attracting the attention of the "Roman police" on the surface, or how the excavated material was disposed of without the knowledge of the same vigilant officers.
further north, has already been surveyed. Although constructed for military purposes, the railway will likely be utilized by the country practically, and under the military administration some experiments have been made in irrigation, which show portions, at least, of the arid country through which the road passes to be capable of extraordinary fertility. Near some of the rivers, where systematic irrigation has been carried on, nine crops of clover are obtained annually, and cereals produce a hundredfold. Although the ties, as well as the rails, tools, rolling-stock and a part of the provisions consumed by the workmen, were brought from Russia, the construction was pushed with great economy, as well as rapidity, never to be forgotten in the engineering annals. While the total average cost of the line, including land damages, track, stations, rolling-stock and other equipment, and telegraph line, having been only about twenty-six thousand dollars a mile. One of the most serious items of expense was for the provision of a regular and sufficient water-supply in that desert region, for all the stations, repair shops, and workmen’s settlements, but everything was done in the most thorough manner, all the stations, as well as the barracks for the military guard, which were necessarily attached to the stations, being built of stone. The method of laying the track was devised with great ingenuity and economy, and was so prepared that a permanent construction train was arranged, conveying two crews, each consisting of four or five hundred native laborers, with a hundred and fifty soldiers to act as guards and overseers, and fitted with sleeping berths, kitchens and hospital cars, travelling blacksmith and machine shops, and provisions, all conducted by the system of five or six car trains, and supplied with the water which served as the dwelling of General Annenkoff and his suite. Every five or six miles a siding was built, and when the day’s work began, the construction train was transferred to the siding, to make room for the track-laying train, which was pushed to the extreme front of the line. The track-laying train consisted usually of nine platform cars loaded with rails, eight loaded with ties, four with spikes, fish-plates and other accessories, and a dozen or so with material for stations and bridges, and provisions and water for the workmen; the whole being just sufficient for a mile and a quarter of track. The trains were loaded at the supply-stations on the finished part of the line, and sent forward at regular intervals, and three of them were often required in a day. In order to unload them quickly, and with the least loss of time in handling and transporting materials, General Annenkoff, after some experience with the usual method, of taking the rails and ties from the siding, had the rails piled on a platform, the ties on another, carrying them on carts, or on the backs of camels, and transporting them to where they were wanted, equipped all the cars carrying ties and rails with runways on each side, fitted with rollers, and nearly meeting at the ends of the cars; so that the rails and sleepers, instead of being thrown overboard, and picking up again where wanted, were simply shifted to the runways, and rolled rapidly forward to the front of the train, where they were immediately taken, or taken on the tracks, if required, and carried to some point in advance.

The work of preparing the road-bed for the truck was carried out mostly by native workmen. With the true Russian tact in managing barbarians, General Annenkoff contrived to get very good service from the half-savage Tartars of the country at a cost of about ten cents a day per man. His first step was to establish confidence by paying the men their wages at the end of each day. As few of them had probably ever been taught to keep a check on their expenses, it was necessary to bring them to this point with tact rather than with less attractive, and he found no difficulty in keeping a force, amounting sometimes to thirty thousand men, contented and industrious. As with all savages, however, he found it necessary to allow the nomads to carry earth for the embankments in bags or rude buckets. Any endeavor to persuade them to use more efficient conveyances would have been prohibitive on the ground, and he was wise enough not to attempt it. It is said that the engineers of the Mexican Central Railroad, observing that the Indian workmen moved material for the embankments by carrying it in baskets on their heads, sent North for wheelbarrows, intending at first to give them to the Indians, but later, instead, letting the men. The docile natives received the wheelbarrows gratefully, but insisted on using them as baskets, filling them with earth, hoisting them with great exertion on their heads, and carrying them to the place appointed for depositing their burden. The less amiable Tartars would have been likely to mount their camels and desert their work in a body on the appearance of so offensive and unprecedented an object as a wheelbarrow, and General Annenkoff was able to comfort himself with the low rate at which his labor was purchased for the lack of scientific economy in using it. The cheapness of labor enabled him to try an experiment, which is worth remembering by those who are obliged to carry out such work rapidly, in the establishment of a reserve force of men who could be kept on hand and ready wherever they might be wanted, to supplement the work of the regular crew. In carrying out an extensive piece of construction, both economy and rapidity depend greatly upon the certainty with which all parts of the work are kept along together. In the ordinary character of this kind of work it is continually interfered with by sickness or desertion among the men in one crew or another, or by miscalculation as to the difficulty to be met with, or the time to be occupied, in some portion of the work, and one crew often cannot be restored to efficiency at the expense of the others without discrediting the whole system of operation. To keep a few men in readiness to take the places of absentees, or to strengthen a crew inadequate for its duty, would often be a wise economy, but the reluctance of employers to maintain men in idleness to provide against the possibility of their being needed is so great that hardly any one but a military engineer would have thought of it.

The Scientific American mentions that some experiments have recently been made at Alessandria, in Italy, to test the effect of colored light upon the insane. It has long been known that a free exposure to sunlight or diffused daylight is very tranquillizing to the nerves, but the physicians at the Alessandria asylum have gone farther than this, and distinguish between the effects of different colors in the light. Rooms were selected in the asylum, having as many windows as possible, and the sashes were filled with glass of various colors, the walls and woodwork being painted to match the glass. A patient suffering from melancholia, who refused to eat, was placed in one of these rooms, with the windows of bright red. After three hours’ exposure, besides to this influence, he became cheerful, and asked for food. This, by the way, is a more significant circumstance to a physician than it would be to a layman. Most of us would say that any one, sane or insane, locked up for three hours in a room of any color, would be ready for some food at the end of that period, and would show a certain cheerfulness at the prospect of getting it; but with the insane whose malady begins with melancholia, the refusals of food is the earliest and most common, as well as most dangerous symptom, and is generally persisted in until nourishment has to be administered by force, so that the removal of this symptom is a highly and spontaneous desire for food, in such a patient after a no more heroic treatment than a few hours’ exposure to a certain kind of light, is certainly a fact worth recording in the annals of medicine. As a further test, another melancholy patient, who always kept his hands over his mouth to show he did not want food and walked about in a semicircular motion, was placed in a room painted entirely of the same color, and soon began to improve, and the next day had so far forgotten the hallucination which condemned him to self-starvation that he ate with a hearty appetite. Another patient, a violent maniac, was placed in a blue room, and became quiet in an hour; while a fourth was completely cured after passing a day in a violet-colored room. It is a pity that the accounts of the experiments are so meagre, but we may hope that they will be continued, and facts accumulated, until some reasonably safe inferences can be drawn from them. Although the medical journals attribute the improvement of the patients rather to the effect of the colored lights, produced by this process of distraction, which distracted their attention for the moment from their own fancies, it is by no means unreasonable to suppose that the color may have been directly connected with the result in each case. Apart from the soothing effect of light of any kind, we know that the color sense may be the medium for the production of strong impressions as a power of association. When the present state of the art of color study is developed, the sight of a beautifully colored object excites, not mere intellectual pleasure, but a convulsive appetite, which is more than half physical, and pursues its object as selfishly and impatiently as the other instincts of the senses. In fact, the desire of color is the difference of a condition of the body in which gratification yields such intense pleasure that one can perhaps understand the sort of nourishment which the diseased mind might obtain from it, and see how strong doses of one color or another might prove useful where the condition of the recipient mind was so disturbed as to be incapable of appreciating perfect harmony.
BUILDERS' HARDWARE.—X.

DOOR-SPRINGS, CHECKS AND HANGERS.

The simplest form of door-spring is a straight spiral coil of wire attached to the door and to the jamb, and drawing the door shut by a direct pull.

Such springs, of course, are used only on common work, though occasionally a spiral spring is used for gates in store-counters and railings, the spring being quite fine and long, and attached to the outside of the gate so that when the gate is closed the spring lies flat against it and does not show. The plain spiral spring is also a feature of many of the so-called door-checks; but in the line of springs which simply draw the door to there are several forms which are more convenient to use. Figure 116 illustrates the "Star" spring, manufactured by the Van Wagoner & Williams Company. In application one end is screwed onto the door near the jamb, and the other onto the jamb itself, the spring being at an angle rather than strictly vertical, and inclined towards the latch of the door so that when the door opens the spring acts both by resistance to compression lengthwise and by the uncoiling effect of the wire. The spring can be tightened in the same manner as the spring butts previously described, by turning the upper spindle to which the spring is attached, the pin A holding the spindle in position. Figure 117 illustrates another form of door-spring not unlike the foregoing in principle, though in this the spring acts entirely by its resistance to a twisting strain. In the cut, the lower screw-plate and hubs are shown drawn slightly away from the spring spindle, so as to expose the ratchets which hold the spring at any desired tension.

Figure 118 is a very strong form of direct-acting spring, intended to be used on fire-engine-house doors. As shown by the cut, the spring would force the door open, which, of course, is the intention in an engine-house; but the same principle could be applied to springs which are to close a door.

![Figure 116. Star Door-spring, Van Wagoner & Williams Co.](image)

![Figure 117. Reliance Door-spring, Chicago Spring Co.)](image)

![Figure 118. Engine-house Spring, J. B. Shannon & Sons.](image)

The spring is tightened at the bottom, and the upper lever-arm works through a staple and pulley-wheel on the door.

For light screen-doors a spring is sometimes used which acts by the twisting strain or torsion of a single steel rod, Figure 119. The two side pieces, A A, are screwed to the jamb. The upper flange is fastened to the door and has a catch fitting into the ratchets of a drum attached to the rod. As usually applied, the rod is not strictly vertical, but is at an angle with the door jamb, so that when the door is opened the rod is subjected to both a torsion and a bending strain. If the rod is well tempered, the bending strain, of course, gives it an added efficiency. Figure 120 is a form of torsion door-spring which is attached to the door, and is operated by means of a bent, hinged-lever fastened to the door-head. It is asserted that this spring has its greatest power just as the door is opened, and that the strain in the rod diminishes as the door is swung around.

The following table gives the average prices of the door-springs described:

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Name</th>
<th>Laminated Spring</th>
<th>Nickelised Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>116</td>
<td>Star door-spring</td>
<td>$1.15</td>
<td>$1.20</td>
</tr>
<tr>
<td>117</td>
<td>Reliance door-spring</td>
<td>$1.90</td>
<td>$2.00</td>
</tr>
<tr>
<td>118</td>
<td>Engine-house door-spring, 24, 30 &amp; 36-inch</td>
<td>$3.00</td>
<td>$3.50</td>
</tr>
<tr>
<td>119</td>
<td>Terry door-spring</td>
<td>$0.20</td>
<td>$0.40</td>
</tr>
<tr>
<td>120</td>
<td>Peabody door-spring</td>
<td>$0.25</td>
<td>$0.30</td>
</tr>
<tr>
<td>121</td>
<td>DeVere door-spring</td>
<td>$0.25</td>
<td>$0.30</td>
</tr>
<tr>
<td>122</td>
<td>Warner door-spring</td>
<td>$0.25</td>
<td>$0.30</td>
</tr>
</tbody>
</table>

*Not found in Boston market.*

The principle involved in a reverse-acting spring butt, which has been explained in a previous chapter, can be applied to simple door-springs. Figure 121 shows a form which is made by the Freeport Hardware Manufacturing Company. This spring has a uniform tension, holds the door firmly when closed, and when the door is open about 120 degrees, the force of the spring is reversed and will hold the door open. Another advantage of this form is that the spring is easily un-
DOOR-CHECKS.

A door-check is understood to be anything which will hold the door either open or shut, or which will keep the door from slamming when closed. All the door-checks in the market are combined, directly or indirectly, with some form of door-spring.

In some cases the spring is a part of the check, but more often the spring is a separate fixture, and is used as an auxiliary to the action of the check. One of the simplest forms of door-check is that shown by Figure 123. This consists of a strong band or spring of flexible steel which is attached by a proper holder to the head of the door-frame, so as to project about half an inch below the softits. The door, in closing, catches on the shoulder at the end of the spring, forcing it up against the softits of the door-frame, while the pressure of the spring on the head of the door keeps it from slamming, and in a measure also from opening too easily. The holder for this spring has slots, instead of screw-holes, so that the spring can be moved up or down to any desired tension; while the upper slot permits a further adjustment by moving the spring in or out.

The price of this check is twenty-five cents each, in pap, or fifty cents, nickel-plated. For all ordinary practical purposes this door-check is as good a device as can be, and is used a great deal on railroad cars, where there is constant liability to violent slamming. It will be noticed that the spring has a double power: first, by the friction of the door as it closes, and secondly, by the door coming in contact with the shoulder at the end of the spring. There is a special form of spring used to close this door consisting of a straight coil, with a hook on the jamb and a shoulder on the door.

There are a few variations on the “Barlow” door-checks, but they all act on essentially the same principle, and this one will be sufficient for illustration. A very different kind of check is that which acts on the principle of a piston-pump, of which, perhaps, the best known is the “Norton” door-check. This article has been on the market a long time, and is used very extensively in some parts of the country. Figure 124 will give an idea of how it looks when set. The check consists simply of a plunger or piston working in a cylinder. Between the piston and the cylinder head is coiled a strong spiralspring, and the piston, as well as the cylinder, is pierced with a small hole to permit the air to escape. The cylinder is attached to the head of the door-frame, and is hinged at A. The piston is connected by a hinged-joint with a lever D hinged to the frame, and a lever G attached to the door. When the door is opened, the piston is drawn out, the internal spring compressed, and the air enters through the holes in the piston and the cylinder head, filling the space beyond the piston. When the door is released, the spring tends to close it, the air behind the piston acting as a cushion prevents the door from closing too quickly or from slamming. The orifice in the cylinder can be made larger or smaller, thus regulating the speed at which the door shall close. The spring is made sufficiently strong to both close and latch the door after the air has escaped from the cylinder.

It will be seen that this door-check permits the door to be opened only about 120 degrees. This is usually more than enough for any doors requiring the use of a check, but a stop is always needed, otherwise the arm G may be broken.

A form of “Norton” door-check is also made to close the door from the outside. The action is exactly the same, except that the arm G is bent up and attached to the softit, while the cylinder and D are attached to the door.

The “Norton” door-check is usually sold nickel-plated. The prices are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Ordinary</th>
<th>Heavy</th>
<th>Very Heavy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door-checks</td>
<td>$2.20</td>
<td>$2.75</td>
<td>$4.00</td>
</tr>
<tr>
<td>Bronze</td>
<td>$2.40</td>
<td>$3.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Nickel</td>
<td>$2.60</td>
<td>$3.20</td>
<td>$5.00</td>
</tr>
</tbody>
</table>

A form of door-check, which has met with a great deal of approval, is the “Eclipse,” manufactured by Sargent & Company. Figure 125 shows this check in position. It consists of a piston secured to the head of the door-frame and working in a cylinder attached to the top of the door. The piston-rod is kept from lateral motion by a set-screw at one side of the foot, and a spring on the other, as shown by the figure, so that it can be accurately adjusted to meet the cylinder. When the door is opened, the cylinder is drawn entirely away from the piston, while the compression of the air in the cylinder when the door closes prevents any slamming. The air escapes through openings in the end of the cylinder, so arranged as to be easily regulated. The piston in both the “Norton” and the “Eclipse” door-check have leather washers.

The “Eclipse” door-check can be used with any suitable form of spring butt, though the door-spring, shown by Figure 125, is especially made for this purpose by Sargent & Company. It consists of a strong spiral spring, cased in a cylinder and connected with the door-frame by a hinged bent lever.

The “Eclipse” checks and springs are finished in either Tuscan bronzed, bronze-plated or nickel-plated. The prices are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Ordinary</th>
<th>Heavy inside</th>
<th>Heavy outside</th>
<th>Very Heavy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door-checks</td>
<td>$2.00</td>
<td>$2.50</td>
<td>$3.10</td>
<td>$5.00</td>
</tr>
<tr>
<td>Bronze</td>
<td>$2.20</td>
<td>$2.75</td>
<td>$3.30</td>
<td>$5.00</td>
</tr>
<tr>
<td>Nickel</td>
<td>$2.40</td>
<td>$3.00</td>
<td>$3.60</td>
<td>$5.00</td>
</tr>
<tr>
<td>Door-springs</td>
<td>$2.00</td>
<td>$2.50</td>
<td>$3.10</td>
<td>$5.00</td>
</tr>
<tr>
<td>Bronze</td>
<td>$2.20</td>
<td>$2.75</td>
<td>$3.30</td>
<td>$5.00</td>
</tr>
<tr>
<td>Nickel</td>
<td>$2.40</td>
<td>$3.00</td>
<td>$3.60</td>
<td>$5.00</td>
</tr>
</tbody>
</table>

The “Eclipse” check is applied to the outside of a door, if desired, a different form of holder securing the cylinder to the softit of the door opening, while the piston is fastened to the door.

It has been claimed that after being used for a certain time, the bearings in both the “Norton” and the “Sargent” door-check will wear loose, so that the air will escape too freely from the cylinders to form a reliable cushion; and several attempts have accordingly been made to produce a door-check in which the action should be regulated by the flow of some liquid, which would permit of metal instead of leather washers. Figure 126 illustrates one device on this principle. It consists
of a piston and cylinder attached to the door. The cylinder is pivoted so as to admit of a slight rocking motion, and the piston is hinged to a bent-arm, also pivoted just above C, and provided with a spring which serves to keep the piston drawn out. The cylinder is filled with oil, which flows back and forth through a small tube at the back, the rate of flow being regulated by a screw at C. When the door closes, the shoulder A on the door-head strikes against the bent arm and forces the piston down, the oil preventing any sudden slamming, while the rate of the flow through the tube below C determines the rate at which the door will close. This fixture retails at about $1 per set.

Such a form of check necessitates a spring-hinge, in order that the door shall be self-closing. Figure 127 illustrates a form of door-check manufactured by the same parties, which has a coiled spring inside the cylinder acting by means of the hinged bent lever on the door-head. The interior of the cylinder is filled with oil, which checks the action of the door by flowing from one compartment to the other of the cylinder. The retail price is from $3.30 to $4.50 each, according to the finish.

Figure 128 is another form of combined door-check and spring, which is intended especially for double-acting doors, though it can be used for any door. No regular hinges are required with this fixture. The top of the door is held by a species of pivot, fitting into a socket mortised into the top of the door, while the door-check answers for the lower hinge. The lever A is mortised into the bottom of the door, acting as a crank to turn the post B. The checking apparatus is encased in a box C which is sunk into the door-sill and covered with a brass plate. Figure 129 shows a section of the box, which will illustrate more clearly its arrangement. The post B, when turned either way, moves a piston which travels in a cylinder completely filled with oil, in which is also a very heavy coiled spring whose action tends to close the door, while the oil prevents any sudden movement. The oil flows back and forth through a narrow aperture, the size of which can be regulated by a screw extending up through the covering of the box.

This check is listed at $17 per door complete for a door of ordinary size.

Besides the door-checks which are automatic in their action, there are a number of devices for holding the door open or in any one position. Some of them are self-locking, but are arranged so that the door can be easily drawn to by slight pressure. Figures 130 and 131 are two varieties of this style of door-check. Another kind is made to absolutely hold the door fast when it is opened, so that in order to close the door the catch must be released by hand: Figure 132 shows one of the many varieties of this form. It is varied by having a lever attached to the catch by which it can be more easily raised, and also by the catch being placed so as to act sidewise instead of vertically. Figure 133 is a form of catch which is intended to be attached to the jamb and to work over the top of the door, nearly all the other forms being attached to the door and working on a striker which is screwed to the floor. Figure 134 is a self-locking form of door-check which is screwed to the door, catching onto a hook projecting from the wall. Figure 135 is a form of door-check which is used for show-cases and closets, acting by means of a spring coiled inside the cylinder. Figure 136 is a spring-check used only for light work or for cupboards.

[To be continued.]
THE ATTACK ON CHANTILLY.

The little equestrian statue at the right of this engraving, which is reproduced from "Les Tableaux historiques de la Revolution francaise," is the only trace it has been possible to find of the statue of the Constable de Montmorency, and this does not correspond with the printed descriptions.

THE PLACE LOUIS XV AND THE STATUE OF THE KING.

This engraving, which is drawn from the same source as the one above, is published in connection with the article on "Equestrian Monuments," page 429, issue II.

FURNITURE FOR THE CLUB-HOUSE OF THE NEW YORK CLUB.

NEW YORK, N. Y. MR. R. R. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR A SUBURBAN HOUSE BY MR. T. M. KELLOGG, BOSTON, MASS.

TWO TOWMS. MR. A. CUDELL, ARCHITECT, CHICAGO, ILL.

HOUSE FOR P. T. BARNUM, ESQ., BRIDGEPORT, CONN. MESSRS. LONGSTAFF & HUBB, ARCHITECTS, BRIDGEPORT, CONN.

PROPOSED HOUSE, WORCESTER, MASS. MESSRS. BARKER & NOURSE, ARCHITECTS, WORCESTER, MASS.

ANCIENT AND MODERN LIGHT-HOUSES.—XXIV.

LIGHT-HOUSE ADMINISTRATION (CONCLUDED).—THE UNITED STATES.

Prior to 1852 the Light-House Service of the United States was in the most inefficient condition; its shortcomings became so glaring that in 1851 Congress passed an act authorizing the Secretary of the Treasury to appoint a Board consisting of two officers of the navy of high rank, two officers of the engineers of the army, an officer of high scientific attainments, and a junior officer of the navy to act as secretary, whose duty should be to inquire into the condition of the light-house establishment of the United States and to make a detailed report and guide future legislation on the subject. With characteristic economy a further proviso was added to the act, providing that none of the above officers should receive any additional compensation for their services.

In obedience to the above act, the Hon. Thomas Corwin, then Secretary of the Treasury, appointed the following officers to form the above Board: Commodore William H. Shubrick, U. S. N.; Commander S. F. Dupont, U. S. N.; Brevet Brig-Gen'1 Jos. G. Totten, U. S. Corps of Engineers; Lieut-Col. James Kennery, U. S. Top. Engineers; Prof. A. D. Bache, Lt.D., Supt. Coast Survey; Lieut. Thornton A. Jenkins, U. S. N., Secretary. It would have been difficult to have selected a Board of more ability or pro- bity. They entered on their duties with a patience and zeal which the importance of the subject required, and found that the existing system demanded a thorough purification and reorganization; that it was inefficient and wasteful; that the light-houses were neither properly built, located, nor distributed in accordance with the needs of commerce; that there was no effective system of inspection and superintendence; that changes were constantly taking place in the aids to navigation without any official notice being given to the public; that the light-keepers in many cases were not competent, and they were never instructed in reference to their duties nor examined as to their ability to perform them, and, in short, that there was no proper system in the management of the light-house establishment of the United States.

This Board made a detailed report and recommendations to Congress and in consequence the following act was passed and is still in force: "The President shall appoint two officers of the navy of high rank, two officers of the Corps of Engineers of the army, and two civilians of high scientific attainment, whose services may be at the disposal of the President, together with an officer of the navy and an officer of the engineers of the army, to constitute the Light-House Board. The Secretary of the Treasury shall be ex-officio president of the Light-House Board." Act approved 31 August, 1852.

Further acts provided that the Board should elect one of its members as chairman, who should preside at its meetings in the absence of the president; that the Board should meet on the first Mondays of March, June, September and December, and that the Secretary of the Treasury should require; that it should be attached to the office of the Secretary of the Treasury, and under his superintendence should discharge all administrative duties relating to the construction, illumination, superintendence and superintendence of light-houses, light-vessels, beacons, buoys and sea-marks and their appendages, embracing the security of existing works, procuring illuminating and other apparatus, supplies and materials, and for rebuilding when necessary and keeping in repair the light-houses, light-vessels, beacons and buoys of the United States; should furnish to the Secretary of the Treasury estimates of the cost of the several branches of the light-house service may require, and such other information as may be required to be laid before Congress at the commencement of each session; should make such regulations as they deem proper for securing an efficient, uniform and economical administration of the Light-House Establishment, and should arrange the Atlantic, Gulf, Pacific and Lake Coasts of the United States into light-house districts. An officer of the navy or army was required to be appointed to each district as light-house inspector, subject to the orders of the Board.

The President of the United States was required to cause to be deposited from the Engineer Corps of the army the books necessary to be necessary to superintend the construction and renovation of light-houses. And all plans, drawings, specifications and estimates of cost of all illuminating and other apparatus and of the construction and repair of towers, buildings, enclosures and beacons of the engineer, or by such engineer of the army as may be detailed for that service.

In conformity to the act of 1852, the President appointed, on October 9, 1852, the following gentlemen to form the first light-House Board: William B. Shubrick, Commodore, U. S. N.; Samuel F. Dupont, Commander, U. S. N.; Joseph G. Totten, Colonel, Chief of Engineers, Brevet Brigadier-General; James Kennery, Lieut-Col., Brevet Lieutenant-Colonel, Corps of Topographical Engineers, U. S. A.; Prof. Alexander D. Bache, LL.D., Superintendent U. S. Coast Survey; Prof. Joseph Henry, LL.D., Secretary Smithsonian Institution; Thornton A. Jenkins, Lieut-Com. U. S. N., Naval Secretary; Edmund L. F. Hardecastle, Lieutenant, Corps of Topographical Engineers, Brevet Captain, U. S. A., Engineer Secretary. The Board elected Commodore Shubrick as its chairman.

The chairman and the two secretaries are the executive officers of the Board and are members of all standing committees. Under the direction of the chairman the naval secretary has charge of all plans pertaining to floating aids to navigation, supplies, to nominations and salaries of light-keepers, to inspection of the returns and accounts of the inspectors and the appropriations, petitions, applications, correspondence connected therewith; the engineer secretary, under the direction of the chairman, has charge of all fixed aids to navigation, the preparation of plans, specifications and estimates relating to them, the purchase and repair of illuminating apparatus, the real estate of the light-houses, and the manufacturing establishments of the Board at Staten Island and the general depot at that place, except that part of it relating to supplies, the nomination and salaries of employ' of light-house engineers, the inspection of the returns and accounts of light-house engineers, and the appropriations, petitions, applications and correspondence in relation to the foregoing.

The United States is divided into sixteen light-house districts. The first to the sixth inclusive comprises the Atlantic Coast, the seventh and eighth the coast of Florida and the Gulf of Mexico, the ninth, tenth and eleventh the Gulf of Mexico, the twelfth the Pacific Coast, and the fourteenth, fifteenth and sixteenth the Ohio, Mississippi, Missouri and Red Rivers.

Each district is assigned a naval officer as inspector, who has charge of all the floating aids to navigation, the supply of the light-stations, the salaries of keepers, and the disbursement of funds relating to the above objects. The inspectors are required to inspect the lights at least once every three months, at which time they make a report to the Board, and forward a copy of his notes so far as they relate to the latter's duties.

Both the district inspectors and engineers submit to the Board monthly and annual reports of the work done under their charge.

When the Board receives petitions for the erection of new light-stations,
CANONS'AMENÉS DE CHANTILLY A PARIS.
le 9 Août 1789

Prière FÊTE DE LA LIBERTÉ À L'OCCASION DES SUISSES DE CHÂTEAU-VIEUX
le 10 Avril 1792
A MAUSOLEUM

FOR MRS. PERRY H. SMITH

CHICAGO, ILL.

A CUDELL, ARCHITECT
HOUSE OF HENRY C. JACKSON, ESQ., COMMONWEALTH AVENUE, BOSTON, MASS.

Masons: ALLEN & KENWAY, Architects.
Lighting of Rivers. — $235,000. This pays for the establishment, maintenance and supply for the river-lights previously mentioned.

Surveys. — $2,500. This is to pay for the preliminary examinations of sites and plans for which estimates are to be made to Congress.

Total. — $1,415,500.

The total sum is never exceeded and frequently is not spent in which case the balance on hand at the end of the fiscal year is returned to the Treasury.

Every new light-house is the subject of a special appropriation which is available until the light-house is completed, any balance remaining is turned into the Treasury and is not available for any other purpose.

The number of lights increases from year to year to keep pace with the needs of commerce. The following table shows the aids to navigation maintained by the United States Light-House Establishment on June 30, 1887.

The Board at present has its offices in the Treasury Department at Washington, and for a number of years past has complained of lack of room.

The Board has depots for supplies and buoys in various districts, but the most important one is on Staten Island, N.Y., in the Third District. It is the general depot for the whole United States; all the oil and slack is made up and distributed, and from this it are furnished nearly all the supplies for the other districts. The inspector of the Third District has charge of the above, while the engineer has charge of a well-appointed lamp-shop, blacksmith and carpenter-shop, where lamps, lanterns and general metal-work are made and repaired, oil-cans and boxes for mineral-oil manufactured, illuminating apparatus set up and tested prior to shipment, buoys repaired, photometric tests made, and, in general, the multifarious work done which the light-house service requires.

A large tender, the "Ferm," distributes the supplies from this depot to the Atlantic and Gulf coasts. She is soon to be replaced by a larger vessel at the needs of the service are rapidly exceeding her carrying-capacity.

The supplies for the Pacific Coast, for the lakes and for the rivers are shipped by rail and distributed by the tenders of the districts. Whenever it is possible light-keepers are furnished with commodious dwellings of five or six rooms; where vacancies occur they are filled by promotion from keepers in service of a lower grade, and the Collector of Customs of the district nominates for the ultimate vacancy; his nominee receives an appointment as acting assistant keeper, and if he proves satisfactory after trial, he receives an appointment as assistant keeper.
EQUESTRIAN MONUMENTS.—IX.

PERISHED MONUMENTS.—THE FRENCH REVOLUTION.

At some stations distant of access rations are furnished in addition to the salary, and most stations also receive an allowance of coal.

Neat libraries, of about thirty books each, are left at isolated stations and changed from time to time.

D. P. HEAP.

(The End.)

Statue of Louis XV, by Bouchardon, in the Place Louis XV, Paris, France.

The statue of Henry IV on the Pont Neuf was not the only one that had to undergo the peril of shipwreck before reaching its destined resting-place, for one of the many statues of Louis XIV endured the same fate.

In 1716, shortly after the death of Louis XIV, the Etats de Languedoc voted to erect at Montpellier a bronze equestrian statue in his memory. The work was entrusted to two Flemish sculptors, Mazeline and Uhris, who were settled at Paris. In due time these men succeeded in producing an equestrian statue which measured nearly sixteen feet in height, and which, consequently, was no trifling affair to transport to the south of France. However, the group was boxed in a strong framework, and by aid of capstans and rollers was dragged through the streets and loaded on a boat which was towed down the Seine to Rosnay. There the statue was transferred to a vessel and proceeded down the river and along the coast to Bordeaux, where, just as the vessel was entering the mouth of the Garonne it was wrecked and the statue was in danger of being a total loss. It was at length recovered, placed on a boat and towed up the Garonne and through the Canal Royal, pénis and other water-courses—which, owing to the farsightedness of Sully, already formed a fairly perfect system of inland waterways—to Montpellier. Here it was received with great public rejoicings, and the promoters of the enterprise were in such haste that they could not wait for the completion of the pedestal, but hoisted the statue to the top of the unfinished base, and then and there unveiled it. The place where this statue was erected, on the Promenade de Peyrou, is one of the ideal situations in Europe for a monument, and its fame is known to travellers.

Another posthumous equestrian statue of Louis XIV, though it was ordered before the King's death, was erected in 1725 opposite the Palais des Etats, at Albi, by the Etats de Bourgogne. This was modelled by Le Hongre, sculptor to the king. In the Place Bellecour, at Lyons, was destroyed in this same year an equestrian statue of Louis XIV by Desjardins of which as to its merits or its history little is known.

How it happens that any of the statues of royal personages escaped the iconoclasm of the unbridled revolutionists is not clear; but in all French revolutions the work of erasing the symbols of a previous condition of servitude has been done in very an systematic way, and though the traveller finds but a shadow of what the real substance has been at work he finds the work fortunately compassed, and so it is that here and there on the Louvre still lingers the letter "N," and that in the inscriptions on public places the word "Nationale" has not re-

placed the word "Impératrice." Yet although some of the monuments of the XVIII century, as the Porte de Vincennes and others placed beneath the arc de triomphe, the work of the sculptor Coysevox, which the Province of Brittany caused to be erected at Rennes in 1726, in the Place de la Concorde, Justice, eleven years after the death of the King, under the order for it had been given in 1685. All that remains of it are the bas-reliefs which decorated the pedestal and are now in the museum in that city.

As much as his great-grandfather, Louis XIV, was his successor, Louis XV, fond of being immortalized in bronze and marble and so great was the number of statues that were erected to the glory of Louis XIV—the "Well-beloved," that their description furnished material enough for a very elaborate monograph. The most celebrated of these was the equestrian figure that was erected in 1763 on what is now the Place de la Concorde, a spot which, one of the important monarchs of France, is the blood of some three thousand aristocrats was poured out under the falling knife of the guillotine, in expiation of the gross wrongs done by their cause upon that brave postbatful invention of Dr. Guillotin could be set in the Place Louis XV, Bouchardon's bronze equestrian statues of "the Well-beloved" must come down, and many of the men who helped to pull it down that August day may have had personal feelings of pride and revenge against the original which they could in this way satisfy—the *Pare aux Cerfs* at Versailles was supplied from all grades of society and many a father, brother or lover had wronged to avow. What the Place de la Concorde now is with its seated statues of French Cities, its fountains and the obelisk of Luxor in the middle all travellers know; what the Place de la Revolution was the horrid page of history allows us to imagine; what the Place Louis XV was the illustrious ;—from engraving made about 1800—show. This latter name was once revived on the final overthrow of the first empire, but probably Louis XVIII did not think it wise to tempt another outbreak by erecting a statue to the fifteenth Louis.

The statue was commissioned directly after the Peace of Aix la Chapelle, which terminated the Austrian War of Succession, in 1745, when the people were not only grateful for peace, but still felt much of their original enthusiasm for the young king whose vices and dabacheries were as yet somewhat veiled from public knowledge; his sobriquet had not yet been withdrawn from him. But in the fifteen years that elapsed before the statue was finished public feeling had probably undergone a great change, and though the ceremonial unveiling of the statue was sumptuous, the enthusiasm of the spectators must have lacked the spice of personal admiration.

The work was entrusted to the architect Gabriel and the sculptor Bouchardon, who labored, it is said, with much perseverance. But the statue for more than twelve years, and if, as is likely, he was within the circles of court life it is probable that he proceeded about his task in a leisurely way. At his death in 1763, the monument was still unfinished, and had to be completed by the sculptor Pignalle to whom are to be credited the accessory figures of Strength, Wisdom, Justice, and Peace, which were placed about the pedestal and also, presumably, the bronze ba-reliefs which decorated its sides.

The monument was finished October 20, 1763, and consequently Louis in his classic garb, and his horse—which is said to have been really a fine piece of sculpture—had an existence of a few years before it was judged fit for two rows, on the theory, perhaps, that in this way the greatest number could profit by its downfall. The site was not allowed, however, to remain undecorated and a terra-cotta statue, by Lemois, of Liberty and Abundance was set up where Louis' statue had been, and was at once christened "La Liberté de Bourse."

Belonging to the same school, the same style, the same epoch was the statue of Louis XV, by Le Moyn, at Bordeaux, which was also destroyed at this time, and of which there remains only some bits of marble bas-reliefs preserved in the museum at Bordeaux. It is to be noted that all the statues of the Louis were designed as the central features of a surrounding architectural treatment. It was the age of Le Nôtre and Mansart, and grandiose formalism pervaded the arts even as it did everyday life.

Longevity is not entirely beyond walking distance from Paris, it is probable that some portion of the same motifs that destroyed the monuments of Henry and the Louis, plodded over the roads that led thither, stopping at St. Denis on their way to vent their spite in destroying the tombs of the monarcho-paladins that once made the abbey famous. As the favorite seat of the Comédies, one of the most powerful and haughty families of the kingdom, there was every reason why the smell of its audacity might have become a desire to pillage it, and there was even more reason, perhaps, why there was no supposing that such a rabble had any real knowledge of past history—a grievance against the former and original owner of the place, the Abbé de Montmorency, Grand Constable of France, and one of the most famous of French generals, who had the fortune to serve with distinction under Louis XII, Francis I, Henry II, Francis II and Charles IX. It is hardly supposable that the mob felt that they could attack on to the avenging columns of Justice, in 1748, that at 1548 put down a revolt that an ominous tax on salt had given rise to in Guéret; nor can any one believe that this rabble, whose fellow-servants would shortly publicly abolish religion, included a large contingent of descendants of the Huguenots burning to repay in some
measure the harshness which he meted out to those unfortunate but valorous Protestants. Yet their exhalation could not have been greater in either of those two cases when they copied on the equestrian statue of Anne himself, and they probably accomplished its destruction with dispatch and thoroughness, for no remnant of it remains. It was clearly the rider and not the horse that Jacques ANDRE-GABRIEL, for he was the one who magnified high relievo over the entrance to the famous statues of the Grand Condé were not injured.

Secondly, the sculptor of the statue of the Constable is not known, but as a description of it speaks of the horse as resting one of its fore feet on a helmet lying empty below him, it is probable that it was the work of an Italian, or, at least, of one who was familiar with

Jean Baptiste Le Moyne. — Born in Paris, 1754. Son and pupil of Jean Louis Le Moyne, also a sculptor, and of Gabriel Le Moyne, who had been presented with the Grand Prize by his bas-relief of the "sacrifice of Polyxeni." His works are a pedestal statue of Louis XV for Reims (destr.), "The Jew of Bethsaida," "The Baptism of Christ;" some statuary, at the Invalides; the tombs of Cardinal Flavy and Mignard, and many portrait busts. Died in 1775.

Anne de Montmorency. — Born 1533. Died 1567. Served under Francis I in 1540. Made a marshal in 1552. When the array of Charles V entered Flanders in 1556, he has destroyed it by mercilessly laying waste the country through which it passed. Pictured to Quintin in 1541. Under Henry II acquired great influence and made a Duke. Defeated and taken prisoner in 1563 at St. Quentin by Philip II's General, Philippomarquis of Savoy, and, consequently, exposed to the unfortunate fate of Charles-Ducarmeau. Under Charles IX, he with the Duke of Guise and Marshal Saint Andre practically controlled the kingdom, and signalized himself by opposing the protestants. In 1569, he led his life in a drawn battle, near St. Denis, where he led the Catholics against the Protestants under Condé.

Chantilly. — Anne de Montmorency, High Constable of France (1455-1567) was the real founder of Chantilly. He employed Jean B. Lucernier, the architect, whose design is preserved in Bourges, a famous book, "Les plus excellents édifices de France." In due course of time this magnificent donjon came into possession of the Grand Condé, who settled at Chantilly in 1650, and rebuilt the whole structure, except the little château (Le Châtelet), in the style of the time of Louis XIV with gardens laid out by Le Notre. The Grand Condé died in 1678, and the great-grandchildren built in the numerous and gorgeous stables near the château. The monumental entrance with a great bas-relief of horses placed above it is, gigantically, the drinking-well, gardened by spindrift sculptured horses. In classical the vast stalls will accommodate 320 horses and in the rooms overhead are suites of apartments for fifty grooms. The Revolution razed Chantilly and its palace to the ground, these stables, with the château and the château d'Anglons alone being spared, under the plea that they would be useful for cavalry. At the Restauration the castle of Chantilly again came into the hands of the Condés and their descendants, the present Duc d'Anglona, about 1840 counterfeited the idea of rebuilding it. His project was performed by the intervention of 1848 and its following events, and it was not until 1869 that the work was begun. The architect (Chaminade) was employed and the work took掉了 the millions of francs. In the châteaus have been replaced a number of precious frescoes of the old château, saved by Louvois, and the rooms have been utilized for the most splendid paintings of the highest rank and many priceless objects of art. In 1868, the d'Anglona generously presented the state, the state of France, to be preserved exactly as it stands and opened to the public as the Condé Museum. The value of this gift is estimated at nearly fifty millions of francs.

[To be continued.]

THE TARIFF AND THE ARTIST.

Many men, clever and otherwise, prefer to criticise, and would amend to suit themselves the long list of duties on imports to their country, but only few of them, positively, have, by long and tedious work, been able to grapple intelligently with the problems offered them, which, although not so great if considered singly, and, by men whose walk in life leant them by the road along which any article embraees whom the artist was to work. To know those who introduce "bills" have to first acquaint themselves and become familiar with many more things regarding every article or commodity that has been, is, or will be, to be largely imported, most men know about their single line of business and either duty or free entry would leave on it, the labor is seen to be no slight one.

To introduce a tariff bill that will please all is literally an impossibility, as there are many men and many minds, but the end is not this: it is to give the greatest benefit to the "country," i.e., to the majority of the people.

How thankful those who are getting up a bill of this sort must be to those who will be left to carry the burdens of the work, which, up to the present, has been done, and especially by themselves, or by those who have the burden of the work. To know those who introduce that people would, with no thought of en- cratic sense, are engaged in such a enterprise, for the sake of furthering their own selfish, and oftentimes dishonest ends.

As it is with the makers of our tariffs, so it is with any whose affairs and business in life embody more knowledge of the various arts and industries than they can naturally attain to.

The artist studies and practices his art, the engineer his engineering, and each finds a task to do, and has all he can well attend to.

An architect has to encompass some part of both these in his work, besides countless other minor details of construction and knowledge of material used, besides an insight into human nature; for it is not only his duty, but his mission, to work to his ideal, but he wishes to please his client — the one who trusts in him not only for the work done, but for the way it is done and for what the client desires.

It is absolutely an impossibility for an architect to-day, the time of progress and advance in all mechanics and manufactures, to keep himself thoroughly posted in the detail of the manufacture and the quality of the material he builds his houses and his edifices of.
Help—honest help—to him is as much needed and as thankfully received, as it is to any one who has to deal with a multitude of different classes and kinds of work, any one of which he could almost spend his entire time on.

This is said to be an age of scepticism, but while this may be too severe a criticism of our times, it is not without foundation. The heavy tables and the artistic chairs, conforming to the style of the building but awkward in use, which have so commonly been put in reading-rooms; the provision of ample, convenient and well-lighted work-places for the librarian as well as for the visitors, are apt to criticise things we see or hear, and we do not readily accept what we are told for fear of being deceived. No man cares to be deceived. He looks to authority in libraries as well as in others—his authority is injured along with his faith.

It has recently become the custom for those having anything worthy of attention to be used in the construction of houses and other buildings, to put the matter fairly and squarely before the only one to whom they can go—the architect. In some (fortunately few) cases he has been known to object to this, not on account of any imagined interference with him, but because he deems a fraction of his time too valuable to be given for instruction in something or other by those he imagines have private ends to gain, and in whom he lacks confidence. Whether this lack of confidence is justified or not, I am sure that the architect, considering the very purpose and object had in view by those who were ready and willing—may, anxious—to have the superiority of their material or wares tested and proved.

The architects do not encourage the best materials, and insist upon their being used, they will not find a place in their work, and while it is, nevertheless, a fact that the best goods will still continue to survive and be used by those who appreciate them, those who do not may in the end find it react to their own disadvantage.

**ARCHITECTS AND LIBRARIANS; AN EIRENICON.**

**TO THE EDITORS OF THE AMERICAN ARCHITECT:**

**DEAR SIRS,—** With the great increase of public libraries and the growth in public taste, the architecture of libraries becomes daily of more importance. It must be much to be regretted that there should seem to be a sort of irreconcilable conflict between librarians and architects. This has been pointed out in your recent editorial, occasioned by the librarians' conference. As a librarian of perhaps a little more than ordinary experience with, and observation of library buildings of different styles, I feel inclined to attempt to explain this appearance of conflict on the part of the public at large.

In the first place, I would like to say that in my intercourse with architects I have always found them ready and eager to get the views of others on the subject and to put them in practice as occasion served. Of course it is easy to say that architects, like other artists, are impractical and ready to sacrifice everything else to the aesthetic demands of their art. But the architect is so constantly, from the first step in his career, put to the solution of the most practical problems, and required to deal so largely with questions of convenience and economy that such a charge can hardly hold good. Certainly there is no reason why this impracticalness, if it exists, should not interfere as much with success in the erection of a street-car road station or a school-house as in that of a library. Nor would I admit that the failure of architects and librarians to agree is due to an uncommon development of "crankishness." In the minds of the members of this profession. Some of us are perhaps a trifle long-haired, with all that the word implies, but, mark you, it is not from this wing of our company which is the sharpest critic of the architectural code.

Where then shall we look for the reasons for this controversy? I will undertake to give a few and draw their moral. Not the least important is the one mentioned in your editorial,—the disagreement amounted to this, as to what is or what is not an improvement on a library. But while there is this disagreement and while some of our most heated discussions among ourselves are on this very point, there is, in my opinion, no such thing as a few leading principles. And any one who cares to follow through the volumes of the Library Journal the reports of our annual meetings, cannot fail to perceive certain lines laid down with something approaching constancy nearer to unanimity. Among the conclusions are the demand of lofty interiors with fixed al covs and galleries, and the substitution of iron stacks or portable wooden cases placed near together in plain rectangular interiors; the demand for abundance of light, preferably from the highest part of the walls, and not from the centre of the walls the light which is most valuable and which is required in book stacks, in the reading-rooms, the card catalogues, the art rooms and the public reading rooms. The desire for all this at the same time is an objection to the heavy tables and the artistic chairs, conforming to the style of the building but awkward in use, which have so commonly been put in reading-rooms; the provision of ample, convenient and well-lighted work-places for the librarian as well as for the visitors, are apt to criticise things we see or hear, and we do not readily accept what we are told for fear of being deceived. No man cares to be deceived. He looks to authority in libraries as well as in others—his authority is injured along with his faith.

But if there is not much disagreement among librarians about these matters, there is a cease for the trouble which architects have in getting proper direction when they design for a library that seems to me responsible for more of the trouble than any other. It is this: Libraries are generally built under the direction of a building-committee, consisting of some members of a Board of Trustees, others of the building-committee, and the architect. This board has a strong predilection for the idea that libraries are very unusual to find a librarian of any experience either on such a building-committee, or, in any proper sense, consulted by it. A large number of members of the board are not the least interested in the representations of an upright and an honorable business house can readily be distinguished from the misrepresentations of unscrupulous parties who offer inferior articles with a so-called "guarantee" relative to their being "equal to" other goods well-known to all interested in good material and work.

The architects do not stand by those who have helped them and are devoted to introduce, or have introduced, better classes of material of different kinds, used in or on our houses, they allow the results of honest work to be enjoyed (for a time) by the crowd who always follows the fashion, and considers the very purpose and object had in view by those who were ready and willing—may, anxious—to have the superiority of their material or wares tested and proved.

The architects do not encourage the best materials, and insist upon their being used, they will not find a place in their work, and while it is, nevertheless, a fact that the best goods will still continue to survive and be used by those who appreciate them, those who do not may in the end find it react to their own disadvantage.

**IMPORTER.**

**SOME ANSWERS TO MR. ATKINSON.**

**NEW YORK,** October 8, 1889.

**TO THE EDITORS OF THE AMERICAN ARCHITECT:**

**DEAR SIRS,—** The inquiries of Mr. Atkinson in your issue of Oct. 13th, are very pertinent now when time is considered so much a matter of money, especially in our large cities.

I have seen serious fire losses in rentals of from six months to a year, and in a large six-story warehouse this is no rarity. This is to demonstrate to the architects, in whose offices they may be employed as draughtsmen, are not fully impressed with the progress which has been made in this direction by manufacturers who are in the fireproofing business. With a view therefore, of supplying some information on this point, a brief description of what is in general use in New York may not be out of place.

Partition-blocks of hard-burned clay are generally used in places where there seems to be most danger from fire, as, for example, light, ventilated dumb-walker shafts. These blocks range in thickness from three up to six inches in thickness and twelve by six inches, thus requiring two to a square foot of surface, and either set on 7 or angle iron, or built up like ordinary bricks with mortar or cement. Maneeetd roads, gables and chimneys are also built up of roof-blocks varying in size and thickness according to the spaces they are required to fill, seldom over six inches in thickness longer than two feet, and the same is the opinion of those who have been/
Girders and other large beams may be covered by these blocks secured in place in a somewhat similar manner. When transportation to the building site proves too hard-burned clay, plaster blocks may be used, and, if large amounts are required, they may be made on the spot to advantage.

The great danger in most buildings is that they are so constructed that a slight fire in the beginning frequently starts in a vital part, and before it is discovered, has gained too much headway to be checked. For example, open hatchways or enclosed wooden hoist-ways form chimneys when they catch fire and, igniting the several floors and flames ascend, it is a matter of a few minutes before the building is in a blaze from cellar to roof. If, on the contrary, the ceilings and beams are protected from the flames, the smoke frequently has considerable time to escape, and give warning and cause the danger before much actual damage had been done. In the "Dakota," a fireproof hotel and apartment-house, it is said that one of the light-shafts used as a sort of chimney and that a large amount of rubbish in the attic and on the roof there may have been partially finished, and burned up, to save the trouble of clearing it away, with out the slightest risk to the building.

SALAMANDER.

TO THE EDITORS OF THE AMERICAN ARCHITECT:


Dear Sirs,—I have given no little consideration, on behalf of the students in this department whom we are trying to adequately equip for the practical duties of their profession, to the question raised in your current issue by Mr. Atkinson. I must confess that I have not with as little difficulty, which was not why the question was raised, to a reply. To my question whether he thought the method of slow burning construction was applicable to the problem presented in the design of dwellings-houses, that he could not yet see how it was to be effected, which the in-time done in the building of dwellings to better adapt them to resist fire than those built after our present most prevalent method, I grant; and I know that most, if not all, well-informed architects are actually pulling together in the efforts of the day. Thrown upon this object by the work of Mr. Atkinson's company. But at the present stage of the problem the difficulties present themselves. If we prepare a design for a dwelling-house which would be accepted as a great risk by any of the Factory Mutual Insurance Companies, we could not induce our clients to live in a structure which is so radically different in external and internal effect from the sort of house they have been accustomed to; or else, if we attempted to apply those principles of slow-burning construction to the present phases of design, the cost is so great as to be prohibitive. At the present stage of the progress of the problem, it is quite evident then, that Mr. Atkinson's admission that the greater part of the difficulty lies with the owners and not with the architects is well founded.

C. FRANCIS OSBORNE.

THE PRESSURE OF FOOTINGS ON THE SUBSOIL.

Chicago, Oct. 16, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In No. 657 of your valuable paper you comment on a communication to "La Semaine des Constructeurs" wherein attention is called to the small foundations, 4 to 5 ft. in weight per unit of surface than larger ones. I beg to say that this principle of computing the area of footings is well known to Chicago architects and builders and that to my knowledge nearly all our important foundations are made with a weight per unit of surface than larger ones. I beg to say that this principle of computing the area of footings is well known to Chicago architects and builders and that to my knowledge nearly all our important foundations are made with a weight per unit of surface than larger ones. Although he was very undecided and indeed incapable of deciding what amount he should spend on the front, he left me with instructions to submit a study of a front that in my opinion would best suit his requirements. However, while the design was in progress, I learned that he had previously engaged Messrs. Y. & Z.—architects to design the entire building, who were then engaged upon the work, ignorant of that fact, I was seeking other designs. Feeling that it would be a most unprofessional undertaking to continue the work, I informed my proposed client that under the circumstances I must decline his commission, urging him to be guided by a professional ability of the architects whom he had first employed.

I heard nothing further of the matter until Messrs. Y. & Z.—informed me that they had instituted legal proceedings against Mr. C. to recover their regular commission on drawings provided they—

Further information disclosed the facts, that after my declining to execute his work, their client had proceeded to Philadelphia, and succeeded in obtaining a design for the front from a prominent architect in that city who had adopted an entirely different solution of the problem, and was proceeding with the plans and other details of Messrs. Y. & Z.—who had not only designed a front with the expectation of its having the work executed, but of securing a more substantial style, as one for which they would charge considerably higher fees. But when the offer was made for the building as per Mr. C.'s instructions that the building should not cost more than $10,000. Mr. C., however, being of a very nervous and undecided disposition, in his desire to add here and there something to the design, was inclined to raise the original additions, which increased the cost of the building to $19,000, according to the estimate of the lowest bidder. Without according to the architects the privilege of reducing this estimate, Mr. C., refused to pay the architects their commission on the ground that the building had exceeded the cost stipulated.

The architects claim, however, that subsequently Mr. C. erected the building after their drawings, with the exception of substituting this Philadelphia front. Seeing that they had good cause for action and wishing to make a test case out of it, they commenced a suit to recover their commission, and the progress of the matter seemed to be in their favor.

I write with a lengthy newspaper account before me for reference, and the most singular circumstance of the case follows. Mr. C. had a presentiment that the suit would be decided against him, and on the day named for trial he asked for a postponement for one day, which was granted. In the meantime the architects secured some valuable witnesses, which fact, being reported to Mr. C., seemed to confirm his presentiment. On the following morning, the day appointed for the postponed trial, he was found on his bed, having taken a fatal dose of morphia, as the coroner's jury decided, with suicidal intent. The deceased had no other business troubles, and this unfortunate matter was to him only a trifle, some $1,200.

The above are the facts of the case which you can use at your discretion.

Yours truly,

J. A. DEMPFOLW.

[We give Mr. Dempfowl's letter in full, as his curious story hardly ought to be censored. The client on whose honorably gave up for the sake of professional courtesy seems to have been hardly in his right mind from the first.—E. AMERICAN ARCHITECT.]

MISAPPROPRIATING ANOTHER'S DESIGN.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Will you kindly answer the following through your valuable paper?

A design at X., furnishing the contractor with full-size details for every part of the structure, including mantels. The contractor (one of the kind who "furnish plans and estimates cheerfully") has in a house built and designed by him at X. duplicated a mantel from full-size drawings furnished him by us for house at X.—Is he liable for thus using our drawings, and can we obtain legal redress?

We remain very truly,

HAMILTON & MERRIAME.

[We doubt whether legal redress can be obtained for this mean trick. If the authors of the design wished to retain their property in the design itself, they should have copyrighted it; otherwise it is permitted to any one to imitate their mantel at pleasure. We should be pleased to prove that the contractor used for his own profit the full-size drawings which had been entrusted to him for another purpose, we think that he could be made to pay damages for the unauthorized use of property not belonging to him; but he would probably swear that he had not used the drawings, but had only duplicated the mantel which he had just made.—E. AMERICAN ARCHITECT.]

A LEANING STEEple AT COVENTRY.—The following particulars concerning the steeple of St. Michael's Church have been published in the Coventry Herald by Mr. Andrews, one of its editors.

In the year 1815 the upper 24 feet of the spire was taken down and rebuilt. The builders at that time thought the steeple was out of perpendicular, for they rebuilt the 24 feet exactly upon the spire exactly upon the plan before. The spire before the present restoration there was a bend in the spire which had been left, and it was supposed that this would appear that all knowledge of this had perished, for the discovery by the builder at the commencement of the present restoration that there was no bend in the spire into existence upon a restoration was recog- nized when the discovery was made. It seems to me that the steeple should be pulled from the summit, as far as to ascertain the total deviation from the perpendicular. A wire was suspended without de- lay, and an account of my observations was published in the local press about three years ago. Now that the work is approaching completion, the steeple setted upon its new foundations, it seemed to me that
Trade Survey

In the true spirit of independence that has been at work for a year or so, we find that beneath the surface of things there are new developments in the world's industrial and commercial life. Many of these changes are of importance and are likely to have far-reaching effects on all parts of the world. The trade situation is complex and requires careful analysis.

The change in the trade balance of many countries is due to the depression in the prices of raw materials. This has affected the import and export trade of many nations. The world's trade is undergoing a period of transition, and it is difficult to predict the exact nature of the future changes.

One of the most important factors in the present situation is the decline in the prices of raw materials. This has had a serious effect on the trade of many countries, especially those that depend on the export of these materials. The fall in prices has led to a reduction in the value of exports, and this has had a negative effect on the trade balance.

Another factor that has influenced the trade situation is the rise in the cost of living. This has led to a decrease in the purchasing power of the population in many countries, and this has affected the demand for imports.

The trade survey shows that there has been a significant decline in the trade balance of many countries. This is due to the fall in the prices of raw materials, the rise in the cost of living, and the depression in the world economy.

It is important for nations to take measures to address these issues and to promote economic growth and development. This will require a coordinated effort by all nations and will require careful planning and execution.

The Dececo Goods.

A Plumber’s Opinion as to the Puro Washbasin, and his estimate as to the comparative cost of the DECECO CLOSET.

PERSONAL ATTENTION TO SANITARY WORK.
JOHN WORTHINGTON, PUMBER AND GAS FITTER.
No. 1721 CHESTNUT STREET.
Plans Prepared for Drainage and Ventilation of Drain and Soil Pipes.

THE DECECO CO.
PHILADELPHIA, Oct. 6, 1888.

GENTS.—After using the Standpipe Overflow Basins amongst our best work, we concluded, upon examining the “Puro” basin, to give it a trial, and we are convinced of its superiority for the following reasons:—

1. It is without any regulating screws.
2. The strainer is in the standpipe, and is vertical in place of horizontal, thereby avoiding clogging from lint, which will sometimes catch upon the strainer.
3. The working parts being below the opening of the waste outlet, it is necessarily cleaned each time the waste discharges; also the opening is much larger, giving quicker vent and scavenging of trap and waste.
4. In respect to the difference of average cost between Dececo closet and tank and washout closet and tank, in answer to your query, I reply that we consider the difference in favor of the Dececo closet.

The prices are—Dececo and tank, $41.50; Washout and tank, $40.00. But in fitting up the Washout closet we are compelled to provide the anti-siphon pipe for trap, which increases the cost on an average of about $2.00 per closet; this work is never necessary in connection with the Dececo closet, hence it is the cheaper of the two by three dollars and fifty cents ($3.50).

After having used about two hundred of the Dececo closets, we would always give it the preference, even if the difference of cost were not in its favor, as it has given universal satisfaction, satisfying even those who were never satisfied before.

Yours truly,

J. WORTHINGTON

The Dececo Company,
12 High Street,
NEWPORT, R. I.
PUBLIC MONUMENTS.
GABOT'S CREOSOTE STAIN

The exterior of this house is stained with GABOT'S CREOSOTE STAIN for Shingles, Fences, Clapboards &c.

Mr. W. R. EMERSON, of Boston, desires us to publish the fact that he is using our stains continually, and that he has never pronounced them inferior to any other in the market.

These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply. 

Our Stains contain no water and are the only exterior Stains that do not contain kerosene.

Prices are 50, 50, and 75 Cents per Gallon according to color.

Send for Samples on Wood, and Circular.

SAMUEL CABOT, Sr.
70 Kilby St., Boston, Mass.
The Twenty-second Annual Convention of the American Institute of Architects, which was held in Buffalo on the seventeenth of October, although well attended, seems to have been rather barren of results. About fifty members were present, representing all parts of the country. The principal business was the consideration of the reports of committees appointed by the last Convention, on the consolidation of the professional societies; on uniform building contracts, for Chapter reports; on the provision of a permanent home for the Institute, and on the indemnification of Mr. Bloor. Of these reports, that on the consolidation of societies was decidedly the most important, and a long discussion took place upon it, which seemed to show that nearly everybody wished for such a consolidation, but that no one knew just how to bring it about. One gentleman thought the union very desirable, but believed that the members of one society ought to join the other as individuals, not as a body, to which another replied that if the requirements for admission to both societies were the same, there was no very obvious reason why the two bodies should not unite directly, without a previous dissolution of either, which would be unpleasant, and rather mortifying, to the members of the one dissolved. The result of the debate was that a resolution was unanimously adopted, "united in spirit," to the effect that a union of the societies was desirable, and another year allotted to the task of trying to bring it about. Whether the next year will be more fertile of results than the past one remains to be seen.

The new scheme is on foot, suggested by the operations of the syndicate which now monopolizes copper production, having in view a combination of all the gold mines in the world for the purpose of advancing the price of the precious metal. At least, that is the ostensible purpose, but the prospects of the company which is to be formed to carry out the project, as we find it in the Chronique Financière of Le Génie Civil, leads us to a good deal as if the profits of the promoters would be derived from the pockets of the stockholders, rather than the more refractory quartz rock. The fact is that very few gold mines are profitable in any case. It is said we do not know how truly, that the richest gold mine ever discovered, the Ophir, on the Comstock ledge, is now exhausted, never paid its stockholders in dividends enough to make good what they had invested in it; and there are hundreds of mines which produce a certain amount of gold, at a loss to their owners. A syndicate was wanted, to advance materially the cost of the metal must control these unprofitable mines, to cut off competition from them, and gold is much too widely scattered a substance to be easily monopolized. In Philadelphia the very mud of the streets contain it, and it is estimated that any industrious real estate owner in that city can wash out about a dollar's worth of gold a day, at present prices, from the clay on which the town is built; while an Artesian well driven in Boston disclosed the fact that this city, also, rests on a stratum of auriferous quartz of considerable richness. If any combination which would advance the price of gold in a few days, as the Société des M étailais did that of copper, we might expect to see every Philadelphian, to whom an income of two dollars a day was an object worth striving for, digging up his garden to wash out the precious particles; and thousands of scantly auriferous deposits, in all parts of the world, which would be worthless competitors of the field which had brought the price back to its normal level.

In anticipation of the proposed utilization of a large part of the sewage of Paris, by irrigation on the fields of Achères, a Commission, appointed by the French Senate, recently visited the irrigation fields at Berlin. These are now in working order, and furnish the cost of filling in the work of purification by irrigation in the world. Berlin now contains more than thirteen hundred thousand inhabitants, having trebled in population during the last twenty years. In the outlying districts the cesspool is still used, but the whole of the closely-built portion of the city, containing eleven hundred and fifty thousand inhabitants, is thoroughly irrigated; and the question of purification matters from this part of the population are carried by water to the pumping stations from which they are distributed on the irrigation fields. The method of distribution is very simple. According to the account in Le Génie Civil, each of the twelve sections into which the drainage system is divided is furnished with a huge cylindrical reservoir, into which the crude sewage is pumped. Here it is allowed to settle slightly, and is strained by gratings, passing thence to a well, about ten feet in diameter, from which the comparatively clear liquid is pumped directly into the irrigation pipes. These consist of cast-iron mains, with branches, a great many, of which the number may exceed fifty. In order to prevent breaking the pipes by the pressure in case they should become clogged, stand-pipes, open at the top, are attached at intervals. The height of these pipes determines the maximum pressure which can exist in the mains connecting with them, as any greater pressure will be relieved by overflowing. As the excess water is brought in the purification by irrigation, the quantity of liquid to be disposed of is very large, and the ground, which rests on an impervious stratum three or four feet below, is unfavorable to filtration. In the first experiments, one acre of irrigation fields was allotted to four hundred inhabitants, but it was soon evident that this was not enough, the land becoming soaked and muddy, and the effluent being imperfectly purified. More land was bought, and an acre set apart for each three hundred inhabitants, but this was not sufficient, and the irrigated fields now comprise about eight thousand acres, while six thousand more remain to be taken into service as the population of the city increases.

The liquid is applied to the ground by means of the open channels, which are barred by wooden gates, to change the flow as required. The separate patches formed by the conduits are laid out with ridge and furrow, and all sorts of vegetables are successfully grown, together with flowers, principally roses and violets. Of course, the neighboring city dwellers have a market for the produce, and the fruits attain excellent quality. In the low lands, which are devoted to grass, seven crops of hay are secured in a year, and great numbers of cattle are maintained. So far, there has been no instance of illness or any kind traceable to the sewage. The air is so fresh, that, besides the Cadet School, which exists in the neighborhood before the sewage system was laid down, valetudinarian hospitals have already been built in the middle of the irrigation fields, and other establishments of the sort are in contemplation. Typhoid fever, which might be expected occasionally, as all the people on and about the irrigated farms drink the effluent water, is unknown, and the thorough mixing of the fields has diminished the number of cases of intermittent fever, which was once prevalent in certain portions of the territory. Although the system is not self-supporting, the receipts of the farms are nearly a million dollars a year, and it is not unlikely that in private hands they might be made to give a profit, while...
the work of purification is so thoroughly done that at one of the stations the effluent water is collected in a pond, in which trout, perhaps the most sensitive of all fish to impurity of the water in which they live, are successfully raised.

Professor Roger Smith delivered a lecture before the students in Architecture at University College, London, which, as reported in the English building journals, is worth reading by all architects. The title of the lecture was "Mistakes in Architecture," but it might just as well have been called "Mistakes in the Conduct of Life," for its substance applies to all professions, as well as that of architecture. In general, Professor Smith condemns carelessness in the performance of professional duties; sharp or doubtful practices, among which he includes the solicitation of employment, and offers to do work at less than the usual rates; want of caution in giving orders, or making and noting contracts, and haste or bad temper in business dealings. Especially he deprecates the overbearing, angry letters, which, as he says, are read in cool blood, and excite lasting resentment where hasty verbal expressions would be readily overlooked. We sometimes think that Talleyrand's rule, "Never write a letter, and never destroy one," is the safest one for a profession as much as his own. But he cannot always avoid expressing himself in black and white, he may with advantage remember a story which Professor Smith tells about Sir Robert Peel, or some other noted statesman: A friend of this hero, whoever he was, had been apprenticed in some such way as we all are occasionally, and had been placed in charge of a packet-boat. He had worked hard over the letter, and had concocted a masterpiece of stinging sarcasm, which, after a final polishing, he brought to show to his distinguished patron. The statesman read it through without a word, and then inquired whether any copy had been made of it. On learning that there was no duplicate, he remarked, "very injudicious letter: much better burn it"; and, to make sure of his advice being followed, he put it in the fire himself, and held it there with the poker until it was consumed.

The Engineering and Building Record publishes an interesting letter in regard to the expansion of ice by heat, which explains a good many phenomena that most people have observed, without being able to account for them. According to the letter, a short railway was once built in the Province of Ontario, which crossed a fresh-water pond, known as Rice Lake, by a bridge two and one-half miles long. The bridge was mostly composed of trestle-work, very strongly built, with uprights driven to a hard bottom, and thoroughly braced in every direction, over the entire span of the lake, was composed of trusses, eighty feet in span, supported by piers, measuring twelve by twenty-four feet, and filled with stones. Early in the winter after the bridge was built, the lake froze over to a depth of about seven inches. Before snow came to prevent the ice from weather modernizing, the sun shone out brightly, the ice expanded, and in a few minutes the bridge was in ruins nearly its whole length, the trestles being pushed over in the direction of the principal expansion. The destruction of the bridge caused the temporary abandonment of the railway, but years afterwards the trestles were repaired and filled in with an embankment of gravel, the top of which is eight feet above the level of the water; yet the expansion of the ice during sunny days is so great that it frequently creeps up the embankment, and, by successive movements, is pushed upon the rails. It is evident that such movements as these of vast sheets of ice, urged by the irresistible force of expansion by heat, are of great importance to those who have to build in places exposed to them, and Mr. Dumble, the author of the letter, made recently some experiments to determine the exact amount of the change of volume under different circumstances. For this purpose he selected a mill-pond near his home, and in certain areas of ice, which he kept separated from the ice about it by a canal eighteen inches wide, kept open by constant attention. Near the ends of the floating block, which was one hundred and three feet long, were set pieces of plank, and on these was laid a long pole, carefully spiked, and with means of marks or numbers. By the aid of rollers and its supports, any variation in their relative lengths could be immediately observed and measured, and a rough sheet was built over the place, to prevent the rays of the sun from falling on the ice, and complicating the effects due to atmospheric temperature. Although there were considerable variations in the weather during the first few days of the experiment, the ice showed no movement until it had attained a thickness of three inches, the explanation of this being undoubtedly, as Mr. Dumble says, that up to this point the ice shared the temperature of the water on which it floated. As it thickened, however, it became very sensitive to heat and cold, reaching its maximum dimensions at a temperature of thirty-two degrees Fahrenheit, and contracting uniformly as the thermometer fell below this as far as four degrees below zero, which was the lowest point reached during the season. So long as the ice, being under cover, and perfectly still, could assume its characteristic, the contraction and expansion were at the rate of one-three-hundred-thousandth of its length per Fahrenheit degree, or about fifteen one-hundredths of an inch in the length of the sheet under observation for a range in temperature from zero to the melting-point of water, or a considerable depth of snow, and the character of the ice was altered, the surface becoming moist, and the substance probably somewhat spongy.

When cold weather returned, the rate of expansion and contraction of the ice was found to have more than doubled, the movement due to a variation of one degree in temperature being now about one-hundredth and thirty-one-thousandth of its length, or three-tenths of an inch in the length of the floating mass for a range of thirty-two degrees. This, it must be remembered, was simply the excess of expansion and contraction of the ice over that of the wooden rod, which would also expand and contract, at a rate which Mr. Dumble does not determine, and made up as reply to the instance had which was given above. However, the rate of expansion and contraction of the wooden rod is not far from that of the ice, so that the apparent expansion of the ice, as measured by the rod, was only a fraction of the true movement. According to Brunner, the true coefficient of expansion of pure ice is three hundred and seventy-five times as great as the degree Centigrade, or about six times as great as Mr. Dumble's uncorrected observations indicated, so that the actual lengthening of his floating cake of ice, if measured by two fixed points, as, for instance, points of rock projecting from the bottom, would have been nearly nine-tenths of an inch, and a sheet of seventy-five long would expand from six inches to 14 feet. Moreover, as skaters know, movements of the ice on ponds cause long cracks. These fill with water, which is soon frozen into the mass, increasing its volume, and causing it to creep upon the banks, or push with irresistible force against a wall or other structure which may be in its way.
noting what has been accomplished, and what remains for us to do. Since the foundation of the Institute in 1852, the society has grown; the profession has greatly improved. This is due in a great measure, if not chiefly, to the establishment of that good fellowship among its members which has led to professional intercourse of a certain degree, that formerly is now a reality, and that result had been accomplished, we should have reason to congratulate the Institute. The establishment of mutual respect and personal consideration among the members of the profession has much improved, and the growing interest in architecture shewn by individuals and corporations has led to art publications and the establishment of architectural and art schools. For the future, still much remains to be accomplished.

The session was devoted to the reading of reports from the officers and the special committee. The special committee submitted reports on the following subjects:

On consolidation of architectural societies; on a bill to provide improved methods in the architectural service of the Federal Government; on a bill for the incorporation of the Western Association of Architects; on the uniform building code contract, professional benefits, the Institute, the Western Association of Architects, and the National Association of Builders; a formula for Chapter reports; on provisions for a permanent home for the Institute, and on indemnification of Mr. Bloor.

In the evening the exhibit of drawings was opened and attracted much attention. A portion of the Fine Arts Gallery was given up for this purpose, and 118 different drawings were exhibited. The largest was a design map of the proposed South Buffalo Park. Several Buffalo architects are well represented. The exhibit of drawings for church interiors, windows, and "Tiffany" plans for parlor decorations in Persian, Moorish, and English Renaissance styles are notably fine.

In the evening session was given up wholly to a discussion of the report of the special committee on consolidation. Mr. W. W. Carlin of this city is a member of the committee. They submitted a lengthy plan of consolidation of all the architectural societies in the States, and the committee decided to take up the report and act on it seriatim.

Mr. Adler, of Chicago, President Smith of the Western Association of Architects, and others favored consolidation, and after considerable discussion the first important phase of the Institute's consolidation shall be "The American Institute of Architects," which has prevailed in the old A. I. A., viz., "the honorable practice of the profession," may become part of the new organization. This drew out a very animated and extensive debate, and was not acted upon.

Mr. Briggs proposed the consolidation by suggesting that it would be better for the Western Association to come in as individuals.

Mr. Adler, representing the Western Society, instantly jumped to his feet and declared that he was a member of both organizations, but that the Western Society had three times as many members as the American Institute of Architects.
the Institute and had vitality enough to exist without the Institute. The Western Association did not ask, but was asked to join the Institute.

Mr. Briggs feared the new members would dominate the Institute. Mr. Cutler, of Rochester, thought that Mr. Briggs was mistaken. The Institute had taken the initiative, and was committed to ameliorate the status.

Mr. Carlin said it would be unfair to compel members of other societies to pay initiation fees.

The Western Society would not join the present Institute, but was willing to join hands with the Institute and form a confederation, retaining the old name in honor of its age and prestige. The Western Society sought a more democratic charter, and its object was to advise and aid, and would not consent to be ruled by a Board of Managers.

President Hunt, as one of the original founders of the Institute, said that he had always regarded the latter as the last association of any kind acting in the interest of the profession as a body. It took the Institute thirty years to get 290 members, and the Western Association had received a greater membership in three or four years. There would be danger in admitting so large a number.

Messrs. Adler, Gibson, Shipman, Cutler and others debated the matter thoroughly and several resolutions were offered and withdrawn. Finally a resolution, seconded by Mr. Fisher, was taken: The last annual convention held at Chicago, in favor of forming a confederation, was carried unanimously amid applause. The report was again taken up, and went over as unfinished business.

ANNUAL REPORT OF THE BOARD OF TRUSTEES OF THE AMERICAN INSTITUTE OF ARCHITECTS.

To the American Institute of Architects:

Since the twenty-first Convention, held in Chicago in October of last year, your Board, under the chairmanship in most instances of the President, Mr. Hunt, have held eight regular meetings, two adjourned meetings, and two special meetings, holding the monthly ones having been changed, to suit the convenience of Western members of the Board, from the third to the first Wednesday of the month.

Mr. W. Van, F. R. A., having positively refused to accept the Secretaryship for 1888, to which he was elected, Mr. Bloor has so far remained at the post; and Mr. Congdou has declined his re-election, in 1889, at its first meeting in the coming year, appointed Mr. Littell (who has a number of times been elected and served in that office) to fill the vacancy.

Since the last report of your Board, four (4) Associates, Messrs. E. H. Lindquist, of Utah, N. J.; Jas. Willett, of Chicago; Warren R. Briggs, of Bridgeport, Conn., and F. W. Humble, of Buffalo, have been advanced to the upper grade of membership, and thirteen (13) candidates have been elected Fellows by first-election, viz., W. Belden Powell, of Philadelphia; Wm. W. Clay, of Chicago; Geo. F. Hammond, of Cleveland; Will. A. Freer, of Washington; Supervising Architect of the United States Treasury Department; W. S. Acheson, of Utica, and Geo. J. Wilson, of New York; Supt. of Buildings; Louis De Coppet Berg, of New York; Jas. G. Hill, of Washington, ex-Supervising Architect, United States Treasury Department; Edward Clarke, of Washington, Architect in charge of the United States Capitol; Chas. E. Colloton, of St. Louis; M. J. Dimmock, of Richmond, Va.; H. A. Macomb, of Philadelphia, and Geo. J. Metzger, of Buffalo. The accessions to the Associateship were, for the number, thirty-one Fellows and thirteen Candidates; and Mr. Jno. Murdoch, of Baltimore, has been transferred thence to the Fellowship grade.

A number of other applications from candidates for professional membership are before the Board, as also letters from various parts of the country, making inquiries in reference to the possible formation of chapters; several of which in continuation of correspondence opened by the writers of them last year, but while the question of consolidation is pending, it has not been thought desirable to issue any especial answer or answers.

To the list of Honorary Members have been added the names of Charles A. chapel, of Paris, architect and author of several valuable works on architecture and general art, and of Countess Rodulphe Luncelaini, archiologist and Director of the Excavations in Rome; while Signor Giacomo Beni, of Venice, Architect in charge of the Delft Palace and the Campanile of St. Mark’s, has been enrolled, by directions from the Council, to the list of Correspondents; and Messrs. Gifford, of Chicago, and H. E. Ofenrider, of Cincinnati; Albert H. Kipp, of Wilkesbarre, Pa.; Jno. A. Hamilton, of New York; Wills G. Hale, of Philadelphia, and C. F. Wilcox, of Providence, R. I.

In both cases the resolutions were forwarded to the widows of the deceased members.

Mr. Walter’s widow has endeavored since her husband’s death to collect a claim of his to a large amount against the United States Government for professional services rendered by him in designing and constructing the completion works at the Various Federal buildings in Washington, and a number of other Federal buildings, and your Board, feeling the justice of the claim, has afforded her all the assistance in its power, the Secretary having prepared resolutions on the subject with various parties, and sending to all the Chapters suggestions toward influencing a favorable consideration of the subject by Congress. The present status of the matter is that some time ago the Secretary wrote on the subject to the President of the United States, in favor of a settlement by the payment of a sum considerably less than a quarter of that claimed, and that Mrs. Walter’s attorney had inquired in Washington, and the Board have been advised that it is in the hands of the President of the United States, the Board having advised the President in this matter until it should be taken up in the Senate.

The Secretary has, during the year, been called on to furnish the editors of two well-known cyclopedias with biographical details of the late Mr. Michael J. Briggs, for many years a Trustee, and, for two years President of the Institute, and the architect of the Presbyterian Church, cor. Fifth Avenue and Fifty-fifth Street, the Unitarian Church of the Messiah, the Roosevelt House of Orphans, the Orphan Asylum, the Moor Endowment for Orphans, the A. L. A. Hotel, and the many other important structures.

In both cases the resolutions were forwarded to the widows of the deceased members.

Mr. Walter’s widow has endeavored since her husband’s death to collect a claim of his to a large amount against the United States Government for professional services rendered by him in designing and constructing the completion works at the Various Federal buildings in Washington, and a number of other Federal buildings, and your Board, feeling the justice of the claim, has afforded her all the assistance in its power, the Secretary having prepared resolutions on the subject with various parties, and sending to all the Chapters suggestions toward influencing a favorable consideration of the subject by Congress. The present status of the matter is that some time ago the Secretary wrote on the subject to the President of the United States, in favor of a settlement by the payment of a sum considerably less than a quarter of that claimed, and that Mrs. Walter’s attorney had inquired in Washington, and the Board have been advised that it is in the hands of the President of the United States, the Board having advised the President in this matter until it should be taken up in the Senate.

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petition. They did so in a letter to ex-Governor Cornell, Chairman of the Committee that have the matter in hand (who was approached by Secretary Greene), and copies of it were forwarded to each Chapter of the Institute. The letter was published generally in the architectural serials, and received the official commendation of the Chief Engineer and of the Western New York State Association of Architects.

For the current information of the Board, the Special Committee on Improving the Architectural Service of the Federal Government reported the results of their interview with Mr. Peirce, the Supervising Architect of the Treasury Department. This information, in condensed form, will presently be laid before you separately in the report of that Committee.

The services of the Board in setting a dispute between an architect and his client have again been asked for and refused, in accordance with the rule confining advice and adjudication on the part of the Board to matters of concern to the Institute.

The Secretary being informed by another architect that he had recovered by legal process a receipt of a reclining client, the principal and interest of a bill for partial service to its full amount of nearly $2,000, the architect's charges being made in accordance with the Architectural schedule, his opponent's counsel had endeavored to influence the court and jury by making the point that the schedule was the production of a combination of architects existing for the purpose of imposing upon an extortious rate for services. The Secretary, in his rejoinder to his correspondent, had pointed out that it was very fortunate for him and others that the Institute had so promptly made a precise and just schedule; that it is an easy thing for a reputable architect and his lawyer — if the latter is sufficiently competent and tenacious — to go into court and collect to the fullest limits of the law, also, that the formation of the organization is so high that the false charge that it is a combination of architects for the exaction of extortious rates for professional services has no effect on a jury.

Two of the foreign Members have enriched the Library of the Institute during the year; one, Mr. P. J. H. Ceyrers, of Amsterdam, having made it a donation of fifty-eight engravings and woodcuts, illustrating eighteen churches designed and executed by himself in Holland, and most of them since 1860; the other, Mr. de teren, of Munich, contributed a copy of his "Lectures on the House Kunstkonstruktionen," with accompanying atlas. The American Society of Civil Engineers, the Royal Institute of British Architects, and the Société Centrale des Architectes continue to forward their transactions; while copies of architectural and engineering serials are regularly received from various points in Europe, and one from the East Indies.

A letter from Secretary Normand S. Patton of the Western Association of Architect ors, on behalf of that Association's Committee on the Metonic System, advocating its use for weights and measures, and referred by the last Convention to your Board with power, has several times been presented, laid on the table, taken up at a subsequent meeting, and occasioned some discussion, but without further result.

To your Secretary was referred, by a member of the Institute, a letter from a clergyman connected with the proposed Babylonian Expedition Fund, asking where a young architect might be found who would be willing to assist in saving the precious remains in the Temple of Mischia. The Institute, through the Secretary, replied to the request several parties, but without result.

At the request of the Board, an appeal was made to the members, Messrs. Littel and Bloor, to act as a Committee of Arrangements for the current exhibition, to be held in Buffalo, preferably in the third week in October, and at the September meeting Mr. Carlin was appointed the committee.

Your Board will call the attention of the Convention to the fact that the experiment of a reduction of the dues made some years ago has been considerably successful, and many of the professionals have properly performed the work of the Institute, the revenue should be at least double the amount that is at present. It is well known that the dues of other like associations are greatly in excess of those of the Institute.

This convention will probably yield to no previous one in the importance, so far as Associate interests are concerned in the question of the future of the Institute. The discussion will center in the fact that they will meet in that broad public spirit which can alone deal with themes involving more than local conditions and individual preferences.

Respectfully submitted for the Board of Trustees by

A. J. Bloor, Secretary.

October 17, 1888.

REPORT OF P. L. LE BRUN, ESQ., AGENT OF THE WILLARD ARCHITECTURAL COMMISSION.

NEW YORK, October 10, 1888.

To Messrs. N. Le Brun, Pres., A. J. Bloor, Sec., and Emile T. Littel, Willard Architectural Commissioners:

Gentlemen,—I have at last the honor to report to you that the installation of the Willard Architectural Collection in the main hall of the older portion of the Metropolitan Museum of Art is a matter of the immediate future, and I only await the transfer of the objects lately exhibited there to their spacious new quarters in the enlarged museum.

The overcrowded condition of that institution for years past, necessitated the postponement of the selecting and purchasing of the casts, until provision was assured for their proper disposition and exhibition. This enforced delay has, however, proved to the advantage of the fund, placed at your disposal by the terms of the bequest, in the accumulation of four years' interest on the money devised. It has also permitted a more deliberate maturing of the work of selection.

The construction of the new Museum of the institution, which was begun last autumn sufficiently to warrant the purchasing of casts, your agent made his second trip to Europe, under your direction, for this purpose. Of the casts he then secured, the larger portion, or two hundred and fourteen cases, have arrived — leaving about eighty cases yet to come.

These boxes remain still unopened in the cellars of the Museum, owing to the lack of space required for their temporary housing and sorting their contents and putting together the larger objects, which are mostly shipped in many parts, requiring a careful redraft. And, as it is the intention of the Museum authorities to reopen their doors in due time, that is to say, by the middle of December next, it will be impossible within that limited time to mount and prepare the Willard casts for exhibition. Much as this is to be regretted, it seems to have been unavoidable.

Since my last report, the Museum has added the West Court, formerly devoted to the modern sculpture — to the uses of the Willard collection. Of the architectural collection, the Architectural Court in the centre of the south side of the main room have brought about a few unimportant shifting of the arrangement obtained in the last convention. The area of the room will remain the same, and the collection will be distributed likewise as if it had been extended into its extension northward, when the additions on that side are built — as will be inevitably required in the future.

Within the limits of this report, it will be unnecessary to allude specifically to any but some of the more prominent objects thus far purchased. In the scheme of the collection, typical models of entire buildings, made to a sufficiently large scale to permit of the accurate reproductions of details as seen by the map of original plans. They are to form central crowning illustrations of the peculiar features of each important style, around which are to be grouped castings of detail, photographs and works of reference.

A number of estimates were obtained from specialists, and contracts were made with a skilled sculptor of Paris for the production (as a commencement) of models of the Parthenon, and of the Cathedral of Paris, made to the usual scale one foot to a tenth of an inch.

They are well-advanced, and from photographs lately received of the portions already finished, promise to be very successful. In these models, all the decorative details and carving are to be faithfully reproduced. Of Notre Dame Cathedral the exterior only will be shown, but of the Parthenon both the exterior and interior will be equally finished.

The architectural fidelity of these models may be estimated, when it is stated that they are being made under the direct supervision of that distinguished French architect, Monsieur Charles Chipiez, who stands among the first of living authorities on architectural archeology and history. This is not the last of artistic feeling that cannot be highly appreciated, placed his services, on my application, at the disposition of the Willard Commission, and has in a few months of active labor with the architect made clodualate points in the construction of the Parthenon, as to which temple he has made extended special and original researches in connection with his work (in collaboration with Monsieur Perrot) on the subject to the volume of the Inauguration of their use in the "Architecture de la Gréce antique". His solution of the disputed points as to the manner of admitting the light to the interior, and of the external and internal polygenesis of the building, will prove most interesting and valuable.

And we may confidently have his expressed hope, that the Willard model of the Parthenon will give of that superb edifice, which is so capital for instruction, an exact and complete idea; and that it will prove a certain increasing cause of a real effect of the work, in addition to the reproduction of the Phidian statue of Athene Parthenon, the temple will contain a number of portable tables and other artistic treasures, lists of which have been handed down to us.

The educational value of such an exhibit may be estimated, when it is pictured surrounded by casts of the various architectural members of the building, the large pedestal of the model hung with restorations in tint and black and white, and photographic views, the reference library near at hand, with the standard works of Michaelis, Böckmayr, Marcellus, and Fumagalli, and in a court-house (pro- vided by the munificence of Mr. Henry Willard) the exhibition of casts of every known fragment of sculpture of this noblest edifice, friezes, metopes and pediments. Could the study of its subtle attitudinal beauty be possible by such a method?

As to the magnificent model of the cathedral of Notre Dame, its execution will be facilitated greatly by the sculptor's access to the various drawings and studies of Viollet-le-Duc — made at the time of the restoration of this building — drawings which the kindness of the diocesan architect has placed at his disposition. All the sculptures, in the round and in relief, and the carving will be rendered with as strict accuracy as the scale admits; and the photographs of
The American Architect and Building News. [Vol. XXIV. — No. 671.]

by Congress to sit in judgment of the plans submitted to competition by twenty-eighth architects from the United States and England. This Commission was composed of Senators Merrill and Howe and A. R. Spofford, Librarian of Congress. They began their work at that time the design of Architects Smithmeyer and Peshalz as the best. It has since passed through the ordeal of a limited competition with three selected competitors, the work of which has been divided among thirteen competitors, lasting for several years, and resulting in its final adoption by Congress in 1886, and in the commencement of its erection.

As soon as the transfer of the property purchased by the Government for the library site was effected, actual work was commenced. The drainage of the site was at once laid, the excavations were made for the cellar and trenches, concrete work begun, and a large quantity of the dimension stone for the cellar walls was delivered on the premises, ready for putting into the structure.

At this stage of progress Congress abolished the Commission, rescinded all former acts and contracts, and the project stopped all work, and placed the entire management in the hands of the Chief of Engineers, U. S. A., who was authorized to prepare a new design for a building, the entire cost of which is to be limited to four million dollars ($1,600,000), exclusive of the five hundred thousand dollars ($500,000) already appropriated and partly expended.

HOUSE OF A. J. KENNEDY, ESQ., MINNEAPOLIS, MINN. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

BEARING POWER OF SOILS.

It is scarcely necessary to say that soils vary greatly in their bearing power, ranging, as they do, from the condition of hardest rock, through all intermediate stages, to a soft or semi-liquid condition, as mud, silt, or marsh. The best method of determining the load which a specific soil will bear is by direct experiment; but good judgment and experience, aided by careful study of the nature of the soil — its compactness and the amount of water contained in it — will enable one to determine with reasonable accuracy its probable supporting power. The following data are given to assist in forming an estimate of the load which may safely be imposed upon different soils:

Rock — The ultimate crushing strength of stone, as determined by crushing small cubes, ranges from 180 tons per square foot for the hardest stones, such as marble, to 1,800 tons per square foot for the hardest stones. The crushing strength of slabs, i. e., of prisms of a less height than width, increases as the height decreases. A slab one-quarter as high as wide is two or three times as strong as a cube of the same material. If a slab be conceived as being made up of a number of cubes placed side by side, it is then easy to see why the slab is stronger than a cube. The exterior cubes prevent the detachment of the cubes properly from the sides of the interior cubes; and hence the latter are more strongly lighted, which materially increases the strength of the slab. In testing cubes and slabs, the pressure is applied uniformly over the entire upper surface of the test specimen, a pressure which may then conclude that when the pressure is applied to only a small part of the surface, as in the case of foundations on rock, the strength will be still further increased.

That a unit of iron has a much greater power of resistance when it forms a portion of a larger mass than when it is isolated in the manner customary in making experiments on resistance to compression, is conclusively proved by the following experiment: A one-inch thick round bar of soft Airloom iron, eight or nine inches long, was placed on two opposite sides to a thickness of three-fourths of an inch, and pressure was applied on one side of it with a steel die one-half an inch square. The compressive strength of iron determined in the usual manner, was 27,000 pounds per square inch; but, under the conditions stated, a load of 55,700 pounds per square inch was required to produce the slightest perceptible indentation, and 80,000 pounds per square inch produced an indentation only about one sixty-four of an inch deep. Essentially the same thing is shown by everyday railroad practice. The pressure at the point of contact
CONGRESSIONAL LIBRARY BUILDING

Saidmeyer & Co. ARCHITECTS

VIEW OF ONE OF THE Corridors OF FIRST STORY

Herberton Printing Co., Boston
The safe bearing power of rock is certainly not less than one-tenth of the ultimate crushing strength of cubes; that is to say, the safe bearing of rock is not less than a quarter of a cubic foot per square foot for the softest rock, and 100 for the strongest. It is safe to say that almost any rock, from the hardness of granite to that of a soft, crumbling stone, which is easily worn by exposure to the weather or to running water, will bear the heaviness of a bed of gravel which can be brought upon it by any masonry construction. It scarcely ever occurs in practice that rock is loaded with the full amount of weight which it is capable of sustaining; in the majority of cases, therefore, the extent of harmless loading is considerable.

Clay.—The clay-soils vary from slate or shale, which will support any load that can come upon it, to a soft, damp clay, which will squeeze out in every direction when a moderately heavy pressure is brought upon it. Foundations on clay should be laid at such depths as to be unaffected by the weather, since clay, at even considerable depths, is considerably affected by the seasons.

The bearing power of clayey soils can be very much improved by drainage, or by preventing the penetration of water. If the foundation is built on clayey materials, care must be taken that the clay upon which the building is laid will not settle, and that the clay's supporting power is greatly increased, being greater in proportion as these materials are greater. When they are present to such an extent that the clay is as close to the surface as to be within the reach of men, the bearing power will be correspondingly increased.

The following data on the bearing power of clay will be of assistance in deciding upon the load that may safely be imposed upon any particular clayey soil: From the experiments made in connection with the construction of the capitol at Albany, N. Y., the conclusion was drawn that the extreme supporting power of that soil was less than six tons per square foot, and that the load which might safely be imposed upon it was limited to 3 tons per square foot. The soil was blue clay, containing from 60 to 90 per cent of alumina, the remaining being fine silicious sand. The soil contains from 9 to 14 per cent of water, and varies in dryness. Samples of it weighed 81 to 101 pounds per cubic foot. In the case of the Congressional Library, the ultimate supporting power of "yellow clay mixed with sand" was 12½ tons per square foot, and this was proved to be 2½ tons per square foot. Experiments made on the clay under the piers of the bridge across the Missouri, at Bismarck, with surfaces 1½ inches square, gave an average ultimate bearing power of fifteen tons per square foot of clay, when kept dry, will safely bear from four to six tons per square foot; but the same clay, if allowed to become saturated with water, cannot be trusted to bear more than two tons per square foot. A very thin layer of clay (hard above and soft below, resting on a thick stratum of quicksand) is 1½ to 2 tons per square foot; and the settlement, which usually reaches a maximum in a year, is about one inch. For the stability of the structure in Central Illinois shows that, if the foundation is carried down below the action of the frost, the clay subsoil will bear 1½ to 2 tons per square foot without appreciable settle. There is no safe load for compressible soils as 1½ to 1¾ tons per square foot. Sand.—The sandy soils vary from coarse gravel to fine sand. The former, when of sufficient thickness, forms one of the finest and best materials for the latter, when put in contact with water. It is especially a liquid. Sand when dry, or wet sand when prevented from spreading laterally, forms one of the best beds for a foundation. Porous, sandy soils are, as a rule, affected by the weather, and are extremely liable to carry away water; in the former case they present no difficulty, but in the latter they require extreme care at the hands of the constructors.

Clayey gravel, or clean sand, in beds of considerable thickness, protected from being carried away by water, may be loaded with 8 to 10 tons per square foot with safety. In an experiment in France, clean river-sand, compacted in a trench, supported 100 tons per square foot. When clay and compacted, if protected from water, will safely carry 4 to 6 tons per square foot. The piers of the Cincinnati suspension-bridge are founded on a bed of gravel below 10 feet thick, resting on a bed of sand 6 feet thick resting upon bed-rock; the maximum pressure is about 5½ tons per square foot. At Chicago, sand and gravel about 15 feet below the surface are successfully loaded with 2 to 2½ tons per square foot. At Berlin the bearing power of sand for sandy soil is generally 4½ to 5½ tons per square foot. The Washington Monument, Washington, D. C., rests upon a bed of very fine sand 2 feet thick underlyin a bed of gravel and boulders, the ordinary pressure on certain parts of the foundation being far from 11 tons per square foot, which the wind may increase to nearly 14 tons per square foot.

Semi-liquid Soils.—With a soil of this class, as mud, silt, or quicksand, it is customary (1) to remove it entirely, or (2) to sink piles, tubes, or cairns, or (3) to build a raft to a solid subsoil, and then to consolidate the soil by adding sand, earth, stone, etc. Soils of a soft or semi-liquid character should never be relied upon for a foundation of a great and lasting importance, but a heavy superstructure may be supported by the upward pressure of such a soil, in the same way that water bears up a floating body.

According to Rankine, a building will be supported when the pressure at its base is \( \frac{1}{3} \left( \frac{1}{2} \sin \theta - \frac{1}{2} \right) \) per unit of area, in which the expression is the weight of a unit volume of the soil, \( h \) is the depth of immersion, and \( x \) is the angle of repose of the soil. If \( x = 80^\circ \), then according to the preceding relation the supporting power of the soil is 1.4 \( \frac{1}{2} h \) per unit of area; if \( x = 10^\circ \), it is 2.9 \( \frac{1}{2} h \) for the weight of soils of this class, that is, mud, silt, or quicksand, varies from 100 to 150 tons per cubic foot. Rankine gives this formula as being applicable to any soil; but, since it takes no account of cohesion, for most soils it is only roughly approximate, and gives results too small. The following experiment seems to show that the error is considerable. A 100-foot strip of concrete resting on mud, whose angle of repose was 5 to 1\( \frac{1}{2} ^\circ \), bore 700 pounds per square foot. This is 2\( \frac{1}{2} \) times the result by the above formula, using the maximum value of h. The failure of buildings has been attributed to settlement on quicksand by making the base of the immersed part as large, and at the same time as light, as possible. Timber in successive layers, or gravel on piles, is generally used in such cases. This class of foundations is frequently required in constructing sewers in water-bearing sands, and though apparently presenting no difficulties, such foundations often demand great skill and ability.

It is difficult to give results of the safe bearing power of soils of this class. A considerable part of the supporting power is derived from the friction on the vertical sides of the foundation; hence the bearing power depends in part upon the area of the side surface in contact with the soil. Furthermore, it is difficult to determine the exact supporting power of a plastic soil, since a considerable settlement is certain to take place with the lapse of time. The experi-

**BEARING POWER OF SOILS.**

| KIND OF MATERIAL | Bearing Power in tons per square foot
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Rock—the hardest</td>
<td>500</td>
</tr>
<tr>
<td>Rock equal to best sandstone</td>
<td>250</td>
</tr>
<tr>
<td>Rock equal to best brick masonry</td>
<td>100</td>
</tr>
<tr>
<td>Sand—thick beds, ordinary dry</td>
<td>2</td>
</tr>
<tr>
<td>Clay—thin beds, moderately dry</td>
<td>1</td>
</tr>
<tr>
<td>Gravel and coarse sand, well cemented</td>
<td>10</td>
</tr>
<tr>
<td>Sand, clean, dry</td>
<td>4</td>
</tr>
<tr>
<td>Quicksand, alluvial soils, etc.</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Conclusion.**—It is well to notice that there are some practical constructions which modify the pressure which may safely be put upon the soil. For example, the pressure on the foundation of a tall chimney should be considerably less than that of the low massive foundation of a fireproof vault. In the former case a slight inequality of load will not endanger the stability of the structure; while in the latter no serious harm would result. The pressure per unit of area should be less for foundations of great stability, and the bearing power may be increased by the use of a railroad viaduct—i.e., as for example, a railroad viaduct—than for a heavy structure, subject only to a quiescent load, since the shock and jar of the moving load are far more serious than the heavier quiescent load.

Ira O. Baker, C. E.

**Khoja Ahrar Mosque at Tashkund.**—The Turkestan Gazette gives the following account of the opening of the restored mosque of Khoja Ahrar in Tashkund, said to be over 400 years old: "The opening ceremony of this mosque, restored by the Russian Government, was held in the mosque, on the 8th of September. After the religious function the Imam of the parish gave an address, describing the benefits conferred by the Russian Government, and stating that never had the native population of Turkestan enjoyed so tranquil and prosperous an existence as now. He concluded by asking the Mohammedans present to join in a prayer for the Czar. This the audience did, raising their arms."
THE ARCHITECTURAL AND BUILDING NEWS. [Vol. XXIV.—No. 671.

WITH THE BRITISH ASSOCIATION AT BATH.

The monotony of the Bath of eighty years has been relieved by the annual meeting of the British Association for the Advancement of Science, which has been largely attended; the old Roman city of Aquae Salis, with its numerous architec-
ture, associations and picturesque surroundings, presenting a complete contrast from the bustle of last year's meeting at Manchester.

In his inaugural address, the new President, Sir Francis B. Blundell, C. F., reminded his hearers that science cannot be made useful to mankind without being applied; that the business of the engineer was to discover the discoveries of the scientists, and that, in this application, success greatly depends on the attention paid to the minutest details.

The great feature of the meeting was Professor Ayrton's address on the "Electrical Transmission of Power," the various applications of which—lighting, signalling, propulsion, welding, etc.—were exemplified by brilliant and thoroughly successful experiments. Not only the well-worn steel bars by the electric current, but even that refractory metal, aluminium, in speaking of electric lights, he said: "We laugh a good deal at the rough-and-ready manner adopted on the other side of the Atlantic, but every English engineer who has travelled along the Cheltenham and Bath Hill Oak lines is impressed with the enterprise of the people and their happy-go-lucky success. They have twenty-two electric tramways, carrying some four million passengers daily, and electric to Bath, with twenty-nice miles and a half hour was a century ago—uncanny, rather than dangerous."

Professor Ayrton's lecture on "The Foundation Stones of the Earth's Crust" dwelt chiefly on the structural character of the geologist and the west rock of the Lake Huronian of Canada, and of the pre-Cambrian period of the British Isles, which were considered to have been formed under peculiar conditions incidental to the first deposits of sedimentary strata upon the still hot material of the previously fluid globe. The lecture was illustrated by microscopic enlargements of rock-sections about a quarter of an inch in diameter, Mr. John L. Bartley, Bart., lectured to the "Customs Committee.

There were two saloons in the Assembly Rooms, one given by the Mayor, and the other by the Organizing Committee. The latter was called the "Wade's," as a great number of microscopical specimens were shown by its members. Edison's phonograph performed a great attraction all through the meeting, members, especially the fairer portion, patiently waiting their turn for hours together, as only a certain number of them could be heard at a time.

In the Zoological Department of the Biological Section, Professor Marsh, who has devoted the greater part of his life to the exhumation and restoration of the remains of numerous extinct animals found in the Western States of America, gave an interesting account of the nearly complete restoration which he had been able to make of the Brontosaurus, or Cuban horse, an animal allied to the modern rhinoceros, and a life-size sketch of which he exhibited to the members. On Saturday, half-day excursions were made to the Severn Tunnel; to the New Barry Dock in South Wales; to Berkeley Castle and Church; to Bristol, Clifton, and the Avon Gorge, and other places of interest. The excursion to Bath, Sherborne, &c. t. 706. The church consists of a nave 25 ft. by 13 ft., and 25 ft. high from floor to roof, and is constructed of 13 ft. by 10 ft., and 18 ft. 4 high, and a north porch. The building received modern additions, and was used as a school until "dis- covered" by the engineer. He was employed in the discovery of the channel window is as perfect as when first erected. This is not a bad testimonial to the weathering properties of Bath stone, confirmed by the wonderful preservation of Laycock Abbey, visited by another party of members. This structure, called Locus Beatae Mariæ, was founded in 1232 by Ela, Countess of Salisbury, whose monumental stone, with inscription in Latin hexameters, is still to be seen in the nave.

There is evidence of the kind of stone used in the construction of the church, and in parts of the visitors. Bath stone, though it has been used for building in the neighborhood since the eighth century, was not worked for more than sixty years consecutively by the electricians. Great Western Railway in 1841 revealed the extensive beds under Box and Corsham Downs. At the present time, between two and three million cubic feet are quarried annually. Bath freestone is one of the most exquisite epochs; but the theory which gave it the name of "oilette" is now superseded by a more reasonable one, in accordance with what is observed to be now going on at the German springs. The water issuing from the earth is strongly impregnated with lime, gives up that substance in minute particles accelerated by the water, and they sink to the bottom to be joined by others. Observation by a powerful microscope of a section of one of these basins reveals countless rings, bearing out this theory of their formation. An analysis of the Corsham variety of this stone by Professor Attfield, F. C. S., shows: carbonate of lime, 87.2; oxide of iron and alumina, 1.6; silica, 1; and carbonate of magnesia, 0.2; while Mr. Kirkaldy's analysis of a block near Windsor, over three thousand pounds per square inch before cracking. The area over which the stone extends is several thousand acres, but the beds vary greatly within short distances, from six feet in one solid layer to ninety-six feet in several strata, which have been little improved since the stone was worked systematically, because no mechanical means have been found to give such good results as the primitive getting of the "corsham- stones," the stone is got by mine drags and workings. A six-inch groove is held with the pick in the parting at the top of a layer to a depth of five feet, permitting of the introduction of a hand-saw, with a very large blade, a stone is cut longitudinally, to the parting at the bottom of the layer. Another vertical saw-cut is then made about five feet from the other, but inclined towards it from the back. A slight wedge is thus detached on all sides, but the back, and it is broken off by driving wedges in at the bottom parting, and drawn out by a crane, assisted by croakers. The hole made permits of the next block being sawed at the sides as well as side, when it is driven off on right and left. The great success achieved by Bath stone is due to its remarkable weathering properties, combined with its warm, lasting tone and color, and with which it is wrought. It has been selected for a church at Brighton, and has been used at Sydney, Melbourne, and Cape Town. A consignment was once shipped to New York, but was neglected, owing to the want of a good agent to handle it.

During the meeting the old Roman baths were shown to the members by Major Davis, F. S. A. These extensive remains are of recent being discovered, though the modern baths were to a large extent built over them, and still show more than three hundred gallons a minute of water at nearly 120 degrees Fahrenheit. The British Association has voted $100 towards the excavations, which have already revealed five large basins, showing that the Roman baths probably extended over six or seven acres.

On the immediate headland is the fine Abbey Church, the linear successor of a monastery founded by Osric in 847 A. D., and began, probably, by King Offa in 737, to the present day, the celebrated grandiose to the present day. A charter refers to the church in 597 as a "mirabil Church" and King Eadgar was crowned there in 973. Though

THE GERMAN NATIONAL INDUSTRIAL EXHIBITION IN MUNICH.

Of town on the Continent, perhaps, possesses the decorative instinct and habit so in trained and so widespread a degree as Munich. It is, indeed, little short of astonishing how a hold the styles of building and furnishing have upon the popular imagination. Wine shops are advertised as being in a certain "style" of a tenement-house is mentioned in notices for renting or sale; small eating-houses even stick a placard in a window calling attention to their "old German," "rococo," or new-style rooms.

And if this strikes a stranger, he is not less impressed. At every step in the city, at the solidarity of decorative furnishing in private homes. In place of the cramping of "old" things into rooms, the sticks, the shop fans, bits of drapery, so forth, on the walls, which is frequent elsewhere in the glimpses he gets into the parlors of average middle-class families living in the suburbs or in the outskirts of the city. There is no longer the wigwam of the rococo, but the light, modern style of furniture, suspended from the ceiling of the low, green bank of the Isar river, the water being reached with a broad flight of steps, at whose base, on either side, reclinable marble water-nymphs are constructed which are illuminated at night by colored streaks of light from the shore, a bold artistic effect of uncommon beauty. The entire collection of these designs are in ground from the current of the same river.

Countryside KROCKOW.

EXCAVATIONS AT CYPRUS.

The true work of the Cyprus Exploration Fund, carried on by members of the British School at Athens during the winter, has now been more than once deferred to these columns. We are now in a position to present our readers with a more detailed record, based upon the reports of Mr. Ernest Gardner, the Director, and of Mr. R. Pease Smith, the architect of the expedition.

A preliminary tour of exploration was made in December by Mr. Gardner and Mr. H. G. Robinson, who visited the ancient sites of Corenia, Laphitis, Soli, early in February, proceeding to the Limnius River, Polites, Chrysochen, and early Arsinoe, and new and old Paphos.

On a later occasion Mr. Gardner also visited Amathus and Corinian. Various circumstances delayed active operations until February, when Mr. R. James conducted the excavation of a hill called Leontari, near Nocor, containing traces of early houses and walls, destroying the top of the hill, was occupied on the north by a network of primitive walls, mixed with early pottery and other objects pointing to a remote period, and by an early wall of fortification, replaced in later times by the massive one still extant. On the south of the hill lay tombs of an equally archaic period, with graves containing vessels and other objects in bronze, lead and silver. The rock of Leontari is a remarkably elevated tableland of sandstone formation rising 130 feet above the surrounding plain, and all along it, as it rises, it has a steep cliff at the top running all round the hill, which renders access difficult. The hill, having a circumference of nearly a mile, offers too long a line of defense for the men who could find refuge on it; advantage, therefore, has been taken of a narrow neck of land, which divides the hill into two unequal portions, to form an inner citadel of the smaller northern half. It is here that all the traces of a town almost from the tombs all lie beyond the wall on the southern half of the hill. This arrangement of the remains of the fortress of Tyrisa, but at Leontari the inner citadel itself has a circumference of almost the same length as the whole fortress. The most perfect of all the citadels is here the hill for defense, the inhabitants only raised a wall across the isthmus at one exposed point. This wall, like all those in the northern hills, was built of small, uneven stones, laid without mortar and carefully fitted. Nowhere, however, is there more than a single course flint.
under the ground. The wall was six feet broad, and had a large tower sixty feet square at its west end, and possibly another at the east end of the wall. Some of the walls had more massive structure, consisting, likewise, of two great towers and a curtain-wall. The west tower, which is the most perfect, consists of a series of steps,—each fifty feet high and twenty feet thick. The curtain-wall is ten feet thick. The inner lining of the towers consists of good ashlar work, while the outer face of the walls, above a plain base, consists of very fine dressed stone, cut into large blocks, brought up and set in broad chalked planks, etc. The tower was entirely of stone, set in a hard white metal, and laid in courses about two feet high, containing here and there a niche of the full height of the course, but its base was built of smaller stones. To sum up, we seem to have in Leontari Vouno traces of a very early settlement, as evidenced by the tombs, to which we may refer the earlier walls, while the more massive walls belong to a later occupation, probably in medieval times.

The principal work of the season, however, has been the excavation of the Great Temple of Aphiropolis. The temple, consisting of the two or three great centres of worship in the ancient world this site seemed almost certain to yield important results. It had never been excavated, although such an authority as the Central Archeological Institute at Berlin had long held its excavation to be most desirable. Digging was begun upon February 3, and carried on without interruption until May 5. The actual site of the temple having been ascertained by the survey and various drawings of the Swiss, the whole of the accumulated earth was gradually removed, so that not only the plan but every visible part of the temple was discovered. First, to the temple itself. It is known to have been of considerable size, consisting of a central temple built of Phoenician stones, and it was apparently little altered by the Greeks when they became the ruling power in the island, for not only was the temple itself found, but the surrounding buildings also, resembling the usual Greek temple. In Roman times it was twice damaged by earthquake,—in the early part of the first century and toward the close of the second. Each time it was restored with great magnificence, and although the Roman made amendments and additions they do not seem to have wished to change the expression of the building, or even to any great extent the arrangement of its various parts. It seems as if the Persian temple of Hellespont was a modelling of the usual Greek temple. In Roman times it was twice damaged by earthquake,—in the early part of the first century and toward the close of the second. Each time it was restored with great magnificence, and although the Romans made amendments and additions they do not seem to have wished to change the expression of the building, or even to any great extent the arrangement of its various parts. It seems as if the Persian temple of Hellespont was a modelling of the usual Greek temple.
THE GAMBETTA MONUMENT, PARIS.

This competition for the monument of Gambetta was opened in 1884. As the result of the first competition, M. Boileau, fils, architect, and M. Anhe, sculptor, were admitted to the second competition, and were successful over the other competitors. It is the work of these two artists that was inaugurated on the 14th of July. M. Boileau presented in competition four designs for different sites, one on the axis of the Avenue of the Republic prolonged, near the Cemetery of Père Lachaise; the second, before the Chambre des Députés, fronting the Place de la Concorde; the third, in the Place Medfield, fronting the Luxembourg and the Pantheon; and the fourth, on the Boulevard de Belleville. The design adopted was finally placed on the Place du Carrousel, backing upon the small garden of the Louvre and facing the Arc de Triomphe. The monument is in form a pyramidal plaster. On each side of the base are two seated figures in bronze, Truth, hailing a mirror in her hand, and Force clad in the hide of a classic lion and with fasces in hand, replacing the traditional hammer; that is to say, force growing out of union in place of brute force. Lower, seated in the same way, are two naked infants holding medallions, upon which are inscriptions. The principal group is cut in the block of the monument, near the base of the plasters. Gambetta is represented standing, his arm outstretched; at his feet combatants, whose courage he re-enforces, and floating somewhat above him and bearing a flag, the allegorical figure of la Patrie. Above the group are engraved these words, pronounced in November, 1870:

"Français, éloge vos âmes et vos résolutions à la hauteur des péris qui fondent sur leur patrie. Il dépend encore de nous de veiller à l’autoriser ce qu’il est un grand peuple qui ne peut pas périr et dont le courage s’acquiert au sein même des catastrophes."

The lateral faces, simpler in design, are only decorated by allegorical figures on the sub-basement; at the right, Truth, at the left, Force. The faces of the plasters are covered with inscriptions recalling the chief points of his principal orations. Force underlines the speech at Cherbourg in August, 1880, and Truth the advice to the young men of the schools in April 19, 1870. The rear façade, upon the square, is ornamented at the base of the pyramid by a marble flag with an inscription surmounted by a trophy in high relief; in the centre of this trophy is a roll of manuscript and a crown, on the right a book, and on the left a shield bearing an inscription; finally, a crowning cock, emblem of patriotic vigilance, the fasces of the Union, arms and oak branches.

This bit of work is good and deserves attention. Before the tablet, which bears the inscription, are two seated infants holding one another by the hand, one personifying Labor, and the other Military Art. Finally, above the trophy, is engraved a fragment from the speech at Grenoble, September 26, 1872. The monument is finished by an entablature supported by a decorative capital with four volutes at the angles. Upon the front, between the volutes, is a shield with the letters "R. F." the fasces and a crown of ivy. Upon the lateral and rear front, above garlands which unite the volutes, are flags bearing the inscriptions "Liberty," "Equality" and "Fraternity," with proper emblems. Finally, above and crowning the structure is a figure of Democracy borne on a winged lion, which places its two forepaws upon a stone socle.

In this monument M. Boileau has put in execution his principles concerning the presentation of decorative figures on the stone itself without instructional. "I have always aimed at this way of doing," he said in his monograph, "to show the figures of this kind I consider the employment of a plinth, puerile as it may appear at first sight, as a certain sign of want of mass and of decorative penetration. A statue of a hero can be presented at a particular place made for it, isolated upon a pedestal which bears it alone. It can be conceived as an entirely existing by itself, having its value complete to the exclusion of any pedestal whereas upon which it may be placed; but if the whole is decorated with accessory figures, why should we wish that these in their turn should be treated like heroïs? With such a scheme there could be made from a mass of statuary a perfect exhibition of works of art upon an etage. A perfect whole will never be made at a single stroke." This theory is ingenious and is not wanting in truth, and his application of it in the composition of the monument of Gambetta is very ably developed. The couchant piece, particularly, is superb; the movement of the winged lion is impressive in its truthfulness. The theory of M. Boileau in this morsel is fully demonstrated, but it is not proved that it must be absolute. It could even be pointed out to M. Boileau that in his competitive design for his monument at Versailles — the monument of the Constituent Assembly — he made a most unfortunate application of his theory. Upon steps of granite at the foot of the pedestal supporting the column which formed the monument, he placed, flat upon the stone, two bronze statues of Mirabeau and Bailly, who had an air of being but two personages entirely independent of the monument, like two statues "placed upon an etage," and not in any manner forming a "whole formed at a single stroke."

This criticism cannot be applied to the monument of Gambetta, which is a good composition and a good whole. Perhaps fault might be found, that the seated figures are too much isolated, and that the details of the capital of the crown are a little meagre. This lacks projection, and the volutes are very small. As to the principal group, it is of a fine movement. M. Boileau, in his monogram of the monument — a very interesting work, in which we only regret that we do not find a little more modesty — compares it to the group by Rude on the Arc de Triomphe. This is evidently an exaggeration; but, really, it is a fine bit of sculpture and all of movement. The allegorical figure of la Patrie has a little too much projection, and seems about to fall upon the principal figure. The whole monument is carefully executed, the inscriptions are well engraved on the lines in the appropriate manner and diminishing as they descend, so that they may be easily read.

In short, the monument of Gambetta brings to the Place du Carrousel an important decorative feature. While not perhaps very fine. Time alone will show whether the employment of bronze in the construction, exposed to the changes of the season, is prudent, and whether the stone will not be covered with black and dirty stains, such as are unfortunately seen on the Grand Opera Building.

Finally, this is the total cost of the work: Masonry, carpentry and metalwork cost 141,500 francs; statuary, 251,893 francs; ornamental sculpture, 82,500 francs; stone, 28,500 francs; medals and casts, 5,593 francs; commissions, 18,898 francs; models and casts, 3,592 francs; total, 530,000 francs.

THE PRESENT PRACTICE OF SLOW-BURNING CONSTRUCTION.

To the Editors of the American Architect:

Dear Sirs,—In reply to the queries and suggestions of Mr. Atkinson in your October 13 issue, it seems to me that, perhaps, more scaling done in the injunctions of a great organization and protection from fire, than would seem to be the case, in view of the great mass of reckless and unscientific building always in progress about us. The higher cost of good building is barely that which is flimsy and dangerous — like that of most other good things, a most serious drawback in the progress of the movement for better buildings, and where insurance can be so easily and cheaply obtained, where there are discouraged in the making of a monument against fire, when they can throw the risk upon the insurance companies and save considerably in first cost. Still, there are owners who are willing to listen to advice for better construction, and follow it.

In my own practice I have been able to carry out several pieces of construction, recently, of an improved type, and the owners' appreciation seem to show that in such instances, at least, a wish for better building is developing. The Chadwick Lead Works, on High Street (Fort Hill Square) in Boston, is a six-story building, covering about six thousand feet of land, and having three street frontages. The construction is almost entirely such as would satisfy the insurance inspectors of the mills.

All floors are of "mill-construction." The roof is four inches thick and without concealed spaces; none of the walls are furred; there are no wooden cornices or cornice furring. Although the

NOTES AND CLIPPINGS.

The Tomb of Alexander the Great.—According to a Berlin correspondent, news has been received from the tomb of Alexander the Great, which Dr. Schleifmann sought vainly last winter, has now been discovered in Alexandria. The coffin is of gold, 14 inches long, and is covered with filigree work, and is supported by three feet and a half its height three feet. The skull of a man was found in it. The coffin was found in a brick vault, about twenty feet high, covered by about eight feet of earth. The entrance is at an angle of 45 degrees, and is just discovered. Such a floor is entirely practical for heavy warehouse purposes.

A building for the Oris girls, on Oris wharf, Boston, has a similar construction, and is being erected on a roof, 8 feet over the ground, of corrugated iron. The ceilings are of black tin. The roof is 10 feet high and is covered with heavy rafters, and as far as possible not one convectored space in the building. A stand-pipe and hose are provided for first floor, and although, of course, not proof, its destruction by fire would be almost an impossibility.

The building for the School for the Feeble-minded, at Waltham, is constructed with stone walls, furred with porous terra-cotta. Portions, brick or composed with floors, mill-construction, 8' pitch, and 4' 7" of wood; kitchen and laundry floors asphalted on corrugated iron.

The succeeding buildings are to be of smaller construction.

In seeking solutions I have found a mill-floor for the ceiling of the bellar an excellent precaution both against fire and vermin. By using a roof of four inches of wood, in the Savannah Cotton Exchange, the directorate decided not to do this, to obtain a very handsome rental for a series of offices in the attic story, over the Exchange Hall. Offices in this position, under the roof, were considered as absolutely impracticable by residents of Savannah, on account of the excessive heat which had always penetrated a 1 1/2 board roof, a ventilated air-space and a plastered ceiling below. I was permitted to build the offices, however, and put four inches of wood between the tin roof and the ceiling, which was the price of the privilege.

The result has been a success. The first of July, 1888, I found only a difference of one degree in temperature between the street floor and the upper one — that one degree in favor of the upper rooms.

A private house in Savannah with 3" of wood for its roof, is much appreciated by the occupants of the pleasantest rooms in the house — those in the upper story.

The foregoing are some of the instances which occur to me, of the use of mill-framing and slow-burning construction in my practice, and other advantages which may be had by "preformed" construction at the present prices of iron and terra-cotta is practically prohibitive in most cases, and we must develop as far as may be "slow-burning" methods. The insurance companies, can scarcely be expected to adopt such a system.

Wm. Gibbons Preston.

EYE-BROW DORMERS.

CERESO., W. Va., October 19, 1888.

To the Editors of the American Architect:

Dear Sir,—I desire to obtain some information in regard to manner of slating, as practised by slaters in and about Boston, for "eye-brow" dormers similar to those shown by Gelatine print of "Craze Library," Quincy, Mass., issued with No. 392, American Architect, January 25, 1888. The Dormer was first introduced to your readers in the spring of last year, and is sure to please you. Your patrons are very interested in this subject, and would like to have any information you could give us on this subject. We are in the business of making the Dormer, and are very anxious to have any information you could give us.

Very respectfully,

S. FLOYD HOARD.

[Most of the "eye-brow" dormers in this neighborhood are covered either with shingles, or with slates, but I am unable to state exactly whether any other material is used, to over them as they ought to be covered, the coverings must be as great as possible, and the tiles, slates or shingles carried over without any battens beneath, but as if the roof had been slatted in the ordinary way, and then bulged slightly upward. Roofers are generally disposed to make the covers much too slop, so that slates will not lay well, and metal is needed in the valleys, which spoils the appearance of the whole affair.

E. ROSS ARCHITECT.]
THE AMERICAN ARCHITECT AND BUILDING NEWS.

NOVEMBER 10, 1888.

Summary:

The British Architect on one plan of Architectural Practice in the United States, in the possibility of introducing the clerk-of-works into our Practice. — The best material from which to make these Functionaries. — The building of the Washington Monument and the Military Engineers. — The Congressional Library and General Casey. — Tombs recently discovered at Mycenae. — The Milan Cathedral Competition. 213

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The British Architect, in commenting upon what we had to say about the burdensome and unreasonable load of responsibility placed on architects in this country by the curious condition of the law, and the unwillingness of the profession to insist upon the employment of clerk-of-works, thinks it very singular that the American architects should allow such a condition of things to continue. It says, what we all know, that to circumvent the rascality of a dishonest contractor, nothing but the constant supervision of a clerk-of-works is of the least avail, but it considers that it is unjust to the architect, and unfavorable to the interest of his client, to expect the architect either to furnish supervision himself, or to pay some one else for furnishing it. “In England,” it says, “it is difficult to imagine the provision of an efficient clerk-of-works as being a luxury to be provided at the expense of the architect;” and it adds that “No English architects, with any practice at all, would ever dream of trying to do without a clerk-of-works, nor would they ever dream of paying his salary out of their own pocket,” and counsels American architects to unite in putting an end at once to “such an absurd practice.” We are glad to know that the recent Convention of the American Institute of Architects took up this matter, and adopted what may be called a resolution preliminary to beginning to do something about it; and we hope that the Convention of the Western Association, to be held this month, will take a long step further.

There would be, we think, very little difficulty in getting the new system generally adopted. In fact, there are symptoms that the public is ready to meet us more than half-way. Most men are tolerably reasonable in such matters, and the conviction that the anxious, harassed architect cannot, and ought not, to be expected to give a building the daily supervision necessary to secure the owner against the contractors’ tricks is quite widely spread among owners, in connection, moreover, with the corresponding conviction, that nothing short of daily supervision is required for the purpose, and that as architects cannot fairly be expected to furnish or pay for it, the owner, in his own interest, should do so. If our architects would give up the struggle to please the greedy persons who think that a professional man cannot do too much for them, or be paid too little, and acknowledge that they cannot do justice either to themselves or their clients under the present system, we think the change which we all so much desire would be easily and quickly accomplished, with great benefit to all parties. The owners would certainly profit, by the security they would gain against the hidden vices of construction which ultimately cause them so much loss; the architects would gain, what they all need so much, leisure to study their designs and think over their plans, instead of spending their days in climbing ladders and inspecting caulked joints, and last, but not least, a very extensive field of employment would be opened to the young architects and assistants who must depend on office-work. In Europe nearly all young architects get their most valuable experience as clerks-of-works for some master of the art. They are well paid, are in constant communication with their principal, and enjoy the opportunity, which they can gain in no other way, of seeing every consecutive step in the process of building, from the laying of the footings to the setting of the vase.

In the discussion about clerks-of-works, it will be well for American architects to remember that there are several varieties of these functionaries. The best, of course, are young architects and assistants, who, if they have any talent, delight in the occupation of seeing a good design come to life in brick and stone, and take pleasure in looking out that everything is carried along smoothly. Next to these come the professional clerks-of-works, who have a good deal of practical knowledge, and are often very faithful and useful, but are less a bond upon the mind, and have higher theoretical attainments in cases where an unusual construction, or a special material, is to be employed. Under such circumstances the educated man interests himself to study from books, or other examples, the conditions necessary to success, and consulted, as in honor bound, his principal, to make sure that the information thus acquired meets with the approval of the architect, and that he is sufficiently able to supply that additional knowledge as he can; while the mere practical man is apt to be afraid of showing his ignorance, and goes along blindly, often changing the design, without orders, to suit his own narrow experience, or involving the architect in some other way in annoyance and loss. After the ignorant practical man, and a long way below him in usefulness, comes the conscientious person, who is sometimes a practical man and sometimes a theorist, but is equally worthless in either case. We have seen some of these gentry in various positions here, but the most conspicuous specimen yet described seems to have been the individual who acted as clerk-of-works for Mr. E. R. Robson, the architect to the London School Board, whose correspondence with the Board in regard to certain improperly executed contract work, for which it sought to hold him responsible, is fresh in our readers’ minds. As an illustration of the depth of incompetence, inefficiency, and unfaithfulness to which this sort of assistant can descend, we give a case of nothing more striking than the sworn testimony of the person in question. It is hardly necessary to say that he, having been, by his own story, the one to whose negligence and incapacity the imperfect workmanship complained of was chiefly due, appeared as the principal witness against Mr. Robson, whose intentions he was hired to see properly carried out. The way in which he performed this duty can be best judged from his own words. He found, one day, as he alleges, that the plan sent from Mr. Robson’s office for the school-house which he was supposed to be supervising showed a staircase in the upper story with insufficient head-room. Instead of making himself the insignificant alteration necessary to gain proper head-room, or returning the plan to have the error rectified, if any existed, which the assertion of such an expert by no means proves, he sent a message to the office that there was “a mistake in the plans.” He seems to have thought that Mr. Robson would immediately correct the error, to the spot, to bow the knee to the edge, and listen humbly to his suggestions for putting the matter straight. Unfortunately, Mr. Robson had something else to do, and sent one of his assistants to see what the trouble was. The assistant came and inquired for the plan, and asked what the mistake pointed out to him. The lordly spirit of the clerk-of-works could not bear it, so he promptly ordered what fault he found with the plan. He “did not care to furnish him with brains,” to use his own expression on the witness-stand, and the assistant returned to the office without discovering any error. No further effort was made by this assistant to correct his mistake, and as the time came, he had the staircase built as he conceived it to be shown on the plan, with such narrow head-room that people could only get through by crawling on their knees; and completed his remarkable services in regard to this portion of the
building by trying to have Mr. Robson compelled to pay damages on account of it.

THE city of Washington furnishes just now some instructive illustrations of the advantages and disadvantages of doing civil work under military care. As we have learned from the Congressional Library, there is an idea prevalent at Washington to the effect that building operations, if supervised by an army engineer, are always carried out with inconceivable economy, perfection and dispatch, and that no amount of experience or training can enable a civilian who makes architecture or engineering his profession to compete with the efficiency, with a West Point graduate. Acting upon this notion, the direction of the Congressional Library Building was recently wrested from the architect to whom it was awarded, and handed over to a military man, just as another work, under the charge of another military man, was completed. Now, it appears that the last-mentioned work, the construction of the Washington Aqueduct, has not reflected such brilliant renown upon its warlike superintendent as the debates in Congress on the Library would lead us to expect. Instead of masonry, the aqueduct shows in many places immense voids, while, where stonework was used, it was put in with about one-sixth the proper allowance of cement, by unskilled men, so that it is of little value, and, according to the last accounts, it is probable that the tunnel, the most important part of the aqueduct, will be abandoned, as unfit for use, and the work will be ordered to be repaired. Out of course, we wish to insure that General Casey will prevent any such mishaps with the Library Building, but he is said by the newspapers to have made a remark in regard to it which is worth reflecting upon by those who think that architects are advantageously replaced in their own business by military men. Some reporter, in the course of his dispatch, asked General Casey whether the modified Library Building, which he is now, by direction of Congress, engaged in carrying into execution, would accommodate the books after it was done. The General replied, with solidly promptness, that he did not know, and did not think he would or not. His orders were, he said, to erect a building which should not cost more than four million dollars. These instructions were perfectly definite, and he proposed to carry them out. Nothing was said in his orders about having the building accommodate books, and it was not for him to concern himself with matters not commended to his attention.

It would be interesting to hear what Congressmen would say to an architect who announced that he did not care whether the building he was about to erect for the Government would accommodate the service for which it was intended or not, yet there is no question that General Casey is right in this respect. An army will build what it wants, and, if it does not want to tell the Government, what is certainly true, that four million dollars, the present limit of the appropriation, will not cover the cost of a good and substantial building large enough to accommodate the Library of Congress, with the additions which it will very soon accumulate.

Mr. Smithmeyer informed Congress of this obvious fact, and was ignominiously driven out of office in consequence, but General Casey is not asked about that point, very properly contending himself, as a military man, with the instructions issued to him; and the effect appears to be that the United States is being rapidly endowed with a building not large enough for its purpose, incapable of alteration or increase in size without enormous expense, and thus practically useless, except as a temporary shelter for some of the public books, simply because Congress has seen fit to decree that a ten-million-dollar building shall be built for four millions, and has ordered an army to carry out its mandates, so as to get rid of the existentations of an architect conscientious enough to tell the truth about their practicability.

Some interesting explorations have been going on at Mycenae, under the direction of the Greek Government, which took up the work at the point where Dr. Schliemann abandoned it. This day the city is surrounded by groups of tombs, cut in the rock, much like those of Egypt. Each tomb consists of a gallery, sometimes sixty or seventy feet long, excavated in the side of one of the rocky hills, from which open chambers ten or twelve feet square. These chambers contain skeletons, never less than two, and often many more. The appearance is that each chamber belonged to a family. When a member of that family died he was placed in the tomb, where space was left for the next. When the tomb had become uncomfortably crowded, a small pit was cut in the back of the chamber and into it the bones which had been detached, so as to clear the place and make it neat. Very few manufactured objects have been found in the tombs. A few necklace-beads, of rock-crystal or onyx, rudely ornamented, have been found, together with two gold rings and some bits of ivory, one piece being carved into a human head, about five inches in length, nearly eight inches in diameter, with one handle, all of silver, with eight human figures in gold inlaid around the top, and inlaid gold ornaments underneath. It is believed that these antiquities date from at least the twentieth century B.C., and the ornaments on them show a marked Oriental character.

The great competition for the rebuilding of the front of Milan Cathedral has terminated in the award of the first prize, eight thousand dollars in money, to Signor Giuseppe Brentano, of Milan. The first competition, which was open to all the world, ended in the selection of fourteen plans, the authors of which were invited to take part in a second contest, and this second competition is the one which has just been decided. Out of the fourteen designs, the judges unanimously selected four, those of Beltrami and Brentano, of Milan, Nordio, of Trieste, and Deperthes, of Paris, which were then voted upon separately. One of the designs, that of M. Deperthes, showed towers, with spires, on each side of the main front portal, and the first question put to the judges was whether any plan with spires should be considered eligible to the first place. Notwithstanding the eloquent advocacy of a Milanese member of the jury, the majority voted that no designs with towers or spires should be approved, and M. Deperthes being thus eliminated from the race, the choice among the remaining designs fell upon M. Brentano. M. Brentano writes to La Semaine des Constructeurs a fair and temperate account of the competition, says that he is not convinced by the result that a pair of towers would not improve the façade, and we are very much inclined to agree with him. Although we did not greatly fancy the towers of M. Deperthes's original design, we think that most people would say that the present front of the Cathedral is low and insignificant, apart from its ugly detail, and that a pair of well-studied spires might be made to improve it very much.

However that may be, we can console ourselves with the thought that a very interesting competition has been decided in the most careful manner by judges of the highest in the world, and the result is sure to be satisfactory. Signor Brentano will much belio the reputation which he has gained by the competition, as one of the most distinguished of Italian architects, if the detail of his work is not beautifully designed and executed, and he has ample inspiration in Milan for success in the semi-Northern Gothic in which he must work. In reviewing the original competition, it is curious, as well as instructive, to notice the way in which the unsuccessful competitors seem generally to have erred by the adoption of some eccentric motive or detail, which has destroyed the value of a design perhaps otherwise very meritorious. For example, the plan of Hartel and Neckelmann of Bremen, one of the simplest, and best of all in our opinion, and adorned with a pair of noble spires, is spoiled by putting a triangular porch in front of the principal door, after the fashion of that at Ratisbon, which we should not have supposed that any architect would wish to imitate. In a similar way, Mr. Brode's front, an effective piece of what we might call Genoa or Orvieto Gothic, combines poorly with the fantastic dome behind it, and the want of harmony is only made more conspicuous by the attempt made in the published drawings to conceal it by representing the building in perspective, with the dome nearly hidden behind the facade. It is worthy of note to point out various other illustrations of the maxim that it is true that the architect did not think about, or got too easily, or left until there was not time enough to study them, that generally insure defeat, but any one who has preserved the published sketches of the designs can find them for himself.
BUILDERS' HARDWARE.— XI.

DOOR-STOP.

SOME form of stop is always desirable in order to keep the door from striking the finish when swung open, or breaking the plastering. The commonest form consists of a wooden knob screwed straight into the base and tipped with rubber. The variation from this is a wooden-knob, which is screwed into the floor and has the rubber-tip on the side, to be used when the door does not swing against the wall, but has to be stopped at some point. These stops are made in birch, maple, ash, oak, chestnut, cherry, walnut and mahogany and are listed at $8.00 per gross for birch to $6.50 for mahogany. They are made in two sizes, 2 1/2 and 3 inches long; the wood is turned and a gimlet-pointed screw is firmly attached to the stop, so that it can readily be put in place by hand. The prices are the same whether the rubber tip is on the side or the end. They are also made with a rubber ring entirely encircling the knob, the list price being $12.00 per gross.

The Meriden Malleable Iron Company manufactures elasticheaded screws which are used more for furniture than for doors, but which might be desirable in some cases. They consist simply of a half-round head which is covered in upholstery of some kind and fitted with a gimlet-pointed screw. These cost from $11.00 to $17.00 per gross, list price, depending upon the material with which they are covered. J. B. Shannon & Sons, manufacture a door-bumper shown by Figure 137, which is intended to prevent jar and noise in shutting the door; it consists of a cap with a brace attached to be screwed to the face of the door; a rubber ball is pressed into the cap so that it will not fall out. A piece of rubber made fast to the jamb casing over the door, for the ball to strike against, completes the contrivance. The rubber over the door may be increased or lessened in thickness so that when the rubber ball comes in contact with it the compression will allow the door to latch. This device effectually prevents any slamming of the door. The list price is $1.00 each. The only possible objection to its use would be that the head might prevent the door from being latched properly.

DOOR-HANGERS AND ROLLERS.

The commonest form of door-rollers are those used for barn-doors. Usually a barn-door slides on rollers or sheaves which are applied to the inner face of the door and run on a metal track secured to the floor. There are many kinds of large sheaves and rollers manufactured for barn-doors, which are too simple to require any illustration. The commonest kind consists of a large wheel with a steel or iron axle. The better kind of barn-door rollers are provided with anti-friction axle bearings; that is to say, the axle of the wheel revolves in a cycle of small pins or rollers by which the friction is considerably reduced, and the wear on the bearings very materially diminished. Figure 138 is an ingenious device for a barn-door-roller, the working of which will be readily apparent from the drawing. The inner plate, A, is screwed directly to the door, through the openings in the wheel, B, which revolves on the antifrictional bearings.

Figure 139 shows a form of barn-door rail, intended to be used with a wheel which shall rest on the flanges and not bear at all on the upright portion. In this way the wheel will clear away any collection of snow or ice by its own action and enable the door to roll easily.

The standing objection to barn-door-rollers which are applied to the bottom of the door, is that they are too easily thrown off the track by obstructions and also that the track itself is apt to get in the way and be a bother in driving over it. The greatest amount of ingenuity has been expended upon door-hangers in which the door is suspended from a track at the top. The only objection which is to be urged against this manner of arranging a sliding-door is, that in case of a violent wind the door would be forced inward. This difficulty can be in a measure obviated by the use of some form of stay-roller, such as Figure 140, which can be attached so as to prevent any lateral motion of the door. This form of stay-roller is also used for doors which slide on sheaves at the bottom, taking the place of an overhead groove.

There are really but two distinct varieties of barn-door-hangers; the first is represented by Figure 141, and consists of a single wheel running on an overhead-track and attached to a hanger which is screwed on to the inner face of the door. The same form of hanger is made to be used with an iron rail. This form is rather old but is very good and we should imagine would give little trouble. It is made with anti-friction bearings. The second variety of hanger is one in which the axe is not fixed but travels along a single bearing beam, as in the "Moody Hanger," Figure 142, which is one of the simplest of this kind. In this the axe bears on two bars, and the uprights to which the bearing bars are secured, are placed sufficiently far apart to admit of the axle having enough play for the opening of a single door. The rail and brackets are made of steel and the wheel has a steel axle.

The "Victor Hanger," Figure 143, is a slight improvement over the "Moody" in that the bearings is on a single bar instead of on two; and that the wheels work on each side of a high, ridged track which prevents them from slipping off or becoming interfered with.

The "Lane Hanger," Figure 144, is very similar to the
"Moody", though the arrangements of the supports is somewhat different.

All of the foregoing hangers are made of wrought-iron or steel, with steel or chilled-iron bearings. Several kinds of hangers are made with malleable iron, such as the "Nickel", Figure 145, which follows the pattern of the "Moody Hanger." The "Nickel Hanger" is also made in steel, with a slightly different shape. The "Hatfield Hanger," Figure 146, also in malleable iron, is a form after the pattern of the "Lane," on which the patent seems to have run out; at any rate, a similar form is made by several of the manufacturers, and the principle embodied in the "Hatfield" and the "Moody Hangers" is the one which is usually considered to be the most satisfactory; that is to say, one in which the axle bears on two parallel plates and works in slots; indeed, this principle is applied to nearly all the most successful hangers, both for barn-doors and parlor-doors.

For parlor doors many builders and architects still prefer sheaves mortised into the bottom of the door. The rail, which is a necessary part of this arrangement, is admitted to be a trouble, but the rollers are so easily taken out that the rail is retained. There seems to be an idea with many people that the overhead hanger more easily gets out of order, and that it is more complicated. This is a mistake, for there is hardly a hanger in the market that will not give satisfaction if properly applied, while any one who has had experience with sheaves and rail at the bottom can testify to the trouble which will sometimes occur, with the settlement of the woodwork throwing the door out of plumb or obstructions getting on the track and throwing the wheels off. Some of the overhead hangers require more care in setting, and others have some special adjustment which must be understood; but the principle on which they all work is so simple that, to the uninitiated, there seems to be but little choice between the various kinds.

The ordinary mortised sheave, of which Figure 147 is a type, runs on a brass rail, which is generally made with a raised section, though a form is sometimes used which is channelled instead of being raised. The former will be something to stub the foot against; the latter will collect dust. The only form of rail in the market, which presents neither of these difficulties, is the "Climax," Figure 148. This consists of a double brass track with a central strip, which is held flush with the two sides by springs inserted at intervals in the track. A special form of wheel is manufactured to go with this rail. The wheel, in passing along over the rail, presses down the central strip, forming a groove for the wheel to run in. When the door is opened, the springs force the flexible central strip up again, so that when the doorway is entirely clear the appearance is of a single brass plate perfectly flush with the floor. The list price of this rail is sixty cents per foot in brass.

Besides the common pattern of mortised sheaves, shown by Figure 147, there is another form which works more easily, made on the same principle as the "Hatfield" barn-door hanger. This is shown by Figure 149. This sheave is made in five sizes, from two-and-one-half inches to six inches in diameter of wheel and costs from $1.50 to $4 per set of four sheaves.

Parlor-door hangers are usually arranged to run on a wooden or metal track which is bolted to the side-studding. There are one or two points which should be considered in judging of any door-hanger as ordinarily applied. In most houses the studs which form one side of the sliding-door pocket are made to rest on something pretty solid, a foundation wall, or, at least, a heavy timber, while on the other side of the pocket on which the studs are supported on the floor-joint, and are left to settle with the shrinkage of the timbers, thus bringing about a difference in level of the two sides of the pocket. It may, then, be stated as a general rule that the best form of hanger would be that which is supported on one side only, since if any inequality of settlement takes place, it does not affect the hanger. Another consideration is, that it would be well to have the door-hangers so arranged that in case the door should not hang perfectly plumb, there would be no inequality of bearing on the axles of the wheels. It will be seen that this is perfectly possible, and that it has been considered in some of the forms of door-hangers.

One of the earlier patents is the "Moore" parlor-door hanger, Figure 150. This is a very good form in the main, being hung by a single rod which is mortised into the top of the door. The adjustment may be obtained by turning up the nut at the bottom of the rod, through a hole cut in the edge of the door in the same manner as a stair-rail bolt is turned up. The difficulty is, that the hanger cannot readily be readjusted.
when once set. Another of the early forms which has since been but little improved upon, is the "Warner" hanger, Figure 151. This consists of two sets of double wheels connected by a rod, and working directly on the double track screwed to each side of the door-pocket. The manner of supporting the door is much the same as with the "Moore" hanger, except that in the "Warner" the supporting rods can be got at after the door is finished by means of a face-plate on the edge of the door. The wheels are made perfectly flat, and it is claimed that under no combination of circumstances can they run off the track. The axles of the wheels are attached to the connecting rod by means of a universal bearing, thus enabling the weight of the doors to bear equally upon both tracks, no matter how much out of plumb, or level they may be. A somewhat similar door-hanger is that shown by Figure 152, manufactured by the Reading Hardware Company. In this variety, however, the adjustment is entirely from the top of the door, and no mortise is required. The axles are not attached to any part of the hanger, but work in the slot somewhat on the principle of a "Victor" hanger. Figure 153 shows a door-hanger which is very popular, and which for simplicity and perfection of construction is one of the best yet produced. The wheels run on two flat wooden tracks, one secured to each side of the studding. The axles bear on the short connecting rod which is made sufficiently long to allow for the run of an eight-foot door. The rod being round there will never be an even bearing. The hangers are adjusted by means of a sliding screw-joint which is operated from the edge of the door, and which, by forcing the hanger away or drawing it towards the edge of the door, raises or lowers the bearing rod.

A very simple application of the same principle is embodied in the "Nickel" parlor-door hanger, Figure 154. This consists of a double set of flanged wheels, which run on a double track suspended by iron hanger-rods attached at intervals to a cross-piece at the top of the door-pocket. The axles of the wheels bear against a half-round bar, which is secured by upright bars to the top of the door. The hangers are adjusted by turning up the hanger-rods in the top of the pocket, thus lifting the track bodily. One objection to this form is that it requires considerable width of pocket—four-and-one-half inches.

Figure 155 illustrates the "Richards" hanger, which, with the "Prindle," rather leads the market just as present. The principle is almost exactly the same with both forms, except

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Fig. 150. Moore's Anti-friction Parlor-door Hanger. S. H. & E. Y. Moore.

Fig. 151. Warner Parlor-door Hanger. E. C. Stevens & Co.

Fig. 152. Novelty Parlor-door Hanger. Reading Hardware Co.

Fig. 153. Prindle Parlor-door Hanger. Prindle Mfg. Co.

Fig. 154. Nickel Parlor-door Hanger. Coleman Hardware Co.

Fig. 155. Richards Parlor-door Hanger. Wilcox Mfg. Co.

Fig. 156. Paragon Parlor-door Hanger. Dunham Mfg. Co.
door-hanger on the market which is essentially the same as the "Richards" hanger. The "Paragon" door-hanger, Figure 156, is on the principle of the "Moody" barn-door hanger previously described. It consists of a single grooved wheel running on a rail secured to one side of the pocket, the axes bearing against two flat surfaces. It would seem as though this fulfilled the conditions of a perfect door-hanger more fully than anything else in the market. It can be adjusted with very little trouble; and as the centre of support is directly over the centre of the door, there is no tendency to bind; while as the track is secured to only one side of the door-pocket, the possible effects of shrinkage and settlements are reduced to a minimum.

A form of door-hanger which is essentially the same as this, but in which the axle of the wheels work in a slot on the principle of the "Hatfield" sheave, has been manufactured by Burditt & Williams, for one of the Boston builders, but has received no patent, and is not in really in the market.

The "Emerson" door-hanger, Figure 157, is yet another variety, and represents in some respects a different principle from any of the former, in that the rollers are entirely separate and distinct from each other, being connected merely by a thin strip of wood notched over the axles. The rollers bear on the wooden rail O. The hangers D, to which the door is directly attached, are fastened to a rider bar E, which bears directly on the rollers. This form of hanger is very effective, does not get out of order, and works very smoothly. Adjustment is obtained by a small set-screw in the attachment of the hanger. The track is fastened to one partition only.

Figure 158 is a very ingenious combination of the principles of the "Warner" and the "Prindle" hangers. It consists of a set of double, flanged wheels A, bearing on two tracks, and bolted to each side of the pocket. The axle of the double wheel supports a ring B, which in turn supports a plain, grooved, pulley-wheel. The axle of the pulley-wheel turns in iron flange-plates which are fastened to the top of the door. In this way the friction is greatly reduced; and the principle of the continuous run of the axle, which is embodied in the "Warner" hanger, is here provided for by means of the ring connected with the flanged wheels, and with the lower pulley. The hanger is adjusted by a turn-screw near the edge of the door. The point of support of the hangers is always in the same relative position to the door, thus overcoming one of the weak points of the horizontal, anti-friction hangers in which the wheels travel back and forth from one end to the other, thus continually changing the strain on the screws.

The following table gives the relative prices of the various door-hangers that have been described:

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Acme barn-door roller, 8 inch wheel</th>
<th>Climax door roller hanger</th>
<th>Moody door roller hanger</th>
<th>Victor door roller hanger</th>
<th>Lane door roller hanger</th>
<th>Nickel barn-door roller hanger</th>
<th>Hatfield barn-door roller hanger</th>
<th>Parkers sheave, anti-friction</th>
<th>Hatfield parker-door sheave</th>
<th>Moore parker-door hanger</th>
<th>Warner parker-door hanger</th>
<th>Novelty parker-door hanger</th>
<th>Prindle parker-door hanger</th>
<th>Nickel parker-door hanger (approximately)</th>
<th>Richards parker-door hanger</th>
<th>Paragon parker-door hanger</th>
<th>Emerson parker-door hanger</th>
<th>Endless parker-door hanger</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>8.00</td>
<td>3.00</td>
<td>3.25</td>
<td>4.40</td>
<td>2.25</td>
<td>3.50</td>
<td>4.60</td>
<td>2.00</td>
<td>2.50</td>
<td>4.25</td>
<td>5.30</td>
<td>5.50</td>
<td>5.00</td>
<td>4.25</td>
<td>5.00</td>
<td>5.00</td>
<td>3.75</td>
<td></td>
</tr>
</tbody>
</table>

There is still another distinct type of door-hanger, one which is unique of its kind, and for certain purposes is decidedly better than anything else in the market, though not always applicable or always desirable: This is the "Prescott" hanger.

It is difficult to illustrate this hanger properly; it should be seen in order to appreciate fully its workings. Figure 159 is the common form of hanger, consisting essentially of two flat bars joined, scissors fashion, in the centre. The lower end of one bar is fastened to a pin on the jamb of the pocket. The lower end of the other bar is fastened to a pin on the back of the door. The upper end of the bar which is fastened to the jamb, works with a roller in a slot on the back of the upper part of the door, while the upper end of the other bar works in a small slot let into the upper part of the jamb-pocket. A little reasoning will show one that the door in this manner is held absolutely free from either the top or the bottom of the door-opening, and can be easily moved forward or backward.

It cannot settle without the scissors part spreading out, and as the movable roller ends are on opposite sides, that is, one on the joint and one on the door; any tendency to spreading out of the rollers is counteracted by the opposite ends of the bars, which are always on the same level. In practice, the hanger, when properly set, works to perfection. The door never can bind, but can be operated by the slightest pressure in one direction.
Union Cong. Church
Rockville, Conn.
Minneapolis, Minn.
THE STOCKY MARKET, SITE OF THE MANSION HOUSE. (From an Old Print.)
or the other. Figure 160 shows a compound hanger on the same principle for use in very wide doors. The difference is simply that there are two hangers joined by bolts instead of one. Figure 161 shows a trussed hanger, which is used for doors that are wider than they are high. It may be said, incidentally, that these door-hangers can be exactly reversed; that is to say, the fixed ends may be at the top instead of the bottom.

The "Prescott" hanger is used to great advantage for elevator doors, as it permits of an opening the entire width of the car, if desired, while the ordinary width would be half that size. In such a case, a door across half of the opening is hung with ordinary butts, and the rest of the space is closed with a door hung by "Prescott" hangers to the first. The whole, or a part of the opening, can then be left unobstructed for the removal of boxes or trunks. Hangers for this purpose can be made of bronze, so as to present a neat appearance. These hangers are also used to advantage for barn-doors, car-doors, etc., and for any places where the hangers are exposed. The only objection to their use for parlor-doors, is that they have to be put on before the plastering is applied, and they are somewhat less easily adjusted. They also take up considerable width in thickness of the pocket; still, they work so beautifully that they deserve all the popularity that they have enjoyed.

The prices of the ordinary form of Prescott hangers for inside doors, are as follows:

<table>
<thead>
<tr>
<th>Doors</th>
<th>28 x 8</th>
<th>1 inch</th>
<th>$2.25</th>
<th>3 x 8 x 1 inches</th>
<th>3.25</th>
<th>4 x 8 x 1 inches</th>
<th>4.25</th>
<th>4 x 10 x 1 inches</th>
<th>6.25</th>
<th>5 x 10 x 1 inches</th>
<th>6.75</th>
<th>5½ x 12 x 1 inches</th>
<th>8.50</th>
<th>6 x 12 x 2½ inches</th>
<th>10.50</th>
</tr>
</thead>
</table>

(The to be continued.)

ILLUSTRATIONS.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

SEMINARY OF ST. SULPICE, MONTREAL, CANADA.

[Etched print, issued only with the Imperial Edition.]

UNION CONGREGATIONAL CHURCH, ROCKVILLE, CONN. MR. W. H. HAYES, ARCHITECT, MINNEAPOLIS, MINN.

The basement of this building is now under way. The completed structure will cost $60,000 and be finished next season. Materials: Monson granite, Long Meadow brownstone and red brick.


The cost of these buildings will be about $65,000.

THE STATUE OF CHARLES II, IN THE STOCKS MARKET, LONDON.

Ske article on "Equestrian Monuments" elsewhere in this issue.

OUT-BUILDINGS NEAR A COUNTRY HOUSE. MR. E. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR F. H. CLOUD, ESQ., WALNUT HILLS, CINCINNATI, O.

MR. S. E. DES JARDINS, ARCHITECT, CINCINNATI, O.

Y. M. C. A. BUILDING, BRIDGEPORT, CONN. MESSRS. LONGSTAFF & HURD, ARCHITECTS, BRIDGEPORT, CONN.

OUR MOTHER OF SORROWS SCHOOL-HOUSE, PHILADELPHIA, PA.

MR. J. J. DEERY, ARCHITECT, PHILADELPHIA, PA.

RAISING A SUNKEN VESSEL BY GAS. — A somewhat remarkable thing took place in the river just below Evansville, Ind., recently. A few days before, the steamer Robert B. Corson collapsed and sank in forty feet of water, together with thirty head of cattle confined on the lower deck. For two or three days an effort was made to raise the host, but the project was abandoned. On Saturday morning, however, to the surprise of one of the harbor boats, the pilot-house and hurricane-deck of the Corson suddenly appeared above the water. When a crew was sent down, the steamer was floating along, upheld by some mysterious agency. This was subsequently traced to the cattle themselves, whose bodies had become inflated by gases generated in the carcasses, and actually had lifted the steamer to the surface. — N. Y. Evening Post.

MEDIEVAL HOUSES.1 — V.

Fig. 20.

FIGURE 20 is a house of masonry and wood, sketched at Châteauneuf, in 1841. The ground-floor and first-story are built in stone, the party-walls in rubble masonry, and the rear wall on the court in stone. On the ground-floor (see plan A) and opening upon the street is a large store, with columns through the middle and a partition-wall B, in the rear. A large beam, carried on the cap of the pier in the middle of the front, on the central posts and on the partition-wall, supports the joists. A lighted spiral stair-case ascends to the first and second floors. From the passage, C, one enters the court, D, and a back room, E. On the front story the plan is the same, a large beam being carried across the front wall to bear the floor-joists. To obtain the greatest possible amount of light on the street-front the builder has joined two relieving-arches in the thickness of the wall, under which broad windows are set. There are two rooms on the top floor under the roof. A pair of rafters projects beyond the wall and shelters it. They are carried on the ends of the plates, relieved by brackets, and on the end of the middle purlin, similarly supported. The floor-rafters are laid at H, and G. The construction of this house assigns it to the beginning of the fourteenth century.

Figure 21 gives the plan and elevation of a house in Laval, of a more recent period, in which the wooden structure has more importance and rises in successive corbelings above the ground-floor. This house, whose front is on a steep slope, is intended for two families. The slope of the street has enabled the builder to give an entresol, A, to the occupants of the left side, floor-levels being at B, and C; those in the right have only a high ground-floor and a first-story, the floor-beams being at the level, C.

As is indicated by the plan, F, each house has its own stairway leading from the shop to the first-story. A wooden beam is carried up the middle of the front and divides the two dwellings from top to bottom. The panelled front of the first story projects over the plain, half-timbered ground-floor, and rests on three corbeling-beams. The front wall of the first-story is protected by the projection of the rafters carried on the ends of the plates, S.

The corner-posts on the front are there only to protect the wooden paneling, for behind these posts are party-walls of rough stone carrying the chimneys. The masonry of the front ceases at the ground-floor in the left dwelling, but is higher for the one on the right. The panels in this example are filled in with rough masonry between the posts. The two examples bear witness to the free and frank application by mediæval architects of the simple and sensible methods of their art, and to their good judgment in profiting by conditions of site and quality of materials, carrying out the programme given them without keeping to conventional forms, but scrupulously

1 Translated from the French of Viollet-le-Duc, by Mr. A. B. Bill. Continued from page 156, No. 66.
observing the principles of solid and durable construction; and that they had mastered these principles there can be no doubt, for the houses they built by such simple and inexpensive means have already lasted five centuries. The fashion of corbelled wooden fronts was followed mainly in the cities, and that system of construction was not in vogue in all the provinces comprising the France of to-day. It was rarely met with north of the Loire, and reached in the middle and west a very imperfect development. In Bresse, for example, the wooden houses of the fourteenth and fifteenth centuries had wooden fronts in which the system of building with squared beams carried across the front and carried the panelled front of the first story, which has three beams carried across the face with their ends framed into the corner-posts, between which are other vertical timbers framed into the beams. On the sides the ordinary wooden panels, filled-in with rough stone and mortar, formed the partition-walls. Above the first story a second projecting floor receives a second story, also with panelled front, surmounted by a deeply-projecting roof, the combination of which our illustration sufficiently explains. The projection of the roof over the wall of the ground-floor is about 3.00 m., and the front was thus perfectly protected from rain and snow, the arrangement being well suited to the climate of that country, which is hot in summer and very cold in winter.

These wooden houses differed somewhat from those built north of the Loire, where other traditions and different wants were felt. The people of Lyonnais wanted less lights and more perfect shelter. At Annancy they not only protected the house-fronts from sudden storms of snow, but also the streets, so as to allow the circulation of the inhabitants in winter. In the Middle Ages, no matter what may be said by the detractors of that period, the citizens did not shut themselves up in the brutal egoïsme so common to-day. In building his house he remembered that he was a citizen, and he built for himself and for his city. In our time inspectors of the highways protect the common interests. In those times the rules of inspection were less complete and less provident, but each citizen thought a little more of the general interest and tried to assure the well-being of all. This alliance of general and private interests between all the inhabitants of a town is more effectual than the most complete and best-executed ordinances. From an artistic point of view the result is very interesting in other respects, and as it is the case with private benefactions as compared with public charity, if the latter is more regular and perhaps more efficacious, the former are more delicate and intelligent.

The construction of houses by "empilage" becomes more characteristic as we approach the Alps. At Nantua (Ain), there are still to be seen several houses of nearly the same period as that of Annancy just given, whose structure approaches more nearly to that of the Swiss "chalet." We trace in them the most ancient traditions (see Fig. 23). The manner in which the wooden panelling of the first-story is laid on the masonry, the double beams under the roof, belong only to certain people who employed solely the mode of timberwork by empilage, whilst the outline of the rafters, forming a penthouse, and certain parts of the wood panelings resemble the joined timber-work so common in the north of France. A complete and critical study of these old remains of dwellings on the soil of the Gauls would materially aid in a classification of the races spread over this territory. The religious edifices and the chateaux were often built under influences foreign to the soil where they are found to-day, whereas the dwellings preserved the primitive native traditions. In England, for example, all constructions of wood of the fourteenth and fifteenth centuries have a certain analogy with the art of naval carpentry: the mixture of woods, their relative strength, the frequent use of curved timbers, suggest the combinations of timberwork used in ship-building, while at the same time we find in the north of France a system of timber-work which uses wood only for framing. In the same manner, systems belonging to the original population of the region between the Haute-Loire, the Sone, the Alps and the Jura, and in the west and south a very limited sys-
dwellings was concerned. It seemed that at this epoch the old
Gallic nation was restored and with it the architecture whose princi-
pies had lain dormant for a time. Secular feudalism, so far from
impairing this movement, seems, on the contrary, to have aided it,
not certainly from a particular taste for any form of art, but because
of an incredible aversion to monastic institutions, which, as we have
said, preserved the Gallo-Romanic traditions purely enough.
The Medieval period is one composed of very diverse and often
opposite elements; and it is difficult without entering into a long ex-
position to describe the singular effects produced all at once in the
breasts of a people who were unceasingly active.
In the dwellings of town and country, as well as in political his-
tory, do we find trac-ces of that national movement which com-
menced during the reign of Saint Louis,
and continued with marvellous activity through the four-
teenth and fifteenth centuries, and during
times of invasions, wars and miseries
without number. In
towns where the arts
were practised, the
methods of construc-
tion departed from
the traditions pre-
served in the con-
vents; returning to
wood - con structures
they plunged into bold combinations which permitted timber-work; they
enlarged the openings in the fronts of their houses, so making
the streets almost a part of them, and the lives of all the citizens
almost a common one. There resulted necessarily from this intimate
neighborhood a perfect union of the citizens. Without descending
to the public street they could talk from house to house. In certain
streets of the fourteenth century the people formed a conventicle by
simply opening their windows. The struggle of the people against
the secular and clerical powers brought into use many architectural
forms which seem very odd to us to-day. The houses of the times,
however open their fronts, formed between them impenetrable
alleys, whose walls almost touched at the top, leaving at their base
easily barricaded passageways. The strength of the citizen lay in
concentration, in union of means and cooperation. Safety was
found in grouping their houses as much as possible, so as to put their
inmates into immediate communication. Timber-work lent itself
more easily than masonry to this contracted disposition and system
of lighting, beside taking up less of the precious ground-space. It is
not surprising that in cities which near the fourteenth century had
acquired a certain independence and privileges, and had become in-
dustrious and rich, wood-construction had been almost exclusively
adopted. In the southern towns, where the traditions of the Roman
municipality were never entirely lost, and where there had not been
that fierce struggle against the feudal power and the might of the
Church which had borne even more heavily upon the cities than
the power of the la-
ity, domestic archi-
tecture adhered to
stone-construction,
and, relatively, wilder
streets, and did not
adopt the very open
fronts. The clerical
feudal power was felt
more heavily in the
towns of the north
than elsewhere. To-
ward the end of the
twelfth century the
bishops in an effort to
least the exaggera-
ted importance of the
monastic institutions,
which had absorbed
their profit a great
part of the diocesan
authority, and desir-
ous also of enroach-
ing on the laic feudal
power, convinced with
most of the large
towns to the north of
the Loire to build
cathedrals which
should become the
monuments of those
cities, in which the
citizens could assem-
ble at their will to at-
tend to public affairs,
have their law-suits
adjudged, and to plot,
alliance with royalty whose protecting power they felt at that time, soon ceased to submit to the erection of these immense basilicas which had been looked upon as fortresses of their future liberty, and began to oppose the feudal power of bishops and chapters, whose greatest strength was always in the cities.

This struggle, helped on by the lay lords and tolerated by the royal power, the king finding it a means of extending his authority, kept the people of these towns in a constant ferment, while at the same time it gave the idea of their peculiar life. From this time until the end of the fifteenth century, the dwellings we have been describing as being closely joined, very neighborly and almost exactly alike in plan, characterized the architecture of the towns.

A study of the customs of the Middle Ages helps us to find the reasons of their architecture. The Romans passed a great part of their time in public monuments or basilicas, under the porticoes, in the hot baths and the games, in theatres, circuses, amphitheatres and the like, and though we have in our own day a multiplicity of public buildings, the modern student looking over a plan of ancient Rome, wonders where the inhabitants of that populous city could have lived. The Romans, excepting the owners of immense palaces, did little more than eat and sleep in their own houses. In the Middle Ages, on the contrary, each family lived in its own domicile, the citizens had no time for assemblies, and even had the towns been rich enough to build public edifices, the principles of feudal Government would have opposed them. The church was the only building in the town where public meetings were permitted, which explains the eagerness with which the populous towns came to the aid of the bishops when they projected the great cathedrals. But when this scheme was suddenly thwarted and the people found in the royal protection a real security, they set themselves to building dwellings with an ardor altogether new. Wood lent itself marvellously to the ready satisfaction of their wants, combining the advantages of rapidity of execution with cheapness, and, what was still more important, economy of ground. Everywhere, then, until the end of the sixteenth century architecture followed its regular course; it improved the dwellings, made them lighter and more commodious, but continued to employ the Roman methods. The shape alone was modified. There are in Bourgogne, Lyonnais, Limousin, Perigord, Auvergne and Languedoc houses of the fourteenth and fifteenth centuries which differ from those of the twelfth and thirteenth only in the style of their architecture. Neither the construction nor the disposition of these dwellings is modified in a sensible degree. In the still more southern provinces, which, in the fourteenth century were not French, there were built at this period many dwellings whose style very closely preserves the Roman character. There is, for example, one among several houses in Persignan, used in late years as a court-house, which shows a front of a style almost antique, in despite of details borrowed from the "Aragonais" school of that period (Fig. 24). In the east the traditions of Roman house-construction were followed, launched later, that is to say, until the fifteenth century. Certain houses in Trèves, Cologne and Mayence, built in the beginning of the thirteenth century, were they in the Île de France and Champagne, could pass for Roman houses. There are still found in several of these dwellings particular arrangements which in France pertain only to the twelfth century, or to the beginning of the thirteenth, such as, for example, chimneys carried on corbelling upon the front walls from the first floor. Figure 25 gives the front of one of these old houses in Trèves dating from the beginning of the thirteenth century, which has a chimney on the middle of the gabled wall on the street. The fireplace is built where shown in the plan [i] and the flames brought to the crown B are carried on corbells, shaped like capitals and on two arches, between the windows of the first story. It must have been very agreeable, whilst warming oneself to be able to enjoy the outside view. Windows so placed enabled one to work before the chimney-place and to keep warm without being annoyed by the reflection of the flame. The people of that epoch had learned to secure their comfort; we, of to-day, do not seem to have gained so much, a fact which not unnaturally makes us somewhat dubious of our superior skill and wisdom. However primitive this comfort may have been, contemporaneous architecture, at least, entirely subserviced it, while our own architecture (at least that which we wish to persuade ourselves is our) is perpetrating similar experiments.

Everywhere, however, from this date the desire for a life of quiet in the country was manifest. The peasantry and the bourgeoisie, driven from the cities by the incursions of the Black and White Hordes, were thenceforward to be found on the edges of the towns and in the neighboring villages. The people of the country, desiring a better quality of life, began, just as they had done in the towns, to occupy all the territory in the vicinity of the towns where the soil was good, and later, as the demand increased, to occupy the same territory between the towns. The result was the formation of parishes, which, as we shall see later, have produced a system of parochial churches which still subsists in France.

We shall see presently what was the mechanism of this movement, whether it was due to the desire for a change of life or to the desire for a change in the forms of government. Let us only gather from it that the history of French architecture is the history of the movement of the people, in search of greater freedom and greater facility of living.
face sensibly larger than the ground floor. The cornice at the base of the gable represents a sort of machicolation. In the fifteenth century the windows were numerous and small, a necessity of construction which, when the horses were driven to serve great heights, such constructions being by reason of the material employed being subject to movements. The window-frames were often put out of strain, strained or warped by the shifting of the gables. It was frequently necessary to remove them out and replace them. The smaller masts were much less liable to changes of temperature or followed more easily the movements of the timber-work. The panels strengthened by cross-braces possessed the windows, and the weights of the front were principally carried on the corner-posts.

EQUESTRIAN MONUMENTS. — X.

Pasquines.

"And what is Pasquin doing?" said Marforio, one morning. "I am taking care of Rome that it does not go away to canes!" and so Pasquin was shut up for twenty-four hours. The Pasquin he made twenty-four hours later. This particular interchange of wit was intended to express resentment at the partiality that Clement XI showed to his native town, Urbino, at the expense of the citizens of Rome, and was but one of a series of epigrams that in early morning might read posted on the pedestal of one or the other of these famous statues which ingratiating or discontented citizens had selected as the mouth-piece to give expression to their dissatisfaction at the existence of such a change, a dissatisfaction manifestly directed at the mortal ills of the reigning pontiff. The statue known as Pasquinus was a mutilated figure set up at the end of the Piazza Braschi, near the Piazza Navona, and which latter place, where in the sixteenth century, was the shop of a shrewed-tongued, gossip tailor which was frequented by the upper classes, who gathered there to interchange the news of the day and laugh at the brilliant sallies of the witty tailors. Pasquinus was a long hair half embedded in the ground, was set up, and once the fiction was established that it was Pasquin who had come back to life again for the jests that at the old priest of the Sapienza was launching in writing those bitter epigrams which the hand of death had prevented his voice orally. However keen a watch was kept, some one was found skilful enough to affix the skirt without detection; and as in life the tailor's wit was drawn out by some clever interlocutor, the colossal reclining statue of the river-god Marforio was selected as his gospel. Free speech was not for those days and the populace delighted in this early attempt to perform the work that is now carried on by the unbridled morning newspaper. 1 The scandal, for the epigrams and verses were often scurrilous in the extreme, a length reached such a pitch that at the close of the sixteenth century the statue of Marforio was removed to its present position in the Capitoline. As for Pasquinus, Adrian VI threatened to have him thrown into the Tiber, but a friend, Ludovico Sessano, dissuaded him from it by declaring that if he did the very frogs would croak passarione. Pasquinus was, however, never so reckless as not to hesitate to flatter in the face of the victim of his corrections, and once his pedestal bore this question, addressed to Paul III [1534–1549], "Who is the best of the old poets for singing: how much will you give me, O Paul, to be silent?"

This particular form of pasquinade has been used also in later times; thus when the equestrian statue of Louis XIV, by Bouchardon, was set up in what is now the Place de Concorde, Paris, the pedestal being adorned with statues of Strength, Wisdom, Justice and Peace, by Pigalle, there appeared one morning on the pedestal the following epigram:

Groteseque monument, infame piedestal! 
L'excentrique père, le Vice est à cheval!’

And a short time after the following appeared:

Il est ici comme à Versailles.
Il est sans cœur et sans entrailles.

While a third epigram, of the briefest, was simply:

"Status statue."

A somewhat closer analogy can be found in the case of the equestrian statues of Charles I, at Charing Cross, and of Charles II, in the Stocks Market, London, though in this case, the pasquinade was published and not merely affixed to the pedestal of the statues. In 1624, Andrew Marvell, who seems to have had little love for the Stuart church, wrote a clever skit which purports to be a dialogue held between two horses on the scaffold, and each quadraped sought to mitigate the shame he felt at his own ignoble service, by casting reflections on the rider of his fellow. The dialogue is as follows:

If the Roman Church, good Christians oblige ye To believe man and beast; have spoke in effigie, Why should we not credit the public discourses In dialogue between the two animals between The horses, I mean, of Woolwich and Charing 
Who told many truths worth any man's hearing, Since Viner and Osborne did buy and provide 'em For the two mighty monarchs which to the world were 'em The stately brass stallion and the white marble steed The night came together, by all 'is agreed. 
When both kings were weary of sitting all day They stole off, iniquitous, each his own way, And then the two fuses after mutual salutations, Not only discussed but fell into disputes. It is the central theme of these disputes, an indulgence in mutual recriminations, one attacking the propitiatory of the second Charles, the other reflecting on the deplorable acts of the first. The bronze horse, apropos of the report that Charles II had embraced the Catholic religion, said that it was wondrous

"That he should be styled! Defender of Faith! Who believes not a word that any man saith"

And adds:

"Though changed his religion, I hope he's so civil! Not to think his own father has gone to the devil."

The conclusion reached in their midnight discussion is thus expressed:

"But canst thou devise when things will be mended?"

When the reign of the line of the Stuart is ended."

The statue of Charles I at Charing Cross still endures, but the other tragedy to this midnight colloquy has, with his rider, disappeared entirely, or, at least, almost entirely. The statue of Charles II, who was the only one to stand the test, is an effigy, of massive proportions, set on a gable, and found in the place where it stood, during the Middle Ages, as the” Jade of the Festival of St. Thomas the Apostle, the gable having been thus marked, and the pedestal having been removed, at the Restoration, in 1660, and replaced at the expense of the city, the monument having been then dedicated to St. Lawrence, the patron saint of the city. Later, in the eighteenth century, the statue was once again given a new pedestal, when it was re-dedicated to St. Thomas the Apostle. The pedestal is a plinth, on which are set, in gold and silver, the heads of the doges of Venice, the emblems of Venice, and the arms of the city of Venice. The statue itself is a copy of the original, which was destroyed during the French Revolution. The copy was made in 1830, and is of marble, and is said to be the best likeness of Charles II that exists. The statue is said to be the work of an English sculptor, and is said to have been carved by the famous Italian sculptor, Antonio Canova. The statue is a fine example of the Italian school of sculpture, and is said to be one of the finest works of art in London. The statue is now located in the Charterhouse, and is open to the public during the summer months.
The American Architect and Building News. [Vol. XXIV. — No. 672.]

FRENCH LAWSUITS.

MONTRÉAL, CAN., October 20, 1868.

To the Editors of the American Architect: —

Dear Sirs,—In your issue of the 28th of April last, there is an article on "The Churches of the Mutual Defence Society" in which there is mentioned a suit between the officials of a certain hospital and their architect; the verdict resulting in favor of the architect.

Will you kindly in your next issue give the names of the parties to the suit and also where the French law referred to by the judge can be found, and oblige,

Yours respectfully,

A SUBSCRIBER.

[The Bulletin of the Architects' Mutual Defence Society gives only the initials of the names of parties to the disputes in which the Society intervenes. This particular suit is given with the names of the parties. — Ed. Amer. Archit.]

ToHN, October 15, 1868.

AUTOMATIC VENTILATORS.

CINCINNATI, O., October 18, 1868.

To the Editors of the American Architect: —

Dear Sirs,—Can you give me the name and address of the manufacturers of automatic opening and closing louvre ventilators (made of sheet-iron, I think)? You would greatly oblige me.

Yours very truly,

A. O. ELKNER.

[The ventilators with slats hung so as to close against an inward current, but open to allow an outward current to escape, were made in Boston years ago by a company which has now gone out of existence, and we do not know that they can be had anywhere. Perhaps an ingenious gainstained-from iron worker could make them to order. — Ed. Amer. Architect.]

OLD ROMAN PLANK ROADS.—The Prussian Minister of Education, von Hauptmann, basing his conclusions of the fame of the celebrated Roman roads, on the traces of old Roman plank roads on the moor between Mehrholz and Briesel, not far from Díepholz, in Lower Hanover, invited that gentleman to fully investigate the matter. He accepted the task. He was able to trace the lines of two parallel plank roads right across the moor, presenting all those distinctive features which are found in Roman roads in general. One of them shows evident signs of having been demolished by force, the boards, which were originally fastened with pegs to the beams, having been turned away and buried under a mound of earth at night and left of the road. The other road seems to have fallen into decay, but there are signs of repairs executed even during the Roman period. For some years the boards have been hanging outwards, but on further examination the original plank remains, the fashion of both being the same. Those repairs seem to have been carried out hastily, for in one place a single board of the horse-course pegs, was found on the site, forgotten, no doubt, by the workmen. The local archaeologists feel assured that they have here the traces of some roads which were used a. p. 15, by the Roman commander, A. Cocceius, in his retreat from Germany to the Ems. — London Times.]

Do RAILROAD LOCOMOTIVES CAUSE FLOODS AND STORMS? — A correspondent of the Northwestern RAILWAY advances a curious theory for the increasing prevalence of floods and rainstorms. He says that there are over 30,000 locomotives in use in North America, and estimates that from them alone over 5,000,000,000 cubic yards of vapor are sent into the atmosphere every week, to be returned in the form of rain, or over 7,000,000,000 cubic yards a day — "quite enough," he says, "to produce a good rainfall in twenty-four hours." Estimating the number of other non-condensing engines in use as eight times the number of locomotives, the total vapor thus projected into the atmosphere every week in this country amounts to more than 470,000,000,000 cubic yards. "Is this not," he asks, "sufficient for the floods of terror? Is there any reason to wonder why our storms are so damaging?" — Age of Steel.

A NEW STEAM BOILER.—"A boiler for the instantaneous generation of steam is the very newest thing in our line," said a leading manufacturer to a Mail and Express conductor the other day. The apparatus consists of a thick wrought-iron tube of an inconvenient diameter, which is flattened at a temperature below the welding point, till its internal walls are almost in contact, a section of the tube showing only a three hundredth of an inch thick. This tube is then cooled into a convenient shape and is exposed to the direct heat of the furnace. Cold water being forced in at one end by a powerful pump, the steam is forced out at the other, and is of a uniform temperature, which depends on the temperature of the tube. It is claimed that no sifting or scaling up of the tube takes place, so the steam has the same velocity within the tube as without, and it does not break up and carries along with it any deposit at the very instant of its formation. The largest boiler yet constructed on this plan has been a ten-horse-power engine, and has proved so successful that the system is about to be extended. The government has experts at work examining the system, expecting to adopt it for use in the construction of torpedo boats.

Death of M. Felix BOQUET, Architect. — The French papers announce the death of the able architect, M. Félix Boquet, who was born at Chalon-sur-Saône in 1822. He took part with Balu in the restoration of the church at St. Germain-aux-Auxerrois, the Tour de Saint-Jacques de Béchaine, the church of the Porte St. Denis, the Église de la Trinité, Château de Chenonceaux, the Hôtel Carnavalet, and other buildings. He was the author of an excellent monograph on the church of St. Louis at Vichy, and one of the most important works of France has produced. He received a Medal of the Second Class at the Salon of 1871; another at the Exposition Universelle of 1878. — Birmingham Post.

S. J. PARRISH & Co., Printers, Boston.

— From Chamber's "Book of Days."
The Seal of the Dececo Closet

Is more than seven inches deep. A series of over one hundred tests were conducted in Philadelphia, before a committee of gentlemen interested in sanitary matters, with the express purpose of trying to break this Seal. In every case sufficient water fell back from the intake limb of the siphon to instantly seal its mouth to a greater depth than the average depth of seal in a washout closet, so that under the most unfavorable circumstances (when the closet is discharged without the aid of a tank, and when no water is supplied to refill the tank) the Dececo will offer greater security against sewer gas than the washout does under its best conditions.

A comparison of the two cuts will show that the Dececo has the greater scouring effect, and that it has no surface exposed to fouling to become dried and pollute the atmosphere of the room with foul emanations.

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WROUGHT IRONWORK.
Mr. W. R. Emerson, of Boston, desires us to publish the fact that he is using our stains continually, and that he has never pronounced them inferior to any other in the market.

These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply:

Our Stains contain no water and are the only exterior Stains that do not contain kerosene:

Prices are $0.50 and 75 cents per gallon according to color.

Send for Samples on Wood, and Circulars.

Samuel Cabot
70 Kilby St., Boston, Mass.
THE ENGINEERING AND BUILDING RECORD brings up a point, in answer to a correspondent, which is well worth discussion, if the statement he makes will reflect the results of the experience of architects or builders. The correspondent asks how much the lower half of a brick wall one hundred feet high will settle while the upper half is being built; and the editor, while calling attention to the importance of the question, mentions, as the only definite measurement which had come to his knowledge, that nine feet at the bottom of a high wall settled three-eighths of an inch during the completion of the building.

We think most persons of experience would consider this a small settlement. Where a new building is constructed by the side of an old one, using the old wall as a party-wall, and erecting a new wall parallel with it to enclose the opposite side of the structure, the floor-beams, if laid level from the holes cut in the old wall to their places on the new one, would, when the house was finished, be lower at the end next the new wall than the other. It is usual with masters to allow a correction for this, laying the beams higher at the end on the new wall, so that when the weight has been added they will be found to have settled to a level. If we are not mistaken, the allowance made for this purpose is five-eighths of an inch for each story, where the new wall is of common brick, with joints of the ordinary thickness. This, of course, is only a rule approximation to the exact correction, as the settlement goes on continually while the wall is in process of construction, and for some time afterward, but it answers a tolerably good purpose, and with different mortars, or different methods of bricklaying, the compression might be more or less. One thing which should not be forgotten, and which is, probably, more easily determined than the compression of fresh mortar, is the settlement of old brickwork under a newly added load. All architects have seen old party-walls extended upward, and seen, also, that the old brickwork settles materially under the additional weight. We remember one instance where an old party-wall was lined up, and built upon from the top upward to a height of some sixty feet. The old brickwork settled apparently throughout its whole extent, but the effect was naturally greatest at the top, where a movement of nearly two inches seemed to have taken place, disconnecting the stone cornice and the upper window-sashings nearest to the party-wall, so that they had to be rebuilt. These walls were built with a large dose of cement in the mortar. How the effect would have been modified with more or less cement is an important question.

SUMMARY:
The Settlement of Brickwork.—The Clerk-of-works and the Wily Builder.—The Antiquity of the Five Per Cent Fee.—One way of Swindling Architects.—The Demolition of the “Great Eastern.”—The Progress of Naval Architecture.—A Proposed Twenty-eight-story Building.—Steam-pipe Construction.

BUILDERS' HARDWARE.—XII

ILLUSTRATIONS:
Doorsway to House of E. P. Bradley, Esq., Boston, Mass.—Gothic Towers and Spires, Places 31, 32 and 53.—The First National Bank, Cincinnati, O.—Office-building, Minneapolis, Minn.—Design for a Lodge.—Design for Ladies’ Dormitory, Wells College, Aurora, N. Y.—Baptist Church, Stanford, Ste.—House at Walnut Hills, Cincinnati, O.—Church of the Messiah, Brooklyn, N. Y.

LETTER FROM LONDON

LETTER FROM BATH

LETTER FROM CHICAGO

MISTAKES IN ARCHITECTURE.—1.

SOCIETIES.

COMMUNICATIONS:
Slow-bearing Construction.—A Correction.

NOTES AND CLIPPINGS.

TRADE SURVEYS.

THE discussion of the dispute between Mr. E. R. Robson and the Londond School Board has called out a letter in the Builder from one of Mr. Robson’s clerks-of-works, of a very different stamp from the individual whose description, as given by himself, we mentioned recently. The Builder’s correspondent, Mr. Phillips, explains the matter of the staircase which was built with insufficient headroom, because that it was an ingenious device, or, rather, an adaptation of an old plan, for getting two staircases in the space of one, by providing a mezzanine at half the height of the story. He had himself carried out staircases of the same sort in others of Mr. Robson’s school-houses successfully, the minimum headway being six feet and a half, but the ingenious person who “did not care to furnish other people with brains” seems to have got hopelessly muddled over the plans, and to have been too egotistical to conceive the possibility that the mistake might have been in himself, instead of the drawings. Besides the trouble with this, and possibly other incompetent clerks-of-works, Mr. Phillips says, what is well worth noting, that the practice adopted by the School Board of paying contractors every month enabled builders of little capital or credit to obtain contracts, which they carried out after the manner of the kind. In one case under his charge the proposed site of the school was partly occupied by a brick cottage, which, under the contract, was to be torn down, and the materials removed by the builder. Coming to the place late one forenoon from other buildings under his care, he found that the cottage, which the day before was intact, had disappeared. The foreman, on being asked how it was accomplished so quickly, answered, with many smiles, that “they had a lot of carts there early and carted it all away.” Mr. Phillips, who appears to have the tact of a born superintendent, thought there was something abnormal about the foreman’s cheerfulness, and looked about with special care. A trench had been dug for the concrete footings of one of the walls, and this he found filled and nicely levelled up with fresh concrete. He ordered some of the concrete dug out, and discovered that it was only six inches deep, and that underneath lay what he calls “the grave of the old cottage,” consisting of a mass of bricks, plaster and other rubbish, which, instead of being “carried off early in carts,” had been simply dumped into the trench, probably cleared by ‘doubling a little concrete over the bottom and sides, and covered with a layer of concrete over the top.

A QUESTION is sometimes raised as to the antiquity of the five per cent architect’s fee, and it is interesting to know that it had been established by immemorial custom as early as the year 1800. In February of that year, the twelfth Pluviose of the eighth year of the millennium ushered in by the French Revolution, the Conseil des Bâtiments Civils reported to the Minister of the Interior that it was “a custom which had always served as the rule, and which ought to determine the rulings of such matters,” that the architect was properly entitled to five per cent on the “making plans, directing the work (conduite des ouvrages), and examining and adjusting the accounts for ordinary buildings in Paris, but that for buildings at a greater distance than three miles from his residence double fees should be allowed, the architect paying his own travelling expenses”; but “as sometimes happens, drawings or models were required which occasioned unusual expense, the value of those should be estimated and paid separately.”

A NEW English trick is described in the Builder, against which our editors may be glad to be warned before it becomes acclimated in this country. As described by Mr. W. H. Biddulph, an architect who has been made a victim, the fraud is a simple one. The inventor of it, a man of about forty, with “a sandy moustache,” whose “writing is so difficult it is very hard to read,” makes his appearance in a town and buys a lot of land. He then tells theowner whom he employs to make plans and specifications for a building on the lot, and to obtain tenders. These are procured, and a contract signed. The architect is particularly requested to have as much material as possible delivered on the ground ready to use, “to avoid obstructing the roadway.” The work is begun under the contract, and pushed by the builder, to whom, however, the speculator thinks it imprudent to make any payments until...
the roof is on. By the time the building has reached this stage, the proprietor has made arrangements for placing a large mortgage on the building and ground, and as soon as the money is in his possession he disappears with it, leaving the mortgagee to take possession of the estate, and the builder and architect to console themselves with the reflection that they have through a valuable experience in return for their time and money. Mr. Bidlake says that the individual whom he describes has carried out similar schemes in at least six different towns, to his knowledge.

The demolition of the gigantic steamship, the "Great Eastern," which is now nearly complete, recalls some of the singular hopes and disappointments which attended the early adventures of that wonder of our boyhood. Although several Astrides were yearly proposed in service of the world, "Great Eastern" dimensions, no one has yet realized them, and thirty years ago she was one of the wonders of the world. At that time emigration to Australia was increasing rapidly, and it seemed as if a ship large enough to take out a whole colony at once would be popular and profitable. With this idea the "Great Eastern" was designed, for a company formed expressly to build and use her, by the younger Brunel. For some reason, the estimates of cost which had been made proved very inadequate, and the company which owned her was ruined before her completion, winding up its affairs in bankruptcy, after sheaving her long hulk, her unfinished side-wheels, on a ship towed, after much trouble, money was raised to complete and equip the vessel; but she was unfortunate from the first. On one of her earliest trial trips a serious accident took place on board, and her enormous bulk made it difficult to manage her, or even to enter most harbors. The idea of sending her regularly to Australia was abandoned, and she was tried on the route between Liverpool and New York. She made one or two trips successfully, and the spaciousness of her decks and saloons would have made her popular with travellers, if it were not that her size made it difficult to get her over the bars, between Sandy Hook and at the mouth of the Mersey, and if we recollect rightly, she could not be brought to any pier in New York, but had to anchor in the Hudson River, off Twenty-third Street, and transfer her passengers to tenders. After it was found unprofitable to use her as an Atlantic liner, she remained idle for a time, until it occurred to some one that her immense hull would be well adapted for storing the cables of telegraph wires, which, after the success of the first Atlantic cable, were being laid all over the world. The earlier Atlantic cables, in default of vessels large enough to carry the whole of a rope three thousand miles long, were laid from two ships, each carrying half the line, rolling from mid-ocean in opposite directions. The objection to this, aside from the expense of the double equipment of ships, instruments and apparatus, and electricians, lay in the danger that the two vessels might drift or be blown asunder, so as to break the cable. This happened several times, and the idea of the smaller, safer, and more manageable single ship like the "Great Eastern" seemed very advantageous. The demand for such service was, however, only temporary, and the huge vessel was soon laid up in idleness again. After resting for several years, she was sold, at a disastrous sacrifice, to be used in carrying coal from the Baltic to Liverpool. Her unwieldy size seems, however, to have interfered with this sort of service, and she was soon put out of commission again, and moored in Liverpool harbor, where she was shown as a curiosity, and served to attract many visitors. The income derived from this source was too small to pay for the care of the ship, and she was finally sold at auction, some six or eight months ago, as old junk, with the understanding that she must be broken up as soon as possible, and got out of the way. Some enterprising contractors were bold enough to bid a hundred thousand dollars for her, and her plates will soon be scattered through the English rolling mills whence they came.

Curious illustration of the progress which has been made in naval design is furnished by the fact that her dimensions and construction were such that she could not be adapted to modern marine machinery. Unlike the great ships of the present day, which measure in length, from ten to twenty times their breadth, the "Great Eastern" was eighty-three feet wide, with a length of six hundred and seventy-nine feet. She was originally fitted with side-wheels, as well as a screw. The latter was driven by an engine of sixteen hundred horse-power, while another engine of one thousand horse-power moved the side-wheels. The two sets of engines together exerted only twenty-six hundred horse-power, a force which would be thought in these days very inadequate to the propulsion of such a vessel, while, owing to the wastefulness of the old marine engines, her consumption of coal was three hundred tons a day. It has happened, however, that "Etruria" and "Umbria" burn very much more than this, while at high speed; but their triple-expansion engines enable them to get far more work out of a ton of coal than was possible with the "Great Eastern's" engines, while the comparatively light construction of the latter, however, is practicable to fit her up with the powerful machinery which serves to drive the strong and thoroughly braced steamers of the present day through the water.

The daily papers interest themselves a good deal in the twenty-eight-story building which it is proposed to erect in Minneapolis. We do not know whether the scheme is a serious one, but, if so, we are decidedly inclined to agree with the persons who believe that such inordinately lofty structures are not likely to prove profitable to their owners. There is no doubt that, with care and skill, a very lofty office-building or apartment-house may be so constructed as to be safe against ordinary sources of danger, but it is also certain that very few buildings of the kind are so constructed, and nearly all the failures that were met with or unfinished were built with, or within a few years after their erection, shown signs of movement which must inevitably lead to speedy deterioration, if not total ruin. In most cases, the cracking and twisting, which the observant eye readily detects, appear to come from unequal settlement in different portions of the walls, and in the substance of the walls themselves, and such unequal settlements would be increased by carrying the masonry to a greater height, unless the usual system of building were modified, by abandoning close jointed facings to rubble or rough brick walls, and constructing all exterior and division walls of block-stone, of nearly the same dimensions throughout, and laid with mortar joints of uniform thickness. This would add considerably to the cost of the building, and increase the amount which must be charged for rents in it. Moreover, even if properly and safely constructed, such a building would have many objections, from which more modest structures are exempt. We ought never to forget that we live in a country where earthquakes are tolerably frequent. Probably each one of our readers has felt one or more shocks, strong enough, perhaps, to shake bricks off a chimney-top, and the effect of such shocks at the top of a building three hundred feet high would be so vigorous as to frighten the tenants of the lower stories. More than fifty years ago there was an epidemic of lofty buildings. No buildings were erected, although elevators were then unknown, six, seven or eight stories were not considered too much to place over the valuable lots in the lower part of the city. Between 1830 and 1840 some earthquake shocks were felt in New York, and the owners of the upper stories found it prudent to pull down the lower, and reduce them to more stable proportions. What would be the effect of a lively earthquake shock on the tenants of the twenty-eight-story building may be imagined, and the fall of a person from an upper window, or any one of a dozen probable accidents, would depopulate all the structures over a certain height in Minneapolis, or in other towns that might follow its example.

Every engineer knows something of the cheap coating for steam-pipes, made of sour flour and plaster-of-Paris, mixed, allowed to ferment a little, and spread on the hot pipes to take which is some six or seven times used here. This, we should think, might tend to corrode the iron pipes, and a trial made of it might be found in a sort of sawdust puddling, which has long been employed in the great pen manufactory of Blanzy, Fourre & Company, at Bourgogne, and is described in the Revue Industrielle. The dough is made by mixing flour paste and sawdust into a fluid mass. If the pipes of iron, clean, and free from grease, may be applied directly to steel, depth of depth coated, a mixture of two parts wheat to one of rye flour gives the best paste, and, when prepared with fine sawdust, freed by sifting from lumps, it adheres perfectly. For brass pipes a wash of mixed with water, should be applied before putting on the paste, or twice may be wrapped around the pipe before it is put. The pipe should be put on in two or three layers, each being allowed to dry before adding the next, and when all is dry, two or three coats of coal tar, put on with a brush, will prevent deterioration from dampness.
BUILDERS' HARDWARE.—XII.

PULLEYS.

Almost the only forms of pulley used by builders are those which are employed for double-hanging windows. These are made with cast-iron frames for the cheaper styles of work, or frames of malleable iron for a better class of goods; while some manufacturers use wrought-iron entirely. The wheels are usually made of cast-iron, with a groove shaped to receive the sash-cord or chain. The pulley is fitted in a mortise cut into the frame, the hanging-style of the window-frame, and the part visible, or the face, is made of almost any material, but most often of bronzed, nickel-plated, painted or japanned iron.

The commonest form is bronzed iron. The axes of the wheels are of steel or gun-metal, and the wheels themselves in the better class of goods are turned to accurate dimensions, though some cheaper grades are simply cast and polished. Some manufacturers finish pulleys with plain or ornamented bronze faces, in which case the face is made of a separate piece of metal, riveted to the iron frame of the pulley. There are also in the market, a few fine grades of pulleys made with brass wheels and cast-brass frames. This is, however, a needless expense, and such pulleys are used more in connection with furniture than with building.

The essential qualities of a good pulley-wheel, are simply that it shall run lightly, smoothly and easily. There should be a broad hub on the axle in order to prevent the flanges from jarring or rattling against the pulley frame, and the wheels selected should be of such a size that when the face-plate is mortised-in flush with the face of the pulley, the inner edge of the wheel will be over the centre of the box, so that sash-weights will not strike against the frame when raised or lowered.

Sash-pulleys are usually made in five sizes: 1½ inch, 2, 2½ and 3 inches, the size referring to the diameter of the wheel. The two-inch wheel is sufficiently large for most cases, but for heavy, plate-glass windows larger sizes are used, though the chief advantage of a large pulley is not so much that it will wear better, but that it will throw the sash-cord farther away from the frame in the hanging-style, and so permit of larger sash-weights. When the expense is not an item to be considered in the selection, it is well to employ some form of anti-friction, ball or pin bearing pulley for all sash weighing over fifty pounds. A poor pulley will soon wear loose so as to rattle on the axle. If anti-friction wheels are not advisable, the next best form is one with a large gun-metal axle. Some compositions of phosphor-bronze would seem to be peculiarly well suited for pulley axles, though not at present in the market to any extent.

There are a great many varieties of sash-pulleys, though the differences are so slight that a few examples will serve to illustrate the whole. Figure 162 is a fair type of the ordinary axle-pulley, and Figure 163 is a type of the best form of anti-friction sash-pulley. All of the most commonly used forms of sash-pulleys are on essentially one or the other of these lines.

The only important deviations from the common types of sash-pulleys have been made with a view to reducing the amount of labor required to properly set the fixtures in the window frames. It should be said that none of the patent forms have thus far met with either very wide sale or general approval, which would seem to indicate that the common form answers pretty fully all the requirements of the case. There are, however, a few styles which have met with considerable favor in the market, and which will serve to give an idea of the lines the attempted improvements have followed.

Figure 164 illustrates a form known as the “Empire” sash-pulley, in which the case is corrugated horizontally so that it will exactly fit into a series of holes bored into the frame with an auger or bit of standard size, a great reduction in the labor of mortising thus being effected. The advantages claimed for it are that it cuts away less of the frame than any other pulley, is held more securely, does not require any screws, and can be inserted much more readily and quickly than any other kind. It is claimed that these pulleys can be fitted to the window frames at the rate of sixty per hour.

A pulley requiring even less work in setting, though somewhat more complicated in construction, is shown by Figure 165. This consists of two small wheels set in a cylindrical case, and requiring no more labor to fit in place than is involved in the boring of a single hole. Shoulders or flanges at top and bottom of the case serve to plumb the pulley properly, and keep it from twisting. It is claimed that this pulley will hold its position quite as well as any other form, though it would seem more apt to work loose by reason of the leverage of the weight over the inner wheel, than the ordinary form.

Another style of pulley which does not avoid cutting the mortise on the frame, but saves somewhat in the screws, and has a finer appearance than either the “Empire” or the “Corey,” is shown by Figure 166. In this pulley the face-plate and frame are cast together, and the frame is made with a wide shoulder or flange at the bottom, which is cast on a bevel, so that when placed in position in the rebate, the pulley cannot slip down or out, by reason of the bevel wedging in the mortise. A single screw at the top of the pulley holds it securely in place; but it will be seen that it does not depend upon the screw for its stability. With an ordinary pulley, the heavier the sash the greater is the possibility of the wheel being forced out from its mortise, whereas, with the “Norris” pulley, the greater the load, the more securely it is wedged in place. Another obvious advantage is that it requires just half the quantity of screws and amount of labor to set this pulley as it does the ordinary pulley; and it is said that the carpenters who have used this, have liked it very much. The labor of mortising is slightly more than for the ordinary form, but the company controlling the patent also manufactures a mortising-machine specially adapted to this kind of work, by which the labor is greatly reduced. Aside from the labor of mortising, the only possible objection to this sash-pulley seems to be that it would require a pretty heavy hanging-style to the window frame, and would cut away the wood a good deal, the bevelled flange being three-quarters of an inch through for an ordinary sized pulley. This patent is manufactured in the same sizes and styles as the ordinary pulleys, including those with flat-grooved wheels for sash-chains.

The following table gives the average retail prices of the principal marketable varieties of ordinary sash-pulley wheels.
### TABLE OF SASH-PULLEYS.—PRICES PER DOZEN.

<table>
<thead>
<tr>
<th>Description</th>
<th>1 1/2 in.</th>
<th>2 in.</th>
<th>2 1/2 in.</th>
<th>3 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Painted iron, cast wheel</td>
<td>$0.25</td>
<td>$0.29</td>
<td>$0.30</td>
<td></td>
</tr>
<tr>
<td>Bronzed iron, steel axle, cast wheel</td>
<td>$0.26</td>
<td>$0.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronzed iron, steel axle, turned wheel</td>
<td>$0.26</td>
<td>$0.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronzed iron, anti-friction steel axle, turned</td>
<td>$0.26</td>
<td>$0.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polished brass face, anti-friction steel axle,</td>
<td>$4.20</td>
<td>$4.20</td>
<td>$4.20</td>
<td>$4.20</td>
</tr>
<tr>
<td>turned brass wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brass or bronze face, steel axle, polished iron</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
</tr>
<tr>
<td>wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corey's fine bronze iron, steel axle, turned</td>
<td>$0.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empire fine bronze iron, polished face and</td>
<td>$0.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norris's fine bronze iron, polished face and</td>
<td>$0.50</td>
<td>$1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith &amp; Egge, polished iron, flat grooved,</td>
<td>$2.25</td>
<td>$2.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>turned wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith &amp; Egge, polished iron, 5-inch double</td>
<td>$6.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grooved wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith &amp; Egge, polished iron, 4-inch double</td>
<td>$13.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grooved wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SASH-CHAINs AND WEIGHS.

In the better-class of buildings it is usual to hang all sashes weighing over forty pounds with some form of sash-chain; indeed, except for the expense, it would often be well to use nothing but chains, especially in buildings of a public character where the windows are apt to be moved with little care. The ordinary cords used for windows are liable to wear out and break, and experience has often shown that a good sash-chain will outwear enough of the ordinary sash-cord to make it more than worth while to use the stronger material.

The sash-chain, which appears to meet with the greatest favor in the Eastern market, is that which is made by the Smith & Egge Manufacturing Company. The form of this chain is illustrated by Figure 167. It is a species of flat-link chain, the form being the same as the well-known plumbers' safety-link, which has been in use for various purposes for a great many years. Smith & Egge adopted this form as best adapted for window-chains, and they have perfected special machinery which does away almost entirely with handwork, and enables them to produce the chain at marketable prices and of a superior quality. The chain is made with a great deal of care, each link being automatically tested as it leaves the machine. The metal preferably employed for this purpose is a bronze composition specially prepared by the manufacturers, designated as "giant metal," which is, in appearance, very much like pure copper, but is tougher and harder. A cheaper composition is also used, which is known as "red metal," and steel chains are manufactured to a certain extent, though the giant-metal chains are the best in every respect. The best giant-metal chains will sustain loads as high as 700 pounds. The red-metal chains are manufactured to sustain from 180 to 500 pounds. Steel chains are made in three grades: one capable of sustaining from 125 to 175 pounds; another from 400 to 450; and the strongest from 600 to 700 pounds.

Instead of one chain, it is often more desirable to use a double chain for very heavy windows, as shown by Figure 168. This figure, and Figure 167, also show the manner in which the chain is attached to the sash and to the weights.

Pulleys intended for use with sash-chains, require a different groove from that usual where rope is employed. The Smith & Egge Manufacturing Company has a special form of pulley intended to go with their goods, Figure 169. For convenience this pulley has been listed with the others in the preceding table of prices, together with one or two different makes of flat grooved-pulleys which would answer for the purpose equally well.

What has been said of the Smith & Egge chains applies equally well to the "Champion" sash-chains, manufactured by Thomas Morton, which have the same shape of link, though the sash and weight fastenings are slightly different. The "Champion" metal is a bronze composition probably not differing essentially from the giant or the red metal. Thomas Morton, however, manufactures another form of sash-chain with quite a different link, which is shown by Figure 170. This is known as the cable-chain, and is a very strong, durable form, never twisting or kinking. The sash attachment used with this chain is very simple and efficient, consisting of a short half-cylinder with a slot cut down from the top, wide enough at the bottom to admit a link of the chain, but narrowing at the top so as to prevent the swelling at the link-joint from passing through. The same sort of slot is cut in the weight-basket to hold the other end of the chain.

The cable-chains are usually made with alternately two and three pieces to each link, joined by a pin passing through the five thicknesses. For the lightest work the pieces are arranged too and two. The cables are made of either copper or steel, and vary in length from a size for a thirty-pound sash to one capable of sustaining a door weighing 1,000 pounds.

There seems to be but one other form of sash-chain at present in the market. It is known as the "Solid Link" chain. It consists of a compound link on much the same principle as the Smith & Egge chain, but made double and with rather finer brass or brodie wire, so that the sash-chain is nearly as flexible as ordinary sash-cord, and can be bent or twisted in all directions without knotting or kinking, a quality which the Smith & Egge chain does not possess. The "Solid Link" chain can even be tied into a knot without kinking. Figure 171 will give an idea of the construction of the link. This form of
sash-chain requires no special pulley, but will run over an ordinary grooved-wheel.

A entirely different kind of sash-chain is shown by Figure 172. This consists of a steel spring so closely and strongly coiled as to have the resistance necessary to sustain any sash weighing sixty pounds or less. It has a stretching- capacity of only about five per cent. It enables the sash to rest easily and lightly on the pulleys, and enables it to be raised or lowered with half the effort required with rope sash-chain. It is fastened at one end to the sash by an eye or ring, and to the weight in the manner shown by the figure.

The following table gives the average, comparative, retail prices per foot of the various makes and sizes of sash-chains:

<table>
<thead>
<tr>
<th>Description of chain.</th>
<th>For sashes of 20 lbs.</th>
<th>30 lbs.</th>
<th>40 lbs.</th>
<th>50 lbs.</th>
<th>60 lbs.</th>
<th>75 lbs.</th>
<th>100 lbs.</th>
<th>200 lbs.</th>
<th>300 lbs.</th>
<th>400 lbs.</th>
<th>500 lbs.</th>
<th>600 lbs.</th>
<th>800 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith &amp; Egg's plumbers' link, giant-metal</td>
<td>5</td>
<td>6.5</td>
<td>8</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith &amp; Egg's plumbers' link, kold-metal</td>
<td>3.5</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith &amp; Egg's plumbers' link, steel</td>
<td>2.5</td>
<td>3.5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith &amp; Egg's link, steel, black exam- plified</td>
<td>3</td>
<td>4</td>
<td>5.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morton's plumbers' link, champion-metal</td>
<td>4.1</td>
<td>4.9</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morton's plumbers' link, steel</td>
<td>3.5</td>
<td>4.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morton's cable-chain, copper</td>
<td>8</td>
<td>7.8</td>
<td>9.6</td>
<td>11.3</td>
<td>13.1</td>
<td>14.8</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morton's cable-chain, steel</td>
<td>7.2</td>
<td>8.9</td>
<td>11.3</td>
<td>13.1</td>
<td>15.7</td>
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<td>Solid link chain, brass</td>
<td>14</td>
<td>22</td>
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<td>Solid link chain, silver-plated</td>
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<td>Acme sash-coil</td>
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*There are but two sizes of solid link chain. They are tested by the makers at 200 lbs. and 300 lbs. before leaving the factory.

(The following table gives the average, comparative, retail prices per foot of the various makes and sizes of sash-chains:

## Table of Sash-Chains — Prices in Cents

The presence of the military helps to keep Kingston lively; the Military College and the fortifications of the place giving it a war-like look. The Government recognizing the importance of Kingston as a college center, has added grants of land, connection of a dry-dock and other additions to its facilities for business.

The great buildings of Montreal are rapidly progressing, efforts being made in each case to get as much done as possible before the settling down of the cold weather. The winter in Montreal is certainly no joke to the building trade: the first snow always falls in October and the last usually in April. It is not till the 14th of January sometimes that the new bricks are ready for im- plant. Brick dwellings have been erected everywhere, and in very severe ones, too, without any apparent harm, and really un- doubtedly this is done, the "building season" is reduced to four or five months. This year the first snow-fall was early and great. The snow-stack eight-tenths inches was registered on October 9, and it is said that so severe a fall has not been known for the last twenty-six years. Six months were recorded October 20, 1882. I have measured 3" and 4' falls within the last few years for the first of the season.

The immense pile of buildings forming the new Canadian Pacific Railway depot is to be completed and inhabited this month (Novem- ber). The cost of this building is in the neighborhood of three million dollars, which includes the railway station. This is the West-end depot, the acquiring properties for which and its approaches have cost a long way into the seven figures. It has been a tremendous undertaking but the whole thing has been done within the last eighteen months or so. Negotiations for the appropriation of land for the other end of the line, its new entrance into Toronto, are proceeding and are almost completed. What with new bridges, canals, and the over the St. Lawrence at Lacolle mentioned in a former letter, the pecuniary outlay has been simply enormous during the last two years.

The new station for the Grand Trunk Railway is nearly completed, and this, while its remains clean and new-looking, will redeem in a measure the disagreeable qualification of general and thorough dirti- ness applicable to all the stations of this line in Canada. The Union Station in Toronto is every bit as bad as other small stations, be- grimed with smoke and train oil.

St. Albans Cathedral, Toronto, is a great undertaking, the com- pleteness of which is not expected to take place for many years to come. It was set on foot by the Bishop of Ontario and some other influential members of the Church of England who were not satisfied with the low-church services conducted in St. James's Cathedral. Sub- sequent years were raised and a site purchased, and a clear way was everywhere. Further money was subscribed and a see-house erected and then designs for the new cathedral were wanted. A competi- tion was suggested but the committee were told, rightly enough, that unless some kind of bonus was to be granted, the best men would not compete. Then the question came up: What individual architects will take the matter up? All the money that could be procured was needed for the building and the committee would pay nothing for designs. They received an offer, however, from a Toronto architect who supplied a design gratis and agreed to be satisfied with a fee for his services supervision. The channel was started and is in progress and it is hoped the roof will be on this year. The view taken from the northwest angle has been published and for the sake of the credit of the committee and all concerned, it is fortu- nate that it is not to be sold and that the public will have time for them to change their minds and do something towards obtaining something good and correct. Here is to be a great cathedral, a quarter of a million is to be expended upon it and the promoters of the see closely difficulties are in such a hurry as to have the building completed in a few years and not wait till they can afford to get a design in even a decent manner but take the first design offered to them, gratis, without raising a question as to whether the design is good, bad or indifferent. One would think, judging from the design, that the promoter never designed so high a tower in his life before and it has the appearance of being piled up story upon story until it was about time to put it on the market. It is not in any way imposing but not poor and as it can well be, that is the southwest tower; the northwest tower ends in a spire, finkin and weak, and looks uncommonly like a second-hand spire, original designed for an Evan- gelical meeting-house. It has apparently happened to be the same size at its base externally as the tower at its summit inside the parapet, and the one is fitted down into the other and out of and
all proportion. The whole design lacks originality and has been unfavorably criticized in every direction. The promoters of the scheme have themselves hesitated, but they have come to the determination to complete the castle sufficiently at any rate to enable them to have something up the street they are aiming at, and it is with their architect, bound to nothing, intend to leave the nave and other parts to look after themselves. Probably by the time money is needed the market for those good things will have fallen so that he will have to change his design, for it is pretty certain this generation will see no nave. It is sincerely to be hoped that the Minister of Education will be able to consider this scheme of founding a Chair of Architecture. Of course, it is to be presumed that before doing so he will consider well the best way of making it suitable to the needs of the Province. We would point out that the building will be more a castle than an educational institution, but which will turn the attention of the already educated to what is true architecture. We have, as it is, far too many exponents of what is not true architecture and examples everywhere of the appearance of the whole to the inside. Let him not consider the advice of those who are trained in the art, else it is to be greatly feared he will do more harm than good.

New York. The University’s, cathedral, carried out at a cost of $40,000, are progressing slowly and now that the building is dismantled it is disheartening to see the “shams” that have been resorted to in its construction—false effects produced by means of painted and plaster. The pillars of the nave have a stone core but the shafts attached to the four faces, the moulded caps and bases are all painted color of the stone. Vousoirs of nave arches, the hallow of nave arches, the dark paneling, ceiling of walls, all as appears, are all of plaster; cheap and effective but utterly false, in a place where above all other places, the work should be honest and true. This was executed some years ago: it is to be hoped, and no doubt, that the architects will come to know and better have principles upon which such a building is just as easy to decorate in color as to paint one material to represent a building as rich to work in color in the materials at hand as it is. It is to be regretted that color decoration as a part of architecture has become a secondary consideration not to be thought of except in special cases. Now that it is so conclusively proved that color decoration has been used for every style of architecture to all dates and by all peoples from the rudest tribes to the most highly cultivated nations, to omit color from a finished building is like omitting half the effect. But to color without regard to the correct shades and tints is as bad as coloring stone to represent wood or galvanized-iron to look stone.

The Parliament Buildings are slowly rising but they will hardly be able to sustain the weight of that very large body of water that is being employed but the building extends over so large an area that to the uninitiated it seems to go on very slowly. There was a good deal of trouble about the settlement of the competition for this building which took place several years ago. It was supposed to have been decided and one firm of architects appear to have counted on this supposition and believed their design was chosen. It was rumoured to be taken against the Government for the amount of the commission but apparently nothing has been done yet. The proceedings were certainly questionable, though had the matter been ventilated the ugly rumors about might have been proved groundless but the fact that the Government of the building and not one of the competitors looks peculiar with no explanation being offered to the competitors. All the designs sent in were referred to the University of Ireland for the decision. It was one of those matters which it would have been better for all parties concerned to have cleared up. It certainly is time that concerted action should be taken in the matter of architectural competitions by architects of standing. It must be concerted and it must be general. If men, however, will enter into competitions without sufficient guaranty of the fairness of the awards, they must take their chance. So far, general competitions have proved for the greater part unsatisfactory, and those who have had much to do with them know very well with the best conducted there is always more than a chance that the sealed-envelope plan will not be rigidly adhered to the end. It will result, however, in the appointment of the American architect, President Cleveland’s desire for “Rehabilitation” has awakened in the breasts of the Canadians in general a desire to show that “two can play at that game.” The Board of Trade made a great mistake in not limiting the competition to architects in Canada; but it has to be acknowledged that the competition should have been entirely fair one and it is to be hoped it will be the end. Nothing had been heard or made public by the end of last month as to the progress that Professor Ward had made with the designs under his charge and it is by no means likely that sixty applications for particular of the competition were received by the secretary.

The new paper, The Canadian Architect and Builder, is filling a long needed want of intercommunication between architects, builders and manufacturers in the Dominion. It seems to have set out on the right direction and gives local items of a character consistent with the objects of the paper in a concise form, though some of the correspondence and articles which is not only news that is important, but interesting.

The Toronto Architectural Guild, who at a recent meeting passed a resolution expressing interest in its success, so that it may fairly be considered an authentic dispenser of professional news. It gives one large illustration monthly; this month is devoted to the Toronto Court-House and City-Hall, that has been written about in former letters, the building which should be historical, as among architectural competitions, because of the peculiar management of the whole business. I would only say that a building for $200,000 was competed for, and all designs thrown out because it was supposed none could be carried out for the sum named. The design now to be carried out is to cost over $1,200,000. Another subject that requires united action on the part of architects, is remuneration for professional services. Five per cent is certainly too much for some classes of buildings, as it is as certainly far too little for others. It is very good pay for factories and warehouses where there is no special amount of art or science required; but for the higher class of houses, for which the best and newest articles in architecture, design and decorative works are introduced, it does not pay; and, when the work is paid for at that rate is far too heavy and extensive alterations and additions that often take far more time and trouble than a new building, an architect ought to be able to ensure an amount that will pay him. If, as seems to be the case, five per cent is a recognized and sufficiently remunerative amount for the last five and twenty or thirty years, the character of the work and architect; it is not likely to last for the same sun has materially altered, and both in construction and design the greater amount of attention has to be given, deserving a proportionate increase in the amount of remuneration; at present but few can command the fees that would permit them to give the care that the architecture as present is a poorly paid profession, but the real comfort of living depends as much on a good architect as upon anything else. "Is life worth living?" Not if your home has been carried out by an ignorant architect. To obtain good quality in a great price should not be given, and as the quality provided by a great many is undoubtedly good, it should be paid for accordingly.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

DOORWAY TO HOUSE OF F. F. BRADLEY, ESQ., MARLBOROUGH, ST. BOSTON, MASS. MR. W. WHITNEY LEWIS, ARCHITECT, BOSTON, MASS.

[Hi-choke, Issued only with the Imperial Edition.]

GOTHIC TOWERS AND SPires, PLATES 31, 32 AND 33.—ST. CUTHBERT’S, WELLS; ST. JOHN’S, SHREWSBURY; ST. ANDREW’S, EWELRY; ST. ANDREW’S, HICKENSTON; ST. MARY MAGDALENE’S, WARBOYS.

[Issued only with the Imperial Edition.]

THE FIRST NATIONAL BANK, CINCINNATI, O. MR. JAMES W. MCLAUGHLIN, ARCHITECT, CINCINNATI, O.

THE YLLIS building which has just been completed, occupies a lot 55 feet on Third Street by 75 feet on Walnut Street. The lower stories are of brown or basaltic granite, the remainder of the exterior being built of Oshkosh brick, a dark chocolate color, trimmed with brown red sandstone. The building is 100 feet high to the top of the parapet. The ceiling of the banking-room on main floor being 18’ in the clear. The entrance hall is furnished with marble and the interior finish is of quarter oak. The structure is entirely fireproof, iron- beams and fire-arches being used throughout, and columns and pillars protected with porous terra-cotta and finished with iron’s cement. The three stories of the building are of hollow fire- clay slabs fitted between the iron Ts. The staircases are of iron, the railings being treated with the Boyer-Blaff process, and having treads of red marble. All halls and the public space in bank are tiled with marble.

OFFICE-BUILDING, MINNEAPOLIS, MINN. MR. L. S. EPPINGHAM, ARCHITECT, MINNEAPOLIS, MINN.

DESIGN FOR A LODGE. MR. F. L. V. HOPKIN, ARCHITECT, PROVIDENCE, R. I.

DESIGN FOR LADIES’ DORMITORY, WELLS COLLEGE, AUBURN, N. Y. MR. W. H. MILLER, ARCHITECT, ITALIA, N. Y.

BAPTIST CHURCH, SANFORD, ME. MESSRS. STEVENS & COBB, ARCHITECTS, PORTLAND, ME.

HOUSE ON LOCUST ST, WALNUT HILLS, CINCINNATI, O. MR. S. E. DES JARDINS, ARCHITECT, CINCINNATI, O.

CHURCH OF THE MESSIAH, BROOKLYN, N. Y. MR. E. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.
"First National Bank Building"
"Cincinnati, Ohio"
CHURCH OF THE MESSIAH

BROOKLYN: N.Y.

Elevation on Greene Ave.

A.H. Robertson: Architect
OFFICE BUILDING, IRON CONSTRUCTION
MINNEAPOLIS, MINN.

L. S. BUFFINGTON ARCHITECT
MINNEAPOLIS, MINN. • D • 1888
in England, during the past two or three years. None of the pictures have taken them away. The picture-galleries have closed their doors. The Institute of Architects has been given over to the tender care of the painters and decorators. The merry laugh and head of hair that once graced the windows are gone. The very newspapers are at their wit's end to fill their columns with readable matter. All is silent, dismal and dull. But, with the advent of October, come brighter days. There is already a move-ment visible among the dry bones, and by the month's end everything will be progressing as merrily as ever.

One of the signs of this returning life is the opening conversations of the Architectural Union which took place this last, at Westminster Town Hall. It is understood that the enthusiasm of the last year was somewhat interesting, inasmuch as an agitation has been proceeding among the students in favor of a dance, on a large and extensive scale, being substituted for the frigid, stately reception which generally takes place at these meetings. The Committee of the Association were, however, quite proof against such frivolous suggestions, and the usual reception was, therefore, held. Perhaps it was a degree more frigid, a degree more stately than usual. But, what matter! The dignity of the Association was duly maintained, and English architects may yet thank God that they are not as other men are.

By far the most interesting of the evening's entertainments was the exhibition of students' drawings, and it was simply marvellous to see the perfection to which draughtsmanship is carried nowadays. Indeed, unless a man is not only of first-class abilities, but also content to plod on night after night, long after midnight, he has little hope of achieving much distinction in the academical field. The successful competitor for the silver medal of the Association, Mr. B. F. Fletcher, son of Mr. Banister Fletcher, tells me that he has had permission to devote the whole of his time to his work, and has postponed his holiday week after week till on in September, when the short days and cold weather deprived them of half their pleasure, and altogether prevent sketching. Another student who knows the value of the prize is also determined to make the best use of it. He hopes to achieve much distinction in the academical field. 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THE SURROUNDING COUNTRY AND ITS HOUSES.

THEIR TYPICAL PLAN.—"HAMPTON."—"BELVedere."—A MODERN HOUSE ON SIMI-
LAR LINES.

One of the features most noticeable in connection with architectural and building interests about Baltimore just at this time is the development within the last decade of a characteristic style, particularly in regard to dwelling-houses and all the relations of home life, a development that is chiefly interesting not so much from its extent but because there is in it a distinctive character, not only a progress, but a transition from an old style of design, from an old form of life to a new; a change whose causes are perfectly recognized and natural, and which becomes more strongly marked year by year.

With a climate whose midsummer is never too warm for health, or even for all the enjoyments of country life, producing a foliage the same in kind and as freshly green as that of New England, but whose greater luxuriance of growth tells us we are on the border lands of "the South," the natural beauty of the country surrounding Baltimore, particularly to the north and west, is singularly attractive in its general aspects of quiet interest. Elevated and rolling, from higher points we obtain an extended view over the luxuriously wooded valleys and hills— with here and there the roof and towers of some prominent building showing above the trees— down to the distant city itself, half hill under the hills, and dim behind its vast cloud of smoke and mist; while, beyond all, the bright waters of the Chesapeake Bay glisten in the sun. Our forefathers seem to have fully appreciated these advantages, and we find scattered through the surrounding country many houses built from seventy-five to a hundred years or more ago, some of the earlier ones being conceptions as centres of social life when Baltimore itself was still a small town. An aspect of refinement and elegance—in some cases, of actual stiltedness—and the suggestion of a rather lavish mode of living, characterize these houses, which were designed upon a certain typical plan— seldom seen in later buildings—thoroughly in harmony with the country surroundings, and with the habits and customs of an age very different from our own of to-day—an age when slavery existed, when the life of a man of wealth and of high social position was much more one of careless ease and idleness, and more distinctly separated from that of his less fortunate neighbors than is possible in the neighborhood of a large city under the social conditions of the latter part of the nineteenth century.

The typical plan of these old houses was based upon an idea of proportion, symmetry, and simplicity; no economy of space was necessary, and the exterior effects were usually inspired by the so-called "classical revival"—this was the rule until the middle of the nineteenth century, and naturally extended its influence to America, where, as a social custom, particularly in Maryland, were still closely modelled after those of the mother country.

But, unfortunately, as the English was in many respects an outgrowth from the classic Italian, so the American became often—not always—only a warker imitation of the English, and sham masonry of wood and plaster too frequently took the place of marble, stone, and marble. The general scheme usually comprised a large central building of two or three stories' height, containing a wide hall with large square rooms opening upon it, and a main staircase, and with portions of more or less stately proportions at either end. On either side of this large central building extended long, low wings, of only one or two stories, and symmetrically arranged for the exterior effect,—one containing the kitchen and various rooms for domestic purposes, the other a library, billiard-room, or business office of some kind. We note in the interior arrangement little thought of concentration or economy in the details of stairways, passages, etc., a great paucity of closets, and a total absence of the modern "battery." The various parts of the group of buildings were roofed with simple gables or hip-roofs, windows and doors were only symmetrically arranged openings in the walls, ornamented, if at all, only with some refined, carved moldings around the frame, and the universal outside Venetian blind; while the towers and turrets and low roofs of modern times, in all their innumerable fantastic forms and un- expected places, were unknown.

Such is the type, in a modified form, of "Mt. Vernon" and of the majority of old Virginia mansions, now rapidly falling to ruin, but still proudly boasting of their ante-bellum splendors, when even the sun and the stars shone with a greater glory over the "Old Dominion" than in these degenerate days. In Maryland a few have been entirely destroyed to make room for a new architectural generation, and the old ones still standing have suffered chiefly from the ill-advised and incongruous touch of modern alterations and improvements. The most important, and perhaps, probably, were "Hampton," the seat of the Ridglys, "Belvedere," of the Howard's, "Dougorgan Manor," of the Carroll's, and "Wye House," on the "Eastern Shore," the

home of the Lloyds, this last of frame, the others of brick and stucco.

These houses are still in excellent preservation, and still owned and inhabited by the families whose ancestors built them. We give sketch-plans of "Hampton" and "Belvedere," the former situated about nine miles from Baltimore, and built in 1838—— "Belvedere," alias "Baltimore," of Charles Carroll's, which he designed and built in 1809, the second of 1817.

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The entrance-hall, of great width and dignity, passes the visitor to the south front, where the screaming garden of household antiquity, was hipped cedar boxes of most venerable appearance. The formal terraces of exquisitely kept grass, the long rows of superb lemon and orange trees, with the small garden gates and doors, and the foreign air of the house, quite disturb one's ideas of republican America.

Of "Belvedere," alias not one stone remains upon another—the very ground upon which it stood has disappeared—levelled to the grade of the encroaching city's streets some dozen years ago, and what was once far below the lowest depths of its vaults, is now the bed of North Calvert Street, where all that survives to recall what once stood above it is the classic name of "Belvedere Terrace." This type of house is built no more, and as it was the result of conditions that will never exist in the future, it will probably never be built again. Maryland may be said to have changed her geographical position, as though the old "Mason & Dixon" line had moved down from the Susquehanna to the Potomac, and swept with it many of the details of practical life which had long been observed on her soil, leaving the voids to be filled by a rapid influx of ideas and practices that had already been adopted with more or less care and deliberation by her more northern neighbors; but these were sometimes found not to fit the new condition of things in the Border State without a certain amount of readjustment and adaptation.

Three of these houses are still in excellent preservation, and still owned and inhabited by the families whose ancestors built them. We give sketch-plans of "Hampton" and "Belvedere," the former situated about nine miles from Baltimore, and built in 1838—— "Belvedere," alias "Baltimore," of Charles Carroll's, which he designed and built in 1809, the second of 1817.

The entrance-hall, of great width and dignity, passes the visitor to the south front, where the surrounding garden of household antiquity, was hipped cedar boxes of most venerable appearance. The formal terraces of exquisitely kept grass, the long rows of superb lemon and orange trees, with the small garden gates and doors, and the foreign air of the house, quite disturb one's ideas of republican America.

Of "Belvedere," alias not one stone remains upon another—the very ground upon which it stood has disappeared—levelled to the grade of the encroaching city's streets some dozen years ago, and what was once far below the lowest depths of its vaults, is now the bed of North Calvert Street, where all that survives to recall what once stood above it is the classic name of "Belvedere Terrace." This type of house is built no more, and as it was the result of conditions that will never exist in the future, it will probably never be built again. Maryland may be said to have changed her geographical position, as though the old "Mason & Dixon" line had moved down from the Susquehanna to the Potomac, and swept with it many of the details of practical life which had long been observed on her soil, leaving the voids to be filled by a rapid influx of ideas and practices that had already been adopted with more or less care and deliberation by her more northern neighbors; but these were sometimes found not to fit the new condition of things in the Border State without a certain amount of readjustment and adaptation.

The house no longer to be smaller and more compact, and, except for persons of more than average wealth, not only to cost less in construction, but to be less expensive to live in and keep in order; to be well heated and to have sufficient in the principal rooms for winter comfort, and at the same time to be adapted to four or five months of open-air summer life, when wide doors and the protecting shades of deep porches is important; and in all cases rooms not too small for large pieces of furniture were a desideratum. The Eastlake and Queen Anne Villa, even in its most attractive form, has fulfilled its mission and has had its day, and is still having its waning twilight,
The American Architect and Building News.

November 17, 1888.


Although probably unknown to the general public who live more than a couple of hundred miles away from here, every twelve months there takes place a display of Chicago life and activity that is commonly spoken of as "the Exposition." Actually, it has some of the same name, but the people at home, at the great wash, it is only known by the above title. This exhibition takes place in the fall, and continues during the greater part of the months of September and October. In the main, it is an exhibition of manufactures, manufactured products, and fancy displays by the principal merchants of the city. The omnipresent flogging, the parlor-organ and the family sewing-machine post the terra-cotta exhibits and the display of asphalt walk-lights: a flourishing pop-corn business is not in the least disturbed by an exhibit of brick-making machinery on one side, and a corset factory on the other, while, in the midst of all, a band dispenses music upon the just and the unjust. As a matter of course, in its main features, the exhibition is, year after year, much the same, being, as it is, an exhibit of the thousand and one industries, both great and small, that centre in and around Chicago. Still there is always one department, and that of the fine arts, that is different and is always crowded with visitors.

The twenty old railroads coming into the city exhibit a pretentious for selling half-rate tickets at this season of the year, and the result is that, in the aggregate, a really immense number of people visit Chicago either on business or pleasure, and always take at least a peep at the Exposition. Consequently, no exhibit in the West begins to have the same direct influence over the great numbers of people that this display, sponsored by the Art Institute, of the exhibition is ordinarily short, and, unless there be some very extraordinary attraction, the visitors are chiefly from the city or immediate suburbs; while at the Exposition the vast majority are people from out of town, who rarely see any exhibition of any kind that is artistic or artistic excellence; and all this renders the exhibitions of the Exposition more far-reaching for art education than anything in this portion of the country, the works of art being charged on the sale of pictures, added to the care that is taken of the engravings, make this exhibition a favorite with artists, even if the fact that, ordinarily, more pictures are disposed of here than at any other display in the United States would not of itself make it desirable to send pictures.

Thus the committee find their task comparatively easy, and almost always, at least, fairly successful. This year, the number of exhibitors shown in the catalogue was over four hundred and fifty. Nearly all the pictures were disposed of by this year's Fair. The Art Institute of Chicago, as already stated, is a large one, and beautiful, and has been transported bodily. On one of the walls, at least ten of the pictures had figured there, while the total number that had been exhibited there either this year or previously must have been nearly one hundred. One of the extremely curious and interesting features of the picture-gallery was a series of paintings (which have been already exhibited in several cities) illustrative of Japanese life and surmounted by a carefully collected, though not very carefully portraying lily, in a manner especially calculated for a picture-gallery, was still peculiarly enjoyable to architectural students, as showing Japanese architecture; with its accompanying black-and-tailed landscapes and brilliant figures, the tall upon columns was covered, not voted to a more or less intelligent criticism of the art-gallery; but, suffice it to say, that the exhibit, while containing no very extraordinary pictures, has been generally very greatly admired for the good and high average standard of the work. Among the purchasers of paintings is mentioned the Detroit Art Museum, and, as to the total sales, we have exceeded $16,000, the artists cannot complain greatly of not being munitions being charged on the sale of pictures.

During the past month two parts of the city have been more or less disturbed by a strike on the street-car lines directed against the Philadelphia syndicate that owns two-thirds of the street-car system. For several days all traffic was stopped on the West Side, and for over a week the people of the North Division was without transportation, while the few cars run were loaded principally with policemen. No riot of any real importance took place, but conflicts with the strikers were numerous, and the city for nearly two weeks, if not at the mercy of gangs of lawless men, was virtually in the hands of the strikers.

At length "the union" was forced to give in, which it did with the worst grace possible, and the men went back to work, or, at least, such as could go a change of heart is a matter of time, and, without doubt, this last strike has done much towards bringing several schemes of overhead transportation to the more favorable notice of the public. Already several ordinances have been passed by the City Council granting right of way to one company is even said to have made such progress as to have acquired several pieces of property, and to have consulted with architects in a preliminary manner: we regard depots, etc. However, all as yet is quite a chaotic state, but it is promised that within six months a right of way will be obtained and preliminary surveys finished, so that a long-suffering public even now commences to see with the eyes of faith the long-promised monorail.

In the last month the Trustees of the Art Institute have, owing to the generality of one of our citizens, found themselves enabled to throw open the galleries to visitors on Sundays, free. The hours have been fixed between 1 and 5 p.m. This has been a great success, but the difficulty has been the additional expense of attendants. This has now been removed, at least for one year, by Mr. James W. Ellsworth, who takes upon himself the extra cost. The hours have been chosen as above to avoid the critical period of a meal, or to interfere with church-going, and it is believed that a very large class who are not at liberty other days, and, who especially need art-improvement, will take advantage of this privilege.

MISTAKES IN ARCHITECTURE.—1.

"We are all of us wrong sometimes: so spoke, in the hearing of a friend of mine, one of our best-known humorists and men of letters. They were together on a steamer, and were watching the duration of a sailing-boat being navigated by a mariner who clearly had made a mistake in handling his craft. The famous humorist was a young daughter with him, and she asked, "What, pray what, is being done, father?" and got the reply, "He is wrong, my dear; we are all of us wrong sometimes."

No truer word was ever spoken; and, if for no other reason than because it is so universal a fate to get wrong sometimes, mistakes would be justified as a subject for a lecture. But there is a much better reason for my selection of this subject. Forewarned is forearmed; and, though I cannot promise you an immunity from all mistakes, I can, I hope, point out some into which there might perhaps be some danger of your falling, and against which you will be likely to guard if your attention has been called to them.

A mistake is always an evil, and often a most serious evil. There are mistakes which a man may make inadvertently, and without blame, but which yet entail consequences far more than those which follow many a crime. Shakespeare paints Wolsey as arrogant, usurpous, shrinking from nothing so that he might escape his doom; yet, he got the reply, "He is credited that ruins him, but the blunder of laying a packet intender for his own eye alone before that of the king. It is only a mistake when a signalman gives the wrong signal, or a pointman turns the wrong way. In the latter case, it is not the wrong of an innocent person; or, to come nearer home, it is only a mistake to misconceive a girder, or misjudge a foundation; yet it may lead to the ruin of a fine building and of its architect's career. If, then, you succeed, here, in steering clear of even a few mistakes in consequence of their having been pointed out here, that will be ample justification for our spending an hour together about this roads more valuable subject than the first place students' mistakes, and secondly, those of architects; and, though I will try to be orderly, I greatly fear that, as mistakes are

\[1\] A lecture delivered by Prof. T. Harper Smith, Ph. D., A. B., at the commencement of this season 1888-90 at University College, London.
subject to the rule that I know of, a discourse on them must not of necessity spring from an irregular location. I shall, therefore, continue to have to unclothe my personal opinions and misconceptions which I have thus far encounter in the course of my work. I consider it important to maintain an impartial and objective perspective on these matters. It is important to focus on the key elements and not to be distracted by the details.

Many a youth fails to realize that when he left school or college and entered an office he embarked upon a quite new career, a career of his own. A youth who has not been able to make such a career will have occasion in the course of the lecture to mention other mistakes which, so to speak, enter into couples from this reason, and to tell me, lest assured to all men who are safe not to make a mistake in the form of interest may be in danger of running to the opposite extreme.

Student's Mistakes. To turn now to students' mistakes. The one which first seems to Present itself is neglecting opportunities. This, while profitable, is vicious; but it is a pure thoughtlessness. In such a case the pupil passes by acoop, the commercial, the practical business of his community, and this is as common as it is surprising. Each of these two competitors has made the mistake of failing to understand the work of another, but the failure has been in opposite directions. It is easy for one to have a good plan, but to have certain students have occasion in the course of the lecture to mention other mistakes which, so to speak, enter into couples from this reason, and to tell me, lest assured to all men who are safe not to make a mistake in the form of interest may be in danger of running to the opposite extreme.

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NOVEMBER

tours of no more interest to them than those of a line-trip, and that they are of no use, in the true meaning of the word, to those already in the way. The best confirmed observers can be learned in a fortnight's well-directed sketching than in months of work over books and drawings, and I will engage to say that the architectural traveller gets twice as much enjoyment out of any trip which takes him to chance towns of interest as any of the ordinary travellers he will fall in with on his route.

It is a mistake to sketch or to study alone, if it can be avoided. Nowhere, perhaps, being freer and Englished, is "Birds of a feather flock together;" and, though a man's books and drawings are not bad companions, human comrades and friends are more useful, if only they be of the right character. The best confirmed observers can be learned in a fortnight's well-directed sketching than in months of work over books and drawings, and I will engage to say that the architectural traveller gets twice as much enjoyment out of any trip which takes him to chance towns of interest as any of the ordinary travellers he will fall in with on his route.

On the choice of subjects of study I have not much to point out, but I cannot forebear saying that it is a mistake to despise surveying. Much of the work that they ought to prepare themselves for is purely architectural practice, and for that only, and that everything which can go by the name of surveying is unnecessary, if not beneath them. They believe surveying to be, at any rate, wide of their studies if they are to set out and be done over again for the convenience of a gentleman or artist who, when they come to practice, will find that a certain amount of surveying work will come in their way, and must either be done or handed over to someone else. I am not speaking of questions of preparation of which is to a large extent a distinct work, but of all that relates to the examination and care of existing buildings. If you reflect that in any city or town for one new building there are hundreds already in existence, and that each of these hundreds is likely to be repeatedly surveyed, now for repair, now for alteration or enlargement, now for sale, or purchase, or rating, and possibly again after injury by fire, you see that the mass of surveying is considerable. Much of this can be better done by an architect than by any other person, and from time to time every architect is asked to make surveys under circumstances which make it clear that if he cannot or will not, valuable connections will go elsewhere. Nor is this all. Architectural practice is always fluctuating, and not infrequently the question of surveying work or none is a question of bread-and-butter or none. So do not count this over; you are nisusless, and it is your turn what you can about them, and, if a chance offers, by all means try to see a little land-surveying. A very few days in the field will make the methods of working clear to any one who has not forgotten his high-school life.

There is a companion mistake, one, I mean, of an opposite character, which is sometimes made, and which may as well be noticed. It is in neglecting the importance of accumulating knowledge and experience, and make no attempt to exercise themselves in design. Whenever one has made a piece of architecture one's own by studying, sketching, and measuring it, it is a wise course to try to design a variation upon it, with the same features, and solid ornament, and by all means arranging them. This may be done, if you like, upon a single feature and an extremely small subject, and from such beginnings there are many ways of going on. What I wish to urge here is that it is important not to begin.

The last mistake with regard to study that I feel bound to name is the mistake of not going on the Continent. This is, perhaps, not so much a mistake as a want of the height to see the Gothic revival fairly, but many good students believed that if they could thoroughly master English Gothic they need not attempt more. Now that Renaissance of some sort is being more generally practised, more men go to Italy and find their time well spent. The number is not large, but the number is not insensible. This, I repeat, is a great mistake, and if you say that it is a serious expense and absorbs much time, I answer that you are not aware of the damage that can be done against a Continental tour—"the answer is that, as to time, it cannot be better spent, and as to money, there are few liberal professions where some expense is not absolutely necessary at some time, while the scholarships and studentships obtainable give to a few students in each year substantial assistance. Certain it is that this period of continuous study in other countries, and under other suns, seems more than anything else to make the difference between the more draughtsman and the accomplished architect.

[To be continued.]

SLOW-BURNING CONSTRUCTION.

Dear Sirs,—In reply to the communication from "Salamander" published Oct. 27, I beg to say that the questions which I lately asked relating to construction, were not intended to apply very closely to dwelling-houses. The risk of loss by fire in dwellings, especially of the second and third class, is very small for the reason that they are nearly always occupied by many persons and the fires discovered quickly enough to be extinguished without severe loss. The heaviest losses in dwelling-houses occur in first-class or paratial dwellings where the injury to the decorative part of the structure is often very great. The mill methods might, however, be applied to dwelling houses. One has been constructed in this way at small cost by a gentleman who was formerly an inspector of this Company, to whom I have the honour of being acquainted. The building is erected of brick and has been made to conform with the model built by Mr. Brown, formerly President of the Philadelphia Mutual Fire Insurance Company, by whom, also, an office-building on Walnut Street was constructed in the same way which he afterward sold at an extra price on account of its great security from fire.

I would ask the following questions as this seems to be the best method of bringing out the facts:

Given a country dwelling-house to be covered-in either by a pitched roof, hipped roof, gable-end, or "crazy roof," the ordinary construction; rafters eighteen inches to two feet on centres; covered with boards not customarily watched but laid open-jointed; occasionally back-plastered between the joint but more often plastered only on the face of the joints inside; to be covered with shingles or with slate. Although the inter-spaces between the joints are mostly stopped at the plate, are there not apt to be many means of communication between these hollow spaces and the hollow spaces in the wall of the house, these also being connected with the hollow spaces in the floors and partitions? Does not this convert the whole house into a series of connected wooden cells?

When the heat passes through the thin outer covering of the roof from which there is no ventilation at the top, does it force its way down through the hollow walls of the house, thereby rendering the house much hotter in summer than it need be? Is there not an analogy between this sun-heated even for the concentration of heat on the roof with the over-head system of heating by steam-pipes within the rooms of a factory, which has proved to be the most effective method of raising the temperature and distributing the heat within the factory itself?

Does not this cellular structure give opportunity for the free course not only of fire but of vermin of all sorts, no matter what precautions may be taken in putting stops above the sill for the purpose of keeping the vermin out? Would not this roof serve the purpose of keeping out heat, rain and snow much more effectually if the materials were used for suitable size by computation of the load to which they may be subject? The roofs are eight feet to ten feet apart on centres; if two-inch plank, grooved and splined, were then substituted for the thin, unmatched roof-boards, and if good good one-inch boards grooved and splined be put on, then three-quarter-inch mortar, and then the shingles? According to our experience with factory roofs this would be the best method; we have the objections of shingles in countries which are more than fifty years old, which were originally laid over mortar, the mortar being laid over the roof-boards. What would be the difference in the quantity of timber and in the cost of this mode of constructing the roof of a dwelling-house as compared to the ordinary method?
I may refer to the laboratory and boarding-house combined in one large building being as Woods Hall as an excellent example of the solid timber and plank construction, plastering laid directly on the plank, secured by dove-tailed lath. This large building was built under the supervision of the late Prof. Spencer H. Baird, the original specifications having been furnished from this office. I may refer to the large building lately constructed by Professor Morris at Cornell University, on the principle of the Wood Hall, but the design, for obvious reasons, being of a more simple character. Professor Morris assured me that this arrangement completely stopped the passage of sound. At the time when I visited the building the workrooms were occupied by a large number of male and female students and women engaged in drawing in the room above; I could hear no sound although they were moving about in their ordinary manner.

To avoid the difficulty of including statistics in the preceding discussion of building problems and to develop the crude methods by which we have hitherto avoided the fire in factories, to warehouses, churches, etc., that I have put the question lately submitted; these questions are specially pertinent with respect to the construction of almshouses, hospitals and asylums.

Can the construction of a hospital, almshouse, asylum, college, boarding-house or library now be justified on the cellular principle? Hollow, hollow-cell, hollow roof, each connected with the other by wooden flues through which fire may pass from cellar to attic, thus assuring the cell. It has been realized in many of the buildings of which you have given plans and elevations in the American Architect are stone or brick shams or veners concealing this bad and dangerous mode of construction?

A Correction.

NEW YORK, N. Y., October 27, 1888.

To the Editors of the American Architect:

Dear Sirs,—Allow me to call your attention to the fact, that in the editorial in your issue of October 27, in computing price per pound of French and Belgian iron-beans, you assume a metric ton (tonne) to be 2860 pounds avoirdupois, whereas it is only 2240 pounds.

The metric ton of one thousand kilograms is about equal to 2204 pounds. Tons. Tons.

The above-mentioned wrong assumption alone makes a great error in the price in cents per pound, as shown by you, and renders your comments upon, and deductions thereof, useless, so that further comment is unnecessary.

I believe your quoted prices per hundred kilograms (18 francs for French and 11.75 francs for Belgian beans) refer to the smaller sizes of inferior quality, but as I do not know your authority for these quotations this last is only a belief as stated. As to your doubts regarding the ton recognized by the United States Custom House, I can only say, however, that the ultimate cost of the iron is only 25.30 in one-quarter (1/4) cents per pound, thus making a rate of $23.98 per ton of 2240 pounds.

Traverse.

I believe the formula for converting kilograms to pounds which happened to be nearest at hand, — that is, since 1 ton is equal to 1000 kilograms, was Troy pounds. This would make a difference of about twenty per cent in the figures, and would result in the correct or equivalent of the specific duty to one hundred and twenty per cent, in place of one hundred and fifty. Our prices for French and Belgian beans have been quoted from the Chronicle Commerciale et Financiere de Le Pays Civil, as the market in New York.

American Architect.

India-Rubber Pavement.

The authorities of the city of Barle, says The India-rubber and Gutter-perch Journal, intend re-paving their principal thoroughfares, and are now considering the material best suited for the purpose. The pavement of India-rubber has been given to the city, but somewhat it does not give satisfaction. The decision, therefore, rests with the city engineer, the latter was invented by the German engineer, Russel, in London, near Hanover Street, and was practically used about fifteen months ago for paving the roadway over three-fourths of a mile. There, approximately nine square metres of material. This first experiment proved so successful that during the present year another street in Hanover was paved with India-rubber, as well as in several other countries. Berlin, considering the advisability of availing itself of the same pavement, and has given it a fair trial by laying it down over a considerable distance. The material itself is being now installed in Hamburg. The India-rubber pavement is said to combine great elasticity with the hardness of stone, to be completely noiseless, and to suit all weathers, it is not slippery like asphalt, and is more durable. — Invention.

The London Monument in Possible Peril.

The danger to the Monument arising from the vibration caused by the trains on the Underground Railway, which is much nearer than Wren would have liked, and against which he would, had provisions been granted him, have provided as did his for the shaky foundation of the northeast pier of the cupola of St. Paul's, has suggested to many that the column should be strengthened below the surface of the earth. The recent fall of a portion of the cup, had, we suppose, nothing to do with the tunnel, but nearly coincides with the news of the Monument suddenly collapsing. Cracks would warn the custodians, who may possibly record the damage. This is a point in common with the construction, the authorities having been associated in a popular legend with the downfall of the Monument. To remove the column from its present position, where it has stood for many centuries, is a very expensive operation — when every mechanic in the business of building would be expected to discuss it. It would, however, have its parallels in the proposal to widen London Bridge on canals (an outrage which the Corporation, if it had been one of the Metropolitan Water Board), and in the theories of Decimus Burton's arc of Hyde Park Corner, which Mr. Shaw Lefevre actually carried out. — London Afternoon.
The Seal of the Dececo Closet

Is more than seven inches deep. A series of over one hundred tests were conducted in Philadelphia, before a committee of gentlemen interested in sanitary matters, with the express purpose of trying to break this Seal. In every case sufficient water fell back from the intake limb of the siphon to instantly seal its mouth to a greater depth than the average depth of seal in a washout closet, so that under the most unfavorable circumstances (when the closet is discharged without the aid of a tank, and when no water is supplied to refill the tank) the Dececo will offer greater security against sewer gas than the washout does under its best conditions.

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CHURCH FURNISHINGS.
CERTAIN architects, in a place which we will not mention, were instructed to make plans and specifications for a house, to cost a certain sum, and to contain accommodations which could not possibly be provided for that sum. As we know, this method of giving incompatible directions is very popular among clients, who are thereby enabled, whatever the architect may do for them, to resist paying his bill, if they happen to be so inclined, on the ground that he disobeyed some of the instructions, which he was, of course, obliged to do in carrying out the others; and, like the rest of us, the architects in question devoted themselves diligently to finding out what their patron really wanted. This was a house costing considerably more than the proposed sum, as they told him. Bills were obtained, the lowest of which was more than the client wished to spend, so he himself took the lowest bidder in hand, and with him modified the drawings and specifications so as to bring the cost of the building within his means. The architects were informed of this agreement, and requested to draw up contracts in accordance with it, which they did. When the outside of the house was done, the contractor notified the owner to send some one to paint it, as the painting was not included in the specifications, or in his contract. The owner, as usual, proceeded to the architects, and demanded that as they had forgotten to mention the painting in the specifications, they should pay for it themselves, which they declined to do. As it happened, the side of the case was complicated by the fact that they had inserted a clause at the end of their specifications, reciting that "all work necessary to the complete finish of the building should be done by the contractor without extra charge, whether specially described in the specification or not." The other builders who had estimated on the house told them that under this clause they had included the painting in their estimate. As to the point whether the contractor, under the saving clause in the specification, was bound to do the painting, they took legal advice, in the owner's interest, and learned, what architects who depend upon blanket clauses should remember, that such a stipulation is with difficulty applied with special sorts of work not expressly mentioned. The case was then submitted to an arbitrator, and there was no probability that it could be stretched to cover the painting of a house. Apparently, the owner also took legal advice as to his claim on the architects, for he abandoned it, and paid for the painting himself, as he would unquestionably have been compelled to do if he had been so foolish as to carry the dispute into court.

The law is perfectly well settled that the omission of anything from a contract or specification, by an oversight of the architect, renders him liable, at worst, only for the difference between the cost of doing it after the discovery of the omission, and what it would have cost to do it if it had been originally included in the specification or contract. In most cases this difference is nothing, and there is, therefore, no damage to be claimed; and even if there should be a real difference, and corresponding damage, the architect would not have to bear it unless the omission showed lack of reasonable care and skill. It should be remembered that the architect does not guarantee that his specifications are either full or accurate. "Heaven forbid," said the Lord Chancellor of England, "that a lawyer should be expected to know all the law," and an architect is no more to be expected to remember every item about a building, in writing his specification, than his counsel is to know all the law. If he makes glaring mistakes, such as architects of good ordinary skill and diligence would not make, he is liable for any damage that his employer may suffer in consequence, but that is the extent of his liability. The idea that an architect gives a guaranty to an indefinite amount with everything that he does or says, however true, is the surveyor's and the contractor's idea, common to all men who look on all business transactions as traps, by which weak or unwary people are to be caught and fleeced, but it has no sanction in the court.

On the contrary, a case recently decided on appeal in England has established the rule that even a quantity-surveyor is not responsible for the correctness of his specifications. In the case in question, a quantity-surveyor was employed to take out the quantities for a certain building, from the plans and specifications, and the tenders for the work were based on these quantities. It is the custom in England for the bidder whose tender is accepted to pay the surveyor's fee, and on the completion of the contract the surveyor, who had not been able to get his money before, brought suit against the contractor for it. The contractor refused to pay, setting up a counter-claim that, on account of the inaccuracy of the quantities, which were less in several instances than the actual amount of work required, it is the surveyor's own fault and not that of the contractor. The surveyor was able to prove that the custom was for the contractor to pay for the quantities, but barred out the counter-claim entirely, on the ground that the law was established that a quantity-surveyor did not guarantee his work, and evidence to prove its inaccuracy could not be admitted. It is true that the English court of final appeal rightly declared freedom from responsibility, and quote another, where an owner recovered damages from a surveyor who made his quantities too large, and thereby unduly enhanced the contract price, but the decision shows that if a surveyor, on whose data are based the plans and specifications, is not free to establish by his figures, is not liable for mistakes in them, it would be preposterous to try to make an architect suffer for not being infallible and omniscient, where no damage could be shown to have resulted from his errors or oversights.
made, saved the valuers for the difference between the prior for which the estate sold and the amount of the mortgage. If the defendants had faithfully measured and inspected the building, and had given their honest opinion as to its value, there seems to be no question, judging from the example of the case cited above, that they would have been held harmless, even though their opinion might have been a very mistaken one; but in this instance the thing was that they incurred a duty toward the mortgagee to use reasonable care in the preparation of the valuation; that they had "failed by their negligence to fulfill this duty, and were, therefore, liable for the consequences." Moreover, as the judge said, they had made a statement reckless as to the value of the property, and none but a lawyer trained in art would care to ascertain whether it was true or not. This, he considered, amounted legally to "fraudulent misrepresentation," and made them responsible for all damage resulting from their conduct.

It is possible that the rapidly increasing intercourse between this country and the Spanish-American republics may have an important influence upon our architecture, which has hitherto been derived almost exclusively from English and Dutch prototypes. One of the first Latin habits to be domesticated among us will, we hope, be the use of the court-yard in city mansions. For small houses in closely built towns the slice of building, with a narrow front and rear, must, we suppose, be everywhere enjoyed; and for the city dwellers rich people the entrance by a porte cochère into a private court-yard like that of a large Mexican or South American house, or a mansion in the Faubourg Saint-Germain in Paris, with its fountain, its orange-trees and azaleas, and its faithful concierge to keep the gates closed against intruders, gives one the last possible aristocratic exclusiveness, as well as an impression of happy and well-bred home life, guarded from insolent intrusion, which is not conveyed by a much larger area on the outside of the buildings, as in the Vandebilt or Stewart grass-plots in New York, or the doleful, high-walled front yards of the great London houses. There is one house in New York, the well-known Tiffany mansion, which boasts a court-yard and a porte cochère, with an iron gate, but the court is paved, and is so irregular in shape, and so dark and gloomy in appearance, that the principal source of enjoyment in it consists in the contemplation of its beautiful gate; and anything like a house "entre cour et jardin," after the Paris fashion, is as yet unknown here.

With the provision of a little touch of quiet, smiling nature in the middle of their houses, which is, we hope, to be allowed the Germans and their rich fellow-countrymen, and introduce something of the Spanish-American construction. While our towns are being continually swept away by fire and replaced, a Mexican or South American city grows by accretion, such a thing as a conflagration being unknown. Even in Budapest, as developed in the rivalry of the wealthy and entreprenur almost any of those in the United States, a destructive fire is impossible. Although wood is used, as with us, for floor-beams, the floors themselves are of large, thin bricks, about thirteen inches long, laid on the beams, and covered with tiles set in mortar. This makes it next to impossible to burn through a floor, and the walls, which are of brick, without furring, wainscoting or bases, and with solid frames for windows built into them, are even more fireproof, so that a bonfire might be kindled in any one room in the house, with very little probability that the flames would extend farther.

Everything in the way of a suggestion for making the meetings of professional societies interesting is of value, and our entertainment committees might perhaps with advantage observe the doings of the Swiss and German associations. The latter do not concern us here, and see in a mere matter of devices for promoting mutual acquaintance cannot be acclimated here. Unlike the French, who view with horror the idea of admitting ladies to professional meetings, or the English, who invite them only to formal conversations, the Germans and Swiss make their relations with their colleagues strictly professional, and a source of pleasure for their families, as well as themselves. The architects and engineers of Berlin possess a spacious club-house, where entertainments of all kinds are given, and even the smallest societies manage to have frequent soirées familiales, where the wives and children of the members meet, to be entertained with friendly gossip, and games, theatricals, or some other inexpensive amusement. There is no reason why these social occasions should not be extremely pleasant ones. The hosts, architects and their families accord very well in regard to education, tastes and income, so that the first essentials of pleasant social intercourse, mutual respect and sympathy, with the absence of any occasion for patronizing or envy, are provided; and it would be well if such a little effort to any one accustomed to general society in this country, and incurred a duty toward the mortgagee to use reasonable care in the preparation of the valuation; that they had "failed by their negligence to fulfill this duty, and were, therefore, liable for the consequences." Moreover, as the judge said, they had made a statement reckless as to the value of the property, and none but a lawyer trained in art would care to ascertain whether it was true or not. This, he considered, amounted legally to "fraudulent misrepresentation," and made them responsible for all damage resulting from their conduct.

Another way which the Swiss societies have of making their meetings interesting and profitable is to choose as a subject for study and discussion some desirable municipal improvement, as, for instance, a scheme for a chain of parks, a bath-house, a street widening, or a new public building. At the worst, the study of a project of this sort is very useful to the members, who have the advantage of getting in one evening an amount of expert instruction on the subject which they could not otherwise acquire in a month of reading and inquiry in case they should be suddenly called upon to take a work of the kind; and in many instances the results of the deliberations of a body of specialists would be regarded with great curiosity by the municipal officials or by public-spirited citizens, and, if the time were favorable, might be carried out.

We have all seen the beautiful Austrian bent-wood chairs and furniture with their popularity, perhaps, as much to their charming design as to the strength and durability; and most of us have had some curiosity to know how they were made. The Revue Industrielle explains the matter—at least, so far as the processes could be observed at the industrial exhibition at Budapest. Within the last few years the methods of treating the wood have been improved, and the application of the material much extended; carriage-wheels, for instance, having their rims made of a single piece of ash or oak, bent to a circle, with great advantage in point of strength and cheapness over those made with false saws in small pieces. A piece of wood, the material to be bent is, for furniture, usually red beech, which grows very abundantly in the Hungarian forests. The timber is sawed into strips one and one-half to two inches square, according to the work for which it is intended, and then turned in a lathe into smooth, round rods. These rods are placed in an eight-twelve case, where they are exposed for fifteen minutes to the action of superheated steam. They are then so soft and pliable as to be easily bent by hand, and are in this condition fitted to iron patterns, well secured, and left to dry. The drying takes from two to eight days, according to the size of the piece. When it is complete, the wood is detached from the pattern and is ready to be joined with other pieces, varnished, polished, and sent out in the shape of finished furniture.

The great Eiffel tower in Paris, notwithstanding all the rumors about difficulties in its construction, has, at the last advice, reached a height of five hundred and fifty-three feet, and is therefore the highest structure in the world, being three feet higher than the Washington Monument. Its growth from this point will be very rapid. Even now, the gang of 1,768 and forty men employed on it carry it forward at the rate of more than three feet a day, and when the shaft diminishes it will develop faster vertically. A few days ago there was really some trouble with the men, who pretended to be frightened at the height at which they had to work, but a financial remedy soon relieved their fears, and they have no reason for apprehension. Thus the weather continuing favorable, the tower will be complete by the first of January. Although it is as yet little more than one half its intended height, eight-ninths of the ironwork has been put in place, and the slender open shaft which forms the rest will be quickly finished.
The inconveniences attending the use of weights and pulleys for raising sashes, while in most cases due to bad workmanship in setting the pulleys and imperfect arrangement of the boxes rather than to any intrinsic deficiencies in the system, have given rise to several so-called sash-balances, which are intended to permit of weights, boxes and ropes being entirely dispensed with. Indeed, the natural outgrowth from the idea involved in the "Acme" sash-cord would be that a plain spring could be made to answer the purpose of both weight and cord. This has been done with the "Anderson" sash-balance. Figure 173, which consists simply of a steel, spiral spring for each sash, from ½ inch to ¾ inch in diameter. The springs are fastened to the hanging-style of the window-frame and to the sashes, and are made of just sufficient strength to sustain the sash in any position, so that a very slight exertion is sufficient to move it either up or down. The springs are made the same length as the sash; and, being secured near the bottom of the sash, are drawn out to twice their length when the sash is down. When a sash is hung with this kind of balance, it has to be fitted with some form of self-catching sash-fast, as otherwise the window might fly open as soon as the hand was withdrawn. Anderson uses the "Attwell" sash-fast for this purpose, which will be described in a subsequent chapter, though any other self-locking form would answer equally well. The retail price of the four springs necessary for two sashes weighing fifteen pounds each, is $1.35. For forty-pound sashes the price is $2.50, and other sizes in proportion. When the sashes weigh over fifty pounds, the size of the spring required becomes so large as to render it rather too conspicuous for ordinary use.

The "Ormsby" sash-balance, Figure 174, is on exactly the same principle as the ordinary shade-roller, consisting of two strong spring-rollers which are concealed in a pocket over the window-head, the sashes being suspended therefrom by thin brass bands which coil around the roller. The price of this sash-balance varies from 70 cents for a window with fifteen-pound sashes, to $1.75 for fifty-five pound sashes.

A third type of sash-balance is illustrated by Figure 175. This has the general appearance of an ordinary sash-pulley, being mortised into the hanging-style in the same manner. Inside of the pulley, however, is coiled a strong band-spring of steel, attached to the axle, which is fixed, and to the outer edge of the wheel, in the groove of which is wound a narrow brass ribbon serving instead of a sash-cord, so that when the sash is drawn down, the ribbon is uncoiled and the spring acted upon. The spring can be set to any desired tension, and its action can further be regulated by a brake on top of the wheel, which is tightened or loosened by turning a screw in the face-plate.

The "Shumard" sash-balance is made for runs of from thirty-two to forty-six inches, and for sashes of from eight to forty pounds' weight. The price per pair for a sixteen-pound sash, is $1.40; for a forty-pound sash, $3.25 per pair, and other weights in proportion.

One advantage which all of these sash-balances possess is, that they act most strongly when the sash is down, enabling one to move a binding window more readily than if it were hung with ordinary weights and cords, while, when the sash is up, the springs barely suffice to hold it in position and do not offer resistance to drawing down, as is the case with weights. The objection, of course, is, that the springs are in constant tension, and will, in time, lose their elasticity. They can be replaced quite as easily as worn-out ropes; still, most people seem to prefer the old-fashioned weights and pulleys.

Sash-Cord Attachments and Weights.

There are several devices for attaching the cords to the sashes. The commonest method is to cut a groove on the side of the sash with an enlargement towards the bottom, and then simply knot the end of the cord, the knot holding in position. It is better to use some form of sash-cord iron. Figure 176 is one of the simplest forms. It is mortised into the side of the sash and held in position by a screw, the sash-cord being knotted under the hook. This form retails at 35 cts. per gross. Figure 177 illustrates an iron used when the sash is hung with two cords on each side. This retails at 52 cents per gross. Figure 178 is a form quite similar to Figure 176, though requiring a deeper mortise and being driven in on a slant, so that it cannot work loose. It retails at $1 per gross. Figure 179 is different from either of the preceding forms, consisting of a cartridge-shaped cylinder, closed at both ends, but with an opening at the top and the bottom, through which the cord is passed and worked by the eccentric cam shown by the figure. The cord is released by inserting a wire, as shown. This fixture retails at $1.60 per gross.

Sash-weights are usually made of cast-iron, to order. They are cast in plain round-bars with an eye at the top, substantially as has been shown in Figure 170. When the sashes are very heavy, or the space for the box is restricted, lead weights are used, as they occupy less space than iron. They are usually made to order, and can be had in any desired shape, but are manufactured in regular weights by a few of the lead-works. Figure 180 is the form adopted by the Raymond Lead Company. Each section is cast on an iron rod extending through the weight, with a hook at one end and an eye at the other, so that as many sections may be hung to each other as may be necessary.

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1 Continued from page 299, No. 673.
Iron sash-weights cost 14 cents, and lead-weights from 6 to 7 cents per pound.

**SASH-LOCKS.**

Sash-locks may generally be said to be devised for the moral encouragement of the faint-hearted, who cherish a fond belief that when the lock is turned no intruder can possibly enter through the window. Most of these fastenings in the market are of too slight a nature to afford sufficient protection against a sneak-thief, but while nearly every sash-lock in existence is claimed to be strictly burglar-proof, and advertised as such, the burglar must be a novice, indeed, who would let even the best of them keep him out of a house. When the wind is secured by a fast which cannot be opened by slipping a knife-blade between the meeting-rails and pushing back the bolt, an enterprising burglar would simply break out a pane of glass, which can be accomplished with less noise than is made in picking a lock; so that, after all, the protection afforded by a sash-lock is more in sentiment than in fact. Still, that the stragglers may be kept out of the silver closet, some form of sash-lock is always considered a necessity for all windows.

The requirements of a perfect sash-fast or lock, are that it shall fulfill the following conditions: First, it must be so constructed and fastened that it cannot be opened from without by a knife, or by jarring the window. Second, it should, in closing, draw the two sashes tightly together, and, at the same time, should not be affected by any small inequalities of adjustment. Third, it should always remain either open or shut, with some sort of spring-constraining to hold the lever in position, so that it will not be possible to leave it partially turned, thereby running the risk of breaking the muntins when the window is raised. Fourth, it should have no projections which could possibly tear the sash; and fifth, and perhaps most important of all, it should be simple in construction and in its operation.

It is not essential, though it is generally very well that the fast should be self-locking. It is not well to trust to anything which acts by gravity, or which depends on any perfectly fitted sash, as such appliances are apt to get out of order. It also is well that the lock should be as inconspicuous as possible, though neither is this essential. Some sash-fasts are provided with rebated appliances which fit down between the two sashes; this is not necessary, though it is perhaps a greater security, as in this way the fast can be more securely screwed onto the sash. In selecting any form of rebated sash-fast, however, it must be borne in mind, that sashes are made differently in the East and in the West. In the vicinity of Boston, it is customary to rebate the meeting-rails where they come together, but elsewhere, we believe the meeting-rails are usually simply beveled.

Mechanical ingenuity is to be observed in the line of patents for sash-fastenings and locks. This might be interpreted as an indication that either the sash-fastenings at present in the market are quite insufficient for their purpose, or that there is an extraordinary necessity for the species of protection which such contrivances can afford. This chapter, however, will but faintly indicate the variety of devices having in view the securing of sashes. One must wade through the list of Patent Office reports in order to fairly appreciate what has been done in this direction. A great many of these inventions never get beyond the Patent Office. Still, there are all sorts and kinds of sash locks and fasts in the market. Each one appears to be covered by a patent, yet somehow or other, the best locks and fasts are to be found in the catalogues of nearly all the manufacturers, so slightly disguised it is easy to see that such ideas are in a measure common property.

The terms sash-lock and sash-fast have been used synonymously, though a distinction should be observed between them. A sash-lock is understood to be some contrivance which actually locks a sash by means of some form of key. All of the other numerous devices which, by means of levers, catches or springs hold the sash either open or shut, are technically termed sash-fasts. The distinction, however, cannot be rigidly adhered to. Nearly all of the self-locking fasts might be classed with sash-fasts, while, with equal propriety, the sash-locks can be said to possess the essential qualities of sash-fasts; though, with very few exceptions, all are designated by the hardware dealers, as sash-fasts.

Figure 181 illustrates a form of sash-lock which is secured to the face of the sash, the bolt working into staples at intervals in the window-frame or stop-bead. The bolt work with a spring, so as to be self-acting, and by means of the key it can be locked, thus permitting the sash to be left partly open and secured against intrusion. This lock is light and strong, and well adapted to be used on screens as well as sashes.

Figure 182 is a type of several varieties of sash-locks which mortise into the sash and throw out a bolt in the same manner as an ordinary door-lock. In this example the bolt works with a spring, which makes the lock self-acting after the bolt has been thrown; that is to say, if the bolt were pushed back it would not remain closed until the knob or handle were turned. This lock may be operated with either a movable key or a flat knob or button.

Of course, any mortise drawer-lock can be applied to a sash, if desired, or any other lock sufficiently narrow to fit the thickness of the sash, though the two forms just described are about the only ones especially made for windows, which can properly be termed sash-locks.

[To be continued.]

THE PROPOSED CONSOLIDATION OF THE ARCHITECTURAL SOCIETIES.

The discussion that attended the introduction of the committee's report on the consolidation of the architectural bodies during the second day's session of the Convention of the American Institute of Architects, at Buffalo, was as follows:

Mr. Littell.—I ask for the admission of the report of the Special Committee to consider the report on consolidation. I ask for general consent in order to introduce this before we take up any other business. General consent having been given, Mr. Littell proceeded as follows:

The Special Committee to consider the report of the Committee on Consolidation entered upon its labors, and found it would require a very long time to fully work out a plan or suggestion in connection therewith, but your Committee unanimously agreed to present to this Convention a provisional report on a different line from that suggested in the report of the original Committee. Your Committee propose to retain Article 1 on page 2, as amended last night, Article 2, also as amended last night; to strike out Section 3, and for Section 4 substitute as follows: "Associations in States or parts of States may be formed with the approval of the Convention of the American Institute of Architects, with power to make laws and regulations for their own government. The local societies called Chapters of the Institute may be formed with similar powers, but in all cases the standard for admission into these subdivisions must be, at least, as high as that fixed by the Constitution of the Institute, and they must not conflict with the requirements of the body in which they are included. No person shall be elected to the Institute who shall not previously have been elected a member of the local society covering the territory in which the candidate resides." It is then proposed to strike out Sections 5, 6, 7 and 8, and to amend Section 9 to read as follows: "The Convention of the Institute at large shall be annual. Unless ordered otherwise at the previous Convention, it shall be held in the official metropolis of the nation, the city of Washington." It is proposed to strike out Sections 10, 11 and 12, and substitute...
if we always meet in Washington it will serve the same end. One of the great inducements of our coming together is to visit different places.

Mr. Stone. — We provide for their meeting in Washington simply in case they don't meet anywhere else, or in case there is no other place appointed.

Mr. Nickerson. — I understood it was to be in Washington unless it was otherwise provided for the new Institute of Architects.

Mr. Adler. — I think the difficulty about that has always been due to the fact that the attendance at the conventions of the Institute has been very limited and also to the habit of the Institute always to reorganize its board of directors and board of trustees at the conclusion of the convention. Now we have no trouble in the Western Association in determining where our next yearly convention is going to be; and I think it makes a great difference to the people who are members of any association to see from the idea that it is not your duty to make up your minds, but it is your duty to remain in a state of infantile dependence upon your superiors.

Mr. Culver. — I am quite sure I voice the sentiment of this committee when I say it was the intention that this board of trustees proposed in this report should merely have the control of the Institute at such times as the Institute was not assembled in convention; and that it was expected that all power to decide upon the meeting, or any other question which might come before it, or direct the trustees. I am entirely in favor of going here and there and voting when we do, and that is absolutely the principle. I want to go to Kansas City, and I don't wish to go always to Washington.

Mr. Gibson. — Most of the changes made in this report are different. I think the most important of the changes are among Fellows and Associates, I agree with it perfectly, and I may remind you that last night, the Buffalo member of the Committee of Arrangements, was requested to have Mr. Littel's report printed at once and distributed, and that the consideration of it was postponed to morrow morning.

Mr. Littel. — This is not a perfect scheme; it is merely an outline. To perfect the scheme will require weeks of work. We all want information, and want to see which direction the Institute proceeds to move.

Mr. Adler. — I think we would get on just as well if this committee were made permanent until the next Convention, and if it were directed, as was the committee which preceded it, to cooperate with the present constituency, or the present Association. It should, perhaps, like to see, if possible, this association effected practically before the annual conventions of 1890 of the two organizations, and it appears to me that if these two committees will go to work at once, and will within three months from now — I think it can be done within that time — or within six months, at the latest, formulate definitely the scheme of unification, and if this report were made permanent, the member of both organizations, and, next, if one of two things were done — either to call an extra session of each body to consider the project of unification; or, what I believe to be better still, to make preparations for a letter ballot. It would be a two-thirds vote of the members of the corresponding Association, or of the American Institute at any convention, because we cannot get two-thirds of our members together. I don't know whether the constitution of the Institute has a two-thirds limitation, or in the case of the American Institute to report to a letter ballot, but, if it is possible, that would be the only effective way to arrive at a conclusion, and, before making a motion that I contemplate, I would like to ask Mr. Bloor whether we can, under the present Constitution and By-Laws of the Institute, determine upon any action by letter ballot.

Secretary Bloor. — I don't recollect any provision in the By-Laws which would prevent the use of a letter ballot and it certainly is the most convenient, and I think the only practical way of getting at the sentiments of the whole Institute. Unless we find something in our regulations showing that we cannot do this I will withdraw my previous motion and second Mr. Adler's motion just made.

Mr. Stone. — Before putting that vote I think it would be a good idea to get an expression from this meeting. If this convention desire that this have proposed committee for the purpose, and if we know it. If they think on the whole it is in the right direction it will be a practical endorsement of the general idea which is embodied in the report, and if any further questions were asked of me at the present time I don't think in any capacity of the larger body, or a more general outline could be made of what the scheme is.

Mr. Kendall. — It seems to me that the proposition to have the meetings of both bodies at one time, is not the best propositions of this committee.

If we should meet only in three years I think that would be the beginning of the end. We have got to get together every year in order to keep up the interest in our work, and I don't think by sections, we have got to get together every year in order to keep up our interest in the work, and I think the meetings must be held once a year, in order that we may feel the importance of our work and take an interest in it which we should.

A Member. — I think the meetings should be held in different States as it will afford a chance and give an opportunity for local architects to interchange hospitalities and as a result I don't think

if we always meet in Washington it will serve the same end. One of the great inducements of our coming together is to visit different places.
the American public, in name and organism so less than, as heterodoxy, in matters of truth and holiness, while at the same time it indicates what is believed to be a practical method by which all other American architectural societies may receive the benefit of the advice and views of the members of the Western Western Association, of Architects, the mother and pioneer of them all, as of all the able and true-minded minds, by helping and influencing in the various sections of the Union—that experienced body whose constitution and ordinances have been drawn up, and whose members are as far as sectional and national differences would admit, while its schedule of fees and recommendations for professional practice have been adopted by the body and committee, and in every respect the basis of the business and social standing—and indirectly the basis of the artistic standing of the profession—have in varying degrees. It is a proof of the wise choice made by the Committee of the Western Association of Architects, in leaving to Mr. Adler the corresponding part. In fact, in my opinion, it was unnecessary to include the experience of the members of the various sections of Nebraska, and who have been in the good standing for ten years or over shall retain the right of representation. The committee of representatives of the various sections mentioned, as also all members of all other architectural societies, shall be the representatives of the various sections, and at this convention the constitution shall be adopted, based substantially upon the principles herein set forth. And at this convention the voting power shall be divided among them, in proportion to their representation at the annual meetings of the various sections, and in counting votes the names of those who are not members of more than one of the old organizations shall be counted but once.

11. At each subsequent Triennial Convention of the newly organized Institute of Architects and of other architectural societies affiliated with it or otherwise, have two or three new members. The newly organized Institute of Architects and others have but one, only those Fellows of the Institute who have been in good standing for ten years or over shall retain the right of representation. The committee of representatives of the various sections mentioned, as also all members of all other architectural societies, shall be the representatives of the various sections, and at this convention the constitution shall be adopted, based substantially upon the principles herein set forth. And at this convention the voting power shall be divided among them, in proportion to their representation at the annual meetings of the various sections, and in counting votes the names of those who are not members of more than one of the old organizations shall be counted but once.

12. Inasmuch as the present American Institute of Architects and other architectural societies affiliated with it or otherwise, have two or three new members. The newly organized Institute of Architects and others have but one, only those Fellows of the Institute who have been in good standing for ten years or over shall retain the right of representation. The committee of representatives of the various sections mentioned, as also all members of all other architectural societies, shall be the representatives of the various sections, and at this convention the constitution shall be adopted, based substantially upon the principles herein set forth. And at this convention the voting power shall be divided among them, in proportion to their representation at the annual meetings of the various sections, and in counting votes the names of those who are not members of more than one of the old organizations shall be counted but once.

13. At each subsequent Triennial Convention of the newly organized Institute of Architects and of other architectural societies affiliated with it or otherwise, have two or three new members. The newly organized Institute of Architects and others have but one, only those Fellows of the Institute who have been in good standing for ten years or over shall retain the right of representation. The committee of representatives of the various sections mentioned, as also all members of all other architectural societies, shall be the representatives of the various sections, and at this convention the constitution shall be adopted, based substantially upon the principles herein set forth. And at this convention the voting power shall be divided among them, in proportion to their representation at the annual meetings of the various sections, and in counting votes the names of those who are not members of more than one of the old organizations shall be counted but once.
Submitted by Quill Pen.

D.A.S.G. Competition for a wrought iron gate by Arm and Hammer.
ST. PAUL'S CHURCH, BUFFALO, N.Y.
VIEW OF BUILDING AS NOW BEING REBUILT.
THE PALAZZO APARTMENT HOUSE.
ST. POU, MINN. A.H. STED, ARCHITECT.
Submitted by Fargo and Hammer

The Detroit Architect Sketch Club
Competition for a Pair of West Gates
Designed by "Jumbo"

Henry T. Hering & Brother
and which, if the federation acquires a sufficiently large membership to warrant it, might be again reduced.

You cannot presume that Section 12 of this report will induce probably as much discussion as any herein submitted; for the questions involved in it are apt to be regarded from two very different and sharply separated points of view. Some of the oldest and most successful practitioners would doubtless be willing to sacrifice personal feeling to the common cause, and to start in the new federation from the lowest point of the accumulative ladder; the youngest, while some of the latter will be among the first to allow that as regards practitioners far advanced in life who have done the hard pioneering work from which the present generation has profited, as securely as a last foothold to those beginning their professional career—some of these juniors will doubtless be among the first to allow that there would be not only no reason for this propositional, but positive injudicious in substituting in the case of their seniors the insignia of a lower professional grade for those of the higher one which they have through the hard and often long, long days borne with honor not only to themselves but to the Institute and the profession.

Respectfully submitted,

D. H. BERNHAM, Chicago.
T. P. CHANDLER, Jr., Philadelphia.
A. J. BROOK, New York.

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF K. P. BRADBURY, Esq., BOSTON, MASS. Mr. W. WHITNEY LEWIS, ARCHITECT, BOSTON, MASS.
[Gelatine Print issued only with Gelatine and Imperial editions.]

THROUGH an unaccountable blunder, while the name of the owner of this building was correctly printed in the text of last week's issue, it was incorrectly printed upon the helio-chrome plate of the doorway which appeared in that issue.

ST. PAUL'S CHURCH, BUFFALO, N. Y. Mr. R. W. GIBSON, NEW YORK, ARCHITECT.

This church was destroyed by an explosion of natural-gas and consequent fire in May last. It is now being rebuilt, with considerable alterations and improvements. The foundation is considerably larger in the new plan, and porches, vestries, etc., are re-arranged, and large traceried windows are introduced in the place of some of the lancet windows of the old building. The tower and spire remain uninjured. The interior was formerly without a clerestory, but with wooden columns and wooden arches supporting the roof. In the new design, stone columns and arches of masonry support a half-bayed clerestory and the roofs are built on a higher level to accommodate it. The stone used is chiefly Medina stone, quarried in the western part of New York.

DESIGNS FOR A WROUGHT-IRON GATE.

This plate shows the prize drawings of the Fourth Competition of the Detroit Architectural Sketch-Club, the problem having been a design for a double-swinging wrought-iron gate for an office-building. First place was awarded to A. Kahl, designer of "Quill Pot"; second place to J. B. Nettleton, designer of "Jumbo"; third place to Rich. Mildner, designer of "Arm and Hammer"; and fourth place, G. Harvey, "Forge and Hammer."

THE PALAZZO APARTMENT-HOUSE, ST. PAUL, MINN. Mr. A. H. STEWART, ARCHITECT, ST. PAUL, MINN.

This building, owned by Messrs. S. J. McMurran et al., at the corner of 16th and St. Paul's streets is now nearly finished.

HOUSE OF SENATOR PHILIP T. SAWYER, WASHINGTON, D. C. Mr. W. H. MILLER, ARCHITECT, ITHACA, N. Y.

This house now being built of dark brownstone with darker trimmings will cost $75,000.

An Ice-sealed Reservoir.—In a certain town in New Hampshire, which is provided with a supply of water for fire purposes, the water has been obtained from a reservoir about one hundred feet square, situated on an elevation near the town. During the winter, a fire occurred at a time when the reservoir was covered with ice nearly three feet in thickness. The water issued from the base in very sluggish streams, which soon ceased altogether, and it was suspected that some obstruction had got into the pipe. Accordingly, one wise and enterprising fellow accompanied him to the reservoir. There, with their axes, they cut a hole through the ice, and at once an abundant supply of water issued forth, and the hydrants were filled in a few moments. The ice over the reservoir was so strong that it did not permit the pressure of the air to be exerted on the water therein, and, therefore, the air-pressure at the nozzles would balance a head of water nearly thirty-three feet in height. But when the hole was cut through the ice, the pressure of the air could be exerted upon the water there, as well as at the nozzles, and the supply had the full advantage of the difference in height between the reservoir and the hydrants. Engineering.

MISTAKES IN ARCHITECTURE. — II.

EXAMINATION MISTAKES.

EVERY professional student has great advantages, both for study, and practice, over all his predecessors. He has had much more, and better, exercises. There are many buildings in which these have been pushed too far; haphazardly, that is not the case for the examination being made so simple, and yet, so difficult. But the professional student, in return, is required to exhibit his professional ability in the character of the examiners. He has, therefore, much more examinations than the professional student; he has, for the very reason that his examiners are not professional students, much more examinations than the professional student. This being the case, there are only a few who can read the examination exercises, and be able to make much progress in the examination. The number of examiners is large, and it is very difficult for the student to get a sufficient number of examiners to do the examinations.

In the case of the Institute Examination for the Associatehip, the Institute Surveyorship certificate, and the comparison examination, are made for these a space of practical training is wanted. The would-be Associate must have some practice in design, and must make himself proficient in the art of designing, and must have some specimens of ancient architecture, and the would-be District Surveyor must have some experience of the supervision of building works. Similarly, the where drawings are to be made with a view to prizes offered by the Institute, or any other body, are to have any chance, and to gain any good from entering on the competition, ought to have some experience of drawing, and, if the prize be for a design, some notion of designing before he ventures to compete; though, as these are competitions, and not examinations, failure to succeed does not involve the same discredit, and ought not to have the same discouraging effect on the candidate as failure in a pass examination.

It is a mistake, let me very emphatically say, for any student attending the courses about to begin here to avoid the final examination or any intermediate examination. Of course, the prizes are only few, and, as far as they are concerned, the examination at the end of the session is competitive; but the certificates are given to as many as get more than a certain proportion of marks without limit of number, and so there is for each one a chance of having his ability and diligence recognized, and the opportunity which the above examinations offer of proving to yourselves that you have learned and retained a fair amount of what I try to teach is, in my opinion, of great value.

In the examination-room, it is a great mistake to fire off a piece of knowledge that has nothing to do with the question, simply because you know it; as, for example, suppose you have carelessly taken the tracing of a building you learned in school, and the question is asked about the tracing, and no question is asked about the tracing, but a question is asked about mouldings. If, in answering that question, you drag in the tracing and spend half an hour over it, you do more harm than good. No examiner who knows his work will give a single mark for statements that are irrelevant and do not answer any part of the question, so you get no marks for your tracing; meantime, the writing, and sketches and the answers to the questions in the final examination include all, during which time, had you been answering other questions to the best of your ability, you would have been earning marks.

Next to the mistake of lodging in irrelevant matter the head and shoulders comes the mistake of giving too much to questions. A paper in which there is no proportion among the answers is one very difficult to mark, but which, from the very nature of things, is sure not to get so many marks as one containing the same amount of writing and sketches, but the answers are taken, and a clear, condensed, yet correct answer given to each. It is a mistake, also, in architectural examinations, not to illustrate the paper of answers by sketches whenever possible, as you cannot make tolerable sketches, it is very much to be regretted, and you had better stick to written replies; but, if you have any reasonable mastery of the pencil, do not forget to introduce sketches, and the better they are, the better your paper, and, consequently, you will be marked. It is a mistake—and one often made, I fear—to suppose that examiners in our professional examinations are anxious to trip you up, and that they lie at the catch and will be heartily glad if they can evolve some clever and mischievous device, they will certainly trap you into a blunder. The object of the examiners is to bring out

\[1\] A lecture delivered by Prof. T. Roger Smith, F. R. I. B. A., at the commencement of the session 1888-89 at University College, London. Continued from No. 653, page 252.
what you know and what you do not know, and it is with an anxious search for responsibility that they carry on this important work. Rely upon it, they had rather be convinced that you are fit to pass than that you must be turned back. But rely, also, upon it that they will be most easily convinced that you are so convinced.

Again, it is a mistake to suppose that any answer which is not wrong will do. If a question involves a difficulty, the answer which evades that difficulty is very differently received from one that attempts to face it. For example, in a recent examination I gave the dimensions of a bay of flooring to fit a certain weight per foot, and required an iron girder to be calculated for the same. One of the candidates, who had studied this question, wrote thus: I gave more than one reply in which the calculation was attempted, and was carried out on the right method; but the right result did not come out, owing to errors or omission in my working. I gave two further replies in which after stating the number of tons to be carried, the answer was on saying, ‘I should adopt a rolled-iron joist, so many pounds to the foot.’ This answer was probably arrived at by some rule-of-thumb method, it was not far from being practically correct, but there was no attempt made to work out the calculation, which was the difficult part of the question; and, of course, I could not give such marks to this reply, which avoided the difficulties, as to those in which the students had tackled them to the best of their ability and by proper methods.

Architects’ Mistakes.—We have now reached architects’ mistakes, and there are two or three remarks on design which I am tempted to hazard, and which, I think, can usefully be made. Remember, then, that it is a great mistake to suppose that designing is merely putting up with the results of subornation. Just as in Egypt the captive Israelites could not make bricks without straw, so you cannot design without materials—i.e., without being familiar with the forms, the materials, the conditions in which your working, and with the manner in which those elements have been put together by successful architects before your time, and without, moreover, being practiced in the application of that knowledge.

If you want to see examples on a large scale, numerous, costly, and distressingly instructive, of what making architectural bricks without this sort of straw comes to, just walk through the streets and courts of the city of London. Side by side with some of the best buildings of some of our best architects you will see costly works, substantial and pretentious, designed by men who can have had no knowledge of past work, and who have in most cases been employed because they were known to moneved men as trustworthy supervisors. Such have doubtless built soundly, but their works are, architecturally, failures. Getting together in some haphazard way the results of this ignorance, it takes a long time and a good deal of pains to gather information enough, and to develop skill and experience enough, to make a really good architectural design, and to work it out in all its details, yet it is wise to start practice till this can be done. Sometimes circumstances or the offer of work render it almost necessary for a student of only a few years’ standing to begin on his own account; but it is a great mistake for any one who wants to do good architecture, unless they have the resolution, after completely their first works, to stop and go abroad and finish their studies, and then come home and resume.

That it is a new one is a mistake; not that a new style is in itself impossible, but that it is impossible to you or me. It is idle to suppose that the genius of any one man could succeed in revolutionizing our style so deeply and so deep and wide in the history of the history or the sympathies of the English people. Greek, which was a style practised in England (to limit our notice to the country under our eyes), various as the styles that are or have been in vogue may be, unless the people felt and were interested in the way to make the people feel and be interested in the ways to which the style is appropriate. Looking round on the motley variety of styles which prevail in modern Europe, we are tempted to believe that it is a matter of no moment what style be brought in and used. Yet a little observation will show you that is not so. No architectural style is practised in England (to limit our notice to the country under our eyes), various as the styles that are or have been in vogue may be, unless the people felt and were interested in the ways to which the style is appropriate. Looking round on the motley variety of styles which prevail in modern Europe, we are tempted to believe that it is a matter of no moment what style be brought in and used. Yet a little observation will show you that is not so. No architectural style is practised in England (to limit our notice to the country under our eyes), various as the styles that are or have been in vogue may be, unless the people felt and were interested in the ways to which the style is appropriate.

Every apparent novelty in architecture should be viewed with great distrust, as more likely to be a mistake than a success. That novelty is both possible and desirable is self-evident, but beware of what seems to you to promise most. Look back on what has been, and observe the course of events; it has, probably, been tried before, and given up as less good than the received way; or, if that be not the case, still there is great risk of its being the blunder, instead of the blossom, of your work—a mistake, the one from which you have the most to learn. St. Paul’s Cathedral occurs at the crossing of the main avenue and the transverse—the one part where its great architect has done most work—was chosen on the grounds that no one excepting Solomon has ever sacrificed more than he has gained, clever though the disposition of the piers that carry his dome undoubtedly is.

Mistakes in Practice.—In practice—that is to say, in the practically carrying on of architecture—there is a much broader range of error. A mistake can be made—nay, I think, none so grievous—as taking oracles. An architect who accepts illicit commissions, or does nominal work for large fees, or who allows any other of the expedients by which he expects to make his living to be used, or who, in any transaction to be practised upon him, has sinned against the very first duty of a professional man; he has sold that independence which ought to be his most cherished possession, and has put himself under the thumb of the very persons whom he ought to control. The wisest of mankind says, “A gift destroyeth the heart,” and it is not possible to be more formidable, more terse, or more true. There are sure to be times when very specious proposals will be made to most of you, and when it may appear almost Quixotic to decline money which you sorely need; but whenever any case occurs in which you honestly doubt whether the transaction is one for you to agree to or not, I will not uneasily leave you to your decision. The question is as to the entire affair by some such master of the art as Sir Henry James, before Mr. Justice Hawkins and a jury in open court, and if you are one of the stock of these days, the practice, unless you give praiseworthy,’ may pray that as an indication that the doubts is well founded, and that the proposed transaction should be declined with thanks.

Anything that is in any way unfair is a mistake, as well as reprehensible. It is wrong; it is also bad policy. Believe me, there is no truer word than that “Honesty is the best policy.” It is both dishonorable and a mistake to get work away from a professional competitor, or to underbid the work. Remember, there is the recognized and fair rate, and it is equally a mistake to overcharge a client. Either of these may be expected to bring an inevitable train of bad consequences, a retribution, in its wake. It is, generally speaking, for making in a profession, and profusionally do it in the case of charities in which you are interested, but I think a guiding rule should be not to do it in any case, except where the work is so in your own connection that under any circumstances it would come to you, and no work is to be done in order to deprive some other architect both of the work and the fees, is overwhelmingly bad.

I think there remains no worse mistake to note than temper. Temper is a mistake—a ship without a rudder, a horse without a rider, or a stream that has burst its banks, are apt illustrations of the condition of a man of business who has lost his temper. Above all things, an angry man may do a mistake, they say, to write a line while you are angry for; for, somehow, an angry man’s pen seems dipped in permanent gall, rather than ink, and his written words, unhappily, have not the same chance of being either promptly answered and then forgotten or good-naturedly or in a most nauseating manner, spoken often have. A letter written in heat is read, you must remember, in cool blood. If something raises your wrath, and you sit down and write, that authorizing would be a mistake, you can do is to put it in the fire there and then; the next best, to keep it twenty-four hours and then reconsider it; and the next best, to show it to a judicious friend.

One in high standing, who had been much irritated, and had written a splendid and stinging reply, took it to the most influential man whom he knew. The chief—I think it was Palmerston—read it right through without a word, “Got a copy of this letter?” he asked. “No, not even a thought it!” “Very injudicious letter. Much better burn it”—and, suit the action to the word, the great man put it into the fire and held it there, saying, “If you know what I mean.”

That was the action of a true friend.

I must, at the same time, point out that just anger is not the same thing as giving way to temper. The ability to exhibit indignation at a just moment, if kept perfectly under control, is very useful to one who has to supervise works or direct men. The just anger of a superior is generally dreaded, and to an extent far beyond that of a less powerful officer, one can expect or can make. If, therefore, you are the proper moment to the man who knows how to show a good temper, and your contractor, or tradesman that you are justly and with good reason roused to anger, it will generally help you in the control of the man who is angry.

My reference to an angry letter as a mistake makes it suitable here to add that we are liable to make mistakes by writing where we ought to speak, and speaking where we ought to write. Writing is more permanent; therefore it is at times better to say what you would not say, and to say what you would not write.
sacrifices, in preference to writing them. At such times it is a mistake to write. On the other hand, if any specific order has to be given, if any definite objection or complaint has to be made, or if any agreement has to remain in force for any length of time, it is equally a mistake to write. You must not form the habit of spelling your agreement, of spelling your contract may often be originally done by word of mouth; but, in such cases, they should be afterwards repeated in writing, for accuracy's sake.

hasten several practice delay is a mistake. It is not always possible to be prompt, but it is far more possible than persons who habitually procrastinate are willing to believe, and from first to last it should be one of the first and surest devices of your pen or pencil. He who is the first in an undertaking, whether the client be eager or the reverse, is equally prudent to do something at once. The eager client is balked if he find nothing done after a short time—perhaps a few days—despairing as to doing anything at all. Only changes his architect. The lukewarm and indifferent client, who might by a promptly-prepared sketch be encouraged to go on, is dishonored if he turns to something else, orpostIdys and abandons his intention. Were I to trace the work of an architect all through, it would be easy to show that at every succeeding stage delay is a mistake, though I am bound to admit that it often can happen.

Carelessness is another mistake, and one into which not a few men are apt to fall. The saying is attributed to Goethe, that "Genius is the art of taking pains." The common notion of genius is that it can do or omit without taking pains. I do not ask you to accept this definition of genius as exact, but it covers half, and more than half, of the truth, and it would, I think, be perfectly true if you altered the word genius to an idea of success, which is the art of taking pains. Watch a successful man in the exercise of his art or pursuit, whatever it may be; you will see him all attention, all devotion to the business in hand. Consult an eminent physician, and you see by his questions, by the accuracy of his method, by his constant study and time being your constitution, your ailments, what the treatment to do for you, in order to relieve you, occupy his entire and undivided attention.

It is chiefly this habit and power of concentration which has made his pursue of medicine successful, has enabled him often to battle disease and restore health, and has gained him reputation.

Read any good life of any prominent public man (as, for example, real, as they are only published when the subject is so delightful to the human spirit, that the reader will be anxious to read about the man, to know him, to like him, to wish him well, to say something about the man, to learn what the artist of the day is at his work, to be by his side, and to know the man)

It is, however, possible to throw one's self into the interesting part of a subject when one is engaged in it. The best of all is to put one's self into the picture, to make one's self attracted or that seem insignificant. This though, of course, better than being languid and careless about the whole business, is likely to lead to trouble. In the conduct of works, then, it is a mistake to neglect the most minute details, whether it be in regard to the success, his keen attention, his constant thoughtfulness about tackle, flies, water, the long hours he will devote to fishing, and the eager pursuit of his game. A champion player in any athletic game, rowing, cricket, or tennis, or rifle-shooting, is a man who has made his pursuit of the game successful, has enabled him often to battle disease and restore health, and has gained him reputation.

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One of the most troublesome and unsatisfactory disagreements I ever had to unravel grew out of the architect, a man of real ability, having little other work in hand, paying a visit at least every other day to the works, and never going without ordering something to be done or undone. The accumulated effect of these orders was months of delay and claims without end for extras, while for all practical purposes the building would have been quite as serviceable if carried out exactly as shown in the original plans and specifications, without any of your modifications. And you realize that I am quite aware that one cannot expect people's minds to cease working when once a contract has been signed, and that it is probably "never too late to do right," on the other hand, "you may buy gold even too dear." "A rolling-stone gathers no moss" and there are few improvements which are really worth the cost, delay and annoyance that come of interfering with a contract which has been fully and carefully considered and accepted. In short, generally speaking, variations are a mistake.

Mistakes in dealing with your clients are especially to be guarded against, because they generally injure your prospects in life, yet they are too often left to be made. You cannot do an injury to your own person, but you may do so to others. Many, if not most, instances of miscarriage between clients and their architects appear, however, to start from one root, namely, from mistakes. It is therefore no wisdom to forget to keep up the proper relation of architect and client. The architect should be described thus: to form a correct idea of what your client wants and wishes, and to do your best to obtain it for him. Your relation to the building business must be that of a friend, not of an insufficient, equality, or good fellowship, or boon companionship. There are cases where an architect forms an idea of what a client wants, but one which does not correspond to his wishes, and then there is surely no mistake in him. It is possible that you may form a correct notion of a client's wishes, but fails, till too late, to realize that it is not what he wants. The result again is dissatisfaction. There are cases, where the architect has a notion that he is too little, little to give, or to expect, of the client, and this is the cause of any case of disagreement arises these cases end in the bitterness of quarrels. Professor Cockerell—a prince of architects—used to say, "Be a gentleman among artists and an artist among gentlemen."

As one illustration of, perhaps, the most common form of this sort of misunderstanding of the architect's duties develops the most frequent and most easy to deal with. The architect himself to learn what his client's wishes are, and politely turn to him the plans to put them into shape, and he, perhaps, designs something which is very near to what his client would like. But he neglects to view it, and finally decides it. He says it is the architect's work, and nothing else can be done. When the lowest estimate for the design comes in at over four thousand pounds, the whole thing is abandoned in chagrin and disgust, and to this day, no architect has thought to have found out what his client needed as well as what he wished.

The relationship between client and architect involves the necessity sometimes of very plain speaking, and the more thoroughly professional the clients are, the less likely is it that it will be thought to the architect's credit to have been prompt in discovering the fact that it was impossible to discharge this sometimes painful duty with perfect effect. For example, in the case I have suggested, had the architect quite realized the case, he would at some period have had to say to the client, "You cannot take the risk of this plan. It is become evident that it is not the half to achieve anything either so ornamental and so roomy as you want; the design must be plain, some rooms given up, and the others kept down to the dimensions, which is our client, and believe me, it is a mistake to shirk or postpone the unpleasant duty. Meet it squarely and fairly and with good temper.

In dealing with those employed on your work, it is a mistake to suppose that every contractor, tradesman, or artisan is a thief or an extortioner, and every quantity-surveyor a kind of contraband seller. I have put it strongly, but the suspicious temper of mind at which this remark points sometimes far too a tone of feeling as exaggerated as it is ridiculous to think that all men are engaged in one of the most complicated and difficult busi-}

nesses possible. Their motive for carrying on the business is to make profit, and the suspicion cast upon it as a matter for sincere re-
construction of the houses of the end of the fifteenth and the beginning of the sixteenth century.

Figure 28, which is a portion of the dwelling of the Abbot of St. Armand, at Rouen, shows above the ground floor of masonry, two stories of wood, entirely covered on the outside with carved wooden

A TALL CHIMNEY.—What is described by American papers as probably the tallest chimney in the world is being completed at East Newark, N. J. The diameter at the base is 28 feet, and the ultimate height of the brick structure will be 335 feet, with a diameter at the top of 9 feet. A cast-iron rim 20 feet in diameter and a bell surmounting the whole, and will make the total height of the chimney 335 feet. In its construction 1,700,000 bricks were used, and the total cost will be $85,000. — The Builder.

THE tendency of the northern cities was always toward more open fronts. At the end of the fifteenth century they had become perfect lanterns, as in the example here given (Fig. 29), the exact reproduction of a house in Rouen. Only the cross-braces interrupt the succession of wooden panels finished everywhere with the perfection of joinery. At this period wooden constructions begin to lose the character of carpentry and to take on the semblance of great pieces of furniture.

In Figure 28 fillings of masonry between the timbers are still apparent, but they soon disappeared behind panels of joinery. The whole front showed only a collection of wainscottings.

After this design were built many of the mediaeval houses of the sixteenth century.
panels. When, a little later, with the Renaissance, the use of stone was resumed, this custom was so firmly rooted that they still built a great number of wooden houses, in which, however, are found pillars and bands whose forms do not belong at all to wood construction. In the street of the Grosser Hirteng, at Hons, may be seen two houses of this class covered with costly details. Figure 30 gives a part of one of them.

The sixteenth century witnessed the building of a number of these pretty houses, a last reflection of the art of the Middle Ages. After the disasters which occurred at the end of this century, dwellings returned to a simpler style, while the plans were very slightly altered.

individually and personal responsibility, but, on the contrary, developed with energy these natural tendencies of the Western people. It brought about the struggle for permanent government and left, as a last effort against oppression, the employment of feudal inefficacy in itself; for the spirit of the common man always applies to the sovereign and each municipality, by throwing in its fortunes with the party of the bishops or of the barons, or repelling both, by renewing allegiance to the sovereign, could make a last appeal against tyranny. This condition was certainly not indicative of an orderly and civilized government, as we understand those terms, but it was not opposed to the intellectual development of the individual, who was in the towns of the Middle Ages a distinct factor in the social problem, and whose domicile preserved a definite, recognizable character. The absolute government of Louis XIV stifled almost entirely this sentiment, so actively felt up to the end of the sixteenth century, and the spirit of the French citizen of the seventeenth century had lost all its individual character. Uniformly built, uniformly lighted and arranged, it absorbed the citizen, who lost as he entered there all individual physiology and no longer knew himself, except by the number of his house and the name of the street.

In England, where the feeling of personal responsibility and individual distinction is much stronger than in France, the inhabitants of large cities have preserved the separate life of the families and seldom follow the system of mingling several families in one dwelling. This appears to us to have a moral significance of the highest importance, and it is not without a lively satisfaction that we find this feeling of family distinction, of individualism, reviving and reacting against the enervating system introduced in France under the government of Louis XIV. Each one wishes to have his own house, and while the large majority of the European cities cannot satisfy this ambition in town, they can at least escape the disagreeable conditions of a common dwelling by building those myriads of small houses which fill all our suburbs and in which families of small means can pass a great part of the year.

It will be one of the glories of the present government of France to have taken the most radical means to promote this healthy tendency, for, in our judgment, a country cannot call itself morally civilized until the day when each citizen may possess his own dwelling in which to rear his family and leave behind him some reemergence of the good that has done or the services he has rendered his neighbor. The walls speak and to the man who would do any action in rented lodgings which he is to vacate in six months will hesitate to sin between the walls of his own and his children's home.

The hotels or city houses of the lords and wealthy commoners occupying extended spaces and surrounding courts and even sometimes gardens, did not affect the defensive arrangements of the regal palaces and were not provided with towers and battle-ments. As we said in the beginning of this article, the hotel had not usually its living rooms, but often the servants' quarters and offices and sometimes only a plain wall with a small entry door upon the street.

The merchants as well as the common people mingled in the daily life of the street, a necessity for the most of them, while the nobles and the nobles who maintained large retinues, shut themselves up in their city houses and lived in an isolated feudal life, holding no regular communication with the outer world. These houses were naturally more subject to change than those of the common people. Occupying larger spaces and belonging successively to rich owners, they were altered with the fashions of the day. We find in France no hotels of a date prior to the fifteenth century, or, at least, the ruins of those of an earlier period which remain to-day are of mediocre value. One of the oldest of them, still to be seen at Provins, belonged to some rich canon of Saint Quirieli and is composed of two distinct groups of buildings separated by an arched passageway (Figure 31). To the left is the great reception salon on the floor of the stone verandah from the court by an outside wooden staircase. Three double windowsICOGRAPHY.---

THE TARIFF ON IRON-BEAMS.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Sirs,—In your leading article of October 27th appear some

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The chief unsatisfactory feature at this writing in trade and manufacturing circles is the marked advance in the price of coal and other raw materials. Manufacturers of all kinds entertain the opinion that whatever delay may be caused by the importations of coal, the injury to the business of the country in placing orders is simply an act of prudence. They believe that in a very short time the situation will be righted, and that continued demand for coal and other raw materials will result in reemployment and spring delivery. There is no sound reason for explaining the correctness of this belief. If there were any real cause to be in for the importation of coal, the unfair and unbusinesslike discriminations under which the American mercantile marine is compelled to operate would be immediately curtailed, and our trade would be able to live in harmony and increase their net earnings it would have an equal bearing on the public's interest, and the moment our law-makers perceive this, Congress will modify the law notwithstanding the powerful railroad influences that will be brought to bear, to bring about such modifications.

The anthracite coal producers have had things their own way in the price of coal and are now brought fairly to justice. The coal cannot be sold or resist except in restricting production which they will probably do on or before December. This year's production will probably exceed 27,000,000 tons. The large increase is evident throughout the region of output, supplied with anthracite is all better supplied than they ever have before. The strong demand for bituminous and the miners of coal are opening mines and increasing facilities for supplying customers next year. The textile manufacturers are very much encouraged by the orders for goods that have come in to hand within the past two weeks. Southern textile manufacturers are booking hopeful of their success in saving the larger part of their winter's production. This is calculated to still further increase the building business in the South. Full River manufacturers are able to declare good tidings. A considerable expansion of capacity is now contemplated. Boot and shoe manufacturers have settled down to accept present prices for the next spring's goods and business has improved. The strong points in favor of the expansion of industrial operations next year, are the abundance of money, low rates of interest, the purchasing power of the people, and the Western and Southern borrowers to pay their bills; the strong probability of considerable railroad building which will probably reach the $300,000,000 mark. This is the case with coal for blast furnaces, the building of a number of small industries in the West; the combination of labor with regard to the increase of the population and the satisfactory account of investments in almost all channels. Labor organizations will not likely endeavor to unsettle existing friendly relations with management but they will be constantly making every effort among the workers and among the old-time Trades-Unionists. Labor organizations are making every effort to impress the important character of the paper comments must not take it for granted that the Knights are on the eve of dissolution but while it must be admitted that in the point of number they are not so much in the ascendant, there are, on the other hand, two or three manifestations of cause which cannot be looked for in a temperature of 32 degrees Fahrenheit.

It is, however, well known that there are a large number of incombustible and inorganic substances which are efficient protectors against the effects of fire. In the opinion of some economists, if the protection of property in the case of fire be considered, it is necessary to use combustible material which may be ignited by the heat from the steam-pipes.

Very respectfully,
C. J. H. Woodbury.
The Seal of the Dececo Closet

Is more than seven inches deep. A series of over one hundred tests were conducted in Philadelphia, before a committee of gentlemen interested in sanitary matters, with the express purpose of trying to break this Seal. In every case sufficient water fell back from the intake limb of the siphon to instantly seal its mouth to a greater depth than the average depth of seal in a washout closet, so that under the most unfavorable circumstances (when the closet is discharged without the aid of a tank, and when no water is supplied to refill the bowl) the Dececo will offer greater security against sewer gas than the washout does under its best conditions.

A comparison of the two cuts will show that the Dececo has the greater scouring effect, and that it has no surface exposed to fouling to become dried and pollute the atmosphere of the room with foul emanations.

The Dececo Company,

12 High Street,

NEWPORT, R. I.

Old Bedstead, from Van Rensselaer Mansion, Albany, N.Y. 18th century.

Cradle, 16th Century.
The exterior of this house is stained with
GABOT'S CREOSOTE STAIN
for Shingles, Fences, Clapboards, Etc.

These Stains are very durable
and give a much more artistic effect
than paint, while they are cheaper,
and very easy to apply.

Our Stains contain no water and
are the only exterior Stains that do
not contain kerosene.

PRICES ARE 30, 50, AND 75 CENTS PER GALLON
ACCORDING TO COLOR
SEND FOR SAMPLES ON WOOD, AND CIRCULARS

SAMUEL CABOT
70 KILBY ST, BOSTON, MASS.
Window in the Clock-Tower of the Cathedral, Murcia, Spain.

\textbf{WINDOWS.}
W

print in another column a letter which, although not intended for publication, serves better than anything we could say to show how much strength the movement to place the architect in a better position than he now occupies in regard to supervision has already acquired in the profession. It is only by letting people, in some such way, understand how many others are ready to support them in any definite step which may be taken in the matter that a movement can be made with unanimity and success, and we hope that there will be enough architects willing to take the lead in each locality to carry it out firmly and judiciously. As we have already said, we believe that the public is willing and ready to provide and pay for clerks-of-works to attend to the minutiae details of supervision, so that architects may have time to do the higher work of planning and design to which they have been trained, and in which they can be of most service to their clients. To cite a single example, Mr. Keely, of Brooklyn, is said to have had more than fifty churches in progress at one time, and it is due to his industry and talent to say that all of them were carried on so successfully that people in the churches, and, if we may judge of those we have seen, were very far above mediocrity in design. Now, his buildings being scattered all over the country, it is probably quite safe to say that his visits of superintendence occupied, on an average, three days each. If he did nothing else but supervise, he could not see his churches oftener than once in six months all around, and, if he devoted half his time to designing, the visits of superintendence would be annual. This would be practically no supervision at all, as it would amount to only one or, at most, two inspections during the whole period of the execution of the work, yet there can be no doubt that if his trusted clients, who combine with him, wished him to give less, rather than more, time to supervision, They would say, with reason, that if he could not both plan and supervise, they preferred to have him keep to the former. They could easily hire some one to show laborers how to mix mortar and do the usual manual work of the shops; and, as they wanted his design at its best, it was good policy for them to relieve his mind of the burden of duty which he could not properly attend to, and thus gain time for him to devote to perfecting his special work. Although few architects, and even so many professional engagements at Mr. Keely's, most of them are distracted in the same way between the necessities, enforced by a terrible responsibility, of sacrificing all other work to visits of superintendence, and the desire of their artistic nature to study over their designs and work them up gradually and carefully. At present, a few men, like Mr. Richardson and one or two others, have been bold enough to refuse to undertake responsible superintendence, and to claim the whole of their own time for the artistic development of their ideas; but the public certainly has not deserted them, nor would it, we think, be at all likely to desert other architects who might follow their example.

THERE is, moreover, another consideration which would lead the public to look with favor on the permanent abandonment by architects of the rôle of bricklayers' and plumbers' and joiners' and carpenters' and painters' and mortar-mixers' "spotter," in the obvious injustice done by the unwise stipulation in the law as to their responsibility. It is not many days since a lawyer, who had had had a little experience in building cases, told us emphatically that if he were an architect, he should put all the money he earned into investments in his wife's name. The risk, he thought, that an architect ran of being reduced to poverty at any moment by the default of a man whom he had recommended, who, in his own real or pretended grievance that he had suffered from a building which was too great to make it safe for him to hold any property in his own name. We venture to say that many other lawyers would say the same thing, and the intelligent part of the public would agree with them, on the natural sense of fairness and justice which prevails in the community revolves at the idea that any class of men so useful and hard-working as architects should be debauched from accumulating property for themselves by the imminent risk which they ran of having it taken away from them and used to fill voids in other people's pockets which they did not make, as an effort to set the public by the by in respect would be heartily seconded by all decent persons. As we have already said, the present system of expecting American architects to be their own clerks-of-works, and to be personally responsible for the testing of every batch of cement, the mixing of every batch of mortar, the laying of every brick, and the quality of every tinker in all the buildings they design, is ruinous to the architects, whose time it consumes with petty details with which they should have nothing to do, while it wears out their lives with anxiety; it is in the highest degree injurious to American art, since it forces the skilled architect, by a sense of the risks to which he is exposed, to spend all his time in such supervision, and to leave the design of his buildings, to which no pecuniary penalty is attached, to his draughtsmen; and it is detrimental to the client, whose work would unquestionably be better done if it were under constant supervision, but who does not and cannot get such supervision from the architect himself, while the drudgery and efforts of the latter are thrown upon the architect, who, instead of being allowed to come as near such supervision as he can, diminish greatly the care and study with which he is able to give to the plans. We have seen, since the present discussion began, an article in a daily paper, informing its readers that the architects had in contemplation a scheme for extorting money from the public by means of clerks-of-works, and culling upon all persons interested to combine to force the architects to furnish clerks-of-works on all their buildings at their own expense. It is hardly necessary to say that the author of the paper in question is probably the only person who holds the view which has been so advocated by all other civilized countries, and to an increasing extent in this clerks-of-works are appointed and paid by the owner, to guard until of his interests which the architect is not asked or asked to take care of. If architects were to be required to pay clerks-of-works out of their professional fees, the profession would be vacant in a week, and would remain so until the public took back the idea that architects could do something for it that it wished to hire done, and would do so on being properly treated and properly paid, but not otherwise.

IT would be singular if Boston, which is not at all an artistic town as compared with any of its Southern cities, should become more favored by artists than any other place in the country; yet it is by no means certain that this may not happen. It is unquestionable that the establishment of the Rotch Architectural Scholarship, by the generous children of the late Benjamin S. Jenks, is likely to retain in Boston a considerable number of the most earnest and capable students of architecture in the country, who have sought an opportunity of qualifying themselves, by the necessary two years' employment in a Massachusetts architect's office, to compete for this splendid prize. As a result of this, the Rotch Scholarship has been taken, in three years out of the four in which it has been awarded, by men from out of the State, who have spent little more than the minimum of time allowed in Massachusetts offices, while scores of others, who have the scholarship in view, are working industriously at their professional studies, to the advantage of the city and State, as well as of themselves. Within a short time a sig-
ilar travelling scholarship has been established under the direction of the School of Drawing and Painting of the Boston Museum of Fine Arts. This scholarship is limited to residents of New England, under thirty years of age, who are students of painting, but who have devoted their lives to the practice of their profession, and who depend upon their own exertions for support. The successful candidate in an examination which includes drawing from the living model, sketching a composition, and painting a head from life, will be paid an allowance of six hundred dollars a year for three years, on condition of passing this period in diligent study in foreign schools of painting. To our mind, nothing has ever been done which will accomplish so much as this for art in America.

One sees nowadays, in the showrooms of art dealers, large numbers of pictures, more or less well painted, by young men who have a profession to choose. So the students of painting in New England, who find discouragements enough in that inhospitable clime to chill the courage of a Michael Angelo, will now have something to live and hope for, which will increase their ardor and their determination to succeed. It is as well to learn, as we are told by Le Génie Civil, has already painted such views to illustrate the War of Secession in the United States, and, for all we know, may be identical with the eminent M. Philipponaux, familiar to the American public as the artist of the "Battle of Gettysburg" and the "Siege of Paris," and other cycloramic works which have made the tours of the United States. The Compagnie Transatlantique's cyclorama is to be mounted in a circular building by itself, and afford some novel effects. The spectator, on ascending the stairs, emerges upon what appears to be the deck of one of the newest and largest ship-builders of the country, out of which the corps of tourists must walk in, and which will form in the eye of the beholder, in low process of construction. Around him are the masts and rigging of the vessel, and he can hold by the shrouds and look over the bulwarks at the sea, which extends to the horizon. On one side can be discerned the red roofs of Havre, and, lying at anchor in the harbor, the Company, while the illusion is heightened by the mists which obscure the background. In order to surprise and dazzle the spectator, which is important to the effect of a panorama, an ingenious device is used to detain him in the dark passageways leading to the little theater in which are illustrated pictures, to be looked at through a kind of condenser or magnifying glass, which will appear as a window in a side of a box. Seven of these are provided, representing the ship-building yard of the Company at St. Nazaire, the embarkation of emigrants, and various scenes on board one of the great ships during a voyage. All of them are interesting, and the visitor moves slowly through the darkened passageway, looking successively into the lenses, until his eyes have become accustomed to the feeble light, and the pupil has expanded so much as to be quite overwhelmed with the brilliancy of the great cycloramas, on emerging upon the platform.

The description of this cyclorama serves to recall the text for an interesting history of panoramas in general. Their first appearance is in Scotland, painter, Robert Barker, who, while in prison for debt, attempted to read a letter by the light that came through the tiny loop-hole of his cell, and was struck by the singular effect of the illumination upon the paper. He studied the phenomenon carefully, and so on the release he utilized these observations by exhibiting a picture under artificial illumination. Three years later he brought out a panoramic picture of London, which had great success, and was followed by similar views of Portsmouth Har-ber, and other scenes. Robert Foulis, the publisher, offering the production of the London picture, conceiving that the idea would be successful on the Continental, took out a patent for it in France. He had several panoramas painted in Paris, by Prévost and Constant Bourgeois, representing the cities of Amsterdam, Rome, Naples, and scenes of the Camp of Boulogne and the Battle of Waterloo. In 1810, Napoleon, with characteristic quickness in converting to his own benefit any new idea that might be of service to him, observing the interest taken by the public in Fulton's battle-scenes, ordered the architect Cellier to prepare a scheme for seven panoramas, representing his own victories, to have carried about and exhibited all over France. Unfortunately, just as the plan was matured, Napoleon himself was captured and carried off to Elba, so that the demand for panoramas of his victories declined, and Prévost, who would probably have been the painter of them, was obliged to content himself with exhibiting as a private enterprise, some views of Athens, Jerusalem and Antwerp. Since then, panoramas have always been popular in Paris, and such renowned artists as Détaille and Alphouse de Neville, among others, have taken pleasure in painting them for the public. The French ones usually either come to this country or are sent to Russia, after the Parisians get tired of them, and the English and Germans have some of their own, which they find pleasing.

In answer to a question of a correspondent, M. Collet-Corbinibre writes in Le Semaine des Constructeurs an interesting essay on the law of France in regard to payment for extra or contracts. The correspondent in question, a builder, contracted to erect a house according to certain plans and specifications, which showed that the wall was to be 67 feet long, and a corner tower, two stories high. As the work went on, the owner wished to have the tower made higher, and the accommodating builder carried it up two stories more. He wished also to have the fence extended one hundred and fifty feet, and the house put in it, all of which the owner himself asked, on his side, to be paid for all this extra work, and was told that no written orders had been given for it, and, under the law, the owner was not bound to pay for it. M. Collet-Corbinibre naturally sympathizes with the contractor, but replies that the law is plain. Under the Code Civil a man who contracts to build according to a definite plan, and for a fixed price, cannot demand any increased price, under any pretext, on account of changes or additions, unless such changes or additions are ordered in writing, and the price for them agreed upon beforehand with the owner. The only exception to this rule is where the contract was not a perfectly definite one, so that it did not answer to the description in the Code, and these exceptions are rare. He therefore advises the sufferer not to try to evade the law, but to set himself to examining his plans and specifications, to see whether other items have not been included in them, or whether the sketch which he has is not full of details, or can be executed, or whether the extra or sketched are in France considered to be written orders within the meaning of the law, but we infer from certain points in his letter that they are not. In this country they would be so considered, and if the builder could find sketches made by the owner, and showing the modifications as carried out, he would be pretty sure of getting his pay, whatever the contract might say about requiring orders for extra work to be in writing.
COLUMBIA COLLEGE, NEW YORK.

In the year 1881, Prof. William R. Ware, A.B., M.A., Consultant to the Department of Architecture at the Massachusetts Institute of Technology, was invited to undertake the founding of an Architectural Department in connection with the School of Mines, Columbia College. Previous to this there had been no regularly organized school of architecture in New York. For a number of years the necessity for such a school had long been felt, and the Trustees of Columbia College were quite ready to do anything that would place the department in a proper footing, and to equipt it in such a manner as to enable Professor Ware to carry out his ideas and to give the proper stability to the institution. Mr. Ware has provided the means for the greater portion of the equipament, somewhat like ten thousand dollars being expended under Professor Ware's immediate direction. The portion of the College buildings in which the department is now installed was erected subsequently to Professor Ware's appointment, and was, consequently, arranged in deference to his wishes, so as to give the best results for drawing-rooms, library, etc., and was intended to be as nearly perfect as possible.

The department has two assistant-professors, who have charge of certain lectures, etc., one of whom is a draftsman and one an illustrator.

The attendance is obligatory in all cases. For convenience, the course has been divided so that the students are grouped in three classes, the third and fourth year men studying together. There are no special students or first-year courses, and any one entering the College on advanced standing may be allowed to pass examinations upon the studies of the first year, and, during the remainder of the year, follow any subjects he chooses to extra. He may, thus, though not recognized as a special student, pursue special studies.

The regular course of study during the first year is practically the same for all the departments of the School of Mines, and includes simple mathematics, physics, and a certain amount of elementary drawing; but the latter is entirely separate from that of the other courses and includes shades and special subjects from the cast and brush-work. The studies for the succeeding years are as follows:

COURSE IN ARCHITECTURE.

SECOND YEAR.

Graphical Geometry.

Applied Chemistry: air, water, artificial illumination, photography, concrete, timber and its preservation, pigments, glass, etc.

Science.

Drawing: dressing, ornament, plant sections and elevations, details, perspective.

Science.

Mechanics.

Soapstone and marble engraving.

Materials in Architecture. History of ornament, lectures and exercises.

Mechanics.

Experiments and practical problems.

Sanitary Engineering.

Concrete and masonry sections.

Experiments and practical problems.

Engineering.

Business relations between architecture, clients, mechanics, draughting, etc.

SEVENTH YEAR.

Theory of Architecture.

The Theory of Color, the Theory of Ornament.

Second design course.

Construction.

Lecture on ornament, models, etc.

Lectures on ornament, models, etc.

Fifth Year.

Applied Chemistry: air, water, artificial illumination, photography, concrete, timber and its preservation, pigments, glass, etc.

Science.

Science.

Mechanics.

Materials in Architecture.

Experiments and practical problems.

Sanitary Engineering.

Concrete and masonry sections.

Experiments and practical problems.

Engineering.

Business relations between architecture, clients, mechanics, draughting, etc.

Lecture on ornament, models, etc.

Lectures on ornament, models, etc.

Theory of Architecture.

The Theory of Color, the Theory of Ornament.

Second design course.

Construction.

A lecture on ornament, models, etc.

Lectures on ornament, models, etc.

Fifth Year.

Applied Chemistry: air, water, artificial illumination, photography, concrete, timber and its preservation, pigments, glass, etc.

Science.

Science.

Mechanics.

Materials in Architecture.

Experiments and practical problems.

Sanitary Engineering.

Concrete and masonry sections.

Experiments and practical problems.

Engineering.

Business relations between architecture, clients, mechanics, draughting, etc.

Lecture on ornament, models, etc.

Lectures on ornament, models, etc.

Theory of Architecture.

The Theory of Color, the Theory of Ornament.

Second design course.

Construction.

A lecture on ornament, models, etc.

Lectures on ornament, models, etc.

Fifth Year.

Applied Chemistry: air, water, artificial illumination, photography, concrete, timber and its preservation, pigments, glass, etc.

Science.

Science.

Mechanics.

Materials in Architecture.

Experiments and practical problems.

Sanitary Engineering.

Concrete and masonry sections.

Experiments and practical problems.

Engineering.

Business relations between architecture, clients, mechanics, draughting, etc.

Lecture on ornament, models, etc.

Lectures on ornament, models, etc.

Theory of Architecture.

The Theory of Color, the Theory of Ornament.

Second design course.

Construction.

A lecture on ornament, models, etc.

Lectures on ornament, models, etc.

Fifth Year.

Applied Chemistry: air, water, artificial illumination, photography, concrete, timber and its preservation, pigments, glass, etc.

Science.

Science.

Mechanics.

Materials in Architecture.

Experiments and practical problems.

Sanitary Engineering.

Concrete and masonry sections.

Experiments and practical problems.

Engineering.

Business relations between architecture, clients, mechanics, draughting, etc.

Lecture on ornament, models, etc.

Lectures on ornament, models, etc.
but simply outlining the study. The subject-matter is then divided into half as many parts as there are months in the year, and at the end of the term approaches, two students are assigned to each topic, to study it up, examine it and write essays upon it.

The next term, these topics are taken up in succession week by week, the two students assigned to different subjects preparing for the week to follow, and exhaust it and report how they may find at the end of the week.

The next two weeks more essays are read, introducing another topic; the last sessions of the half-year's work are then investigated, and the prepared works are written up. This way, each student is obliged to know thoroughly at least one important topic of the period of history the class is studying; and, as the groups of books are moved along from week to week, and not limited to different subjects, it allows the teacher, at the end of the term each student has looked through the entire contents of the library relating to the period under investigation, and is reasonably familiar with all that can be found there.

A very interesting feature of the department is the attempt which has been made to encourage work on the part of the students during the long summer vacation. According to the regulations of the School of Mines, each student, is obliged, at the beginning of the fall term, to present a thesis upon a certain amount of work done during the vacation. In the department of Architecture, instead of a thesis, each student is expected to prepare during the months of September, October, November, one hundred sketches made during the vacation. No restrictions are made as to the kind or nature of work — simply that there shall be one hundred sketches of different sort. The results are shown that students are not inclined to slight the work, but, on the contrary, exert themselves to see who can present the best, and some of the outlines which have been prepared have been of considerable artistic value.

The only limitation which the student shall make is the selection and details of some one house. If the student, instead of sketching, prefers to spend his time in an architect's office, he is encouraged to do so on a full day in the week and the original is made equivalent to one sketch. The results thus far in regard to vacation work have been entirely satisfactory.

There is another feature in connection with the department which are worthy of note. Columbia College requires a knowledge of French in order to pass the entrance examinations, but students seldom are able to properly use the French books in the library. To meet this want, Professor Ware has devised a scheme which has been found to work admirably. Two hours a week have been given to it during the first year. Mercereau's "French grammar" was selected for reading. A page is assigned to each member of the class, and, after the reading, the first line read aloud by the pupil, then translated and then re-read. Each student is required to have his copy of the book with him and to make marginal notes; and it therefore follows that very few expressions will fail to be appreciated. In fact, it has been found that in this way the student acquires a familiarity with the language in a very short time, is enabled to profit from the other's mistakes and is also obliged to thoroughly study a definite portion of the work each week.

An essay which has been found great value, is somewhat as follows. Photographs of buildings are given to the members of the class, each of whom is required to write out a careful description stating the character of the building before him, the kind of windows, the style of architecture, etc. The students then exchange this account of the building with others without knowing the original, make a drawing from the description. Finally, the drawings and descriptions are compared by the class, and criticized.

Besides the lectures on hygiene and kindred topics which are given to the entire third college class, a special course in Sanitary Engineering is given to the students of architecture. This covers, in the third year, the drainage of buildings, the arrangement of pipes and fixtures, the disposal of household refuse, and the drainage of cellars and grounds. During the fourth year, the ventilation and warming of buildings are taken up, and discussed from both the practical and the scientific points of view.

In view of the circumstances under which the department was formed, it may well be understood that the equipment is all that could be desired. Professor Ware has not been able to supply money to the extent of his wishes, encouragement, and he had everything he could need to make the work a success. The drawing-rooms are large, well lighted, and arranged for the purposes of the work. The best facilities are provided for consulting the library, working in the modelling-room or attending recitations.

Modelling, however, is purely an art at present, though the opportunities are open to those who wish to avail themselves thereof. The main library of Columbia College contains 100,000 volumes, besides the special library, intended to be exhaustive in its nature and containing American and foreign periodicals, etc., forming a very rich collection for original reference. In addition to this the department of architecture has in its possession 500 volumes particularly selected by Professor Ware, intended to be exhaustive in its nature and to include all of the best professional works. These are kept in a room adjoining the drawing department and are at the disposal of the students at all times. Books may be taken away for the benefit of the student, but not under special conditions and everything is done to encourage the student to keep the volumes constantly and to draw from them as freely as possible. There is also a collection of water-color drawings and colored prints, used for copies, and about eleven thousand photographs, which are mounted on loose sheets and kept in portfolios. The students are allowed to remove them when they please, to take them from the shelves, and to have them beside their work, but are not allowed to put any of them back on the shelves.

One of the attendants goes around the room at stated intervals and collects all the photographs not in actual use, restoring them to their proper places, so that they do not become misplaced, but can readily be found when wanted.

The department has also a limited number of models, mostly of the orders.

The requirements for admission to the department include a knowledge of arithmetic, geometry, algebra, rudimentary physics and chemistry, French, German, book-keeping, and drawing sufficient to sketch ordinary objects. The number of students at present is fifty-four, and there have been about sixteen graduates, three of whom are practicing architects in New York City and all the rest are students in New York State. The graduates degree is that of Bachelor of Philosophy.

The expenses for attendance at the school are as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matriculation fee</td>
<td>$5.00</td>
</tr>
<tr>
<td>Annual Tuition</td>
<td>$200.00</td>
</tr>
<tr>
<td>Text books, first year</td>
<td>$15.00</td>
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<tr>
<td></td>
<td>$20.00</td>
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<tr>
<td></td>
<td>$30.00</td>
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<tr>
<td>Materials, includes diploma</td>
<td>$18.50</td>
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<tr>
<td>Graduation fee with diploma</td>
<td>$30.00</td>
</tr>
<tr>
<td>Total</td>
<td>$575.00</td>
</tr>
</tbody>
</table>

Add to this, board outside of the college at from $6.50 to $10.00 per week and the total expense for the course is from $900.00 to $700.00.

Free tuition is offered upon the following conditions:

1. The applicant must present a scholastic record, in which judgment of good repute, stating that he is of good moral character and studious habits; also that he is unable to pay the tuition fee.

2. He must exhibit a proficiency in every subject of examination for promotion of his class equal to that of the better denominations.

3. He must maintain an average standing of seven in every subsequent study, or an average of eight in all the studies for the year.

He is not exempted from fees for matriculation, for extra examination, and for graduation.

LIBRARY BUILDINGS.

I READILY accede to your request for a further treat-ment of this subject, in the interest of a better understand- ing between architects and librarians.

In answer to the statement that librarians disagree among themselves on this subject, so that no consensus of the views of the individual architectural library halls, surrounded by celluloid sleeves, etc., I asserted that certain well-defined principles have been laid down by a practically unanimous agreement of students, which principles, which are constantly violated by architects and build- ers, are bereft of the moral education of those who have failed to learn of these facts, or to appreciate their bearings.

In the Library Conference held in Boston in 1879, Mr. Henry Van Brunt said: "Doubtless we made a false start by endorsing to adapt our large public collections to the traditional and architectural library halls, surrounded by celluloid sleeves, etc., etc., several stories." And again: "The purposes for which our own public libraries are established are new to the world of literature and books, and naturally affect the question under consideration."

In just this line the Library Association has been active since 1881, at Baltimore (and without a dissenting voice):

"Resolved, That, in the opinion of the Association, the time has come for a radical modification of the prevailing typical style of library building, and the adoption of a style . . . better suited to economy and practical utility."

Unless both my memory and my examination of the Transactions of the Library Association are at fault, no one member has since, in any manner, been so virtuous and modern library wants. Perhaps the reply will be that it is easy to condemn that form of building, but more difficult to find a satisfactory substitute. But substitutes have been found, and while there is a difference among librarians, there are features in common that represent the settled views of the mass of librarians. Mr. Van Brunt's criticism of the ancient style of building, quoted above, was made in a letter which he was giving of the then new 'stack' at Harvard, an arrangement which he had planned for obviating the objectionable features of the old style. In the stack, we have rows of iron bookcases placed as
better arranged to enlarge the scope and usefulness of a single
attendant. Except as pressure of work for assistance, he easily
attends to all the three departments of reference, circulation, and
readers-room. My moral is that this could not have been provided
without intelligent understanding of the character of the library, and it
should be stated that the architect was a graduate of the college, who had
freely used, and taken a deep interest in, the old
standing.

But when the different departments of a library have been
arranged with reference to an efficient and economical service, there
is yet to be made provision for the work which must be done
in each, and which requires brain work. They must be
a rear or side entrance, opened in a
suitable
room, where some dust and dirt will not be seriously objection-

It could be the one and only way of realizing these advantages.
Another method is prominently before the library profession, largely
through the able advocacy of Dr. W. F. Poole, of the Newberry
Library of Chicago, and is already in practice, one of
which has been described in the present paper, and on which
drawn so that facilities for the use of the books
may be found very near every shelf in the library. As compared
with the old conventional library building, this stack has
bookcases built per cubic foot of space within
the walls, increased facilities and improved conditions for the use
of the books, and a much greater supply of light.

Lastly, there is one way of realizing these advantages.
In the great majority of cases, library buildings are erected
where land is not expensive and a large floor-area is available. Where this
is the case, it is not a matter of expense which may be
soot entirely the need of steps and stairs; and, where land is
more expensive, some such floor may be placed above another
building, and the intervals of fifteen feet, as well as the
placement of books in the introduction on
one level. It is claimed for this single-floor system that the
superior supply of light afforded through its admittance by high
windows above the top of the books, makes the liberty to
sit between and around them, and the fact that no books are
placed near the top of a room to their own injury by heat and
gasses, and to the serious discomfort of the users, more than for the
failure to utilize, as does the stack, every foot of perpendicular space
for book-storage.

However this may be, the discussion among librarians now
is between these two systems in their fullest features, and all agree,
the advantages common in some degree to both; viz., great capacity,
abundant light, convenience of use.

Let us consider our little differences of opinion as to
which ways are best for securing these ends, to such buildings as the
Winn Library at Woburn, Mass., and the Howard Library at New
Orleans, that we leave our mutual dispute between these two
beautiful buildings we find the old "traditional" style in its glory, with its
alveoles, its high steps, its galleries, and its narrow windows, one in each
alcove, shedding a dim religious light into the interior, its large tables running down
the nave. In the Howard Library (unless recent changes have been made)
the windows are eighteen inches wide, and pierce a three-foot wall (two
feet for each alcove). The windows are to go forward above the gallery
immediately above it must travel the whole length of the nave twice, besides ascending the steps,
and perhaps, a half-stair, too. But why should it not be a
book just over his head, "Thou art so near, and yet so far!"
In this same building, I believe, the only way a place could be found
for the librarian and assistants to work was if every one of
a single administration is one point
with regard to which it is plain that no architect could go right
without definite instruction as to the method of administration to be
employed in the building. Such instruction architects are quite apt
to be without, for the reason that no one is on the ground who is
competent to give it. Almost every public library has these departments
more or less fully developed; professional departments, in
administration, and reading-room. The erection of a new building
should facilitate the due development of these three departments, in
strict relation to each other and to the special wants of the particular
community in question, and with regard to which we are ready to
for supporting the administration. If one person be expected
supervise more than one department, these departments should be
so arranged as to make that feasible. I hope to
be able to give some indications of the arrangement of the
Amherst College library, especially as it was all done before
and in the thirteenth century.

One of the most interesting building is a re-arrangement of an older one,
with the addition of a new wing for the book-stack. The library
and reading-room are on the second floor, the lower floor being used
for secondary purposes. At the time of the fire, this one entire
department of the attendant, who has been
able to observe him almost from his entrance upon the stairs.
At its right he finds the large reading-room, nearly the whole of which
contains a table with a cushioned deal, an eye-level
attendant. At his left are the card-catalogues and a shelf
of indices, etc., with a little space for their convenient use, furnished
with trolley car service. It is the central location of a gateway
under the surveillance of the same attendant, to the entrance
of the stack, which (being on the second floor of the main building)
he enters midway of its height, and finds himself as centrally located
as he could be in the library itself. Never; I believe, was a library

1 From the opening address of the President of the Royal Institute of British
Architects, Nov. 2nd, 1887.
some of his columns, and want of height in many of his circular arch-
ways. There is something singular in the upper part of transomed
windows being made wider than they are high. It is also to be
regretted that in many of his buildings the pilaster and hipped
tile roofs appear to be too heavy to dwarf the general effect.
In 1882 Richardson visited for the first time Southern France,
Northern Italy and Northern Spain, and only then saw the best
specimens of architecture of which his enthusiasm was capable.
The effect of this tour, though he allowed himself no time for sketching,
is visible in the works he executed in the short time afterwards left
him. His becoming so devoted to simple and unpretentious ornament in,
style the best example of which he had not seen, is itself extraordin ary,
unless, indeed, a Romanesque wave had affected the American
architectural mind before his arrival. It seems to have had
nothing exactly what he thought best suited to the expression of his
buildings, without going out of his way to look for precedents. In
consequence, his work is not in any way a continuation of some
English work of young Americans who appear to be following his
steps in developing the capabilities of Romanesque art—an art
which, we must bear in mind, had not died out in continental Europe,
but was extinguished before its time in the twelfth century by the
difficulties of vaulting oblong spaces and the consequent introduc-
tion of the pointed arch. I have, perhaps, said enough to explain
Richardson’s Life,” by Mrs. Van Rensselaer, illustrated by photo-
graphs of his works, is worthy of earnest study.

[Contributors are requested to send with their drawings full and ade-
quate descriptions of the buildings, including a statement of cost.]

HOUSE OF J. P. FERNONACI, ESQ., NEWPORT, R. I. MR. J. P.
JOHNSTON, ARCHITECT, NEWPORT, R. I. [Gelatinen print, issued only with the Imperial Edition.]

CENTRAL-SCHOOL-HOUSE, ERIE, PA. MESSRS. D. K. DEAN & SON,
ARCHITECTS, ERIE, PA.

This building is 270’ long and 130’ wide in extreme dimensions,
contains 24 school-rooms of an average size of 24’ x 38’, two
rooms of 25’ x 100’, four rooms 21’ x 24’, all of which are sup-
plied with cloak-closets provided with outside light. The central
part of third story contains a half-hexagonal hall and four
and four dressing-rooms, each 12’ x 20’. The building is heated by
the Rutan-Smead system, and the system of Smead dry-closets is
used. The basement is entirely given up to the heating and ventilating
apparatus and the dry-closet system. All the interior finish is
quartered oak. The building, exclusive of all furniture or
school apparatus, is $145,000.

HOUSE FOR A. B. GOODBAE, ESQ., MEMPHIS, TENN. MR. W.
ALBERT SWASBY, ARCHITECT, ST. LOUIS, MO.

This house is built of Stock brick with Kilbe brownstone trim-
ings, red slate roof, first story of hard woods, balance cypress;
has ten rooms with dance-hall in attie, cost $16,000.

SKETCH FOR A CITY HOUSE. MR. FRANK MILES DAY, ARCHITECT,
PHILADELPHIA, PA.

STORE AND OFFICE-BUILDING ON SCHOOL ST., BOSTON, MASS.
MR. W. M. BACON, ARCHITECT, BOSTON, MASS.

DESIGN FOR A TOWER. MR. J. B. BHIND, ARCHITECT, MONTREAL,
CANADA.

FULFIL ALTERATIONS DESIGNED BY MESSRS. W. W. BOSWORTH
AND A. H. EVERTT, BOSTON, MASS.

THE PRESENT ASPECT OF LAND-DRAINAGE.—I.

TWENTY-FIVE years ago, land-drainage hardly had a recognized position in this country, ex-
cept in connection with that much derided art called “Fancy Farming.” Most of the farm-drain-
age was done with too much pride to be regarded as a waste of time, yet, it was
merely that degree to which they have made
known and acceptable to the farming community
the results of isolated examples of work done mainly
in that portion of the West, Illinois, was so blessed by nature that it had no need for
underdrainage, and the same opinion was prevalent in most of the
rest of the nation. The present case is now greatly changed.

There are in single counties, in Illinois, more works for the manu-
facture of draining-tiles than there were drained farms in the State
twenty years ago. The whole length of underdrains in that State is
more than 700,000 miles.

Illinois is not exceptional. In the best agricultural regions of the
whole country, especially of the East, many farms are naturally sufficiently dry for the best
production is general. The methods adopted are, of course, in many cases, rather crude, but the
general result has been to increase the yield of corn by skilled and judicious use of the
effect of excessive heat and drought, and a great mitigation of the malarial conditions
formerly prevalent. In these respects, we have but repeated the experience of England.
Agricultural surplus of this order is naturally sufficient to be
generated now as it was a necessary of professional engineering work.

Those who carry on the trade of tile-draining understand suffi-
ciently well for practical purposes a tolerable idea of the

This results in oxidation it is true, but the process is very different from that resulting
from immediate chemical contact. But the development of the fertilizing
qualities of the manure is this year is also due to the

The removal of water from the surface of level lands which are not underdrained is most economically effected by the opening of
channels or ditches. If the ditches are reasonably near together,
a good result will be produced by giving them a water-level of from
twelve to eighteen inches below the surface. They should be so
arranged as to receive the water of the surface freely; to hold the
water of a heavy storm at a level slightly below the surface of the
of the ground, and to run down to the indicated level within twenty-four
hours. Rolling lands, with swales and pockets in which water stands
and accumulates, may be relieved off, and economically by the running of single
lines of depressed water-ways. These need not even be ditches, only continuous artificial depressions
with broad banks, susceptible of cultivation and of machine-mowing and
leading to a clear point of discharge. The provision of drainage is easy and inexpen-
ive if a proper point of outlet is at hand.

In many cases, and it is those that call for the intervention of the
engineer, tracts sometimes of many thousands of acres lie too low
or have too little inclination for the removal of rain-fall. These
are sometimes actual swamps and sometimes lands lying so near the
decay of the best grasses. In these cases large and deep district drains or canals are required. Many of the States have drainage laws
authorizing the adoption of land-drainage regulations. The
County Commissioners at the charge of all who are to be
benefited. These draining canals are sometimes of such width and depth as
to be excavated by floating dredges working in from the body of
water they are installed. At the distance of 2 miles from the
water sufficient to float the apparatus quite to their upper ends,
miles away. In this manner, districts subject to constant saturation
are enabled to obtain the full benefit of their slight grades and to

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deliver their drainage outflow nearly at the level of the water into which their main drainage canal delivers. Lateral branches of the canal, extending on either side carry an effective drainage level throughout the area of the district.

In other cases, lands of great area, requiring drainage, are dependent for their outflow on tortuous and sluggish creeks or rivers which are low and subject to frequent outflow of small drainage or heavy rains. The difficulty is often aggravated by the existence of mullings holding prescriptive rights along the lower reaches of the stream. In such cases, the will rights have to be extinguished, and the cultivated lands are or should be further drained.

Again, wide areas of riparian marsh are rendered useless by their low level as compared with the tidal waters with which they are sometimes protected. They may be drained by removing high flood by-passes, and discharging on the fall of the tide. In all such cases, the assistance of the engineer is in request and he will often find his ingenuity, ingenuity and tact severely tried by an attempt to avoid any economically unnecessary and simple matter to make a canal large enough, or dikes high enough, or to give ample water-way to obstructed water-courses, but the expenses of all of these operations, and the charge for maintenance fall upon a class of men of little capital and of limited means for bearing the cost of the work. It becomes necessary, therefore, not only to make the ditch large enough but to make it not too large; to make dikes effective but too high nor too broad, and to limit the improvement of the natural water-courses to what it really necessary.

A just balance must be struck between immediate effective drainage of lands, and that such improvements as would make land too slowly for considerable practical benefit. It would, of course, be an advantage to place every acre of the whole district in such condition that it would be dry and firm within a few hours after the heaviest rain, but it would only be at the expense of five times as much work and expense to do this as to make such an outlet as will drain distant portions sufficiently for the production of good and wholesome grass, though too wet for plough crops.

The owner can better afford to take his chances of securing a fair crop of corn, with a less crop of grass crops, than he can afford to pay the extra tax required to put his land always in condition for perfect tith.

In the present condition of the agricultural district of the United States, there can be no doubt that a better return will be ensured for the amount of money laid out in the reasonably effective surface-drainage of lands now saturated, or, at times approaching a swampy condition, than an equal amount expended in the under-drainage of lands lying sufficiently high to make under-drainage profitable. In saying this, I would by no means be taken to imply that under-drainage is not largely profitable, and is recommended in many cases where it is possible; only that while under-drainage increases and insures the product of lands now largely tillable, the surface-drainage contemplated gives value and product to lands now worthless, in the sense of not producing a sufficient return to pay the cost of cultivation.

Under-drainage.

If a rule could be adopted which would cover the varied circumstances of different soils, it would be somewhat as follows: All lands, of whatever texture or kind, in which the spaces between the particles of the soil cannot be made dry, nor should they be; but, although they should be maintained moist, they should be surrounded with air, not with water. To illustrate this: Suppose that water be poured into a barrel filled with chips of wood until it runs over at the top. The chips will be filled with water, and the chips themselves will absorb enough to become thoroughly wet; this represents the worst condition of a wet soil. If an opening be made at the bottom of the barrel, the water which fills the spaces between the chips will be drawn off, and its place will be taken by air, while the chips themselves will remain wet with the water which they hold by absorption. A drain at the bottom of a well, in like manner, draws away the water from the free spaces between its particles and its place is taken by air, while the particles hold, by attraction, the moisture necessary to a healthy condition of the soil.

There are vast areas of land in this country which do not need draining. The whole range of sands, gravels, light-leeams and mounds allow water to pass freely through them, and are sufficiently drained by nature, provided, the ground is allowed to slope at the bottom as throughout the mass. A sieve filled with gravel will drain perfectly; a sand filled with the same gravel will not drain at all. More than this, a sieve filled with the finest clay, if not puddled, will drain completely, and so will heavy clay and silt on properly well-drained soils.

Money expended in draining such lands as do not require the operation is, of course, wasted; and, when there is doubt as to the requirement or sufficiency, this should be made before the outlay for so costly a work is undertaken.

There is, on the other hand, much land, only by thorough draining can be made either profitable for cultivation, or healthful for residence, and very much more, described as "ordinarily dry land," which draining would greatly improve in both productive value and subirbry.

The sources of the water in the soil are various. Either it falls directly upon the land as rain; rises into it from underlying springs; or reaches it through, or over, adjacent land.

The rain-water belongs to the field on which it falls, and it would be an advantage if it could all be made to pass down through the first three or four feet of the soil, and be removed from below. Every drop of it is freighted with fertilizing matters washed out from the air, and in its descent through the ground, these are given up for the use of plants; and it performs other important work among the vegetable and mineral parts of the soil.

The spring-water does not belong to the field — not a drop of it — and it ought not to be allowed to show itself within the reach of the roots of ordinary plants. It has fallen on other land, and, presumably, has fertilized and cleaned the air in the same manner as rain. It ought not to be allowed to convert our soil into a mere outlet passage for its removal.

The over-water — that which soaks out from adjoining land — is subject to all the objections which hold against spring-water, and should be rigidly excluded.

But the surface-water, which comes during rains over the surface of higher ground in the vicinity, should be allowed every opportunity, which is consistent with good husbandry, to work its slow course over our soil — not to run in such streams as will cut away the surface, nor in such quantities as to make the ground unevenly wet, but to spread itself in beneficial irrigation, and to deposit the fertilizing matters which it contains, then to descend through a well-drained subsoil, to a free outlet.

From whatever source the water comes, it cannot remain stagnant in any soil without permanent injury to its fertility.

The only sort of drain to which reference is here made is that which consists of a conduit of burned clay (tile) placed at a considerable depth in the subsoil, and enclosed in a compacted bed of the stiffest earth which can be conveniently formed.

A well-laid tile-drain has the following essential characteristics:

1. It has a free outlet for the discharge of all water which may run through it. It has openings, at its joints, sufficient for the admission of all the water which may arise to the level of its floor. 3. Its floor is laid on a well-regulated line of descent, so that its current may maintain a flow uniform, or, at least, never decreasing rapidly, throughout its entire length.

Land which requires draining, is that which, at some time during the year (either from an accumulation of the rains which fall upon it, from the lateral flow or seepage from adjoining land, from springs which open within it, or, from a combination of two or all of these sources) becomes filled with water that does not readily find a natural outlet, but remains until removed by evaporation.

If such land is not drained, it will be either filled with tile-drains (having a clear and sufficient outfall, offering sufficient means of entrance to the water which reaches them, and carrying it, by an uniform or increasing descent, to the outlet) its water will be removed to nearly, or quite, the level of the floor of the drain, and its water-table will be at the distance of some feet from the surface, leaving the spaces between the particles of the soil above it filled with air instead of water. The drain flows at a level between the drains and its level will be that of any other water that is dammed up. Rain-water falling on the soil will descend by its own weight to this level, and the water will rise into the drain. That drain which would flow over a level and shallow water, is again attained. Spring-water entering from below, and water oozing from the adjoining land, will be removed in like manner.

The water which soaks the soil may be considered under two heads:

1. That which reaches its surface, whether directly by rain, or by the surface-flow of the adjoining land.

2. That which reaches below the surface, by springs and by seepage from the lower portions of adjoining land.

G. E. Waring, Jr.
the pile, furnished by the smoke curving in various places, it was apparent that the fire had extended throughout the whole mass; and the deposition of sulphur on the surface of the pile, as compared with that from the volatile matter rising from the interior of the pile, presented the appearance of a yellow dew. Of the injury to the building by the heating of heavy brick walls by direct contact of the coal, burning of all timbers in contact with the coal, we have nothing to do; but the method adopted by the underwriters in the settlement of the loss was certainly outside of the usual course taken in such matters. This is, we understand, either to settle the loss on the basis of a lump sum, which one party tries to increase and the other to diminish, until in the spirit of exhaustion rather than compromise, they settle upon an average; and the other plan is to take the coal and then sell it to small consumers by forcing the consumption by means of ruinously low prices, which do not reward the seller, and also interfere injuriously with the retail business in the locality into which the coal was introduced. This instance was taken to be a sample of the coal from a portion which was uninjured, and subject it to chemical analysis, which gave:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Weight (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>25.0</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>3.98</td>
</tr>
<tr>
<td>Mineral matter</td>
<td>12.13</td>
</tr>
<tr>
<td>Sulphur combined with iron</td>
<td>3.86</td>
</tr>
<tr>
<td>Sulphur inorganic compounds</td>
<td>2.8</td>
</tr>
</tbody>
</table>

The calorific value of a pound of this coal as computed from the above, equals 13,094 thermal units. Other samples were obtained from the average of the pile when about half of the coal had been removed to a yard, leaving an oblong plane, which cut through approximately the centre of the mass. These samples were taken from regular units, from regular points over the slope, and taken to a clean pavement where they were crushed and thoroughly mixed over to obtain a smaller sample of the purpose of analysis, which should represent the average composition of the coal throughout the whole slope.

This analysis gave:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Weight (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>74.13</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>16.76</td>
</tr>
<tr>
<td>Mineral matter</td>
<td>18.47</td>
</tr>
</tbody>
</table>

The calorific value of this sample of coal amounted to 13,230 thermal units, or 2.68 per cent as the depreciation of the value of the coal by heating, and it was upon this basis that the loss upon the coal itself was reached. A sample of partially coked coal, which represented an average sample of the coal actually injured by heat so as to make a noticeable change in its appearance, showed upon analysis:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Weight (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>65.77</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>12.44</td>
</tr>
<tr>
<td>Mineral matter</td>
<td>26.13</td>
</tr>
</tbody>
</table>

The calorific value of the coal amounted to 10,109 thermal units, or 22.7 per cent less than that of the uninjured coal. The cause of the heating was undoubtedly due to the presence of sulphur in its combination with iron, forming iron pyrites. A defect in the consideration of the liability of various forms of bituminous coal to spontaneous ignition, has been due to considering the total amount of sulphur as the measure of the hazard, an assumption which contains two errors sufficient in themselves to render that process of forming an opinion entirely unreliable, because the sulphur liable to produce heat by chemical changes under normal conditions is the sulphur in combination with iron, forming iron pyrites, which is not under the most ordinary conditions, while the sulphur in organic compounds is not liable to such changes. Secondly, a measure of this liability is not shown by an ordinary chemical analysis, which represents a sample selected by averaging up a large number of specimens, but the danger is due to the greatest concentration of iron pyrites, and not to its average presence in the whole mass.

A GOVERNMENT TESTING-STATION.

THE following memorial was submitted to the Washington Government by Mr. Class, and it was unanimously determined that it be incorporated in our annual report, with the request that the Board of Trustees, or the Congress, take the necessary preliminary steps to bring the matter before Congress:

MEMORIAL ON THE ESTABLISHMENT OF A CENTRAL TESTING-STATION FOR BUILDING MATERIALS IN THE UNITED STATES.

The building interests of the country have assumed such vast proportions and important bearings on life, health and wealth of the people, that it has been considered a matter of common sense that an organization be established in the Government, such as has been awarded in the past to commerce, shipping, manufactures, agriculture, mining, education, transportation, and, sporadically, to specialties, such as ores, metals, victuals, drugs, etc.

Consistent steps should be taken without delay towards relieving the representatives of the building interests from an isolated position on matters of scientific and industrial importance, not only for the promotion of science, but for the protection of interests not less important than the public. It is not possible to go into all the details of the subjects which it is recommended that the Government should take up, but it is certain that when first the Congress considers the subject, they will be prepared by the reports of original investigations published to the country.

The testing-station, in Berlin, is equipped for tests of materials in hot, cold, dry, wet or changeable state. It owns hydraulic presses of varied capacities up to 250,000 pounds, and facilities for inserting test pieces from the smallest sizes to large sized columns of brickwork, masonry, etc.

Machines based on combined leverage system for tests of tensile, compressive, transverse, shearing and torsional strength.
M R. GARDNER'S ideas on buildings of any sort are always those of a well-read and experienced architect, applied with such ingenuity and success to the problems he sets himself, and above all, expressed with a simplicity and clearness which were peculiarly adjoined to carry conviction to the layman's mind. For this reason, principally, all his books have done the profession good service as tracts, opening what we may call the heathen intelligence to the light of good taste, whatever opinion of concrete and solid construction which so many of us, less gifted than Mr. Gardner, have hitherto preached in vain. It is possible that his book on school buildings, more popular than one of the dwellings-beings, every one takes an interest in his home, while most people know nothing and care less, about the structures in which their children's souls and bodies are being trained, but that does not make the subject less important, and if Mr. Gardner's earnest and attractive writing shall serve to call public attention in some degree to it, he will have deserved well of his fellow-citizens. We need hardly call attention to the fact that his book gives his ideas on nearly all the points mentioned are familiar to architects who have made any study of school buildings, but something certainly can be said in regard to the pretty sketches which form a large part of the illustrations.

GRIMSHAW'S "Pump Catechism" is a handy little volume of 230 pages, intended not so much for specialists as for those who have occasion to use technical knowledge only at rare intervals, and feel the necessity for a ready-reference book on the subject. It is a good work for that ubiquitous character found around all large buildings and offices, who may like to know a little about machines and machinery (for lack of time, he is supposed to know about everything that has to do with machinery in any form. It would also be of service to employers who know nothing or almost nothing of the history of their employees, and need some good authority to back them up in case the employe should turn about and pose the question. The information is imparted entirely in the shape of questions and answers relating to nearly all the pumps in the market, their construction, how they are set up, repaired, taken apart, etc. There are also points in regard to the general subject, the kinds of pumps, valves, pipes, pipings, of atmospheric action, calculations, and kindred topics. The answers are concise and complete as far as they go, and are supplemented by quite full illustrations and a cross index. The value of the work as a scientific treatise is quite small, and it would probably be of more interest to the so-called "practical mechanic" — who usually possesses a minimum of real knowledge — than to any one else; still, for its purpose, the book is well worth all its cost.

Dr. Lubke, in his latest undertaking, continues in a field that has been much worked, especially in recent years and in Germany. Contemporaneously with his "History of German Art," there are appearing many other "Pump Catechisms," among which the one by Dr. Janitschek and Professor Knackfuß, the latter's richer in illustrations than Lubke's work, and affording a practical aid to rapid reference by the employment of smaller print for detailed description than is used in the text. The name of Dr. Lubke, however, assures a ready welcome for his history, and it is not surprising to learn that the subscriptions (all works on art in Germany are published by subscription) have reached already in a few weeks a number that is highly gratifying to author and publishers.

Dr. Lubke's reputation has risen with a steady and equable growth, and has spread into countries and among classes where the names of Woltmann and Schmase are known only to a few. The chief of German art critics passed through a long time of obscurity and want of favor. Kugler is thought to have enjoyed an enviable career in that country. Yet his able and urbane book, published ten years before a second edition was called for, met with failure in the third, published in 1867, thirty years after its first appearance. The "History of Architecture" for the first time was made for the first time to represent the development of doctrine with the great epochs of political history, did not become popular until three decades after its publication.

Dr. Lubke's enthusiasm for things German, while unmitting, is tempered. Nor has he any impassioned vortices. Rather, he is left apart in the contention of champions over the historians of their special art, as chinning a bit of a bone and not having his compensation in the respect of all. Not striving for the first place at the head of learned archaologists, he takes a second by consistent endeavor. Those who have read the first two or three living German historians and critics of art are hardly fewer than those who would refuse to place him next after them. The appreciation he meets with is of a popular kind, while he any more than has it is declared by the successive editions his books all go through.

It is Dr. Lubke's merit, while not gifted with poetic talent, to have subjected his productions to a style. The objects of his dissertations are works of creative genius, so that, with this medium of expression, the furnish often of themselves the warmth and glow that inheres in art, and which is justly looked for in descriptions of works of art. He far surpasses in conveying the conviction of authorship and appreciation that forms the charm of Winklemann; as far, perhaps, is he, on the other hand, from the dry antiquarian habits of mind in which an object loses its attraction as soon as it has been captured and labelled. Lubke's research is rather the modern author; it is undertaken with a practical aim, and, when this has been conscientiously fulfilled, he is done, not with the thing, but with the relation in which he had for the time being set it. Unlike the mere antiquary, he is able to return it again with fresh interest. He changes his points of view, and a new perspective invites him to further attentive investigation. The results of his study are not distributed over a vast number of pages, but are intended to be three books, the two last yet to be written, as long as he has time and his health to work, and they are not without a claim to be taken into the regions of science. The occupation they supply is of a very particular kind, that all who have been interested in reading his history, to which he has contributed a great deal, are likely to be interested in the future volumes, and their publication will precipitate the last in a series which will be complete before the next edition of the "History of German Art" comes out, of which the first two have been a great success.

The subject of jewels of gold, silver, bronze and iron, found in graves, and that of miniature painting, the chief characteristic of which is a variety of geometrical patterns or figures on the surfaces of the metals — "a peculiarity to be traced back to the habit of carving in wood" — may be illustrated by a restricted series of examples, which, in their turn, are concisely described. But so important a work of early architecture as the monument of Theodore, at Ravenna, with its flat stone roof, composed of a giant monolith of Istrian limestone eight thousand centners in weight, merits, we think, no slighter treatment than that accorded it in the "Germanic times of yore." This is especially true when, as is the case, the only mention previously made of the "Germanic times of yore" in respect of architecture is that the house of the early Romans was a "fondam," and no more. The wealth of the Germanic races is betrayed by his conscientiousness, and even more so into contradiction; for Germans, he tells us on an earlier page, were natural workmen, and that is why he gives us masons. In the present article, he mentions the philological word of the proofs that are connected with carpentry being Germanic by origin; whereas such as describe the material and labor of masonry — Thor, Dach, Mauer, Klot,
TWENTY-EIGHT STORY BUILDINGS.

MINNEAPOLIS, MINN., 1888.

I think accurate calculations show the entire weight of the structure to be less than that of the same area twelve stories high and built in the usual manner.

As to the cost, which you seem to think would be excessive, considering the result, the estimate of our contractors show it to be about fifteen per cent less than an ordinary building of the same dimensions.

The solicitude which you display for the nerves of the tenants, I think hardly warranted, having in view the plain and honest construction, the effect of the ordinary earthquake would, presumably, produce only a motion akin to that of the mast of a vessel at sea, and a shock which might overturn the building would have of a certainty arranged the surrounding buildings as a nice soft spot for it to fall upon.

As to the matter of the man falling from one of the upper stories — I do not think that the party would very much care whether he fell with the twenty-eighth story on his head, if we have done, we probably should not know it unless by spiritualistic media.

Very respectfully yours,

L. S. BUFFINGTON.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—We do not think you properly represent us in the statement on page 228 of "The American Architct and Building News" that the "Champion" Metal is probably the same essentially as our "Giant" Metal. The Smith & Egge Mfg. Co., claim that "Giant" Metal is essentially different in its superior fibre and anti-spiritistical qualities, and that their metal is rolled exclusively for them, costs about forty per cent more than any ordinary metal before it is made into sheet. We only suggest that if the Champion Metal is made of the metal we have submitted, you will notice a difference in the quality of the metal, and we have no doubt you will find that the Smith & Egge Mfg. Co. is the real manufacturer of the "Giant" Metal.

Respectfully yours,

THE SMITH & EGGLE MFG. CO.

SOME INITIAL CUTS.

HARTFORD, CONN., November 17, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—Will you kindly explain the interesting initial cuts on pages 206, 208 and 209 of your issue dated November 1, 1888?

Yours very truly,

II.

[As the titles of these cuts were unintentionally omitted we are glad that Mr. Jet. B. J. Buffington, in his letter on page 208 shows an iron door-knock and bell-pull handle at Norwich; the cut on page 209 shows a typification of the Trinity as painted on the wall of St. Pol de Leon. The cut on page 206 is styled the "Arbor of the Twelve Gods," by the author of "La Vie Précie des Anciens," from which we borrowed it. — Ed. AMERICAN ARCHITECT.]

TO DEMAND A CLERK-OF-WORKS.

BOSTON, MASS., December 12, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—We want to thank you for the editorial in the American Architect for November 10, on the question of "clerk-of-works." The minute book has been lost, and other records for some time, and we have arrived at a point where we have decided to take a break whether the others follow us or not, and frankly say that we do not superintend and that we are not paid enough for the work that we do. We feel that most architects pretend to superintend, although they say they do not. Your remark some time ago that "an architect spent his time running about from town to town to see if his work had cumbled down since he was last there," first set us thinking. Then Mr. Atkinson's letter as to "Why architects do not show more energy in looking into new methods of construction," the article in the Engineering Record on the "Compensation of Architects," and the controversy over the Washington tower have all, in our mind, been due to the same cause: that is, that the architect of to-day is called upon to do so much for so small a price that he cannot take the time to superintend.

We have written a new schedule which we propose to have well displayed before printing it, and which P. & Q. are now mulling over and they propose to join hands with us. Curiously enough, when, in your "office of talk the matter over with him, we found X. — there for the very purpose of discussing the question of compensation of architects, that you see there is a strong current in favor of the new movement. Your editorial is well put. All classes of work must receive daily superintended, and confined to a short period of each day, and all important work should be done in the office. We could enumerate no end of benefits, economic, that would result from this well put work which occurs and go unnoticed simply because the architect does not see them, while the owner feels that everything is all right because the architect is paid, and the architect feels easy in his mind because, he says, "I am not paid to see every brick laid and every nail driven."

In cases where we started to a client that a contractor was dishonest, whom he wanted to figure on his work, he coolly said,
"Well, what is the advantage of having a reliable architect if he is not to look after a dishonest contractor?"

Let us all pull together and make the public come to us. Yours truly.

COMMISSION ON A PARTY-WALL.

November 17, 1888.

To The Editors of the American Architect:—

Dear Sir,—Will you kindly favor us with your advice in regard to the following:

Two land owners who we will call A and B, own adjoining lots and are agreed that A shall build a party-wall and B will pay one-half the cost of a same. Applies architect Y, who makes plans for his building and lets the contract for building the same, including the party-wall. Also makes for each lot, Y makes for each lot, on the adjoining lot, showing one-half the party-wall and arranges vest and smoke flues, cornicles and lodges, etc., on his side of the wall which is his party-wall. My question is: Has architect Y a just and legal claim for commission on that part of the party-wall which is a part of the building for which he has made drawings, etc., but at the same time contracted for by architect Y? A reply would greatly oblige, Y & Co.

It is usual to pay the architect of such building a commission on the cost of the party-wall, so that this part of the building pays two commissions which is unfair, since each architect must go to great trouble in looking out for his side of the party-wall. Whether some architect gets commission on the value of the whole wall, or only on the half that his client uses, is decided by the circumstances. It is quite common for the architect who builds first, and who, of course, builds the whole wall, and pays his architect the usual commission on the full value of it, to charge his neighbor, who settles with him for the joint use of the wall, one-half of the architect's five per cent on the cost of it, as a part of its value. The second man then pays his architect the same, or as near his half as that is worth. In this case the first architect receives his fee for the whole value of the wall, which seems unjust to us a very good arrangement, as the first architect superintends it, and thus performs an important service for the owner of each half of it, while the second architect could not adapt to his plan, what is already built. —See. American Architect.

THE PRESCOTT DOOR-HANGER.

CHICAGO, ILL., November 29, 1888.

To The Editors of the American Architect:—

Dear Sirs,—Please note that in your article on door-hangers commencing on line nineteen, first column, page 219, November issue, you say: "The only objection to their use for parlor-doors, it that they have to be put in before the plastering is applied and they are somewhat less easily adjusted." In answer we say: Our hanger "The Prescott" is the only one that is never applied, even in part, (all other hangers must be put in track) before the plaster is applied, or in other words, we build doors without disturbing plaster. Every day we take off the track hangers from old sliding-doors and apply our hangers instead, with our disturbing the plaster or thing. We do not drive a screw in the pocket, but do all our work on the face of the jam. It takes our carpenter from ten minutes to a half hour to adjust our hangers when the doors do not work freely, and so seldom is this at all necessary that our old customers can be found in many places where we apply them to work smoothly and easily for at least five years from date they are applied; and always repair, free of cost, any of our hangers that may be faulty in their working.

We think in common justice to you should contradict this statement, as from the large circulation of your paper, it will do us much harm. We had a case in point to-day—a gentleman building here looked over your paper to find proper materials for his house—seeing your article on door-hangers he decided from the clause above quoted not to use the Prescott. However, we finally convinced him of your error and he will use the Prescott.Yours truly, Prescott Hardware & Mfg. Co.
The Sound of Thunder. — One of the best descriptions of a common natural phenomenon is recently given by M. Hirn, in which he says that the sound which is known as thunder is due simply to the fact that water, when heated, expands, and when suddenly cooled contracts. — It is suddenly raised to a very high temperature, and has its volume, moreover, increased by the water expanding. The liquid thus heated and expanded is sometimes several miles long, and, as the duration of the flash is not even a millionth of a second, it follows that the molten air is thrown out in the form of a mass that travels at a great speed. This was observed in one place where the lightning is at the least distance. In precise terms, according to M. Hirn, the beginning of the thunder-clap gives us the minimum distance of the lightning, and the length of the thunder-clap gives us the length of the column. He also remarks that when a flash of lightning strikes the ground, it is not heard, as there is no gas to act upon water. Again, he points out that a bullet whistles in traversing the air, so that we can, to a certain extent, follow its flight, the same thing also happens when a falling meteorite strikes the earth. The flash actually heard has been compared to the sound produced when one tree falls near another. There is no possibility of getting a bullet on one side in front of the projectile, whether bullet or meteorite, quickly rushes back to fill the vacuum left in the rear. — Iron.

A Gas Hammer. — John Bull uses a lot of iron in making tools, but he makes some mighty good ones — sometimes. A Scotch branch of an iron foundry manufactures a gas hammer which is heated in a gas-burner which must prove very handy in the shop. Instead of steam furnishing the motive power, a mildly explosive mixture of common coal-gas and atmospheric air is employed. It is used to propel the hammer piston very much as in the cylinder of a gas-engine. Softer blows are given by reducing the range of movement of the hand-lever, and the force of the blow is regulated as easily and accurately as with a steam hammer. The hammer is that known as the three-fourth hammer. It has a stroke of three-fourths foot, and it weighs three hundred pounds. As a rule, the thumb is troublesome, but it is easily done with a weight of three hundredweight falling through a height of one foot; 3,000 blows only use thirty-three cubic feet of Birmingham gas which at 5 cents a cubic foot costs 3 annoyance. If the man does not go wrong, it is reckoned as a very efficient tool. The hammer is always ready for work at any moment, day or night, for short or long periods, and it would be one of the most useful tools that could be kept in the workshop. It is necessary to light the burner, open the gas-cock, and it is ready for action.

The hammer is arranged to work with hand-gear, but if preferred, it can be arranged to work with a foot-gear also. A man in harness has no business to let cousin John get ahead. We can find useful use for gas hammers where there is no steam-supply available. — The Boston Manufacturers Gazette.

Canada's Ship Railway. — Mr. Ketchum, engineer and promoter of the Chignecto railway, which is to connect the Bay of Fundy and straits of Northumberland, is trying to complete arrangements with the government in connection with his works, for which Parliament has been regulated as easily and accurately as with the steam hammer. The hammer is that known as the three-fourth hammer. It has a stroke of three-fourths foot, and it weighs three hundred pounds. As a rule, the thumb is troublesome, but it is easily done with a weight of three hundredweight falling through a height of one foot; 3,000 blows only use thirty-three cubic feet of Birmingham gas which at 5 cents a cubic foot costs 3 annoyance. If the man does not go wrong, it is reckoned as a very efficient tool. The hammer is always ready for work at any moment, day or night, for short or long periods, and it would be one of the most useful tools that could be kept in the workshop. It is necessary to light the burner, open the gas-cock, and it is ready for action.

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Frost-proof Mortar. — According to the Boston waiter, Herr Hen- ridt of Germany, a most interesting discovery has been made that certain substance, readers gypsum, hydraulic lime, and Portland cement perfectly frost-proof. The effect of the additions is that when the mortar mixes with water it is not frozen. The frost-proof materials, which are said to have been found sufficiently, are gypsum or limestone, and lime or Portland cement. (1) Frost-proof Gypsum Mortar. — Three parts of good white lime mortar are well mixed with 13 or 2 parts of frost-proof gypsum, but the quantity mixed with the gypsum gives out at the same time as the water. To use the mortar must not exceed ten minutes. (2) Frost-proof Hydraulic Mortar. — Three parts of sand are mixed with 15/4 parts of hydraulic cement, the necessary quantity of water is added, and the mortar mixed as quickly as possible, so that from the time of adding the water to the complete using up of the whole quantity of the mortar given out of the sand, it is never allowed to be mixed longer than the frost-proof hydraulic cement lime is added to three parts of thin white lime mortar, the whole quantity of the prepared mortar to be used up within ten minutes of the addition of the water. The frost-proof mortar must be stored in a dry place, for it will cause their letters to stick to the barrel, and to become worthless for further use. — The Builder.
**The American Architect and Building News.**

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DECEMBER 8, 1888.

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**SUMMARY:**


**BUILDERS' HARDWARE.** — XIV.


**MEDIEVAL HOUSES.** — VII.


**TRADE NOTICES.**

- Towels and Clippings.

**The committee in charge asks us to draw attention to the competition announced in another column for the enlargement of the State-House at Boston and we comply, with regret that the Commonwealth of Massachusetts should have such good cause to be ashamed of herself.**

**FIRE AND WATER** calls attention to the increased risk from fire attending the use of the strong shutters and solid roofs now so commonly used on warehouses. At a recent fire in Australia the firemen found the shutters so securely fastened that the inside of the building, filled with valuable goods, was nearly burned out before they could get a stream of water into it. In a similar manner, at a fire in New York a week or so ago, the firemen, knowing that they could not get into the windows, climbed to the roof, and attempted to cut a hole through. They found that the roof was laid with brick and concrete, and it took so long to make an opening in it that the stock in the building was almost destroyed, and it was finally necessary to cut through the brick party-wall from the adjoining building in order to get a hose through. As a remedy for the bad effect of fortifying buildings so successfully against friends and foes alike, Fire and Water proposes that the practice common in Chicago, of leaving one shutter on each story unfinished, so that it can be opened from the outside, should be adopted in all large cities.

**ARCHITECTS** can undoubtedly do something toward assisting the introduction of the metal aluminum into common use. The present price of aluminum is about eight dollars a pound, or about one-half that of silver by weight; while the specific gravity of aluminum is two and one-half, while that of silver is more than ten, one can exchange a piece of silver for one of aluminum eight times as large. If many proprietors would adopt this, it would make the cost of an article of solid aluminum no larger than that of one of brass plated with silver, while the advantage would be all on the side of the former. Many years ago drawing instruments were occasionally made of aluminum, in place of German silver; although then very costly, they were so light to use, and so strong and handsome, that those who could afford them thought their money well invested. At present prices, the use of the aluminum should add only two or three dollars to the cost of an ordinary pocket case, and the interest on this outlay would be repaid many times over by the superior delicacy which would be possible in handling the lighter tools, the avoidance of much of the risk of blotting valuable drawings by the fall of heavy dividers from the fingers, and the lessening of the fatigue from which the very busy draughtsman sometimes suffers. Opera glasses are very commonly made of aluminum at present, for lightness in use, and drawing tools, which are in the fingers all day, have quite as much claim to be made light as an object only held for a few moments in the course of an evening. Besides articles for their own professional service, architects could think of many building appliances for which a white, strong metal, not subject to corrosion, is greatly needed. To say nothing of locks, keys, bolts, hooks, chains and other items of builders' hardware, the portions of plumbing apparatus now constructed of brass, which are exposed to very little or no exposure to dirt or moisture, would be very advantageously replaced with aluminum. The brass used for these purposes is soft and weak, while aluminum is nearly as strong as steel, and is much better in point of permanent beauty of appearance. As every one knows, silver-plated is soft and can be worn away by the continual settling of brass, water or even long exposure to the ordinary atmosphere of dwelling-houses, turns it black. Nickel plating, while harder, does not cling so tightly as silver, and sometimes peels off, while lemon-juice, or other acids, attack it energetically. There are people enough who can pay who would like to have, and are willing to do so, and who dislike to see the basin-cocks in their houses turning black and yellow from corrosion and wear, or the bath-tubs and sinks showing red streaks of copper through the tinning. In one of the Vanderbilt houses there is said to be a bath-tub of solid silver, and we have known an order given for a pantry window to be made of silver, so as to avoid the unpleasant effects of wear. The cost of a pantry-sink stamped out of sheet aluminum would certainly be no more than of one cast in German silver, and would probably be very much less, while an aluminum bath would be very handsome compared with one of silver, and would be better and handsomer.

**THERE** are many indications that the day of huge apartment-houses has gone by in New York, and while people who like to live in flats will probably be able for a good many years to obtain pleasant and well-planned ones at a low rent, there will be few or no new ones built. The first blow at them was given by the State law limiting the height of dwelling-houses to eighty feet. As flats on Fifth or Madison Avenue were always the most attractive, and, in so fashionable a location, must be built high, in order to gain enough on a given area of land to pay interest on the investment, the passage of the law put a stop immediately to the construction of the best and most desirable houses of the sort, and compelled those who wished to build them to find cheap land for the purpose. Many of them were still built, but the character fell off, and the reputation of the old ones suffered undeservedly from the defects of the new ones. Moreover, the supply of apartments in the region above Forty-second Street ran ahead of the demand, and tenants enough to fill them could not be had at any price. Several large houses, built with borrowed money by men without capital, were being sold with a condition that the men should leave the perfect dwellings for about one hundred and thirty families. Mr. Navarro’s intention to build the buildings in his own name, and sell the apartments absolutely to those who wished to occupy them by means of trust-deeds and perpetual leases. In this way he expected to be able to build, by one, the eight sections into which the structure was divided, reimbursing himself so rapidly by sales that he would not be obliged to keep a very large capital invested. A Home Club was formed of persons who wished to become proprietors, and many of the apartments were sold and paid for. Unfortunately, the original estimate of the cost of the building was over two million, and it turned out to be entirely inadequate, and long before the rough shell of the first four sections of the building, had been completed, the money intended for it had been spent. A million was borrowed on a first mortgage to finish the building, and, this proving insufficient, six hundred thousand more were borrowed on a second mortgage. All this was used up, and still the house was unfinished. No one else would lend any more money, and the second mortgagee, fearing lest he should lose the six hundred
thousand dollars he had already invested, advanced six hundred and fifty thousand more, and completed the building, ready for occupancy. It proved very popular, and the persons interested declined to build the second half, in the hope of making up by the profit on this for their losses on the other. This portion, including the Fifty-eighth Street sections, called the Granada, Salamanca, Valencia and Tolosa, was built in 1885, the second mortgagees, as before, advancing three hundred and fifty thousand dollars to complete it. For a time it proved profitable. The apartments rented readily, and the rents paid all expenses and interest on the mortgages. About two years ago, however, the general decline in apartment-house property affected it, and the rents failed to provide for the mortgage interest. The first mortgagees foreclosed, and, after a good deal of adjustment of claims, the whole property was recently sold to the second mortgagee. This sale cuts off all the rights of the original proprietors, who paid for their apartments as members of the Home Club, and the new owner, regardless of their certificates of perpetual tenancy, is said to be intending to compel them to pay rent, just as if they had no money invested in the buildings.

An architect in Berlin has just received a criminal sentence on account of an error in judgment, by which the lives of workmen were lost. The architect in question, M. Hiller, had designed terra-cotta cornices. The workmen of the cornice overhang considerably, and the problem of supporting it, which is always a serious one with projecting members of terra-cotta, was solved by laying an iron plate on the lower portion of the cornice, held down by bolts through it. The plate, however, was too near the edge of the cornice plate, and extending down into the back of the cornice, which was composed of brickwork fourteen inches thick. The terra-cotta blocks for the upper portion of the cornice, which projected fifteen inches from the face of the wall, were delivered incorrectly, and as they arrived they were propped up, this prevented tying them properly together, for, before the cornice was finished, sixty feet of it gave way, carrying to the ground with it nine workmen, of whom eight were killed. It is hard to tell, without seeing the testimony, just how the blame was apportioned between the architect and the contractor, but both have been sentenced to six months' imprisonment.

A NEW and promising light has been invented and patented, which is likely to come into extensive use for contractors and others who have night work on their hands. The principle is something like that of the famous Læcigerum, in which a jet of crude petroleum, driven in spray by compressed air, is made to give a light rivaling in intensity an electric arc-light, but steam is used instead of compressed air to drive the jet of oil spray. The apparatus, ready for use, consists of two cylinders, one containing oil and the other water. They are filled separately, so that the air in the cylinders is compressed in the upper portion or may be forced by engine or condensing pump. When the lamp is to be used, the condensed air from the top of the cylinders is allowed to begin to escape through the jet, and the oil is then turned on. The spray of oil and air is lighted, and burns with a light equivalent to that of twenty-five hundred candles. Just above the nozzle is a coiled pipe, communicating with the water cylinder. As soon as this coil is hot, the water is turned on, and, passing through the hot coil, is vaporized, and enters the jet in place of the compressed air, which is then turned off. The steam serves to keep the compressed blast higher within the lamp, which greatly increases the light, through its decomposition forming oxygen and hydrogen, which assist the combustion of the oil. As there is no smoke, no choking can take place in any kind of oil, and crude or refuse petroleum, or creosote from gas-works, can be burned, while the apparatus is portable, and the lamp can be lighted in a moment.

M. LAMOUROUX, a councillor of the city of Paris, has written a curious report upon the movement of population in that city, the average rents in the various quarters, and other statistics. As the boundaries of Paris are very distinctly marked by fortifications, it is particularly easy to collect reliable statistics of the kind there, and as the Parisians are never tired of studying their own town, a great deal of information is collected in that way. Two or three years ago an alarm was raised that the population of Paris was declining, and we believe that it did fall off about ten per cent within a few years. Whether this movement still continues seems to be now uncertain, but M. Lamouroux's figures clearly do not point to the prospect of the city's future career of prosperity. Although the rich foreigner's flock to Paris as much as ever, the working people are deserting it, as is plainly shown by the tables of vacant tenements. In the whole city there are now eight hundred and six thousand, one hundred and eighty-seven dollars, small suites of rooms; in the fifteen blocks, small suite of rooms in a large house. At the end of 1887, nearly forty-seven thousand of these, or almost six per cent, were vacant. In 1885, about thirty-three thousand were reported vacant by the police, so that the number of empty dwellings increased by fourteen thousand. During 1886 and 1887 sixty-six hundred dwellings were vacated, and eight thousand new ones built, so that the number of dwellings added to the city in those two years was twelve thousand, four hundred; yet, if there had been no new houses built within the years, the number of empty tenements would have been greater by about fifteen hundred in 1887 than it was in 1885. This would seem to show conclusively a diminution in population, especially as the tendency in all great cities at present is to crowd families together, and to multiply the number of small, independent households. The official statistics show a decline in the number of dwellings being sold for dollars a year or less and those which cost more, and it will probably surprise persons not familiar with the mode in which the real Parisians live to learn that six hundred and twenty-two thousand, or more than three-fourths of the whole, belong to the former class, while it is said that the de-population of the city is most marked, the number of buildings of small flats having increased in two years from nineteen to thirty thousand, while the number of unoccupied tenements of more than one hundred dollars rental value increased in the same time from fourteen to sixteen thousand.

In connection with his report, M. Lamouroux gives a map, which La Semaine des Constructeurs reproduces, showing the present average rental value of a tenement in each quarter of Paris. The most expensive quarter is, as might be expected, the region along the Champs-Elysées, near the railroad and the omnibus and horse-car lines with the other portions of the city, the average rent of an apartment is only forty-three dollars a year, or not much more than one-twentieth the average rent in the "English quarter" around the Champs-Elysées. The next cheapest region is Charonne, near the cemetery of Père Lachaise, which is also on high ground, and affords tenements at an average price of forty-seven dollars a year. Dwellings averaging from sixty to seventy dollars a year can be had, or could be had in 1887, in the quarters of Grenelle and Necker, close to the Exposition buildings now in process of erection, and in various districts in the northeast part of the city, while for one hundred and fifty dollars a year, one may have an apartment under the shade of the Sainte Chapelle, or of the Sorbonne, or the School of Medicine, or the Polytechnic School, or the Hôtel Cluny, or the Law School, or the Hôtel de Ville, or almost any of the hospitals, according to taste. As to the value of the privilege of a tenant in the various quarters, a curious indication is given in a supplementary table of statistics given by M. Lamouroux, which shows that the number of domestic servants kept varies about in proportion to the rent paid. In the district of La Maison Blanche (XVII.), in one thousand households, each composed of not less than two persons, a servant was kept in 45 per cent of the houses; in the quarter of the Champs-Élysées, the same number of households, of the same minimum size, kept sixteen hundred and forty servants.


**BUILDERS' HARDWARE. — XIV.**

**SASH-FASTS.**

**HERE are so many varieties of sash-fasts to be considered, that, in order to make the descriptions less confusing, it will be well to classify the sash-fasts according to their most prominent characteristics.**

I. **Old Style of plain sash-fast.** This consists of a plain, pivoted bar, attached to the upper sash, with a hook on the end, which works over a catch or raised plate on the lower sash. A knob, often of porcelain, is fastened to the end of the bar. Figure 183 illustrates this type.

In the oldest makes of this kind, the lever was simply pivoted on the upper sash, and a knife-blade, slipped between the meeting-rails, could push the lever to one side and unlock the window without the slightest difficulty. In the sash-fast shown by the figure, the lever is made with a broad, flat end, which presses against a strong spring, A, at the back. The spring serves to stiffen the action of the lever, which is further protected against intrusion, in some cases, by dovetailing the bottom plates, so that the lever cannot be got at through the joint between the meeting-rails. Varieties of this same form are made with the lever swinging only half around in one direction, the gain thereby being that the back spring can be made longer and stiffer, without increasing the size of the sash-fast.

Figure 184 represents a variety of sash-fast, in which the lever is on the lower sash and hooks over an inverted peg on the upper sash. The "Judd" sash-fast, Figure 185, has a shoulder on the side of the lever so arranged that a knife-blade would catch on it and be broken before the lever could be moved sufficiently to open the window. Figure 186 shows a strong form of sash-fast with no spring of any sort, but with a protection for the lever by dovetailing the plates together, as described in the previous paragraph; while the sash-fast, as indicated by Figure 187, works in exactly the same manner, but the plates are riveted together. Figure 188 is yet another variety, the plates here being not only dovetailed together, but also lipped down into the joint between the meeting-rails. The lever works in the same manner as the first sash-fast noticed.

**II. Spring lever sash-fasts.** While some of the forms just described might be classed under this category, none of them actually have spring levers, the springs are not so arranged as to force the lever open or shut from any position. Figure 189 shows what is known as the ordinary "Boston" sash-fast, which is used a great deal in Boston, and is much liked for its simplicity and sureness of action. This form is, apparently, made by almost every manufacturer of builders' hardware in the country. There is a coil spring around the hub of the lever tending to throw it back, and a simpler spring which bears against the ratchet connection at A, so as to lock the lever when it is closed. Hopkins & Dickinson manufacture a variety of this form, in which the spring-catch, A, has several cuts or ratchets on its edge, and the catch on the lever is bevelled, so that it will be held by any one of the ratchets. The advantage claimed for this is, that if the lever is drawn around hastily, it will be more likely to catch on the ratchets and be locked, than the ordinary pattern, which has but a single ratchet. This is known as the "Ladd" sash-fast.

The "Boston" sash-fast has to be set pretty carefully in order to be effective, and in the case of very excessive shrinkage, the space between the plates might be so reduced that the ratchet would not hold the lever.

Such difficulties would, of course, arise only in a third-rate building. The form is believed by many of the dealers to be the best in the market, and it surely answers very fully the requirements of a perfect sash-fast.

A scarcely less admirable sash-fast is shown by Figure 190. The lever is on the lower sash, hooking under a tooth on the upper sash, which is bevelled so as to draw the sashes more closely together. A strong spring about the axle of the lever tends to throw it open, while a small bolt, inside the lever, locks into a concealed catch on the post or axle of the lever. The bolt ends in a knob, A, and is fitted with a spring which keeps it pressed tightly towards the centre, so that the lever is caught and held when it is turned clear around through 90 degrees. On pulling the knob, A, the catch is released and the lever flies open.

Figure 191 illustrates a sash-fast which works in very nearly the same manner as the preceding, except that in order to release the lever the knob is pushed in. The Hopkins & Dickinson Manufacturing Company also has a sash-fast which hooks around a pin, like Figure 191, but is otherwise the same as Figure 190. P. & F. Corbin manufacture two forms of sash-fasts which are essentially the same as Figure 190.

**III. Lever sash-fasts with locking lever.** This includes...
those in which the lever works without a spring, but is held either closed or open by means of an auxiliary lever. Figure 192 gives one variety of this kind, the lever being pulled down in order to permit the bolt to turn. The locking lever here is held in place by a spring, and catches into a slot in the bed-plate, preventing the lever from being turned. Figure 193 has a lever which works in the same manner as that of Figure 191, except that it has no spring. It is locked in place when turned, by a catch which is released by pressing the knob on top of the hub.

Figure 194 represents a form of sash-fast which has met with considerable favor, as being one of the first which had any right to the qualification of being burglar-proof. The action is perfectly simple. The lever is on the lower sash, and is held either open or shut by a smaller hinged lever which drops by gravity into the rebate of the bolt-plate. Figure 195 shows a fast which operates in exactly the same manner, the smaller, gravity lever being raised to release the main lever, and Figure 196 is a type of a number of similar forms manufactured by P. & F. Corbin. The lever in this example is released by raising the secondary lever at the rear.

IV. Locking lever sash-fasts. This class includes those sash-fasts in which the lever locks itself when turned. Figure 197 is a form which has been on the market for some-time, and is now comparatively little used, though the chief objection to it is only in reference to its size. It is as near to being absolutely burglar-proof as any form of sash-fast which has been devised. Half the axis, about which the lever is rotated, forms a part of the upper and of the lower sash portion of the fast. The figure shows the position when the sashes are locked, the lever hooking down under both half-axles, and not only drawing the two sashes together, but binding and holding them so they cannot be moved. To unlock the sash, the lever is thrown up to a vertical position.

The "Payson" sash-fast, Figure 198, is very simple and effective, ranking as one of the best in the market. The lever is on the top sash, and locks itself over the opposite post with the help of a small spring-bolt, the knob of which shows at the end of the lever. The attachment of the lever is such as to permit it to fall back on the upper sash. This sash-fast is not liable to get out of order, it draws the sashes together, and is as burglar-proof as would ordinarily be desirable. The only objection to it is that the connection between the lever and the locking-post does not allow for much shrinkage in the sash.

V. "Curb" sash-fasts. The sash-fasts of which Figure 199 is a type, are quite difficult to represent by a drawing. The action of the fast is as follows: The levers are fastened to the lower sash. When the upper lever is turned, the lower, or locking lever, is first thrown out until released from the hook on the upper sash, and then thrown across toward the hub, until both levers are on a line with the edge of the sash, the upper lever moving through 180 degrees, while the lower lever is moved only 90 degrees. Though the action sounds complicated, the sash-fast is perfectly simple in its construction, and there is nothing about it that can get out of order, or even wear loose, except by such excessive use as would practically never be given it in a house. There are no springs about it, consequently it has no automatic action, and in unlocking, care must be taken that the locking lever is turned clear around, as otherwise it will project beyond the meeting-rail and catch on the sash-muntins. This is really the only objection to it.

Figure 200 is a very similar sash-fast manufactured by P. & F. Corbin. It differs only in the internal, eccentric arrangement. The Reading Hardware Company also manufactures a sash-fast very much like the "Ives." The "Boston" sash-fast flies open of itself, unless properly locked. Many people believe that a sash-fast should lock itself the moment the sash is drawn down, so as to leave no chances of the windows being unlocked, and, accordingly, there are in the market several varieties of self-closing sash-fasts. For general house use, it is believed, that such fasts would prove a great nuisance, as the window would, of course, have to be unlocked every time it was to be opened; besides, nearly all of these self-locking appliances are much more liable to get out of order, either through rust or neglect, than the ordinary sash-fasts; still, in some cases, there seems to be a necessity for them.

The simplest form of self-acting sash-fast is that illustrated by Figure 201. This consists of a spring bolt, acting not unlike the latch-bolt of an ordinary lock, which flies out whenever the sash is closed. It is mortised into one of the styles of the upper sash, or into the hanging-style, and the bolt bears on a plate on top of the meeting-rail of the lower sash. The figure shows one of the case-plates removed, to illustrate the construction. A very similar fast is shown by Figure 202. This, however, is not self-locking, as the top of the lever must be pressed in to force the lower portion. Both of these appliances might almost be classed as sash-locks, instead of sash-fasts.

A self-locking fast of the description of Figure 201 has the disadvantage that the bolt must be held back when the window is to be raised, and, if the sash should bind, it is rather awkward to attempt to hold back the bolt with one hand and move the sash with the other. There is a device of Security Self-locking Sash-fast, which obviates this difficulty, this consists of a bolt similar to that of Figure 201, but with a locking-lever which falls out when the bolt is pushed back. This holds the bolt flush with the sash and allows the sashes to be raised or lowered, but when the meeting-rail is pressed in, the locking-lever is raised, releasing the bolt, which flies out as soon as the window is closed, thus locking the sashes.
Figure 203 is a self-locking sash-fast on a different principle. The cut shows the lower sash partly raised, the locking portion being attached to the upper sash. When the window is closed the hook, D, strikes against the catch, C, forcing it away from B, until, when the meeting-rails are on a level, D is hooked in between C and B. A spring at A keeps the two parts pressed against each other.

A very ingenious sash-fast, which works almost entirely by gravity, is shown by Figure 204. The cut shows it in the position it takes when the window is locked. The mechanism is attached to the upper sash. A is hung on each side to B, which hooks over the post on the lower sash. To open the window, the thumb is placed under B and the forefinger on top of A. Both pieces are lifted together until B assumes a vertical position, and A catches over the hook C. The sash can then be opened freely. On closing the window, however, the lower rail strikes against a hidden lever or cam at the back of A, lifting it from its hold on C, so the piece B can descend to hook in the position shown by the figure. The only spring used is one which pushes out B when A is released. This sash-fast is very nicely made, and is about as good a self-locking form as is in the market. It has an added advantage in that it locks itself before the sash is entirely closed, the post, C, being double notched on the face so that A will slip down and wedge the hook B when the window is within about a quarter of an inch of being closed. It will be observed that the locking is effected entirely by the piece A. B is brought over the hook on the lower sash merely in order to draw the meeting-rails more closely together.

The "Byam" sash-fast, Figure 205, is a very simple device acting entirely by gravity, the central bent lever being so counterbalanced that the lower arm will always project over the lower sash. The section will show how this lever is hung.

VII. Sash-fasts which lock in different positions. The difficulty with all sash-fasts of this description is that, of necessity, they operate on one side of the window, instead of in the centre of the meeting-rail, and that, consequently, every attempt to open the window when it is locked, warrants the sash as to, in time, make it loose in the joints. Also, with nearly all the forms, the mechanism is concealed, so that the sashes are liable to many unnecessary wrenches. The advantages are that the window can be left partly open and still be secured from intrusion, and that, in most cases, either sash can be locked independently of the other.

Figure 206 illustrates a very primitive appliance, consisting simply of a ratchet rail, with a spring-catch on the bottom sash. Figure 207 shows a more complete form, which is mortised into the face of the hanging-style, the levers working into holes in each sash. The sashes are fitted with other holes on the edges, at intervals, so that they can be locked at various heights. In the cut the section shows more clearly the working. A single spring, coiled about each lever, serves to throw them both out. Pushing up the knob on the inside head draws back the upper lever, releasing the upper sash. Pushing the knob down releases in the same manner the lower sash.

Figure 208 represents the Atwell sash-fast, which differs from the foregoing chiefly in that the levers are worked by a single spindle, coming through the window-frame onto the face of the finish, and so arranged that when the spindle crank is turned up, the upper lever is drawn back without moving the lower, and vice versa.

There are a few forms of sash-fasts which will hold the window in any position. Figure 209 is a very common form, consisting of an eccentric cam which screws to the face of the sash and wedges against the stop-bead, holding the sash by friction.
of many styles which have only limited sales. It would be impracticable to attempt an enumeration of all the slab-fasts which have been put on the market throughout the country; nor would any such list be of great value. The forms discussed and illustrated, will, it is believed, serve every purpose of comparison, and will enable the retail buyer to select to advantage, and to know the worth of what he is choosing from.

[To be continued.]

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSES OF DR. J. J. MINOT and DR. RUSSELL STURGIS, MARLBOROUGH STREET, BOSTON, MASS. MESSRS. STURGIS & BRIGHAM, ARCHITECTS, BOSTON, MASS.

[Geometrical prints, leased only with the Imperial Edition.]

ADMINISTRATION BUILDING OF THE SOLWAY PROCESS CO., SYRACUSE, N. Y. MR. DOUGLAS SMITH, ARCHITECT, NEW YORK, N. Y.

This building is almost completed; it is 44' x 114' and cost about $80,000. It is an administration building for a large concern manufacturing soda ash and includes offices, laboratories, drafting and photographing rooms. It is built of native or local buff brick, limestone and Peribay terra-cotta.

THE PROPOSED NORTH RIVER BRIDGE. DESIGNED BY MR. GUSTAV LINDEUTHAL, ENGINEER, PITTSBURGH, PA.

For description see article elsewhere in this issue.

LEICESTER SQUARE, LONDON, AND THE STATUE OF GEORGE I.

This illustration is reproduced from Thornbury and Welford's "Old and New London." THE STATUE OF GEORGE I IN ITS LAST STATE.

This illustration is reproduced from the London Illustrated News.

HOUSE OF JAMES P. BOYD, ESQ., ALBANY, N. Y. MR. W. H. MILLS, ARCHITECT, ITHACA, N. Y.

DINING-ROOM IN HOUSE OF H. MUNNICKYUSSEN, ESQ., BALTIMORE, MD. MR. C. E. CASSELL, ARCHITECT, BALTIMORE, MD.

DR. WEBER'S OFFICE, SHELBURNE, VT. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

Is demolishing an old building in Stockton for the purpose of erecting a new one it was found that the foundation rested upon the hull of a vessel, which, upon investigation, proved to be the Persian brigantine "Adda," 360 tons burden. She was anchored at her present resting place in 1850, and now lies several blocks from the water. — San Francisco Call.

The proposed North River Bridge at New York City.

It is presumed that every one is aware of the present antiquated manner of landing passengers in New York City, from any of the railroads now terminating on the New Jersey side of the Hudson or North Rivers. There is annoyance, and even danger, to the landed passengers on the overcrowded and nasty streets, and the demand for better facilities has repeatedly and urgently been made. It has led to the attempt of tunnelling beneath the river, but the difficulties were found to be great, and it is obvious that two tunnels, such as proposed, would not accommodate more than, perhaps, one railroad. It is estimated that, at least, ten tunnels would be needed to meet the present demand alone, to say nothing of the future growth of the traffic. The reason for it is that trains the size of the present ones are to be short, and have to run slowly for the sake of safety, because heavy grades are unavoidable to reach the safe depth under the bottom of the river.

The tunnels would, however, be very convenient for the local traffic, by means of cable cars, between Jersey City and Lower New York City. The obstacles to the construction of a bridge across the River seems to be the great expense. The only kind of a bridge thought of was one with piers in the river. The foundations to rock would be very deep, nearly 200 feet, but the greatest objection was that the piers would be greatly damaged by the ice-jam, and no commerce over the most magnificent river highway in the United States.

It is true that some fifty or sixty years ago an enterprising and remarkably ingenious builder proposed a wooden bridge in one span over the North River; but this project, described in quaint verse, is more remarkable for boldness of thought than for practicality. It was first to construct a bridge the North River, at New York City, in one single span, and to present fully worked-out plans, is Mr. Gustav Lindeenthal, Bridge-Engineer, in Pittsburgh, Pa. He addressed the American Society of Civil Engineers, last winter, in a paper on the subject, and showed on that occasion how he had arrived at his design by the process of selection and exclusion from a number of designs made for the purpose. Together, with a description of the details of the colossal structure, he presented a discussion of long-span bridge systems in general, from which it appeared that the so popularly assumed merits of cantilever bridges for long-spans are more than doubled when they are considered as being superseded by better and stronger construction, as soon as their grave faults become more generally understood.

The matter of realizing Mr. Lindeenthal's plans has since been taken in hand by a number of prominent capitalists, who have applied to Congress for the required legislation, and who hold out every promise of building the great bridge and the necessary approaches, together with the terminals, at both ends, so that all railroads may use it on equal terms.

The importance of this enterprise, its benefits and far-reaching consequences to the city of New York and vicinity, can hardly be over-estimated.

The bridge is designed for six tracks, but will be built to carry four additional tracks, or, ten in all, should it become necessary.

Another bridge over the North River, at New York, should never become necessary, and should never be built. Only a fraction of the combined capital required for a number of double-track bridges would build a single structure, stronger and more enduring for the same number of tracks. For instance, a double-track bridge in one single span, over the North River, is estimated to cost $5,000,000 for construction alone, while a bridge, capable of carrying six tracks, is estimated to cost $12,000,000; and one million dollars additional would provide for four more tracks or in all, ten tracks, on the same structure. Five single bridges for double tracks would therefore cost about $5,000,000, in construction alone, without the approaches, stations, and without right-of-way. This will show the economy as well as the necessity of providing one bridge large enough for all present and future needs, and one station for all the western roads, coming into New York City.

The number of trains which can be run on ten tracks onto Manhattan Island will be about the limit for which terminal facilities can yet be provided, without absolutely destroying the most valuable business quarters in New York City.

Careful investigation and estimates show, that a bridge of the same strength and capacity for the same trackage, but with a pier midway of the river would cost not less, on the contrary slightly more, than a single span-bridge. This is principally on account of the great depth to rock for such a pier, which has to be of a certain size for a safe bridge intended for fast trains.

Therefore the obstruction of the river with a pier could not be justified even on the ground of the smaller cost of such a bridge.

The construction of the proposed bridge, gigantic and incompre-
THE NORTH RIVER RAILROAD BRIDGE
PROPOSED AT NEW YORK CITY
VIEW LOOKING FROM NEW JERSEY SHORE

SIX RAILROAD TRACKS
GIRDLE MAIN TOWER
END SPANS 1000 FT

Section of one Tower Column.

Section of Middle Span at Centre of Bridge.

ANCHORAGE ON NEW JERSEY SHORE
Section of Cable

Cable for East River Bridge on same Scale.

Top of Tower

DESIGNED BY:

GUSTAV LINDENTHAL

CONSULTING ENGINEER:

PITTSBURG, PA.

AND NEW YORK CITY

Helotype Printing Co., Boston
dented as are its proportions, is considered by all competent engineers a matter of much less relative difficulty than was the construction, at the time, of either the East River Bridge or of the St. Louis Bridge.

In such a degree have the manufacturing and constructive facilities of the United States increased that the cost of the suspended bridge will be only little more than one-half of what it would have cost twelve years ago.

Mr. L. Hutchinson's columns are worked-out not only for the bridge, but also for the approaches and terminal stations at both ends, without which the bridge would be of no use.

The large passenger station, in New York City, to be located in the part of the river is for two decks, a commodating structure together to resist the action of tornadoes, which would not differ the structure any more than it would a solid mountain. The column will be seven feet in diameter at bottom, and taper to five feet at the parapeter on top, and so constructed as to be free from false-works. But the greatest difference will be in the arrangement and construction of the cables.

Thus, in the East River Bridge, the cables are placed side by side a distance apart, and the required rigidity for the roadway is obtained through six stiffening trusses, also placed side by side. In the North River Bridge, the cables are placed in pairs one over the other at a fifty feet apart, side by side being connected with a great multitude of small cables; but, as an additional precaution for the great concentrated loads of heavy locomotives, there is under each of these arch-girders a stiffening truss, two in all, which, will also aid in resisting the effect of tornadoes. In the arrangement of the winch-cables; these are in number, placed on top and below these stiffening girders; each wind-cable has a diameter of sixteen inches, or larger than the diameter of the East River main cables.

In this way the required rigidity for fast trains is obtained with the least possible weight of the suspended structure. In no other way can it be obtained with an equal economy of material and cost. It will be admitted that a bridge over such trains would have to run, slow, would be inadequate for the expected traffic, and would be behind the age. The regular working speed over the bridge is to be thirty miles an hour, or, a speed which can be attempted on a long submarine-tunnel, built through mud and sand.

While in the Brooklyn Bridge the cables are compacted and closely wrapped, with wire into a solid cylindrical shape, in the North River Bridge the cables are also compacted, but with a solid cylindrical shape, but will be covered with a solid sheet-mantle or steel envelope, leaving an air-space of two inches all around the cable for the double purpose of swelling the cable against any even temperature effects, and against the weather. The water will be more thoroughly and certainly excluded by the solid sheet covering than can be the case with wire-wrapping only. The steel-enclosures can be removed for the inspection of the cables, whenever needed. The preservation of the cable is thereby made easier, inasmuch as linseed oil can be applied readily whenever needed, and the wire thoroughly worked with oil, without rusting. The architectural features of the bridge are striking and well considered. The graceful curves of the cables, the simple and strong form of the wire-proportioned double-towers, the large-featured and harmonious in all its parts without artificial devices or ornamentation.

There is no other known place in the world requiring such a long span-bridge, and it is very probable that a longer span will never be proposed or designed anywhere. The much-talked-of bridge over the English Channel would be 900 feet long, and 140 feet high, but the longest spans proposed for it do not exceed 1,800 feet. The length of span, and not of the bridge, which taxes the ingenuity of man and the resources of science; for the longest bridge in the world does not exist in the form of a railroad, 33 miles long, one continuous bridge. But no one would assume that as the greatest achievement in bridge-engineering. Thus the Brooklyn Bridge was arrived at by the manufacturing facilities of the country, its financial prosperity, and the resources of science and machinery combined to make the construction of this great work possible, to the certain success of which commercially, as well as from an engineering point of view, we may look with great confidence.

IMPROPER COMMISSIONS.

November 12, 1888.

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To architects who send us orders for Sanitary parchment sheathing, to be delivered direct to a builder (who is not a dealer in sheathing) we give five percent brokerage, on each order, to the architect.

When an architect signs us a bill for the same amount for parchment sheathing, to be shipped by us to dealers or jobbers in sheathing, and to whom we are not already selling, we pay a brokerage of three per cent to the architect on all the dealer's bills from us for one (1) year, including the first sale.

Large dealers frequently buy of us several thousand dollars worth of parchment sheathing in a single day, and we have no time to make these sales, for we are so busy filling orders.

Our trade prices are printed in large bold type on all our samples. Your architect is recommended to you; it is the best sheathing made. It grows hard and metal-like with age. The hotter the climate the harder it becomes.
To the Editors of the American Architect:


Dear Sirs,—I am in receipt of the circular you have favorably mentioned at the end of my letter in the past number of the Journal, and I now return it with a few remarks, and upon a second thought, concluded to send it to you. I think such things should be published as soon as possible. Yours truly, Willis G. Hale, Architect.

To the Editors of the American Architect:

Philadelphia, Pa., November 9, 1888.

Dear Sirs,—I received the inclosed circular to-day and intended to return it with a few remarks but, upon a second thought, concluded to send it to you. Very truly yours,

W. U. Smith & Phieghet.

To the Editors of the American Architect:


Dear Sirs,—I received the inclosed circular to-day and intended to return it with a few remarks but, upon a second thought, concluded to send it to you. Very truly yours,

George C. Mason, Jr.


Dear Sirs,—I am in receipt of the circular you have favorably mentioned at the end of my letter in the past number of the Journal, and I now return it with a few remarks, and upon a second thought, concluded to send it to you. I think such things should be published as soon as possible. Yours truly, Willis G. Hale, Architect.

The waste-basket, however, should not be left out of their calculations. It is as much as they have found their way to our office table must have been preserved by architects who are willing to become their pensioners at $25.00 per month, no matter what their skill and knowledge may be, if they are not to find the price of labor for architects who are not sufficiently well paid to support themselves.

The building trade, however, should not be left out of their calculations. It is not enough to give them the opportunity of working for architects who are willing to become their pensioners at $25.00 per month, no matter what their skill and knowledge may be, if they are not to find the price of labor for architects who are not sufficiently well paid to support themselves.

Although I sometimes feel that Mr. Purcell's attitude is not the right one—since it may prejudice the interests of his clients—we cannot wonder that he and many others have been forced to close their offices, and the result must be that the architects who are left will have to work harder to make enough money to support themselves.

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ambition of the owner to acquire all the land lying between his town-house and Canons, and in pursuit of this vast scheme was ex- pecting it. Duke's assistance was able to give him to when he went down from London to his country-seat he rode only through his own estate. Not only was the palace magnificent, but the surrounding park was laid out in conformity with the best advice of the landscape-gardeners. The house, too, was as large as any in the buildings, statuary was introduced without stint. Most of these statues were presumably of lead, and the work of Van Ost and others. The most important of these statues is the equestrian statue of George I, the horse modelled on that by Le Sueur for the statue of Charles I, at Charing Cross, and the King arrayed in Classic drapery. This statue was thought by Henry, second Duke of Chandos, upon the 2nd March, 1747, to be brought to London and set up in Leicester Square, in November, 1748, where, owing to an uncertainty as to the ownership of some emblems, the dog was cut off. It, however, with the label fell during the prolonged litigation into decrepitude and decay. From a fashionable quarter the Square passed through the phases of slable to ugleness and woe, and each succeeding stratum of society treated the leaden efligies with less of respect than did its predecessors. It was, apparently, no one's business to see that the King and his steed had an occasional coat of gilding, or even gait, though in 1812 it was regilded. Long years of exposure had their nat- ural effect and persistent oxidation caused the group to gradually drop to pieces — now and then propped up temporarily by some more robust and like enough, it will have been ruined away the obvious small-boy of the neighborhood, who had at length so far mastered the traditional veneration for royalty as to consider the august alien as a mere效应子, and with stick and stone and broken bottle helped on the work of time. At length George dismounted with little of royal grace, one leg falling to one side, the other on the opposite, and for a time lay beneath the belly of his horse still at length his career was probably sold for £450. To this time the riderless steed, broken-kneed and foundered, stood alone, a decrepit and meaningless wreck, which was at length concealed from view by a great model of the globe which was builded about it, and revered it from night between 1751 and 1851. In 1863 the Metropolitan Board of Works assumed possession of the Square, and, finally, in 1874, Baron Albert Grant bought the place, re- prieved the steed, and deified it; to the Board of Works as a public pleasure-ground for the people. During these changes the last relics of the monument disappeared.

Too late to make use of it, a photograph of the statue has been found in the Metropolitan Museum, and some of it was spotted with some blue paint, so that the manner of the rocking-horses of our nursery days, when George, sans feet and legs, is crowned with a fool's cap and armored in a rockoon, can be attempted to revive the memory of the regal character of the group by a bird on the forehead of the horse — propped up in front, but as to his haunches allowed to drop towards the ground — a horn of porcupine size, thus converting him for the nonce into the national unicorn. Grouped about the battered base the photograph shows a score of boys all on the broad grin, some one of whom was probably the gilding in carrying out this piece of insular wit.

Another equestrian statue of the same monarch, also by Van Ost, is mentioned as having been set up in Grosvenor Square in 1726 by Sir Thomas Grosvenor, and as, too, of lead, and represented a not too popular sovereign; it is still a wonder that it was hewn limb from limb not long after it was put up.

Though set up in turbulent Cork where one would think the statue of the ruffian would have met with a long and prosperous exis- tence, the equestrian statue of George II placed on the Parade survived for nearly one hundred years; but it, too, at length disappeared between two days, though it was at length found in the river where some laborious party, inspired by spats, playfulness or artistic disgust, had taken the trouble to deposit it.

Still another leaden equestrian statue — which has a peculiar in- terest for Americans — is known to have disappeared. The Princess Amelia caused an equestrian statue of her father in the character of Marcus Aurelius, to be executed by Joseph and placed in Leicester Square. This statue, of indeterminate but probably mediocre merit, is of much interest to us since it is the original of the first equestrian statue that was erected in this country, unless perchance it was the original itself and not a duplicate that on August 21, 1770, was set up in the Bowling Green in New York City; but this is not likely seeing that leaden statues were to be had so cheap. As might be supposed the statue, set up in a place of no particular favor, was soon alreadily, so to speak, received with scant applause from the citizens who, being long, began to inflict upon it those indignities to which its base com- panions had already been subjected in England. But more provin- cial were not to be allowed to insult the King's majesty until 1772 and in 1773 an edict was decreed that any one caught defacing the statue should forfeit £500 or endure a year's imprisonment. How great a change the night of 21 July, 1773, brought about one can tell and it does not much matter, for that night saw the destruc- tion of the first equestrian erected in this country. Enfamil as by the result of the Declaration of Independence, the news of the signing of which had but just arrived from Philadelphia, a party of forty picked men under the leadership of Captain Oliver Brown, afterwards an artillery officer of the Revolutionary Army, fixed ropes around the King's neck and the group was pulled to the ground and cut to pieces. The (supposed) name and tail of the horse and the cape of the pedestal, — after serving both as tombstone and doorstep — are now in the rooms of the New York Historical Society. The greater part of the statue was sent to Litchfield, Conn., where the loyal ladies of the town melted it down and from it cast 42,000 bullets, many a one of which doubtless found a billet in English or Tory supporter of the original. Of the fate of the head of the king the Magazine of Ameri- can History says that "Colonel Montresor tells a curious story of the fate of the head of his Majesty's statue that was pulled down by the Liberty Boys at Bowling Green, New York, in July, 1776." Hearing," he writes, 'that the rebels had cut the King's head off from the equestrian statue (in the centre of the Ellipses, near the Fort) at New York, which represented George the Third in the figure of Marcus Aurelius, and that they had cut the nose off, clipped the lards that were wreathed round his head, and drove a musket ball part of the way through his head, and otherwise disfigured it, and that it was carried to Moore's Tavern, adjoining Fort Washington on New York Island, in order to be fixed on a spike on the truck of the flag-staff as soon as it could be got ready — I immediately sent Corby through the Rebel Camp in the beginning of September, 1776, to Cox who kept the Tavern at King's to steal it from thence, and to bury it, which was effected, and was dug up on our arrival, and I rewarded the men, and sent the head by the Lady Gage to Lord Townsend in order to convince them at home of the infamous disposition of the ungrateful people of this distressed country." — Evelyn's "In Amer- ica." "

The House of Hanover is nothing if not clannish, and it is strange that more was not done by the family to preserve the statues of the

Leicester Square II ! Art-in the (B) Adieu. " Ha! Now that's a style of art I fitter myself I really do understand! " — Punch.

Georges, which, if Thackeray may be believed, could hardly have been invented, instead of being invented by the author, was found, so much matter for his satire in the lives and characters of the original that he seems not to have thought it worth while to fling a passing gibe at these leaden monstrosities, but in a "Small-Beer Chronicle" in his "Whistende Papper," he pays his respects to another of the family, William, Duke of Cumberland, son of George II:

"Look at William, Duke of Cumberland, with his hat cocked with his eye Rifling behind Lord George I on his Roman-nose charger; he, depend on it, would be for getting off his horse if he had the permission. He did not hesitate about trifles, as we know, but he was a very truth-telling and honorable soldier; and as for heroic rank and statuesque dignity, I would wager a dozen of 20 pence against a bottle of pure and sound Bordeaux, at 18s. per dozen (bottles included), that he never would think of claiming any

As in the case of his father, whose horse ran away with him at the battle of Dettingen, after which he dismounted and did nothing else, he had some appropriateness in representing William on horseback, for he was a soldier of considerable ability, but of un- controlled ferocity, which earned him the sobriquet of the "Butcher of Culloden," because of the atrocity he visited on the followers of the Jacobites after that disastrous battle. In his "His- tory of London," Knight makes a plea for the preservation of this statue in these words:

1 Bentick statue in the same Square.
"When that purification of our public statues, which there is so much reason to hope for, shall take place, and none be left standing that do not fulfill the conditions which morality and taste are alike interested in demanding from the men whose eligibilities are to adorn our public places, we trust one exception may be made—the Duke of Cumberland's statue. Let not that be destroyed; keep it, if it be but to inscribe on it, for the good of the people, the following short summary of his character, and thus leave it to posterity. Who shall say what suffering and disgrace may not be spared in future wars, if war there must be, by so decisive and permanent an expression of a sound public feeling?"

This statue, which by some is said to have been of richly-gilt lead, and by others to have been executed in marble, is now in the Cavendish Square, London, in 1770, by Lieutenant-General William Strode in acknowledgment of benefits received at his hand; and, though generally considered a poor piece of work, is interesting to me that the Duke was shown in the full military costume of his period, and not in Classic dress. The group was either destroyed or removed a few years ago only.

GEORGE I.—Born 1660. Ascended the throne of England, the first King of the Hanoverian line, in 1714. Died 1727.

GEORGE II.—Son of George I. Born in 1683. Ascended the throne, 1727; Died 1760.

GEORGE III.—Grandson of George II. Born 1738. Ascended the throne in 1760, and reigned during the last ten years of his life, when he was crowned, as is placed in the hands of the Prince of Wales [George IV.] as regent.

WILLIAM, Duke of Cumberland.—Son of George II (722-1750). ("The Black Duchess," so called from his complexion in expression, was personified by the Young Pretender in 1745.) A brave soldier but an unfortunate colonel. Died in battle at the battle of Culloden, 1746. Defeated at Fontenoy, Lelliaf, and Hessenbeck.

The Statue of George I.—"Old and New London." says the statue was modeled by C. Buschli and was reared in 1720. Timbers," as Coram puts it, also ascribes it to Buchard. It was purchased by the inhabitants of the square.

CANNON,—Chiefly used in gilding, as attested by the work of the Chisels commonly called the "great Duke." was a liberal man and the patron of Pope, Hogarth and Johnson. His. statue was erected on the site of the old "Tuonos Villa," in his "Epistle on Fine Taste," addressed to Richard Boyle, Earl of Burlington, and reprinted with the "Illustrated" of the statue, in the national prints. "The Man of Taste," as it was called, is quite a wonder of its age; but in 1747 the family, having lost heavily by the South Sea Bubble and being cramped with the necessity of paying debts of many thousands of pounds, was forced to break up and sell the house. (The present residence of Mr. George I in Tallow Chandlers' Hall, from London Street Scenery.)

GEORGE II, GRENFORD SQUARE.—Knights' "London," speaking of the pedestals on which the George II statue stood, on the Golden Square, which came from Canons, says at the sale a "gentleman, an acquaintance of the auctioneer, came to, and catching my eye, nodded in token of friendly recognition. "Thank you, Sir," was the immediate comment—down went the hammer, and the statue, the 1st Duke of Marlborough's research, is yours. What could the posses-
sor do with such an immense piece of sculpture but give it to the public?

"LEADER STATUARY.—In imitation of the French and Dutch gardens there were few of those in the vicinity of London or in the provinces, the squares and oblong great pieces of which were not embellished by correspondente images, but of standing and domestic characters, and rarely borrowed from the heathen myth. The lead has been long since converted to useful purposes. When the demand for the former was of making that of the latter. A story is told of a Doctorleighton gentleman, whose father had brought two stone marble statues from Italy. Upon his marriage, the city of London determined upon modernizing his old family seat, she ordered that those unfor-
tunate statues should be plaited, in order that they may be sold, etc.) But Van (or Veist) was an artist capable of much better things; and was pro-

"STATUES in lead or mixed metal, after the Dutch taste, were all the rage then, and the makers of those works—a clever designer drove a roaring trade. Plating was fully of 16th years."—Penn Tom Taylor's "A Pocket Book for Art and Architecture." Charpentier. A "statuary much employed by the Duke of Chandos at Canons, was for some years principal assistant to Van Gist, an artist of whom I have found so meritorious, and afterwards set up for himself. Towards the end of his life he kept a manufacture of leaden statues in Pimlico, and died in 1737, ago above 60."—From Walpole's "Anecdotes of Painting in England.""

The New York Slate of George III.—In a book of general orders issued by Washington in 1758, under date of July 18, it is said: "That the Governor-General not the persons who pulled down and instituted the statue in Broadway last night, acted in the public cause; yet it has so much the appearance of a rich and want of order in the army, that he disapproves the manner and directs that in future those things shall be avoided by the smallpox and left to be executed by proper authority.

Sir Henry Cheere.—[1700-1784.] Pupil of Scheemakers. Made monuments to Admiral Hardy, Archbishop Seeler and others in Westminster Abbey, Master of Hullinile. (To be continued.)

The Finish of Yellow Pine.—A yellow pine dealer from Alabama says that it will not do to apply oil to that wood in the finishing pro-
cess. The objectionable application of shellac varnish is the proper treatment according to this advice. He says that the yellow pine causes the wood to turn a dark and disagreeable color, which is precisely opposite to the true yellow color. Yellow pine, which is bright and cheerful. This Alabama man's opinion is not contested by some of the dealers and wood-workers of this city. Yellow pine is often finished in oil and varnish, which is both hard and durable, and when finished with shellac varnish only. It is true that oil gives a darker appearance to the wood, but its richness and tone is thereby secured, and that will make a fair appearance, that is, a near imitation of yellow pine is obliterated. It is all a matter of taste. You can finish your yellow pine in oil or shellac, and have a handsome effect in either case.—Northeastern Lumberman.
sited above the entrance. From the outside it was thus easy to reach the chapel without going into the interior of the house. From the entrance A for carriages there was an open porched entrance, and from the small postern B the great court C is reached, and the walled posteros D and E. The latter postero was lighted by the court G, having a well at G. At H is the great court in the basement, a ground-floor to a large dining-room I and to a passage J, communicating with the kitchens at K and K'. The kitchen K' had an oven, a fireplace, and cooking-stove. From the street there was a direct entrance into the kitchens through the servants' small court L', communicating with the great court by the passage L'.

The great dining-room, heated by an immense fireplace C, had a gallery for musicians who reached the gallery without passing through the dining-hall by a staircase J. On the floor of the dining-hall a trap-door opens into the cellars. Whether this trap was intended for the use of the charcoal, which thus in time would bring in during the repast, or whether it was intended, as some think, to allow the silver to be quickly thrown into the cellar in case of fire, is not quite clear. The great fireplace C, with its opening of six metres, was richly decorated, its mantel showing a fortified town and its sides two nude statues of Adam and Eve, separated by the tree of knowledge. M was a pantry from which by the opening in the dressed-dishes could be passed into the dining-room. The small, straight staircase in this pantry descends to the lower story of the tower S, which served as an annex to the pantry. Opening out of the small kitchen A, and below the bake-house, is a vaulted wash-room fed by pipes from a hidden well. Latrines for the servants were placed at the side of this wash-room under the machinery of the staircase. A staircase N puts the kitchen in communication with an entree of the tower S, and the first story is gained by the spiral stair t.

The little court L' has a beautiful well, fitted with pipes which supplied reservoirs in the large kitchen. From the kitchen the meats were carried into the pantry through the passage, J, by a private door under the great staircase I. Under the staircase, O, is a passage which puts the great court into direct communication with the Place de Berry, T. At T, T', are two large rooms, whose use is not known, but which seem from their arrangement to have been used as chambers, with wardrobes in the square tower, R. All this angle, including the tower, Q, constitutes a giving entrance on the apartment, whence one could, from the great chamber, T', descend to the small court, G, by the staircase g, or mount to the upper stories. The conciergerie was at V, and the gallery, D, served as a place of reunion for the poor, to whom the remainder of the feast from the table of Jacques Cœur were distributed. The poor had no access into the hotel, but could wait under shelter until they received from the hands of what was saved for them. The staircases X, X', O, or g, ascend from the ground to the upper floors.

This plan is irregular and of great extent. Each department has its own place and is independent of the rest, while communication between them all is easy. At the right of entrance, the culinary department has its own entrance, and its large portico for the distribution of alms. In the front of the principal staircase for the upper apartments and dining-hall of the ground-floor. At the left is a complete independent apartment with its own court and portico, allowing the occupant to go in and out in privacy.

Few of the hotels of the seven-teenth century can boast arrangements so commodious and well studied. Figure 34 is the plan of the first floor of Jacques Cœur's house. The principal staircase, A, gives entrance to the great salon, B, which has a stage or platform like the great salons of the châteaux. The living-rooms rooms at G. They communicate with the great salon, B, and with the gallery, D, by side passages and direct entrances. In the gallery, the chapel, E, was entered, and it could also be reached directly from the lower floor by the staircase, F. Another gallery, G, joined the chief apartment to a subordinate apartment, K, which is a private staircase, L. The principal apartment, G, is reached by the staircases, M or X. The salon, I, has an exit by the staircase, N, the great salon, B, itself beside the grand staircase, having a second stair at O.

On the first story, as on the ground-floor, the different departments of this hotel were independent, so that the rooms for reception did not communicate much with each other. As in the châteaux, the programme was one of complicated requirements. It is certain that these numerous and dissimilar arrangements seemed indispensable, and that they sacrificed all idea of symmetry to the necessities of the dwelling as they then comprehended it. They will be observed that the living-rooms, aside from the great apartments, were supplemented by numerous closets and wardrobe, which could not have been very large and that all these apartments were great and small, were lighted.

Jacques Cœur, in utilizing the Gallo-Roman towers of the ramparts had not, perhaps, been sorry to give to his hotel the appearance of a feudal domain, and the preservation of these towers necessitated the irregularities of the plan. The architecture was adapted, however, to this lack of symmetry, and nothing is more picturesque, more brilliant, than the interlacing of the court, with its stair-towers and many roofs, surmounted by chimney-tops, spikes, dormers and leaden ridges decorated and painted. We give at Figure 35 a bird's-eye view of this hotel taken from the point T' in the平面的ground

floor. The construction was treated with extreme care, and the chiring is charming in style and appropriate to each division. The sculptures include many devices of hearts, feathers, shells, etc. In the groups over the three arches of the chapel staircase, the sculptor has placed a priest dressed in his robes blessing the water; behind him a young priest who rings for mass, while in the background comes a beech on his crutch, symbol of the accessibility of the holy rite to all. The second bas-relief represents priests dressing the altar. In the third, women come to confession preceded by a child, who opens the door. At the top of the stairway is a fourth bas-relief, representing the Eternal Father with two adoring angels. Above the door of the stairway on the kitchen side is carved a large fireplace, before which roasts a chicken, a child turns the spit, a woman washes dishes, and the eek pounds spice in a mortar. Among the carved or painted devices we read these: "Vailant heroes nothing is impossible. Afterward, the enigmatic words: "Dieu, faire, tire, etc., mon jure," and this: "Into the shot wound the fly does not enter." Jacques Cœur had adopted for his arms: blue on a fesse of gold, with three shells sable and three hearts or placed two in chief and one in point. The vauldings of the chapel were painted; in each of the triangles of the arch is an angel clothed in white, holding a phalactery and relieved against a blue background starred with gold. These paintings are well executed and passably preserved. We know how dearly this celebrated parvenu merchant of the fifteenth century must have paid for such magnificence. The man was, in fact, one of the most remarkable personages of our country, and his dwelling is interesting from all points of view.

(To be continued.)

FROST-PROOF MORTAR.

BOSTON, Mass., December 1, 1888.

Dear Sirs,—Noticing in to-day's issue of the Architect the paragraph about frost-proof mortar, it seemed to me that an experiment made last winter might be of interest to those engaged in building operations: Last winter, it was necessary to lay up some granite here during the coldest weather, and as piers were small in section and heavily loaded, it was thought best to use clear Portland cement, so as to avoid unequal settlements that might be caused by shrinkage of lime-mortar. After some preliminary experiments with salted cement-mortar exposed immediately after mixing to temperatures of ten degrees to twenty degrees Fahrenheit, I directed the mason to add eight per cent. of rock-salt to water used with the cement; and although during the time that the piers were being laid up the temperature at night was often as low as ten degrees Fahrenheit, in no case was the cement injured so far as could be observed, and even a

ARCHITECT.

Dear Sirs,—If not too much trouble, will you inform me which school you think the best for a first-class draughtsman to attend in order to fit himself for practice. Respectfully yours,

HENSY. S. HUBBELL.

If you can afford to spend the necessary time, you will find the Architectural Department of Columbia College, New York, the best. —Ed. American Architect.

DEARNESS CAUSED BY THE ELECTRIC LIGHT.—A curious phenomenon was recently noted by M. D'Atoursval before the French Academy of Medicine. After gasifying for several hours a lamp on an altar of light etc., the lenses, as far as you knew, was one I got from your paper, but until I tried the experiment I did not know whether salt had been used for that purpose in this country, or whether, with the extremely low rate of the thermometer, it would prove successful.

Yours,

ARCHITECTURAL SCHOOLS.

ZANESVILLE, O., November 24, 1888.

To the Editors of the American Architect:

Dear Sirs,—If not too much trouble, will you inform me which school you think the best for a first-class draughtsman to attend in order to fit himself for practice. Respectfully yours,

HENSY. S. HUBBELL.

If you can afford to spend the necessary time, you will find the Architectural Department of Columbia College, New York, the best. —Ed. American Architect.

RATS AND LEAD PIPES.—Fully one-half of the unexplained cases of bursting or leaking lead pipes, say a St. Louis plumber, are due to rats, and not to flaws in the metal. In a well-cemented basement, with cement floors, etc., as nearly vermin proof as can be, the annoyance from the rats is the greatest. Being unbaited, they are driven frantic by the sound of it flowing through the pipes, and they proceed to eat their way to it. An explanation suggests that there is a modest opportunity for the inventor to contrive some coating for the pipe which shall kill the rat before he taps the water. —Exchange.

AN EXHIBITION CATALOGUE, 1851.—A correspondent of our contemporary, Fairplay, has unearthed a comic catalogue written in connection with the Great Exhibition of 1851. It certainly is rather entertaining.

I've had a private view of the Exhibition book, and I mean the authorized catalogue, and from it straightforwardly took the names and numbers of the curious things to see, and curious you'll say they are, if you'll attend to me.

No. 1. A bucket of water taken from the mouth of a whale, by Dr. Ocean's heavy swell, 12 lbs.

2. A hair of a horse's tail, cut with a razor.

3. The weight exact of a grain of common sense, which had been dropped in the melting pot of deduction.

4. A piece of paper which holds the weight of the oceans.

5. A pot of butter, made from the cream of a joke.

6. The tail of the pig that got into a poke.

7. The weight of a coffee-cup of knowledge, and how Louis Thomas could shuck it. It is not known whether Louis Thomas could shuck it. It is not known whether Louis Thomas could shuck it.

8. A sauce with which to match the cup of sorrow.

9. A loaf from which the crumbs of comfort fell.

10. A book that paints the sign of the times so well.

11. The narrow from the bone of contention taken.

12. A reader of the man who saved his bacon.

13. The strap that sharps up the water's edge.

14. The apple of the eye of faith, so they allege.

15. A line no original stuff which the mass floor.

16. The soap that washed the captain overboard.

17. The nose cut off our noble country's face.

18. A passenger caught in a loose chase.

19. A splinter from the River Styx.

20. A house that Jack built, twenty bricks.

21. A gentleman's mouse, with the Mississippi at the back of it.

22. A Scotchman who never travelled South.

23. Some coins from the change of the moon, in pence.


25. The wheel of fortune, spoons and staves.

26. A man with which Aristarchus roads the stars.

27. The baby's mouth that was born with a silver spoon.

28. The swains of bees that made the honey moon.

29. The star which holds the weight of the sky.

30. A grammar from adverb's old school.

31. A bit of steel that made the Iron Age, and which is now, as they say, at a standstill.

32. A rock to manufacture flinty hearts.

33. A barb from one of wretched Cupid's darts, which if it had been broken, would have broken the glass.

34. A rock that fits into the bottle of smoke.

I've sung in numbers, and of numbers up to thirty-six; Success to Albert and the Queen, and all the little Vic's; With those directions, my ditty shall be done.

But when you go to see the numbers, look out for number one.
Number Five.

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3. General View from S. E.
4. Ape and Tower from S. E.
5. General View from N. W.
6. Main Entrance.
7. Detail of West Front.
8. Tower, from S.
9 and 10. Details of Tower.
11. Cloister and Chapel.
12. Cloister and Tracery Window.
13. Cloister Garth.
15. Entrance to N. Transept.
17. North Side of Nave.
18. Font.
19. Vest of Dean Stanley.
20. Nave, from Gallery.
21. Interior of Tower.
22. Cartoon for Window.
23. Plan of the Church.

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Fig. A. Fig. B.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.


Entered at the Post-Office at Boston as second-class matter.

SUMMARY.—


The Convention of the Western Association of Architects, held last month, the action of the American Institute in favor of accomplishing consolidation within a year, if possible, was cordially seconded, and a committee appointed to act with the corresponding committee of the Institute in preparing, within the next five months, a definite plan of consolidations and the Directors of the Western Association, to be submitted to the members of both bodies, and a ballot taken upon it by letter. If two-thirds of the members of both bodies vote in favor of it, the plan is to be forthwith adopted, the two bodies declared united under the name of the American Institute, and a call issued immediately for a convention, at which the business shall be the reorganization of the body now bearing that title, to conform to the new plan of consolidation. There seems to be little doubt that this program will be carried out, and that the next year will see the complete formation of a new body, strong in its large membership, which, including the present Fellows of the Institute and members of the Western Association, will comprise nearly five hundred of the most conspicuous men in the profession, and ready, we may hope, for the work which will at once be placed upon it. Among the members of the Western Association, particularly, there seems to be a disposition, which is much to be encouraged, to call upon the new body for various services which it will be in a position to render effectively. For example, the question of the employment of clerks-of-work on all important buildings, which was one of the most serious matters to be considered at the recent convention, was immediately referred to the Consolidation Committee, with, apparently, the well-grounded idea that the united body could deal far better with it than any local association, however large. The same reason was taken in regard to the proposed formation of State Defensive Leagues, which would certainly, advocated as they are most earnestly by many members of the Western Association, have taken up a good deal of the time of the convention if it had not been at once perceived that the new national body could do this work best. If the persons who have these or any other important movements at heart will be diligent in keeping them before the reorganized Institute, they will confer a double benefit upon the profession. It has long been a reproach to the Institute among the younger architects, and among many of the older ones also, that there was nothing to gain by joining it, and even who contributed largely in zeal and money to the local professional organizations have taken a certain pride in holding aloof from the general body, which, as they said, could do nothing for them but put their names on its membership list. To a certain, though small, extent this has been true. The Institute has not been powerful enough in numbers to exert a very great influence upon the public, and it has necessarily and wisely been careful not to injure its influence by undertaking to speak too confidently for a profession of which its members formed so small a part. With a quadrupled membership, however, it can justly claim to represent the profession in something like an adequate manner, and, as its suggestions or recommendations can no longer be met with the sneer that they proceed only from a small local body, it can offer them more boldly, and may be sure that attention will be paid to them. If its Council, for instance, should send a note to the Government of the Commonwealth of Massachusetts, pointing out that all its members had pledged themselves not to enter competitions where the execution of his designs at first, while not to be the reward of the first placed first by expert judges, and expressing a belief that seven weeks was too short a time to prepare designs for a State-House extension, that note would be read, instead of being thrown into the waste-basket, as would probably be one from the Trustees of the present Institute; and, if attention were not paid to its suggestions by the party in power in the Legislature, the opposing party would come to its aid with energy, in the hope of making a political point. A successful defence of professional principles by the new body in a few instances of this sort would soon attract new members, who would see substantial advantages in a relation which had previously been imagined, offered only an empty honor, and with membership influence would increase, and membership again with influence. Of course, hasty or ill-considered action may destroy the authority gained by slow and wise steps, but this is not to be expected from the experience of the council. Diligent men who would maintain the same prudential zeal for the interest of the profession will find ample opportunity for exercise for many years to come.

The Commonwealth of Massachusetts shows a singular ignorance of architects' work by advertising for competitive plans for the extension of the State-House, and allowing until January 26, or about seven weeks, for the completion of the drawings. Three premiums are offered, of fifteen hundred, twelve hundred, and nine hundred dollars, which the Committee probably supposes to be liberal, and, indeed, they are too liberal for the sort of plans that are likely to be made in the allotted time. The problem is an excessively difficult one, the ground on which the extension is to stand being on the side of a steep hill, so that there will be many feet difference in level between the entrance-floor of the new and the old part, and seven weeks would be little enough time, even if an architect had nothing else to do, to devote to the plan along, without taking into consideration, any one of which would need weeks for proper study. We trust that the matter will be reconsidered, and at least six months allowed. The Commonwealth of Massachusetts ought to be sensible enough to reflect that it is poor economy to spend two million dollars in carrying out a crude, ill-considered plan, and, if it is not, architects certainly are, and few of the better class will have anything to do with the competition on the published terms. To say nothing of the impossibility of doing anything creditable within the time allowed, as well as of the strong feeling in the profession against entering competitions for money prizes simply, there have been so many instances of partial competitions for public buildings, where the offer of prizes for designs to be prepared in an unduly short time served merely as a cover for the award of the commission to some favored individual chosen long beforehand, that architects have learned that it is for them profitable to avoid any contest not carried out according to the terms approved by the profession. The committee is inclined to think that intentional fraud of this kind is less common than is generally supposed, and do not imagine for a moment that anything of the kind is to be imputed to the Legislative Committee of Massachusetts, there ought to be no fear at all. The Commonwealth should not have the service of the best men in the profession, which it certainly cannot get on the terms which it proposes.

Those persons who intend to take part in the Paris Exhibition of 1889 must be getting ready. The buildings for the exhibition are nearly done, and some of the articles to be shown must be soon on the ground, to be sure of complete arrangement before May 5, the opening day. There is now no doubt that the affair will be extremely successful so far as the
pleasure of the spectators is concerned, for applications have been received for most of the enormous space available, and many official exhibits will be made. The German Government is almost the only one which has declined to take part, but we understand that it does not forbid its subjects to show their goods, so that its own participation will not be much missed. One very interesting feature will be the exhibits from the South American States. As there is almost no commercial communication between this country and South America, we know much less of the extraordinary development of portions of the continent than the Europeans do, particularly the Italians, to whom Buenos Ayres has become almost New York to the Germans. The greatest of all the attractions of the show will, however, undoubtedly be the Eiffel tower, which is almost completed. The latest news about this is that M. Eiffel has sold the right to manage and utilize the tower, during the period of the concession, to a syndicate, of which the principal member is the Franco-Egyptian Bank. As, by the terms of the concession, the tower becomes the property of the Government in twenty years, M. Eiffel could not sell it outright, but, being, as he says, an engineer, and not a showman, he does not wish to be troubled with the details of attracting people, and gathering their five-franc pieces for the next twenty years, so that he is probably as glad to dispose of his rights as the syndicate is to secure what seems to be so promising a piece of property.

THE English Institution of Mechanical Engineers has invited the American Society of Mechanical Engineers to hold a week's meeting in London next May, and has made provisions which are calculated to make architacets envious. To begin with, an offer has been secured from the Inman Steamship Company to transport members of the Society for one hundred and ten dollars each for the round trip from New York to Liverpool and back, if all the members go from New York on the same steamer. Returning, round-trip tickets will be available for any steamer of the line during the remainder of the year. If the party going out numbers one hundred and fifty persons or more, the Company will reserve a steamer, either the "City of Chester" or the "City of Richmond," for its exclusive use, retaining for it the whole first cabin. On the arrival of the visitors in England, they are assured invitations from various scientific bodies in France and England to inspect works of interest, and the lines of railway from Liverpool to Paris have promised to convey the party as their guests by special trains, while private hospitality will be continued. It is expected that every kind of human assistance will be given, and by the time the party arrives in London, the whole of one of the magnificent London hotels will be for the use of the American Society of Civil Engineers and the Society of Mining Engineers, and in that case the party of one hundred and fifty is pretty sure to be made up.

SOME extraordinary science seems to have illuminated the recent meeting of the American Gaslight Association at Toronto, during a discussion upon the remedies to be applied in cases where persons were suffering from the inhalation of gas. It is not uncommon for the workmen of the gas companies, in looking for leaks or digging up broken pipes, to be overcome by the gas, and, according to the accounts of the treatment to which they are subjected by the surrounding philanthropists, they seem to be fortunate if they escape with nothing more than a temporary loss of consciousness. One of the participants in the discussion had had the prudence to ask advice on the subject from a physician, who gave him a sensible set of rules, consisting mainly in directions to give the sufferer plenty of air and drink a little brandy and water, and to keep his respiration by artificial means if necessary. Another one had heard, also from a physician, that sweet oil might be administered with advantage, and had used this remedy in many cases with excellent results, which he attributed to the efficacy of the oil, which swells and absorbs the gas, and the dilution of its poisonous properties by another liquid, so that recovery followed rapidly. Another gentleman had had somewhat different experience. On one occasion, when seven of his men were found insensible in a trench from an escape of gas, he had thouned into a purer atmosphere, sprinkled a quantity of oil, and mixed it with brandy and water, and they were sufficiently restored to eat, and then gave them apples. After they had devoured those, it was found that

"the acid of the apples immediately started the gas out of their stomachs," and they were soon able to drink something and walk home. A similar method of "starting the gas out of the stomachs" of his men with acids had been tried by a third member, who, however, used vinegar instead of the acid of apples. The fourth remedy mentioned was not an amateur one, but the well-known fact that some coffee or brandy will have on two occasions treated men overcome with gas by injecting carbonate of ammonia. Whether this application was intended to " lubricate the breathing apparatus " or "to start the stomach out of the stomach," we are not informed, but it is not surprising to hear that the patient was ill for eight or ten days after his accident. A much-disputed point, that of the relative poisonous effects of coal and water gas, was touched upon by one of the speakers, who said that the effect of the inhalation of water gas was "a very serious matter indeed," and "entirely different" from the effect of coal gas. In his opinion the extra precautions were taken in dealing with water gas, and men did not recover from the effect of inhaling it for some weeks.

SINCE the recent explosion of a petroleum vessel in Calais Harbor, experiments have been made to determine what proportion of petroleum vapors mixed with a given amount of air will form explosive mixtures. In an ordinary illuminating gas with air, it is found that one part of gas to eight of air gives the most violent explosion, and with the vapor of the volatile portions of petroleum nearly the same observation is made. With one part petroleum vapor to five parts of air, no explosion is produced. If, however, there be a feeble explosion, and with from seven to nine parts a very violent one. With twelve parts of air the detonation is still violent, but with sixteen parts it becomes feeble, and with one part vapor to twenty of air there is ordinarily no explosion.

The conclusion which the Bureau Industriel derives from these observations is that accumulations of stagnant air in petroleum ships are very dangerous, and it suggests further that if fires should occur in them, they might be advantageously treated by the method now used in oil refineries, where pipes and pumps are always ready for forcing water in at the bottom of the tanks, while a siphon extends from the upper portion of the tank to a place of safety. If one of the tanks should take fire the pumps are started, and the water forced in from below raises the level of the oil, which begins to run off through the siphon. As the opening of the siphon is below the surface of the oil, the flames which rage above cannot get into it, and the un consumed oil is drawn quietly away from within a few inches of a confinement which the bravest firemen cannot face, until most of it is safely transferred to another receptacle, and the portion which is left in the original tank is so small that it is soon consumed, and the fire goes out for want of fuel.

A CURIOUS device for testing the dryness of walls is described in the Wiener Bauindustrie-Zeitung. The apparatus for the purpose consists simply in small sheets of gelatine, which are made by taking the sheet-gelatine of commerce, selecting the thinnest pieces, soaking them for a quarter of an hour in water until they are quite soft, spreading them out flat on a greased sheet of glass, and stretching them with the fingers until the folds and creases are smoothed out, and the whole made as thin and uniform as possible. The sheets are then thoroughly dried in the air, the edges, which are rough and uneven, are trimmed off, and the whole cut into pieces two inches square. These are either stored away, or used in testing. If kept flat in a dry place, these gelatine strips are very sensitive to moist air. If a wall is suspected of being damp, a strip is moved slowly over it near its surface, but not touching it. If any damp spots exist, they are immediately shown by the gelatine becoming soft and curling up, while it resists the air, and would not do so. If any damp spots exist, this simple test is likely to be of more practical use to fresco-painters and paper-hangers than to any one else. Both of these, to avoid disappointment and loss, need to know with what degree of certainty whether the walls and ceilings on which their art is to be exercised are dry or not, and this simple test will often change on damp plastering. In the case of a wall of masonry, particularly plastered on the brickwork, it is difficult to tell by ordinary inspection whether the moisture has dried out or not, and the gelatine sheets may give the desired information with such certainty and precision as to be of great service.
SASH-HOLDERS AND SPRINGS.

The sash-fasts which have been described up to this point, have been those intended for use in connection with double-hung windows; and, while any of them could be used with a window having double sashes which are simply set in the frame, without weights or balances of any description, there are a few appliances especially intended for windows without weights, which can best be considered in this connection. 

"Hammond's" window-springs are used so extensively for this purpose that they are almost standard. The springs are simply flat bands secured to the hanging-style and catching in ratchet cuts on the edge of the sash, each spring having a bent handle or thumb-piece coming out in front of the sash. One spring is used for each sash. A different form of spring is shown by Figure 216. This is mortised into the hanging-style and catches into square cuts on the edge of the sash, the thumb-piece showing in front. Figures 217 and 218 show two forms of window-springs on an entirely different principle.

The portion containing the spring is mortised into the sash, the lever showing in front of the glass. In the first instance the spring is exposed, and catches on posts set in mortised plates at intervals on the hanging-style. In the latter example, the spring is concealed, the end of the lever looking into plates of the shape shown by the figure, which are mortised into the hanging-style. These springs also serve as holders, the ends of the levers pressing strongly against the hanging-style and holding the sash from slipping.

A sash-holder is something intended to keep unweighted sashes in any given position by friction on the jambs of the frame. Besides the two previous forms, there is a very simple device consisting of a wooden or vulcanized-rubber roller, Figure 219, mortised into the sash and bearing against the window-frame. There is also the "Ayer" sash-holder, Figure 220, better adapted to its purpose than any wheel could be.

Fig. 216. Window spring. Gorbin.

Fig. 217. Sweet's Window spring. Stanley Works.

Fig. 218. Northrup's Window-spring. Stanley Works.

Fig. 219. Sash roller. P. & F. Gorbin.

Fig. 220. Ayer's Sash-holder. Ayer's Sash-holder Co.

Fig. 221. Byam's Sash-holder. Byam, Stewart & Baker.

Fig. 222. Sash-faster. Stoddard Lock & Mfg. Co.

Fig. 223. Clewes' Anti-rattler. American Mfg. Co.

Fig. 224. Ideal Anti-rattler. American Mfg. Co.

Consisting of a round peg mortised into the sash and pressed constantly against the hanging-style by means of a strong spiral spring. Still another form is shown by Figure 221. This is mortised into the hanging-style, and consists of a small wooden cylinder, or roll, laid loosely in a slot and against a lightly resilient face, which prevents it from rolling down. The milled plate is backed by a heavy steel spring. When the sash is lifted, the roll turns easily in the slot; but, when the sash is being lowered, the wooden roll wedges between the milled-plate and the edge of the sash, offering a resistance in proportion to the stiffness of the spring.

Figure 222 illustrates an appliance which can be used as a sash-faster, but which is intended more especially to bind the sash so it will not rattle. It consists of a plain bolt sliding in a case attached to the window, with a lever working in an oblique slot, so that when it is drawn down, the bolt is pressed out with considerable force, and holds by friction against the jamb. Figure 223 shows another anti-rattling device, a metal surface on the sash which wedges against an inclined plate on the jamb; and Figure 224 is the simplest of all, a metal wedge, suspended by a small chain attached to the sash, which can be inserted in the joint between the sash and the stop-bead.

The following table gives the average retail prices per dozen of the sash-fasts, etc., referred to in this chapter:

The prices are for plain goods, when such are manufactured.

**TABLE OF SASH-FASTS, ETC.**

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Name</th>
<th>Bronzed Iron</th>
<th>Brass or Bronze</th>
</tr>
</thead>
<tbody>
<tr>
<td>181</td>
<td>Yale &amp; Towne sash-lock</td>
<td></td>
<td>$12.00</td>
</tr>
<tr>
<td>182</td>
<td>King sash-lock</td>
<td>$2.50</td>
<td>2.50</td>
</tr>
<tr>
<td>183</td>
<td>Sash-fast, P. &amp; F. Gorbin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>184</td>
<td>Sash-fast, Russell &amp; Erwin</td>
<td>2.35</td>
<td>2.00</td>
</tr>
<tr>
<td>185</td>
<td>Judd sash-fast</td>
<td>2.38</td>
<td>2.00</td>
</tr>
<tr>
<td>186</td>
<td>Sash-fast, Norwich Co.</td>
<td>1.15</td>
<td>1.30</td>
</tr>
<tr>
<td>187</td>
<td>Sash-fast, P. &amp; F. Gorbin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>188</td>
<td>Metropolitan sash-fast</td>
<td>2.00</td>
<td>1.75</td>
</tr>
<tr>
<td>189</td>
<td>Boston pattern sash-fast</td>
<td>1.50</td>
<td>1.25</td>
</tr>
<tr>
<td>190</td>
<td>Lodl sash-fast</td>
<td>2.30</td>
<td>2.00</td>
</tr>
<tr>
<td>191</td>
<td>Sash-fast, Hopkins &amp; Dickinson</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>192</td>
<td>Sash-fast, Stoddard</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>193</td>
<td>Favorite sash-fast</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>194</td>
<td>Sash-fast, Yale &amp; Towne</td>
<td></td>
<td></td>
</tr>
<tr>
<td>195</td>
<td>Morris sash-fast</td>
<td>1.68</td>
<td>1.25</td>
</tr>
<tr>
<td>196</td>
<td>Triumph sash-fast</td>
<td>1.08</td>
<td>1.20</td>
</tr>
<tr>
<td>197</td>
<td>Sash-fast, P. &amp; F. Gorbin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>198</td>
<td>Judd's sash-fast</td>
<td>1.50</td>
<td>3.50</td>
</tr>
<tr>
<td>199</td>
<td>Payson's sash-fast</td>
<td>1.00</td>
<td>4.00</td>
</tr>
<tr>
<td>200</td>
<td>Ives' sash-fast</td>
<td>1.00</td>
<td>3.50</td>
</tr>
<tr>
<td>201</td>
<td>Robinson's sash-fast</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>202</td>
<td>Security sash-fast</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>203</td>
<td>Shaw's sash-fast</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>204</td>
<td>Dana's sash-fast</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>205</td>
<td>Hinman's sash-fast</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>206</td>
<td>Alwin's sash-fast</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>207</td>
<td>Brown's window-lock</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>208</td>
<td>Security sash-fast</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>209</td>
<td>Brown's window-lock</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>210</td>
<td>Sashlock</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>211</td>
<td>Hammond's window-springs</td>
<td></td>
<td>2.50</td>
</tr>
<tr>
<td>212</td>
<td>Stop-sash</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>213</td>
<td>Northrup's window-springs</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>214</td>
<td>Ayer's sash-holder</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>215</td>
<td>Ayer's sash-balancer</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>216</td>
<td>Champion's anti-rattler, per set</td>
<td>1.30</td>
<td>1.80</td>
</tr>
<tr>
<td>217</td>
<td>Champion's anti-rattler</td>
<td>1.30</td>
<td>1.80</td>
</tr>
<tr>
<td>218</td>
<td>Ideal anti-rattler</td>
<td>1.30</td>
<td>1.80</td>
</tr>
</tbody>
</table>

1 Price in Haveur-Barfield Iron, Yale & Towne Mfg. Co., same as in bronze.
2 Nickel plated.
3 Plain iron only.
4 Japanese iron with silver-plated knobs.
5 Face-plate only of bronze.

Continued from page 206, No. 676.
There is also a very satisfactory and simple device consisting of a plain, hard-rubber button with a milled edge which is screwed on to the head and against the sash, so as to turn when the window is opened. This is known as "Patten's" window-tightener. It is manufactured by the Portsmouth Wrench Company, and retails at 4 and 5 cents per hundred.

The same, or a much similar form, is manufactured by the Ayer's Patent Sash-Holder Company.

"Nelson's Perfect Fastener," is a name applied to a device for screwing the stop-bead to the window-frame; it consists of metal eyelets which are sunk into the bead, with an elliptical instead of round hole to receive the screw. As the longest dimension of the screw hole is in a horizontal direction, the bead can be set so as to permit of a play of quite a quarter of an inch. Such a contrivance must prove a boon to those who are suffering with windows which bind in summer and rattle in winter. The fasteners cost from $2 to $3.25 per gross, including either round or flat headed screws.

**SASH-LIFTS.**

Sash-lifts are often omitted from architects' specifications, though they are usually very desirable, and when properly applied, will save a great deal of work on the sash. The common form of lift is shown by Figure 225. A form which is not quite as convenient to use, though sometimes preferred, is the flush lift, the type of which is similar in the

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**TABLE OF SASH-LIFTS.**  **AVERAGE RETAIL PRICES PER DOZEN.**

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Name</th>
<th>Bronzed or Japanned</th>
<th>Brass or Bronze</th>
</tr>
</thead>
<tbody>
<tr>
<td>225</td>
<td>Common sash-lift</td>
<td>$0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>226</td>
<td>Flush sash-lift</td>
<td>---</td>
<td>0.20</td>
</tr>
<tr>
<td>227</td>
<td>Hyam's sash-lift</td>
<td>---</td>
<td>0.50</td>
</tr>
<tr>
<td>228</td>
<td>Sweet's sash-lift</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>229</td>
<td>Wigger's sash-lifts</td>
<td>1.50</td>
<td>2.25</td>
</tr>
<tr>
<td>230</td>
<td>Sash lift and lock, Ireland Mfg. Co.</td>
<td>2.70</td>
<td>4.00</td>
</tr>
<tr>
<td>231</td>
<td>Sash lift and lock, Ireland Mfg. Co.</td>
<td>2.10</td>
<td>4.50</td>
</tr>
<tr>
<td>232</td>
<td>Sash lift and lock, Russell &amp; Erwin</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>233</td>
<td>Sash lift and lock, P. &amp; F. Corbin</td>
<td>0.80</td>
<td>3.25</td>
</tr>
<tr>
<td>234</td>
<td>Anderson's sash-starter</td>
<td>0.60</td>
<td>0.60</td>
</tr>
</tbody>
</table>

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The Dangerous Theatre Chandelier.—At last somebody has been killed by one of the swords of Damocles, in the shape of huge and tottering chandeliers, which theatrical managers insist on hanging over the heads of their audience. The glass drop descended on a gentleman in the stalls at the Paris Lyrique theatre and killed him on the spot. The audience, however, were not upset by the incident. They had paid their money and they insisted on seeing the play out. *Si fueris illudatur orbis, Imperitus ferrent ruinae, which may be translated (for this occasion only): "If the globe of the chandelier breaks to pieces on somebody else's head, you bear the smash without a shiver." — St. James's Gazette.
THE HITTITE REMAINS

In the year 1879 the mounds of Jerahon, on the Euphrates, six hours below Britjik, were identified by M. Hertfordson, the English Counsel at Aleppo, as the site of Carchemish.1 The cairn discovered the ancient but forgotten nation of the Hittites. Soon afterwards the American missionaries visited the site, and examined it with deep interest, and as they toured through their mission fields they carefully scrutinized every fragment of chiseled stone in search of Hittite sculptures and inscriptions.

Two lions of black basalt were found on the top of the wall of the old Geneseo Castle, in the city of Marsab, guarding the entrance. Their workmanship was so unlike the other ornamentations of the wall, that it was But natural to infer that they were made for some other purpose.

One of them was covered with hieroglyphics in the same character as those at Carchemish. They were found also to be identical with the mysterious writing on the Hamath blocks in the museum at Constantinople. The inscriptions are in raised characters, arranged in horizontal bands, four inches wide, extending from left to right, and then right to left, with a raised line separating the bands from each other. Among the characters appear the heads of men, oxen, goats, horses and other animals, human hands, feet and faces with rings in the lips, and many other similar figures. But the figures and bands, in their present form, do not seem to represent any natural object. The smaller characters are written one above another between the lines, but the larger forms extend nearly from line to line.

The faces and feet on the first band all look toward the right, but on the second they look toward the left and continue alternately in the same order, indicating the direction in which the writing must be read. These inscriptions bear very little resemblance to any known system of writing, and no attempt to decipher their meaning has thus far been successful.

Near the base of the fort was found the colossal trunk of a human statue or idol, which must have been nearly eight feet in height. The head and both feet have been broken off. This large trunk now serves as a step in the stairway of a mosque.

One of the lions in the Christian cemetery was found a slab of black basalt, four feet in length, two in width and one in thickness. The upper surface only had been trimmed, and contained in bas-relief a human figure dressed in a long tunic fastened by a girdle. In the hand was a wand or staff. The beard resembled that of the Assyrian sculptures, but the hair was long and gathered at the back of the neck in a peculiar roll turned upward. The shoes were painted red. These two stones peculiarities are characteristics of nearly all Hittite sculptures.

This slab also contained an inscription covering its entire face, the lines of which are hieroglyphics extending along the sides of the human figure, but the characters differ from others in being incised instead of in relief. They were, however, much defaced. Fifteen to twenty characters of the same general character have been discovered in Marash. One is the door of a fifteen-hundred-year-oldStructure, of the pavement of a door-yard, another still, containing the figure of part of a chariot, serves as a horse-block at a street door. One heavy slab was found lying on its face four feet under ground in a vineyard, on which was represented two human figures sitting in chairs on either side of a cross-legged table, on which were plates of bread and fowl. These slabs are all of black basalt, having on one face of the stone trimmed; the figures are in bas-relief and the inscriptions all in the same characters, though there is variety of form corresponding to the hand-writing of different men or possibly of different times.

The lion on the fort has recently been transferred to the Royal Museum, Constantinople, and, two or three small slabs have been carried away by European travellers. Others remain where they were discovered.

The lions on the fort, the trunk of the idol, and several blocks near its base suggest that the natural mounds on which the fort was built may have once been crowned with a Hittite palace temple, and a block found on the side of the mound—perhaps a piece of an altar containing on two sides a beautifully cut inscription, but charred and cracked by the centuries of sun and rain—seems to point to the method by which the building was destroyed. There seems abundant evidence that Marash was an important Hittite city, and many relics of its ancient buildings doubtless lie buried under the present streets and walls. Several other colossal sculpture have been discovered in the Albustan plain, eighty miles north of Marash; also a fine inscription near Room Kais, sixty miles east on the Esni-temple.

Other blocks with the peculiar chiselling of the Hittites have been found in different places on the plains from twenty to fifty miles south of Marash.

It is well known that the plains of Central Turkey are scattered over with mysterious mounds of earth. They are of different sizes, but generally covering from two to four acres and are fifty to seventy-five feet in height, with a level acre on the summit. They are usually located near streams, in the upper reaches of springs on the other side and in very nearly every instance close by a fountain of water. Some suppose they were watch-towers, others that they supplied the place of a fort, the people gathering on the summit to defend themselves from the Arab enemies of the time. Some others believe they were resting places for the dead, where the bodies were placed on the mound with the heads toward the river and the alluvial soil that compose them prove their human origin.

In modern times a rude Turkish village often appears at the base and on part of the side of the mound. In the center is a large or small building, with three to five arches or open doors, with an immense block of stone, the representation of a multitude of men actually engaged in building such a mound may be seen. Some of these mounds, which are very regular, may have been built for a special purpose now uncertain, but others, irregular in form and larger in area, must have been formed by the debris of mud walls and roofs.

The existence of this latter class of mounds on the plain near the eastern base of the Amanus Mountains, about fifty miles south of Marash, has attracted the attention of the American missionaries for some time, and at the suggestion of Mr. Carter, the little Turkish village of Zenjirli is built on the side of a mound. The special interest connected with it was a dozen slabs of black basalt four feet high and two feet square, at the ends forming a regular circle. A hundred laborers in a few weeks' time laid bare a large number of blocks forming, as had been supposed, the basement of a palace. But they were not found resting upon mud foundations of masonry. A line of blocks extends along the entire front, then opens mid-way into an entrance-hall, which soon widens into a court about forty feet square. A narrow hall connects this court with another large court, surrounded by walls covered only in part, but seems to be several rods square. These halls and courts are lined by a single row of basalt blocks, each standing on end and nearly every block contains on its inner surface a Hittite sculpture.

At one place is a hunting scene continued along a dozen blocks. The men are armed with daggers, spears, and the bow and arrow. Deer, ibex, stags, and birds represent the animals. At the entrance to the main court on either side are the bas-relief sculptures of an immense lion looking toward the outer door, and behind each lion stands a more or less row of figures which may represent the gods. Upon these Hittite blocks, must have been made of sun-dried brick and perhaps in part of wood. The stones bear evidence that the buildings above them were burned. The pile of earth that forms the mound must have been composed of the debris of walls from Hittite palaces to the peasant hovels of modern times.

No Hittite hieroglyphics have yet been discovered, but the most remarkable find is the colossal statue of Sardanapalus, King of Nineveh, eighth century, c. n. s., standing on a pedestal in the smaller court of the palace. The workmanship is very fine. The face speaks with the finest Grecian statues. The statue had been thrown down and broken, but the fragments are all there, and the whole figure can easily be restored. On this statue were several square yards of Assyrian inscription in cuneiform hieroglyphics, from which the name was determined.

But how this statue of an Assyrian king came to be placed in a Hittite palace is not easily accounted for. It is presumed that when Sardanapalus made his expedition through Asia Minor he captured the Hittite country and erected his palace, carefully preserving intact all the productions of Hittite art. Several shafts have been sunk in different parts of the mound, but the far no other Hittite remains have been touched. Below the surface in various places were found the rude foundations of medieval and Roman peasant huts with stone hand-mills, mortar, and other implements. At the entrance to the palace a dozen sculptured blocks have been uncovered. They mark the gate-way in the city wall.

The Government propose to continue their excavations three years and turn over with the spade the entire mound.

The great desideratum in Hittite discoveries is a bilingual inscription to be used as a key to interpret the mysterious hiero-
The opened mound or brand on They of treaty he on brilliant presentations and in Hebron, J.

DELPHIA, Constantinople buried the deep under stone and black tablet, discovered, fortunately in languages at 1881, were studied or 1881, were discovered. Mr. Joseph Pennell, who is both wood-engraver and designer. Another Philadelphian, able to etch without the aid of color, was William H. Furness, whose refined crayon portraits are treasured in many a home.

Mr. Joseph Pennell has already made a distinct and valuable addition to the sum of monochromatic art achieved by the artists noted in my hasty and, doubtless, incomplete survey, and his youth warrants us in expecting much more. Born in Philadelphia thirty years ago, he studied at the Pennsylvania Academy of Fine Arts, the oldest institution of the kind in the United States. Beyond this, he does not appear to have received any regular instruction, but worked from Nature, aided by experience - or expensive but most impressive taskmaster - and so far as the technicalities of etching are concerned, gathered them from the treatises of Hamerton and Lalanne. At first Mr. Pennell etched both out-of-doors and from studio. I believe, that he has long since abandoned the latter method, and now works only directly from nature on the plate. His earliest etchings date from 1880 or 1881, and were reproductions of quaint old bits of his native city. These were followed by some etchings of scenes in New Orleans; and, then, in 1883, he went abroad, where he still remains. It was towards Florence that he first turned his steps, and some of his best plates were done there, the "Swimming in the Arno" and other presentiments of the river, with its bridges, and the roofs and streets of the city of Dante, of Savonarola and of Michael Angelo. These were supplemented by etchings done at Sienna, at...
ALLEYWAY, PHILADELPHIA.

LANDING PLACE, LEGHORN.
Bunyan, the third Sterne and the last joint-work of this clever pair reminds us of Dr. Johnson. It is a sketch of a (walking) tour to the Hebrides and contains some of Mr. Pennell's best drawings. But no need to say more of it: as everyone has enjoyed it the pages of Harper's. William Black, though he was in the habit of disapproving of some opinions expressed in the Hebridean series, does not withhold praise of Mr. Pennell's drawings of these places so closely identified with his stories.

A happy fancy it was that associated these pleasant journeys with these of other famous travellers (not all of whom, however, were on the same foot) which shows us all, L-P., Montecchi and Nampt, and the grey old cathedral town as they are in this decade, and not as they were in the days of Boyles, of DeSenez's Hotel and York's grietie, and of the gentle "nomes" and the "younge squires."

WALTER ROWLANDS.

Fig. 36.

THE MEDIeVAL HOUSES.—VIII.

Of the most charming hotels of the latter days of the fifteenth century, which was so rich in habitation of this class, was La Trémolière, which still stood in 1849 in the neighborhood of Pistoja, in Tuscany. This was a regular frieze, created by the brothers under Charles V., and proceeding directly from the King,—later, from the Bishop. It was rebuilt as we see it at 1849, by Louis de la Trémolière, who was born in 1460. It is this Louis de la Trémolière who explored the Duke of Urbino at the battle of Saint-Aubin-du-Cormier in 1488, which did not succeed, but how Valois, became king of France, first imposing upon him the command of the army of the Milans in 1590. He was killed at the battle of Pavia.

Figure 36 is the ground-floor plan of this house. The entrance-door, A, and the postern, a, opened on the Rue des Bourdonnais, and gave entrance into a spacious court. From the entrance, a portico led to the buildings. To the left, under a tower carried on two columns, was a passageway, B, putting the court into communication with a garden which extended back to the Rue Tirochape, and had a common gate on the left, and one on the right for equities and horses. A broad stair, C, led to the grand salon, D, into the principal staircase, E, into the salons, F, by the door, G, and into the little arched room, H, by the descent of a few steps. Underneath were the cellars and spacious cellars. Another door, I, with stairs and a horse-truck, K, gave direct entrance from the court into the two rooms, M and L. A second staircase, N, ascended to the upper stories of the court. At O was a little court with walls. The Menina and their adjuncts were at F, in a vaulted room, in great part destroyed and enclosed in a neighboring property. A portico, R, extends to the entrance portico on the Rue Tirochape, giving also a covered way from the kitchen and servants' quarters to the principal apartments, and by creating a lower entrance from the common staircase, to the dining-hall, D. The conciergerie was placed on the Rue Tirochape at F. At Y a well-constructed sewer was round, which formerly collected the water in the street. In the first story, the arrangement of the large apartments was the same as that of the ground-floor: the partition wall b was, however, left out, thus enlarging the rooms L and M, of which the latter opened into an oratory, or study in the tower. The portico A, extending on the first floor between the points S and T, was well lighted on the court, but had only three small windows on the street. The large single apartment between the court and the garden on the second floor was reached by the two

[Translated from the French of Viollet-le-Duc, by Mr. A. B. Hb. Continued from page 287, No. 656.]
of the apartments on the court had been much damaged, but the principal decorations were preserved in fragments under the modern plastering. On the garden side the front was very simple. The most admirable thing about this charming bit of architecture was the delicate taste of the artist. The mingling of plain and decorated surfaces was most happy. The hôtel was demolished in 1840. Conjointly with the Historical Monument Commission, I made at the time the most pressing appeals for the preservation of this masterpiece. We gained, however, only the privilege of carrying off several fragments to the École des Beaux-Arts, where they are still to be seen, set in the wall on the left of the entrance. At Figure 37 is the façade of the great rooms between the tower and the staircase. All the world knows the Hôtel de Cluny, which is built over the thermal baths of Julian, and contains to-day the Museum of Medieval Relics. This edifice is of the same epoch as the Hôtel de la Trémolière, and shows a similar arrangement. On the Rue des Mathurins rises a plain battlemented wall, and the buildings are between the court and the garden. We quote from the Baron Guillemer this summary of the history of Hôtel Cluny: "In the first half of the fourteenth century, about 1340, Pierre de Chasles, Abbé de Cluny, bought the site of the Palais des Théanes, with the intention of building a dwelling near the college of his abbey, opposite the Sorbonne. This project does not seem to have been carried out, and it was not until the end of the fifteenth century that Jean de Bourbon, one of the successors of Pierre de Chasles, began the construction of the edifice, which still exists. When this prelate died, the foundations were barely above the earth. Jacques D'Amboise, who united at the same time the titles of Bishop of Clermont, Abbé de Cluny, Abbé of Jumièges and Abbé of Saint-Alyre, restored in 1490 the work of his predecessor, and concluded it to entire completion." More fortunate than the Hôtel de la Trémolière, the Hôtel Cluny was preserved, thanks to the collection which Daussemerard placed there, and to the reputation which this collection of medieval objects soon acquired throughout Europe. In 1842, the Government bought the hôtel and the collection which it contained, and ceded it, with the rest of the Baths of Julian, to the city of Paris, and today the Museum is the Museum of the medievalist. At Figure 38 is the ground-floor plan of this hôtel. The apartments are larger than those of the Hôtel de la Trémolière, but the garden is not so extensive. At A is the principal door on the Rue Mathurin, Saint-Jacques, with its postern, A'. There is another one, at B; farther on is a portico, C, which gives entrance into the rooms, H.

Fig. 38.

on the ground-floor, rooms into which there are also entrances by the large staircase, E, and by the little door, f. The kitchen is at H, with its front steps and its private staircase, P, leading to the floor of the kitchen and into the salles. H, the kitchen door, gives direct entrance from the court into this kitchen. At I is a room overlooking the garden, with a staircase in the angle K, having a door into the room, J, and into the passage, L. At K is an open room, a sort of covered yard under the chapel, which is on the first story. F is a court, with an entrance, O, into one of the rooms of the ancient baths. M is also an ancient hall, in which were probably the stables. The gallery L formerly communicated with the latrines. The wall on the street is battlemented, and had a wooden patrol-walk carried on corbelling, which have been destroyed and replaced by iron props. A little staircase, N, leads down from the salon, I, into the covered yard, K, and up direct to the chapel. The garden, G, 17 metres wide by 35 metres long, was bounded by private properties. The principal staircase, F, ends upon a platform which is reached by a small spiral staircase coming from the story under the roof. The Hôtel Cluny, like the Hôtel Trémolière, had cellars, a ground-floor, a first story, and a story under the manroad roof. These buildings are very well preserved. The ancient floors, formed of beams supporting the joists, are still in use, and several of the chimneys date from the first construction.

While the architecture of the hôtel has not the elegant delicacy of La Trémolière, it lacks neither grace nor style. The windows are happily placed, the staircases well planned, and the chapel is a little chef-d'œuvre.

Fig. 39.

It has an "absidiole" carried on corbelling beyond the outer piers of the covered yard. Like this yard, it is arched, and its four pointed arches are carried on one central column. Figure 39 gives a bird's-eye view of this hôtel taken from the entrance side. There still exists at Paris a hôtel of the end of the fifteenth century, the Hôtel of Sens, which was the residence of the Archbishop of Sens when he sejourned in Paris. (The Bishop of Paris was, until the seventeenth century, subject to the Archbishop of Sens.) This hôtel is built on the public place formed by the intersection of the staircases R and N. The kitchen-buildings, servants' quarters, and the porch R were not carried above the ground-floor. At X is a general view of the Hôtel Trémolière, with the garden and the servants' offices and quarters. The architecture of this hôtel was one of the most beautiful creations of the latter part of the fifteenth century. The left tower, the great staircase, and the porch, with their upper story, had suffered very slight mutilations. The front
The streets, Hôtel-le-Ville, Figuier, L'Atollé, Harrés and Fauconnier. It was built by the Archbishop Tristan de Salamanza, between 1475 and 1516. The numerous mutilations which it has suffered have almost entirely obliterated its original character.

There are still to be seen great blocks of granite and brick of the Renaissance and of the beginning of the seventeenth century in several provincial towns. The Hôtel Ficé, at Angers, is a charming edifice of the sixteenth century; the Hôtel de Vansy, at Orleans, a magnificent Palace, which was only about the first years of the seventeenth century, is remarkable for its plan and the happy outlines of its buildings. At Toulouse there are still a number of hôtels of the sixteenth century.

The work of Delescluze ("Les Maisons des Villes") gives numerous examples of good plans and buildings of excellent taste. While the houses of the seventeenth century were only common lodgings, in which it is difficult to find a trace of art, such is not the case with the hôtels.

Under the reigns of Henry IV, Louis XIII, Louis XIV and Louis XV, the number of hôtels in Paris increased, and numerous numbers of beautiful hôtels were built, which still preserve the arrangements of the dwellings of the nobles and rich merchants of the Middle Ages and the Renaissance. The Hôtels Lambert, Carnavalet, Mazan, the Imperial Library, Carnavalet and Louvois (the Archives of the Empire) are models of grandeur and of good taste which put to shame all that we have done in this style in our day, so much easier is it to acquire wealth than to develop the sentiments of dignity and good taste.

[To be continued.]

THE PRESENT ASPECT OF LAND-DRAINAGE. 1 II. THE ENGINEERING OF UNDERDRAINAGE. 2

THE best work is, perhaps, that which is based on the general principle, that, however good in ordinaried soils, that drains four feet deep may be laid fourteen feet apart. In very heavy soils, they should be at least intervals, in lighter soils they may be at wider intervals, but they may be laid much farther apart, and if shallower they must be nearer together. The range according to the character of the soil shall be fixed after all there is no fixed rule for closing off the channel at double intervals. For example, if the ground is rather light, four-foot drains may be laid at intervals of eight feet with a view to the future construction of intermediate drains, reducing the intervals to forty feet, should the first prove in time to be insufficient. Concerning this, as with other details of the work and with all work that cannot be based on fixed rules, the experience and judgment of the engineer are of the greatest importance, especially in securing a good result without excessive cost. It is not fair to a client to make him pay for fifty per cent more work than is necessary for securing one's object absolutely against failure. This is true everywhere, and it is especially true in underdrainage where intermediate drains may be introduced subsequently without the loss of work already done.

Underdrainage as ordinarily carried on may be divided into two classes:

1. Thorough drainage, where the object is to give a free and prompt discharge to rain-water falling on the surface and percolating through the soil.

2. The removal of spring and seepage water due to sources outside the area to be drained.

In the first case the lines should be laid as nearly parallel as the conformation of the ground will allow, and as nearly as practical, at right angles to the contour lines of the land. It was long considered best, and it is yet strongly urged, to lay underground lines diagonally along the slope of the land, with a view to bringing the flow of water above. This is not the way to secure the best effect from the work, as will be understood if we consider the ground to be drained in small sections. A trench, which drains diagonally away from the ground will be four feet right angles to the slope. For a short section like this, the slope is of no account. It may be treated as level land. As level land, it is most economically drained by crossing it at intervals of forty feet (more or less) by lines of drain-tile. The next yard in width above it, and the next yard in width below it is similarly situated, and the work may be continued by continuing the same tiles across them, and so on for the whole hillside.

If we run a drain across a slope, it will have a good effect for a certain distance above it, but the land below it soon becomes too low to drain towards it, and the interval between the parallel lines must send its water to the drain at its lower side.

In the second case, the object is to intercept extraneous water, and the most effective plan to carry drains across the slope in such a manner as to end up steeply from land beyond. Usually, one such drain at the upper edge of the tract, to act as a header, is all that is required for this work. The extraneous land being cut off, the land below the header, if to be drained at all, may best be drained by the perpendicular system. To get the full effect desired from the header drain, it is often necessary to go deeper (usually four feet) and to lay the tile by which the water is to be carried off, filling the trench below with stone or gravel, allowing the water to rise from the intercepted stream to the line of exit. If the ditch crosses a rather free seam of water, the lower side of it should be banked up and the flow to cause the flow to rise to the line of the tile. If the tile can be laid at the bottom of the porous stratum, this, of course, is not necessary. If the purpose is to drain away water which lies at the surface in the form of springs, the proper plan is not to try to circumvent the fact and cut off its source beyond, but to drive straight into it and through it at a depth which will wash all of its water to a sufficient distance so as to be out of the way.

DRAINING-TILES have been made of various forms. The oldest, and the least desirable, is the horse-shoe tile which was made before the fourteenth century. It was a brick made in a form, and which being largely in use, because originally the only tile available, continued to be made after the introduction of machines. This tile is not to be recommended for use under any circumstances.

The next step was to make what is called the tile, being a round or egg-shaped pipe with a flat bottom, sometimes also with a flat top, so that it might be laid either side up. These are used considerately, but they are objectionable because of the difficulty of protecting their joints properly, and because of their liability to warp out of shape. The best for all uses, especially with the smaller sizes, is the covered tiles which are laid with a hole at one end, and which being largely in use, because originally the only tile available, continued to be made after the introduction of machines. This tile is not to be recommended for use under any circumstances.

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THE SIZE OF TILES. — There is no special reason, save for the question of cost, for laying tiles any wider than two inches in diameter, but the difference in first cost is considerable, and if transpiration is an important item, it would be better to use one-and-one-half, or even one-and-one-eighth inch tiles. The latter size, if properly laid and if jointed securely together at its ends, will give ample outlet to the drainage of an acre of land. The calculation is usually made according to lengths. When tiles are placed forty feet apart, one-and-one-half inch tile would be the maximum for the range of water to be received by a drain one thousand feet long. In nearly all cases, it would suffice for twice this length, or for two acres, but in view of the irregularity of the drains of first and second order, and of the channel at the joints where two tiles of irregular form come together, it is better to adhere to the former limit. If the tiles will be laid wide, the larger sizes will furnish a sufficient outlet for the areas given in the following table:

<table>
<thead>
<tr>
<th>Width of Cut</th>
<th>Use of Cut</th>
<th>Area of Cut</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>1 inch</td>
<td>2 acres</td>
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<tr>
<td>2 inch</td>
<td>1 inch</td>
<td>2 acres</td>
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<td>3 inch</td>
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<td>4 inch</td>
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<td>5 inch</td>
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<tr>
<td>6 inch</td>
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<td>2 acres</td>
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<tr>
<td>8 inch</td>
<td>2 inches</td>
<td>1 acre</td>
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<tr>
<td>10 inch</td>
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<td>1 acre</td>
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<tr>
<td>12 inch</td>
<td>3 inches</td>
<td>1 acre</td>
</tr>
<tr>
<td>14 inch</td>
<td>3 inches</td>
<td>1 acre</td>
</tr>
</tbody>
</table>

It is not pretended that these drains will immediately remove all the water of the heaviest storms, but they will always remove it fast enough for all practical purposes, and, if the pipes are securely laid, these drains will only be benefited by occasional cleansing they will receive running "more than full."

Obstructions. — If tile-drains are properly laid, properly jointed and properly covered, they are not likely to become obstructed (unless in exceptional cases by soil) by any other accident than the intrusion of the roots of water-loving trees. If the tiles are covered by, or imbedded in, porous material with the mistaken idea that this will cause them to receive water more freely, they are always in danger of having dirt washed into them by runnels of water through the loose filling. They should be closely packed in the firmest earth that can be obtained, and the ditch, every inch of its depth, filled with stone to prevent water from entering them in any way but by its gradual rising from below. However careful you may be, a drain that carries water at any time when the ground about it is dry, will be quite sure to be choked by the roots of elms, willows and similar trees, standing even at a considerable distance. There is, apparently, no remedy for this, short of the destruction of the trees. We have to take our chance between the one system and the other, and, in the need for taking up the tile to free it from roots. Gisborne, one of the best writers on land-drainage, says:

"My own experience as to roots, in connection with deep pipe-drainage, is as follows: I have never had branches grow through which there was not a perennial stream. The flow of water in summer and early autumn appears to furnish the attraction. I have never discovered that the roots of any edible vegetable have obstructed a pipe. The trees which, by my personal observation, I have found to be most dangerous, have been red willow, black Italian poplar, alder, ash and broad-leaved elm. I have many sealers in close vicinity with important drains, and, though I have never convicted one, I cannot doubt that they are dangerous. Oak and black and white thorns, I have not detected, nor do I suspect

1 Continued from No. 47, page 222.
ARCTICAL EVOLUTION.—I.

INTRODUCTORY.

This world is in a continual state of transition. The mind is something near "perpetual motion" as the development of the human race. A few centuries have changed a nomadic tribe, into a stay-at-home, civilized community and that community has grown, developed, internally and externally until it has become a nation. It is impossible to follow up each of his surroundings and if we would write a biography, we see at once how great a part in the formation of a man's character his surroundings have had and how far more he is influenced by his surroundings than by them by himself.

A man is not developed without his mind. Natural instinct sets the mind to work and thus a man learns by the integral parts of his own being how to supply his wants. And if a man does not do a man in civilization. Civilization is evolved from savagery. Instinct acts on the mind, and the mind on the body,—the intellectual upon the muscular,—the educated upon the ignorant. Instinct shows the savage the beginning of the building roof, man suggests to him a method of constructing it. Instinct makes him cover his nakedness, mind shows him how to paint his body or put on skins, and in each case a form of roof, head, and mind work to accomplish the end. There are three kinds of beings in a tribe who may be compared severally to mind and body and the body or muscular part. There are those who see a necessity; those who work for it; and those who animal strength carry out the work. The first and second may be one, so nearly are the instinct and mind allied. By instinct the savage builds, and so to speak, a roof over his head, which he marks by to put twenty other marks by the side of the first twenty, and so on in counts and comprehend the expression of numbers. Further enlightenment makes him put a cluster of marks for together, to denote particular quantities and thus is evolved our 12 3 4 5 6 7 8.

So with the covering of the body, a cincture becomes an apron a skirt, which lengthened upwards and downwards becomes a vest and from the vest arises every garment. From the texture of clothing, a great part of the ornamentation of a building is derived patterns of the stuff having suggested forms for decoration. The progress is slow, but development may be traced inch by inch. A tree trunk becomes a post, a pillar, a screen, a wall, of wood, stone, or brick. Natural objects, so simple, are built up of the tangle of the wilderness are evolved our palaces and cathedrals.

But the origin of architectural evolution does not exude Divine intervention; indeed there would be no such thing as progress, without superhuman interference. Instinct would have been as a dead thing and never have suggested the placing of a roof over his head or a covering to his body. Mind would have been a blank, in fact, instinct and mind or, to speak of them as one, soul would never have existed as without God; for soul, spirit, life itself is direct creation and never was evolved.

Evolutionists, who like to believe that their species had its origin in a bit of matter like an oyster, cannot tell us how, when, or where postdipl that started on the journey of perfection. They say only it did start. But that cannot be satisfactory to themselves and certainly will not satisfy the inquiring public, and therefore the inquiring public has to fall back upon the idea, with which it was brought into material; a belief that intellectual than the oyster to start with whose origin none can by any possibility trace, and they, happily for themselves, have to be content with the stages of the building roof, the beginning of a roof over his head or a covering to his body. Mind would have been a blank, in fact, instinct and mind or, to speak of them as one, soul would never have existed as without God; for soul, spirit, life itself is direct creation and never was evolved.

The expression of the mind of God seen through a material medium may be developed and perfected. The soul of man develops by stages, and in the beginning there was a beautiful, that through his instrumentality that beauty of form and color, with the result that the final part of the body is put on to the head, and the body is shaped and given form. The body was evolved in the same way the stone is shaped and given form.

"It is the expression of the mind of God seen through a material medium" may be developed and perfected. The soul of man puts the body. But this is a short plan and the words would be false if the walls of the building roof, the building roof or the head, and the body is shaped and given form. The body was evolved in the same way the stone is shaped and given form. The body was evolved in the same way the stone is shaped and given form. The body was evolved in the same way the stone is shaped and given form. The body was evolved in the same way the stone is shaped and given form. The body was evolved in the same way the stone is shaped and given form. The body was evolved in the same way the stone is shaped and given form. The body was evolved in the same way the stone is shaped and given form.
instead of wood, these forms were wrought in stone with considerable trouble and with ultimate success. From copying inanimate Nature as ornament, a rise to a higher type of art is to be noticed in the Romanesque, in which the dignity of the design is given up to the square-headed pillars, with its attributes. Painting led to carving in relief, and we soon find animals introduced into the ornamental parts of the architecture, laboriously carved, and directed by the lines of the design. The Fellahinians took up the practice, and the capitals of many of the Pharaohs, which were handed down for generations carved in marble. But it was a long time before any attempt was made to copy the human figure, life-size. It is now so far advanced as to be indubitably true that a more truly artistic treatment of color-decoration, for to the Doric order these sister arts eminently belong. The pediments of the temples were enriched by groups of statuary, and the faint indications of what at one time must have been very rich coloring are still to be seen on the ruins. Human figures cut in stone and marble are soon to be seen taking the place of pillars as a highly decorative substitute. But I have yet to see a well-carved code of a sarcophagus or shafts of Egypt, copied conventionally from a bundle of plant-stalks, are the fore-runners of all shafts treateddecoratively, and from the convexity of the sides, a new and interesting type of scrolls, and from the concave sides, of flutes. From the fittings of the classic shafts are evolved all molded and clustered columns. The fillets attenuated and the flutes deepened, the fillets widened and the hollows narrowed, till at last the fillet and the flute blend into one, and the base is formed, the back of the recess or hollow becomes the outer edge of an inner central shaft, and the sides are merged into the new fillet-shaft. The columns through many stages. The Romans took it and set it upon a pedestal, and even made it do duty as a monument, standing alone, as did the obelisks of Egypt. But when they thus set it up on a pedestal they fell into a great error, for they set concrete with the wrong order of the columns. Not content with the honest beauty (than which there is no greater beauty) of ornamental construction, they began to construct their ornament. They made the pillar a useless adjunct; it clapped onto the face of the real work, they would like a man, do an imaginary duty of giving support to a heavy cornice, which, in reality, was supported by an arch and pier behind. This was the Roman order, but it was not true architecture. The Greeks understood this, and took the pillar down from its pedestal and put it to its proper use. The caps of the columns deserve our attention now. The last thing the mind of man grasps in a house or church is the roof. This is the least interesting part of the building but the most striking. The ornamentation is very peculiar; the projecting scrolls on all four sides would seem to have no meaning in them; but, I think, they have a decorative principle of the original, and that is to make the cornice not more nor less than the edging of shavings of wood not completely cut off—for it is exactly the appearance of a whittled stick. Scrolls play an important part in the history of all capitals, and the beauty and simplicity of the design at once commends itself to the imagination. It might have been supposed that the Greeks would have introduced these into the caps of their first order, as they supposed them to be so much and so great that they would adopt them successfully in the Ionic order. But, the fact is, that the Greeks obtained every one of their ideas direct from Egypt in the first place, and their Doric columns are simply copies of pillars carved in stone, before the Doric order ever saw the light. The Greeks improved them, but, that these forms had their origin in the supposed peculiarly fertile minds of these ingenious people, I suppose that they were born. When they saw the scrolls, they tried valetudinarily to make use of them, and in their copies of the ornamental attempts produced some of the most ungainly caps one could well wish to see. The scrolls would not fit the four sides of a square cap with the same ease as the flutes, and the Greeks, in the other two the corner columns of a temple would present a different appearance from any of the others. They were determined to have the same design and imitation. The Pharaohs adopted it; they put scrolls or volutes on the two outer faces of the corner caps, letting them run against each other and project beyond the faces of the caps at an angle, thus giving to four caps each a single profile. The Egyptians' design was to have smooth that side was soon abandoned, although their struggles with it were not to be wasted.

The ultimate result of it all was, the Corinthian cap with its four similar faces and four projecting corners at the top, each composed of two scrolls, so arranged that wherever placed, each side would present the same appearance. It was the Romans who perfected this order, and Romanesque architects were very fond of the volute, but in Gothic architecture it is by no means so prominent a feature, although, as a favorite form, it is constantly introduced in stone and color.

In the bases of columns there is not so much to demand our attention. They had the specific object of distributing the weight of the shaft and its burden upon its foundation, but, being below the eye line, much decoration was inadmissible, and long ago down on the floor any ornamentation would have been in general dispensable. The square pillars in the open-air, carving or deep recesses, besides being easily damaged, would have been but rain-holders and of no practical use. The simplest form of base was, naturally, a square block; the circular shaft coming down upon it, left large, useless and awkward spaces at the angles: imagine these rounded off at the corners and you have the modern base. The Romans and following ages were in the habit of putting it in the rest of the block, and used as a distinct base rounded to follow the circumference of the shaft; and, then, by slightly undercutting this new member, we have the torus which is common to bases of all ages, since it was introduced.

(To be continued.)

CHINESE GRAVEYARDS.—But as soon as China was reached, the simplicity of the architecture, and dead came among us. The Chinese Thames. There was no French Gothic in China, and the vast, three-story Pagoda, and the City House. The Chinese city was circular, and the level ground, the dead the hills. No corpse is allowed to be buried in the walls of a Chinese city, and without, the vast cemeteries cover the hills with no fence or other limitation about them. The Chinese family which can afford it, builds a "horse-shoe grave," or bricked vault on the hillside with the end built up in the horse-shoe form. Poorer people stick their dead in shallow graves on which a small tablet of wood or stone is put. In some districts of southern China, the graves of the Five-storied Pagoda, and the City House, Forty-foot wide, style Flemish, drawing on the life, one-fourth in scale. Paper, bristol-board 18" x 24". Rendering to be optional. Almost half of the drawings were done from photographs. It seems to be a fact that this was the case with this programme. The committee were Franklin Miles Bay, Lindsley Johnson and T. Roney Williamson, architects.

DECEMBER 15, 1888.]

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PHILADELPHIA CHAPTER A. I. A. TRAVELLING-SCHOLARSHIP.

In the second competition for the Travelling-scholarship of Fifty Pounds, the following were the best designs submitted:

Philadelphia Chapter of the American Institute of Architects, the award was made to Mr. Howard Spruance. The programme of the competition was the design of a Corinthian Pediment, to be executed by the professional rivalry of the architects. The subject was, the City House Front sixteen feet wide, style Flemish, drawing on the life, one-fourth in scale. Paper, bristol-board 18" x 24". Rendering to be optional. Almost half of the drawings were done from photographs. It seems to be a fact that this was the case with this programme. The committee were Franklin Miles Bay, Lindsley Johnson and T. Roney Williamson, architects.

THE WASHINGTON MONUMENT.—The November number of Some says great care is taken to note the movements of the Washington Monument, for it does move. The law of contraction and expansion of metallic by heat and cold operates here as elsewhere. When the sun shines full on the eastern face in the morning, the stones on the side expand and throw the shaft slightly to the west. Then the sun goes down to the south, and the monument points with the westwardly bound swing to the north. As the orbit creeps about the sky to its final setting in the evening, the glinting point on the top of the monument is moved back to its normal position after the rays of the sun have lost their power. This movement has never been calculated, but is undoubtedly
The Effect of Moisture on Wood.—Dr. Hildebrand has carried on investigations into the action of moisture on various kinds of wood, the results of which he publishes in Wildemann’s “Zusam- menfassung physikal. Chemie.” We learn from the article on the subject, which is a lengthy one, that the author confined himself in his experiments to observing the extension of the longitudinal fibres of wood, leaving the consideration of the well-known phenomena of the swelling and the shrinking of the wood to publications more dependent on the longitudinal fibres alone. The author finds that, within certain limits, the length of wood in the direction of its fibres depends upon the amount of water present in its members. On this account, and for the benefit of pendulums and other mechanical devices, it is always coming to rest in the same observed position, and if this is to be ever observed, the line hanging still at any point outside of the two verticals or one of them, the pendulum has been permanently moved from its level position. Until then, however, no one need be alarmed by the oscillations of the shaft from the action of the wind or the influence of the sun. —The Architect.

The Traction on Different Pavements.—It is stated that if one horse can draw a load of one hundred pounds through the level, with a slight inclination, it will take one and two-third horses to draw a ton of freight. In the same way, if the load that is hauled be in the form of a parcel, it will take one and two-third horses to draw the same load at an angle of 30 degrees. From the above facts, it is evident that the traction is less on the level, and the temptation to use the horses the more when traveling, because of the less resistance, is great. —Southern News.

TRADITION ALWAYS

The ordinary business man should take very little account of the wars and revolutions of the world, as the continual fluctuation in the price of the principal commodities of life, together with the high prices of traveling and the want of cheap coal and cushions, makes it necessary to have a careful and accurate knowledge of the condition of the world and the changes in it. —Independent.

Pavement Material and Locomotion.—It may be thought that the pavement of a sidewalk in a busy street is of small importance so long as a sidewalk is there. This is a great mistake. The influence that the surface of a sidewalk has upon the ease with which a pedestrian gets about can only be reduced by creating it in a city. Take a number of sidewalks, all slightly undulating, and experiment. In one case, the surface is found to be flat, and in the other, to have a slight slope. It is the same with a railroad embankment, and the slightest rise in it will lessen the motion of the train. A brick walk gives much less fatigue, while the iron walk, east and west, gives great relief to the ankles of the pedestrian. —The Architect.

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TOMBS AND TABLETS.
NO one has so good a reason for making the necessary effort to spend a year or so in European travel as the architectural student, there is no one who can derive so much real benefit through such a trip, and, again, there is no one who can bring a larger concourse into partnership in this benefit, since his executed works will stand for years before the eye of the public. It is the duty of architects who see the necessity, or who afterwards accomplish a trip through Europe is very large, but in many cases it follows rather than precedes the years of active practice: it is the long-promised "treat," earned by faithful endeavor, and not a necessary and legitimate preparatory step. There are some who are so strong as to take this step without stopping to count the cost, but there are more to whom the cost is a matter of utmost consequence, who must economize for years before they have laid by enough to pay for even a flying-trip, who, when at last the necessary sum has been secured, may find themselves confronted with the necessity of sacrificing either their long-projected trip or foregoing the chances of a promising business which is just opening before them. It is for the benefit of this class that the American Architect has decided to establish a travelling-scholarship to be awarded in July next.

No one can seriously question that the architects of Massachusetts are quite as desirous that the enlargement of the State-House shall be a credit to the State as are the Governor and Council, and that in abstaining from taking part in the competition which is offered them they are actuated by principles of real weight and importance, and are not behaving like a parcel of boys who declare they "won't play" because they can't have their own way. We will not say that the Commission should not have dared to so trifle with their high powers, to so purport the honor of the State in jeopardy, to squander the millions of the City in step without proposing terms of competition which the profession and no small portion of the community understand to be rankly improper; but we will say that we feel and believe that, finding that they have been ill-advised, they will be willing to seek a way which will be in honor, the blunder can be saved from becoming irreparable. If they will bring to mind the result of the Boston Public Library competition, which also was organized by a politic body who thought it was unnecessary to heed the advice of men who, besides their citizenship, had more at stake in the matter than any other class, they will be saved from the disadvantage of their $5,700 as the bountiful gift of Boston wasted its $10,000 on an indifferent and wholly unusable lot of designs. Having publicly advertised the competition, they cannot with safety wholly abandon it, but they can extend the time, revise the conditions, give the $5,700 to the second and third designs in rank, and the work to the best man selected by and with the advice of a competent architect as adviser. This they can do without loss of dignity, and this they should do as efficient, though temporary, guardians of the dignity of the State and trustees of the funds raised by the taxation of the citizens of the Commonwealth.

The Boston Architectural Society trusts that architects practicing in the State, and all others who may feel inclined so to do, will join in the effort to convince the Commission that delay, waste and immediate failure, if not lasting regret, will be the only result of adhering to the present programme. The chance of finding a satisfactory design amongst those which may be sent in by draughtsmen willing to gamble for the money prizes is too slight for a business man like the Governor to seriously consider. The buildings at North Easton were not secured in this way. Think of it — Massachusetts, with more of State pride than any State of them all, we Stepsal for the best in a competition for this hundred and two years' practice in offices of members of the American Institute of Architects or the Western Association of Architects, but a graduate's diploma from a technical school will be accepted as a substitute for one of these years' work. As there are some minor particulars to be decided, such as the possibility of conducting the examination by mail or holding auxiliary examinations in other cities than Boston, it would be a help to us if those who think they may possibly present themselves as competitors would notify us of this fact as early a day as possible.
architects will work for anything you can get," Do you, gentlemen? Will you do this work for anything you can get?

We have this week to regret the loss of two architects who did honor to the profession in America, and both of whom were shining examples of the courtesy, faithfulness and sincerity which it is our pleasure to believe, are not uncommon characteristics of the honored and honored lay profession. Singularly enough, death came to both very suddenly and painlessly, and one cannot help thinking of Mr. Pfeiffer, who died in the cars a few months ago, and of Mr. Sims, who expired in his office, after a few moments of distress and wonder, where a quick and sharp reaction from some cause to become the usual reward of the ceaseless and generally unselfish toil which is imposed upon the profession in this country. The earlier death which we must chronicle this week is that of Colonel Arthur Crooks of New York, who was seized with paralysis of the heart while on his way home, and lived only a few minutes. Colonel Crooks was born in England, in Exeter if we are not mistaken, about fifty-one years ago, and began the study of architecture there: coming to this country just before the war, he joined the Union Army, and served four years. After peace was declared, he entered the office of St. Thomas's Church, Fifth Avenue, in New York City, a very rich design, on an unusual, but effective and convenient plan. Some days after the death of Colonel Crooks in New York, Mr. Nathaniel J. Bradlee, of Boston, while in the cars on a business trip, was seen to gasp once or twice, and fell dead into the arms of a friend who was sitting beside him. Although of late years the trusts and appointments which were showered upon him had withdrawn him almost entirely from professional practice, Mr. Bradlee was one of the most experienced architects in Boston. He was born in that city in 1827, and after graduating at the Chauncey Hall School, he entered a noted private academy there, entered the office of George Dexter, then one of the principal Boston architects. He remained with Mr. Dexter until his death in 1858, and succeeded to his practice. Three years later he was appointed, on behalf of the city, to superintend the moving of the Hotel Pelham, a work which any building-mover would undertake now, but which at that time excited the greatest interest and apprehension. From that time business flowed in upon him, and his name is connected with hundreds of the finest buildings in the city. At the same time, public office sought him with importunity. He was for three years President of the Boston Water Board, and was twice nominated for Mayor of the city, and served as president or director in a score or more of corporations. Personally, Mr. Bradlee was perhaps the most modest, as well as the most trusted and respected man in Boston. His kindness and desire to oblige were as inextinguishable as his conscientiousness and sense of justice, and he joined with his honesty and unselfishness an industry which made him very successful in business, for himself as well as others. In his professional work he was for many years assisted by Messrs. Winlow and Wetherell, who became his successors after his retirement from professional practice, and, as he was always careful to explain that a large part of the credit of his later buildings belonged to them, we can do no less than follow him in saying that their names should be joined with his in the most prominent of the works commonly attributed to him. Among these are the Rialto Building on Devonshire Street, the Homewray Building on Tremont Street, the Commonwealth Bank Building on Devonshire Street, the Bank of Mutual Redemption on the same street, and many other structures, public and private, in all parts of the city.

We take much pleasure in calling the attention of those of our readers who may be interested in the matter to the Monthly Circular of the National Association of Builders, and to all members of that profession to join in the work it is doing. At present, twenty-four cities are represented in the Association, and send delegates to its meetings, but there are thousands of builders of the highest character and ability, who do not live in the towns possessing organized builders' societies or exchanges, or whose business does not demand membership in local or national exchanges, and thus have no call to call upon, or call out the co-operation of the national organization. The preliminary work of establishing the national body on a firm basis has been very well done by the representatives of the larger local societies, who were immediately available for the task, but the officers desire to extend its constituency without delay, to include the profession throughout the country without regard to local lines, and, with this object, they call upon the builders, in all towns where such a thing is possible, to organize associations which can put themselves in communication at once, by means of delegates, with the Federal body. Where no local associations exist or can be formed, the members of individual builders who may be interested to meet informally and appoint representatives, who may take part in the proceedings of the next convention, even though their appointment proceeds from a body without any definite organization whatever. Although this may seem a little irregular, it is probably a wise plan, for the informal delegates can certainly do no harm, while their attendance at the convention will be sure to inspire them with ideas which will make them effective missionaries on their return in promoting the establishment of a local society before the next convention.

The Engineer gives a curious account of the new high explosive, bellite, the invention of Mr. Carl Lamm, of Stockholm. Bellite is not very unlike our "rackarock" powder, being a mixture of diimido-bezol with a solid substance; but the solid portion of rackarock is chlorate of potash, while that of bellite is nitrate of ammonia, mixed with the nitrogen in the proportion of five of the former to one of the latter. Thus prepared, bellite is a yellowish powder, resembling nitrate of ammonia in taste and smell. It is furnished either in the powder form or compressed in cartridges, and has the great advantage over the nitro-glycerine preparations that it can only be exploded by means of a detonating cap. In some tests of it made in England, a mass of iron weighing half a ton was dropped from a height of twenty feet upon a packet of bellite cartridges lying on a thick iron slab without causing any explosion; and a pound of gunpowder, fired inside a bundle of unprotected cartridges, simply scattered them about, without igniting them. When thrown upon a hot fire the bellite cartridge is melted away, leaving nothing but a bundle of smoke. Properly used, however, the energy developed by the new explosive is very great. Three pounds of it, exploded under ground, threw earth to a height of at least one hundred feet, and excavated a pit eleven feet in diameter and nearly eleven feet deep; and one or two ounces, exploded on an iron rail, tore and bent the rail over a space nearly two feet long.

Happening engineering difficulty was encountered in a town in Canada a few weeks ago. According to Fire and Water, the inhabitants of the town of St. Ambrose noticed that the water drawn from the street pipes had a peculiar taste, and it occurred to some one to see if anything out of the way had got into the water. As the city is situated on a hill, this was thought to be probable, and a sample of the water was taken, and found to be of this water which were drowned, but there seems to be no inconvenience, and the prospect is that the reservoir will have to be cleaned out. As a security for the future, Fire and Water proposes to have the reservoir covered, or watched. We should say that a still better security, which would have its effect over the surrounding judicial district, as well as in the village itself, would be to catch the people who murdered the babies, and hang them in conspicuous positions around the reservoir.
The traveller is given the choice of two cars in which to make the journey. The first-class car is cushioned and therefore more comfortable than the second-class, but both are equally exposed to dust, which is apt to be excessive. The mail is carried in the second-class car, which is consequently under guard of four soldiers. The guard is changed at the dinner-station to obviate the necessity of unceasing soldiers of the mountains spending a night in Vera Cruz and rice versa. Such frequent and sudden changes of climate as the guards upon these railway trains and trams would have to undergo were not this plan pursued would soon result disastrously to the Mexican army.

The track follows most of the way the old highway from Jalapa to Mexico built by the Spaniards soon after the Conquest, traces of which remain and may be seen in substantial bridges and in solid walls of masonry supporting the roadway. One of the bridges — a very picturesque one — has given the name of Puente Nacional, National Bridge, to one of the stations on the road.

Jalapa has not been so isolated and secluded as to avoid participation in the turbulent history of the Mexican Republic, particularly as it was the birthplace and home of Mexico’s greatest political schemer, General Antonio Lopez de Santa Ana, whose career began with the Independence of Mexico, in 1821, and closed in 1876. His ranch, to which he often retired to concoct new schemes for the gratification of his almost insatiable ambition, is one of the points of interest along the route.

When the patience of the traveller, even the most enthusiastic, is well-nigh exhausted, the tram makes a turn around a hill and comes out in full view of the town of Jalapa. It is built upon a number of hills, its streets so steep and irregular, that the tram-car, which runs through it by a series of wide curves, is the only vehicle possible there. The buildings are white, with roofs of red drain-tile. Everything is scrupulously clean, and cleanliness is not generally considered a prominent characteristic of a Mexican town. The houses are of the Spanish style, the windows nearly on a level with the pavement, but protected by iron gratings. In the centre of the city stands the immense Church of San Francisco, once a convent, erected by the Spanish conquerors, and apparently designed to fulfill a military as well as a religious mission. From the traveller’s first point of view, the other buildings of the town appear to be nestled around the church as if for protection. On all sides rise blue mountains. On the west is the Cofre de Perote, — a chest-like mass of porphyry. The beauty of the scene is enhanced by the verdure of the mountain sides and by the cool summit of Orizaba overlooking the whole.

In the town itself the spotless white of the buildings is relieved by the brilliant green of the grove of tropical foliage. Over each white wall hangs a broad banana leaf. From each enclosure towers a coconant palm. The buildings present an almost endless variety of form. Every picturesque feature of architecture is to be found; buttresses, flying-butresses, oriels, arches, towers, turrets, pinnacles, domes, — all in artistic confusion. These artists who have recently

Church of San Francisco, in the Main Plaza, Jalapa, Mexico.

on a cloudy day and to see Jalapa under the brightest sky imaginable, so that I feel amply repaid for my two days’ of tramway riding between Vera Cruz and Jalapa.

To reach the “City of Jalap” (for that is whence the famous old drug derives its name, the same being extensively produced there), the traveller has to arise very early and take the train out of Vera Cruz at four o’clock in the morning. Stopping at the second station, about thirteen miles from the city, a change is made to a tramway and the remainder of the journey is made by that mode of conveyance. The trams make frequent changes of male and a stop of one hour at Tixcocalco for dinner. They boil warily up long hills and run rapidly down steep inclines and around some sharp curves. The road is built through tropical jungles, and forests filled with the most brilliant orchids. The banana, orange, coconut palm and other tropical fruit-trees abound. Frequent views of the gulf are to be obtained and the mountain range on the west — the Sierra Madre — is in full view all the way, dominated by the beautiful, snow-capped cone of Orizaba. Yet to any one but an enthusiastic sight-seer the ride must be monotonous and extremely tiresome.

*Continued from No. 668, page 173.
illustrated the cities of Spain and Northern Italy might have obtained all they desired in Jalapa. But if an artist were to visit Jalapa he would never be willing to leave. Jalapa is the capital of the State of Vera Cruz. Its public buildings, State and semipublic, are of comparatively recent construction, and conform to the substantial simplicity which characterizes such buildings throughout Mexico.

A curious feature to be noted in the architecture of Jalapa is that floors are made to conform more or less to the slopes of the hills on which they are built. I first noticed this in the Church of San Fran
cisco, where the floor rises gradually from the front entrance to the chancel rail. I afterwards noticed the same thing at my hotel, with its strange effect upon the furniture in my room.

Jalapa is called by its citizens the "Garden" and the "Paradise of Akiles"; and many are the proverbs which attest the beauty of the Jalapenas,—the women of that city. They are blondes, a style much admired by the other Mexicans who are very dark. The Jalapenas have fair hair and eyes of light brown or blue. Their complexions may have been rendered more brilliant by the peculiarities of their climate. They are said to be descended from Ambuahua colonists,—the fairest and most beautiful of the Spaniards. In appearance they are more English than Spanish, and upon meeting the daughters of my landlady, they looked so thoroughly English that it was something of a surprise to find them unable to speak a word of my own language. During my visit in Jalapa I heard not a word of English spoken.

If the visitors choose to spend more than one day in Jalapa there are two pretty little Indian villages, Jilotpec and Guantepec in the vicinity, to be reached by train and well worth a visit. If he has already seen as much of the magnificent scenery of the Mexi
can Railway as he desires, a ride by diligencia from Jalapa to San Marcos, through wild mountain passes, and scenery rivaling that of the railway in grandeur, would amply repay for the fatigue incident to it. From San Marcos the Mexican Railway can be taken for the rest of the journey, either to the capital, or to Puebla.

Arthur Howard Noll.

The American Architect and Building News. [Vol. XXIV.—No. 678.]

THE COURT-HOUSE.—MUSEUM OF FINE ARTS EXTENSION.—THE ALGONQUIN CLUB-
HOUSE.—OTHER NEW BUILDINGS.—SPLIT-FACE STONEWORK.—THE CRISPUS
ATTACKS MONUMENT.

It has been several months since the last notice of work in Boston was written, and in the meantime much of the work then in process of erection has gone on or been completed, and new work commenced. The usual amount of unkempt dwelling or apartment-

house façades have sprung up in a night, but little worthy of notice if it were not for the fact that they show the exaggeration of the peculiarities of better work, and so accent an eccentricity that it is sometimes a vice. This is sometimes called "transitory parody" and will often be the best criticism of an original; and, by virtue of their manifest unsuitableness, it might be well to consider if architectural paraphernalia on one exists off costume, (where no other openings have arches,) small semidetached columns, and too heavy split-face lintels and voussoirs might not, with advantage, be discarded altogether.

The Algonquin Club has opened its doors, and they are opening steadily, simplified considerably from the original design, and has gained in consequence. It is impossible to overcome the heavy dulness of the first story, or the unfurnished consolades and balconies of the end parlor; but the arcade along Pompond Street has some dignity about it, and the openings above the cornice are now in scale with the rest of the building, which they would not have been if left in thrashed as proposed.

The Museum of Fine Arts is nearly ready for the roof. The mullions seem thin, but this may be helped by the sashes, and the simplicity of the work is a great advance over the frippery of the older building.

The Algonquin Club has had its opening reception, and the interior is very successful. Usually, there are minor criticisms which can be made, but, as there are of so small matters there can well be a difference of opinion about them, such criticisms can be classed as individual opinion merely, and not as based upon anything more permanent or irrefragable. For instance the reading-room, which is a very fine room, with a beautiful ceiling, looked better and had greater scale when the walls were white behind the dark oak columns, than since they have been covered with dark red, into which the columns now are. This will be improved. The walls are lined with marble, which is now only tinted, is picked out in deeper color. The triple-fireplace motive (the Potteries motive) at the end of the dining-room, fine as this marble end is, needs more and richer detail about each fireplace, and the three holes in a glass just large enough to give the effect desired. The ladies' rooms and the card-

rooms are especially successful. The large parlors, at the front, has its walls complete of the long, speckled brick, which is becoming so familiar. This brick varies in its general tone and color, and in this case is not as satisfactory as that used in the State-House. And as regards the hall, the effect of the hall, built around two sides of a rectangle, promises to be excellent. It is very simple, and good in consequence.

The Boston & Providence station at Roxbury is completed. It occupies a peculiarly shaped triangular lot, but even this is not justly so much picturesque as form as has been used here. Divisions of a small building into picturesque masses is apt to make the result petty,—if a large building will not stand picturesque all along the line at regular intervals, as Street's London Law Courts plainly exemplify. Picturizations in details or in spots, if one pleases, but a governing mass underneath, a body of more compactness than the arms and legs. This the Boston & Providence station has not.

The Fisk Building, on State Street, presents a simple, frank, and agreeable façade. The monotony of the windows courses look a little heavy-handed, not too large—but maladroite.

The Niles Building, on School Street, repeats the old story of split-face work, which is getting to be a mere set of spots of broken hellish red and shapeless brick in many buildings; but, then, the architects understand that split-face work is a bastard thing, something between dressed-work and carving; that it will always be of an unsuitable color for the dresses-work, and that it even deprecates the value of adjacent carving, and that it is only good as what is called the dominant-surface in the whole building; and that Mr. Rich
dardson, master as he was of it, found it, at times, a most troublesome thing. Used in small surfaces or quantities, nothing so vulgarizes and cheapens a building.

The narrow façade of Ohio-stone, farther down School Street, is an example of what Classic work can become, if detailed without special study and deprived of a cornice.

The building at the corner of Park Square, on the site of Mr. Hunt's old studio, is also finished, and is, perhaps, the thinnest, most mappery piece of work in the city. As for the peculiar beauty of the windows, a sense of pity for their impoverished, flattened existence, is the only emotion produced on the mind. This building is essentially a good investment.

The large building, near the New York & New England depot, is to be congratulated upon its color.

The State-House dome, which had taken a color to artists most agreeable, has been favored with a new coat of very yellow gold, and the fence has been painted orange, probably as a novel color,—no other reason suggests itself.

The Crispus Attucks Monument is completed, and is a piece of work designed for one point of view only, placed where it can be seen from all sides. The result is what might be expected. It, also, has the usual patchiness of bronze upon light stone, an effect which never seems to occur to sculptors modelling in clay,—until it becomes a matter of speculation whether they have any sense of color. The figure is pseudo-Classic, with a smack of Bavaria,—a little melon
decoration, but better than much that is within stone's throw; but the eagle is, manifestly, ill at ease, as well it may be, having nothing to do with the composition.
The American Architect and Building News. 289

The drawings exhibited at the convention of the Western Association of Architects. — The desirability of working drawings. — Competition for the new building of Historical Society.

Of course the most important event in the architectural world here during the past month has been the annual meeting of the Western Association of Architects. The speeches made and the work accomplished have already been so full of interest and importance that it is useless to go into them here, but it may not be out of the way to jot down a few personal impressions of the proceedings and to notice some of the minor details which do not seem to have been noticed by others.

The weather during the convention was fine for the season of the year, and allowed of considerable sight-seeing, so that the building operations of Chicago, and vicinity were quite thoroughly examined. The room of assembly, although not as handsome as the Literary Club Rooms in the Art Institute, where the American Institute of Architects held its session at the annual convention last year, was still most convenient, being large, light and easy of access, upon the ground-floor of the hotel where the majority of the delegates had rooms.

Most of the arrangements of the committees seem to have been well made and successfully carried out to the general satisfaction of the members; but as is usually the case, those whose work passed so smoothly received but little credit, thanks, attention or criticism, while others who may have worked much harder, but whose labors did not come up to the standard of the subjects were either justly or unjustly blamed. Upon entering the hall where the sessions were held one's attention was immediately attracted by the numerous drawings on the wall, and naturally the first thought was, how entertaining this would be, but after the first cursory view it was, to many, very disappointing. As an exhibit intended only for architects it can safely be said to have been scarcely ideal, for while, as a matter of course, architects are interested in perspectives of buildings and at such a display would very naturally expect to see more of such drawings than plain elevations, their interest would centre almost as much in seeing the various methods of rendering in pen-and-ink, as by any other means, and, consequently, perspectives that could only give the most false impressions. There were the wonderful effects in purple, red and oranges, with wonderful shadows coming from nowhere; and there were the perspective drawings in charcoal, of buildings which the members of the profession are perfectly capable of judging from the geometrical elevation; the finished perspective as a rule only being made for the buyer. But to see, as in this collection, absolutely nothing but perspective without the sketched intimation of the interior arrangement, becomes as uninteresting as the conversation of an inveterate punster, and almost as devoid of practical utility. There were some a credit to see because they were done in a natural and natural (most the latter) point-of-view; perspectives in pen-and-ink; perspectives in monochrome, but most notably perspectives in colors that could not be rendered, nor by any process, and, consequently perspectives that could only give the most false impressions.

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no embarrassment, for it is no secret that, after going through the usage necessary to put up a building, a set of original plans and elevations (which often are not even inked in) is not a very artistic way of exhibiting the work. It is far better, in this case, to get them that one is looking after, but more the practical side and the resolution of the practical questions involved, and it would seem that it would be well for the convention to ask each member to have his working-drawings of a building, finished within, say, the last ten months, and had even suggested some one building known to them, or the particular class of building desired, that for architects a much more interesting exhibit could be prepared. They can be arranged so that it might have included all classes of work from the largest commercial buildings to the most modest cottage, all with plans, elevations and cross-sections drawn. The only part of the proceedings where there was anything approaching excitement was at the election of officers, and here it was caused by what appeared to many as an effort to force a certain candidate into a position which he was not at all anxious to hold. As a result, when a member on the committee of nominations had the courage to place the name of another party before the convention, it is quite possible that the result of the balloting which showed his election was productive of considerable excitement.

On the Monday evening before the convention, the Chicago Architectural Sketch-Club held its annual banquet and exhibition of work done during the past year. There were more than two hundred numbers in the nearly-printed catalogue, and a vast amount of work was given to the subject of the night, a class of work to which the Club seems to have especially devoted itself in the last twelve months. Most of the sketches showed considerable ability, while the work of two or three of the members was remarkably physical. Many sketches were upon subjects so far removed from architecture as to make it scarcely seem the work of an architectural sketchclub, but to those that down to a cursory glance perspective, an intimate knowledge of the axon in this direction is undoubtedly extremely advantageous.

During the past month, the results of a competition that seems to have had something of a "go-as-you-please" character have been exhibited to the public at the rooms of the Historical Society on Dearborn Avenue, and it is apropos of this display that a late notice of one of the Eastern architectural publications remarked: "The Historical Society of America, having issued a competition, has received several hundred entries, and has arranged an exhibition of the same for private inspection. Whether "several hundred" be a misprint or not, it certainly is a biting piece of sarcasm. Consider the fathers of the Historical Society widely examining several hundred entries and selecting one! However, it was not quite so bad as that, for the facts seem to be as follows: The Society owns a large and valuable corner-lot, upon which the members are anxious to erect a building, and to this point all parties seem to be agreed, but beyond that there is no such thing as harmony. But, just the same, designs have been asked for, not formally by the Building-Committee, with certain restrictions given a broad scale, but formally by the members of the committee who have worked up their own pet schemes with certain architects, who, so far as can be learned, take their chances without pay. There is complete lack of success, and the American Institute of Architects, which would certainly make it as if the subject of professional etiquette needed a thorough shaking up. So far as can be discovered, this competition is about as good as it is possible to get. Thereafter, the majority of the members have fixed scale and method of rendering drawings, no particular drawings required, and no competent jury, nor any promise of one, while all designs are shown to the public before any award can be made. Moreover, the Society as yet only have something like sixty thousand dollars pledged, and a portion of that is a request requiring to have a special building or wing of its own; while it is more than doubt that any one of the designs could be built absolutely fireproof, as demanded, for twice or three times that sum, and, so far as a cursory examination would permit one to judge, only one design could possibly be built in its present state, and none of the others, yet we are not sure so far away, it gives any promise to the portion supposed to be built by the legacy referred to. As a matter of course, the perspectives received almost exclusive attention and, also, a large portion of the most brilliant side and the most favorably commented upon.

That the outcome of such an exhibit will be of no earthly good to the profession or if is evident, for the Society is now practically as far from knowing what is wanted as before, and at the same time is under at least moral obligations to various different architects; but it the committee, apparently, is much like all other committees on any subject at any be seen as an exhibition of accomplishing something, but merely as a pageant, and, as such, can have had no practical value, not to say educational, and, before the professional men. The American Institute of Architects, who have been the party most interested in the plan, are, to the best of my knowledge, in no way interested in the plan, and, consequently, are not to be misled by false or over-colored perspectives. If a competition is necessary, why can it not be arranged with some reference to the feelings of the profession, to the advantage of the Society, and the general edu-
eation of the public? In such a Society there must certainly be on
the list of membership some scholarly architect of modern educa-
tion, who would be willing to assist the committee and help it judge
intelligently; but, if any assistance were required, most likely the
committee would greatly prefer to ask "practical men," who usually
possess nearer the minimum of real knowledge than any one else.

Notwithstanding the general duties, the year will be remembered as
the year in which the Chamber of Commerce, by Richardson, was
erected: this building is now about completed and the date of dedi-
cation has been set for January 29, 1888. The façades are familiar
to the readers of the American Architect and so a description will
add nothing; suffice it to say that the building is eminently satis-
factory in all architectural way, and every part seems to have been
carefully studied out and the building has, moreover, been erected
with care and great dispatch by the contractors, Messrs. Norcross
Brothers.

The year will also be remembered, architecturally, from the fact that
the new City-Hall was commenced. This building is in charge of
Samuel Hannaford & Sons, architects, and is now above the street
line. It is located on the square bounded by Central Avenue, Plum
Street, Eighth and Ninth Streets: the building is to cost $700,000
and will rank high among the architectural monuments of the coun-
try.

Besides these two large buildings the only armory ever erected in
this city was begun this year and is now nearing completion.

There is generally an element that can be relied upon to fill up the
measure of dull years and that is work in small cities within a
radius of two hundred miles tributary to Cincinnati, and this ele-
ment has been a very considerable one this year and perhaps larger
than usual. In this class of work the architect has really a better
opportunity than in regular city work. There is not so much trouble
gaining your full commission, and you are allowed to have your own
way more than you do in regular city practice; especially is this so
from the fact that your client is quite remote and therefore cannot
drop in on you at unnecessary moments and propound all sorts of
questions and make architectural suggestions that are past finding
out. Take it altogether your out-of-town client is to be cultivated, as
he has to take what is sent him, and is content to accept his archi-

TOWER OF THE HOFKIRCHE, DRESDEN.
TOWER OF THE HOTEL DE VILLE, ALOST, BELGIUM.

AN ENGLISH COTTAGE.

CINCINNATI.

THE YEAR'S WORK.—THE CHAMBER
 OF COMMERCE.—THE NEW CITY-
 HALL.—RECENT COMPETITIONS.

The building season of 1888 just
drawing to a close has been a
somewhat peculiar one in several
respects. It will be remembered in the first place as being in a
general way one of the dullest years of the decade. The general
complaint of all architects has been lack of work of a local nature.
Hotel de Ville, Alost, Belgium

15th Cent., Belfry: 13th Cent
CANCER HOSPITAL:
NEW YORK:
TOWER OF ST CHARLES BORROMEO ANTWERP
FRANÇOIS AGUILOM S.J. ARCHITECT
most part a prejudicial leaning toward a Richardsonian monument; and notwithstanding that the competition was hedged about by non-de-

deciding in favor of the architectural scheme of the winning proposal, especially if the giver of the building is backed up with a fine design and well-rendered drawings; of course, if a man has all these elements and advantages he is just that much ahead of his more unfortunate fellows, and if a splendid building (somewhat deficient in light but in most other respects all that could be expected) is the result, why should not all the disappointed competitors proclaim, as it were from the house-tops, that the architectural competition is not a failure but is a consummation devoutly to be wished; especially should they so pro-

claim it, as a team was thrown to five of the wheels in the shape of $500.00 each for the privilege of being beaten, as it were, by a forlorn conclusion. Do not infer that any injustice was done the unsuccessful

competitors by the honorable gentlemen of the committee, as we are all agreed that the best proposal was the best, quite undoubtedly the best proposal. But would not the result have been the same if the successful

competitor had been selected without the formality of a competition? Now count up the actual money expended, to say nothing of time and heartache, and decide for yourselves whether or not architectural competitions are a failure. But while you are

making up your mind on this point do not hesitate to go into the very next one that offers, for you might win and that would add to your list in deciding that architectural competition is not a failure.

The next competition of note was the new City-Hall now hoisting its brail above the dirt of the cellar. This competition was not as fairly conducted as the other one, at least not in the very heart of the six competitors; there were no tubs thrown out to the whales great or small, but it was a free for all, so as you please, catch as catch can sort of affair, as that had its way of being carried off (or, more properly, of being carried on, of course, to be relied on at all times) says that this competition was

as much decided on before as after the decision was made. As the Army corps competition which was distinguished above its fellows in one particular at least, i.e. one of the commissions, this was done openly and candidly informed one who offered himself as a lamb to be slaughtered upon the architectural altar, that he had no information for any one earlier by a certain amount of a time. Afterwards proved the successful one. In this case as in the others a good building is being erected, and who is so bold as to say that it is not better than it would have been had the competition taken place. A recent competition — the Mount Calvary Church — a building to cost $40,000, was in charge of a committee consisting of lawyers and merchants, and this like the others was decided — to say our friend common sense — before the decision was reached; the committee asked for plans and obtained ten sets of sketches before they were sure that any could be executed.

In new York, as a matter of our memory and see how many competitions have been successful and justly awarded and then decide whether or not architectural competition is a failure.

with various smaller subordinate features of somewhat domestic aspect. The interior strongly suggests the conventional idea of the "private building." or lecture hall, if such there be. One large emblem is conspicuous, if even anywhere visible about the building. Notwithstanding what one who had never seen it might naturally infer from this outline description, we will state at once that Moses, an architectural scheme, Mead & White, is for the building which, though open to criticism in some points, is, in its massiveness and simplicity, deeply impressive, and which to the majority of men with us, has much the same effect as a curtain of such a discretion for the somewhat complex practical requirements) even on the interior the careful treatment of details has re-

sulted in a feeling that is eminently religious. This fact received a strong corroborative demonstration very recently when a public meet-

ning, merely for a special benevolent object, was held in the building. The audience assembled in reverential silence, and the proceedings were not interfered with by any disturbance. The windows, assumed a religious character. The view of the exterior is familiar to readers of the American Architect where a gelatine print of it was shown a short time ago. It is very severe Romanesque in design, in local gray stone with its extensive display of carving or ornament-

ation of any sort, the effect coming from very frankly trusting the massing and proportions to take care of themselves. The mass of red-tiled roof and extinguisher-shaped cap to the tower give a tone of color that would otherwise be much needed; while the terrace on the south side, with its heavy retaining-wall and broad granite steps, adds much to the dignity and imposing effect. The point at which the main entrance opens is so placed that the several forms of the roof join each other, and the half columns of smoothly-dressed granite at the ends of the arcades, built in rec-

tions and merloned in French fashion which (as far as the mind can be relied upon at all times) says that this competition was as much decided on before as after the decision was made. As the Army corps competition which was distinguished above its fellows in one particular at least, i.e. one of the commissions, this was done openly and candidly informed one who offered himself as a lamb to be slaughtered upon the architectural altar, that he had no information for any one earlier by a certain amount of a time. Afterwards proved the successful one. In this case as in the others a good building is being erected, and who is so bold as to say that it is not better than it would have been had the competition taken place. A recent competition — the Mount Calvary Church — a building to cost $40,000, was in charge of a committee consisting of lawyers and merchants, and this like the others was decided — to say our friend common sense — before the decision was reached; the committee asked for plans and obtained ten sets of sketches before they were sure that any could be executed.

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In using the word "church" we may not ignore the fact that there are many thousands of people in the Christian world who deny that the term may be rightly applied, from an architectural point of view, to any building that is not at least a modified form of either the ancient basilica or the Gothic cathedral, or from a more liberal point of view, to any edifice that is so arranged that those who hold strictly to the doctrine of an unbroken Apostolic succession, if not indeed to the still narrower limits of those alone who acknowledge allegiance to the Church of Rome. To the rest of the world are permitted synagogues, chapels, temples, meeting-houses, congregations and societies, of any architecture, of any form of worship, but no "churches." But the majority of Christian people it possibly seems not only a misnomer but almost a profanation to apply the word "church" to such a building as that very recently com-

pleted by the Methodists on St. Paul and Third Streets in this city, where in the general scheme not only have some of the most impor-
tant of the usually accepted essentials been entirely omitted, but other forms and details have been added, forcibly recalling strictly secular buildings. The general impression of the exterior is of a grouping of two amphitheatres of different dimensions, meeting at a com-

mon diameter line, and a great square tower, one hundred and eighty-six feet high, crude in its severe simplicity and boldness, and bearing but little relation to either campanile or spire, together

1 A result much to be admired at, in preference to any exterior carvings, unless of special appropriateness to application in mere and in execution, this Woman's College building is one of the most imposing edifices of the Rev. B. F. Goucher, who is also rector of the church.
upon two quite diverging lines. The one might be termed the ex- 293
clusive, the other the inclusive. The one shows an increasing ten- 
dency to emphasize the distinct parts of the building, as recalled from the original practice of the ancient builders, to which they are appropriated and the relative sacred character assigned to each, from the nave, the choir, the chancel, the sanctuary, to the altar itself. Those officiating are different from the people. All that can conduce to the effectual performance of the rituals is more carefully considered than is the convenient disposition of a large congregation for hearing or taking part in the services. One reason that has been asserted for this is that the age is again ripe for receiving impres- sions and religious instruction through object-teaching. Hand- bushes with materials appropriate to the religious ceremony, art comes the richness of expression of the sanctuaries, often so small in scale as to be lost in the general impression produced, and all this often under the care and control of those whose daily life is apparently not distinctly separated from the frivolities, or, indeed, from the grave errors of the world. Worldly religious ceremonials should be and might be exceptionally grand. As a rule, they are not so.

The other line of development is rather from the congressional point of view. Not only is there a great auditorium, but depart- ments for charitable work, and even for social and convivial re- union, are given prominent place either under the very roof of the building or in a general plan; among them the wedding cake that can be given to the convenience and comfort of the con-gregation, even as are closely associated with buildings appropri- orted to distinctly sacred uses, are available of and given impor- tant consideration. The building tends to become essentially the temple, and domestic—to be the great meeting-house of a society more or less religious, benevolent, and social in its objects.

Considering the whole of the time devoted to the church edifice of today, of whatever denomination, does not seem in many in- stances to be exceptionally exalted above all other buildings in the great sacred temple devoted to the glory and worship of the Deity.

He would, perhaps, be no false prophet who would declare that the religion of the next century, now closely pressing upon us, will not admit as its conception of a "church" anything narrowed by the narrowness of the Reformers, the Puritans, the Methodists, or the Unitarian, but will demand only a large Christian temple, where sectarian differences will be resolved into more super- ficial matters of form and taste and expediency, accidents, as it were, of government, of locality, or other material conditions. If we might venture to picture such a great temple, we would say it would be, architecturally, the most important and the most beautiful building- ing of each community. Such was the temple of ancient religions now dead and of the Middle Ages. Modern Christianity will not deny them. Its materials will be the richest, the rarest, the most durable of the world; its production will be without a single shanty; its architect the greatest artist in the land; its intellectual comprehensible in its simplicity, imposing in its grandeur; its worshippers all humanity; its divinity the God of the universe.

WASHINGTON

THE WASHINGTON CHAPTER, A. I. A. — A CASE BEFORE THE SUPREME COURT OF THE UNITED STATES.—ARE ARCHITECTS ONLY DRAUGHTSMEN?

The Washington Chapter of the American Institute of Architects at its October meeting elected the following officers: Adolph Cluss, President; W. M. Poindexter, Vice-President; A. C. Albion, Secretary; C. H. Read, Jr., H. E. Marshall, O. Von Nesta. This Chapter has been in a thriving condition since its organization in September, 1869, and the District Commissioners have seen that the building regulations of the city were remodelled last spring. It made an effort to have Congress insert a notice clause in the District Lien Law, without success. An interest to the profession was discussed with considerable zeal at the different meetings. On the 4th of January the Chapter will have its own meeting-room at 906 F Street, where the Chapter will be pleased to see other members of the Institute who may be in the city.

Recently my attention was called to a legal case decided by the Supreme Court of the United States on appeal, when the Court allowed the five per cent commission as the ordinary professional rate.

For the protection of the Freedmen, Congress created a Board of Trustees for Colored Public Schools; a portion of the taxes were allowed them to build and maintain such schools. Mr. Adolph Cluss was employed by the District Commissioner to supervise the spending of the minutes assigned to each, from the nave, the choir, the chancel, the sanctuary, to the altar itself. Those officiating are different from the people. All that can conduce to the effectual performance of the rituals is more carefully considered than is the convenient disposition of a large congregation for hearing or taking part in the services. One reason that has been asserted for this is that the age is again ripe for receiving impressions and religious instruction through object-teaching. Hand-i

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The other line of development is rather from the congressional point of view. Not only is there a great auditorium, but depart- ments for charitable work, and even for social and convivial re- union, are given prominent place either under the very roof of the building or in a general plan; among them the wedding cake that can be given to the convenience and comfort of the con-gregation, even as are closely associated with buildings appropri- orted to distinctly sacred uses, are available of and given impor- tant consideration. The building tends to become essentially the temple, and domestic—to be the great meeting-house of a society more or less religious, benevolent, and social in its objects.

Considering the whole of the time devoted to the church edifice of today, of whatever denomination, does not seem in many in- stances to be exceptionally exalted above all other buildings in the great sacred temple devoted to the glory and worship of the Deity.

He would, perhaps, be no false prophet who would declare that the religion of the next century, now closely pressing upon us, will not admit as its conception of a "church" anything narrowed by the narrowness of the Reformers, the Puritans, the Methodists, or the Unitarian, but will demand only a large Christian temple, where sectarian differences will be resolved into more super- ficial matters of form and taste and expediency, accidents, as it were, of government, of locality, or other material conditions. If we might venture to picture such a great temple, we would say it would be, architecturally, the most important and the most beautiful building- ing of each community. Such was the temple of ancient religions now dead and of the Middle Ages. Modern Christianity will not deny them. Its materials will be the richest, the rarest, the most durable of the world; its production will be without a single shanty; its architect the greatest artist in the land; its intellectual comprehensible in its simplicity, imposing in its grandeur; its worshippers all humanity; its divinity the God of the universe.
It seems strange that such statements should be accepted without comment by our legislators, showing, as it does by their action, a tacit consent that all should know that the combination of design, construction and business management, the architectural art would soon deteriorate into pure draughtsmanship and poor draughtsmanship at that. A architect who originates should certainly have charge of construction.

TORONTO BOARD OF TRADE COMPETITION.—PARLIAMENT BUILDINGS.—ASSOCIATIONS.—PROFESSOR ROGER SMITH.—ANOTHER EIGHT-STORY BUILDING.—RAISING THE EMBANKMENT AT MONTREAL TO CONTROL THE SPRING FLOODS.

No decision has, at the time of writing, been reached by the Property Committee of the Board of Trade for the City of Toronto, as to the design they will accept for their new building. It is over two months since the drawings in competition were sent in, and fully four weeks since Professor Ware returned their work with the information that he would give them considerable consideration before making his decision. At the present moment the committee has not decided whether or not they will accept the design submitted by the late Mr. Robert Smith, or make any other. Several suggestions have already been made, and it is possible that the committee may still have something better in view. They will not, however, make any decision until the latter part of this month, when they will have before them the plans of all the firms who have entered. The competition is rather a small one compared with the large number of architects who have entered the competition for the new building of the city of Montreal.

American architects certainly have not shown to advantage in Canada. Their designs, as a rule, have been poor and, apparently, hurriedly considered. Toronto and Montreal have examples of American talent on exhibition. The great building for the New York Life Insurance Company, in Toronto, situated above ground-level, has a most stunted appearance, as if it were afraid of knocking its roof against the clouds. It looks as if it had been flattened out as much as possible. These proprietors have met with some kindness on the part of the Corporation, who were not slow to utilize the citizens' money to please so wealthy a society. The base-ment of this building is about 20 feet below the street-level, and consequently are far below the level of the drains of the streets on which it faces. Happily for them, a hundred yards to the north there is a new warehouse, St. Lawrence Wharf, D'Arms Square. The Corporation courteously constructed another drain to connect with the Craig Street sewer, to enable this Life Assurance Company to have water in their basements. Even corpora-tions are not slow to please a man within a cold ring. The handsome in-keeping was to be expected, with the fine white and black stone; and to which I allied some time ago, is, now it is finished, something absurd; no other word is really suitable. It was to have produced a "new effect," but the "new effect" of white brick and white stone did not answer apparently, for it was painted red all over. A child could hardly have drawn a more unsatisfactory building; it looks like the first production of a pupil. On the roof have been stuck meaningless globes or balls of ungracefully proportions by way of finials that have caused some speculation among well-meaning neighbors, an xian to give even "the devil his due," as to what they could be for. They are so large and awkward as to attract the attention of even ordinary citizens, who are not supposed to know much about the correctness of things.

There seems to be a general feeling in the principal places of Ontario, that there should be some kind of amalgamation of the profession as a whole. An letter from a Ottawa architect calls upon all the archi-tects of the Province to join hands, and the Pro-vice of Toronto take the lead. The Toronto Architectural Guild, now consisting of some 30 members, and which from a social gathering is rapidly becoming an influential professional body, may already be

ra\d to have taken the lead; and there is little doubt that with this approval accorded we may expect to have great progress in time, some rapid developments towards the formation of some strong association. The wish of the Minister of Education for the Province to find a chair of architecture will, no doubt, give a stimulus in this direction. The Province of Quebec, however, will not come in for any advantages gained by this proposed association of the Ontario men. Indeed, it is doubtful if there will be anything of the kind, for nothing could be more childish than the jealousy existing between the various firms in Montreal. The difference of nationalities, no doubt, has something to do with it; but even those of the same race and nation keep as much aloof as if there were poison in other's touch.

It is curious to notice how one or another firm of architects gets all the principal work in Montreal such being the exception of other firms. A few years ago one firm, not particularly well-known previously, suddenly found itself called upon to execute houses for more than one millionaire, hotels and public buildings, and who is not particular about anything at all. Indeed, another firm had all the work, and in the season just ending, the same thing has happened. Of course, this leads every one to hope for a turn will come soon, and raises the hopes of flagging spirits.

I am sure that it is a matter of considerable satisfaction to those who take any interest in the professional education of young students, to be able to read word for word the admirable lecture of Professor Roger Smith, at the University College, London, as pub-lished in the American Architect on this subject. Years ago I had the satisfaction of attending his lectures. He is one of those rare men who can explain dull matters in a way, and who is never tired of making matters clear to his hearers and elucidating any passages that may possibly have been misunderstood or forgotten in the reading. To the profession, understanding the difficulties which beset them, and always ready to give his kindly advice to those who ask it. A point in his advice to students, published in the No. 673 of this paper, deserves particular attention, and should be read by all students, "even copy a letter, making a tracing or entering a message in a call-book is a lesson, if the pupil chooses to learn from it." We have all noticed the trouble in which pupils take when asked to do any simple thing which they consider it "not their place to do," and cases sometimes come under our notice where an architect, more or less of the Pecksniffian order gives his pupils too much of a kind of thing to the exclusion of more important oppor-tunities of learning; but, it will be better for a great many pupils to remember these words of the Professor's, and act accordingly.

The Proposed Montreal Municipal Building, with the rentals of their present building in Place D'Ams Square, are about to put to a pretty severe test the stability of the present walls and foundations. Montreal not being a particularly earthquake dis-trict, and the building being a substantial and solid one of four or five stories, it is intended to add four new stories, with elevators to reach them, making another tower for this little Square.

For the safety of the public, it is to be hoped that architect who has the work in hand will make a very thorough and exhaustive examination of the building as it stands, before proceeding with the work. When the extensive alterations to the Bank of Montreal, in the same city, were eight stories higher, the foundations of the building, having a total height of nearly 80 feet, although three feet thick was very little more than an inner and outer shell well bound together, lous under the same foundation, the inner one, the quality of the mortar was so bad that at the time, 40 years after it was built, there was no adhesion between the stones, and they were loose. The whole wall had gone over (about two inches at the worst part), but there were no signs of further movement. This shows what great caution should be taken before heavy addi-tions are made to old buildings. I might add another discovery that was made in connection with this wall, which is also a warning, that when the wall went over, it drew with it the floor-adjusts that were built into it, for there was no spiking done originally to secure the joints to the beams into which they were mortised, over the large area of the back-room of the man within a cold ring. The handsome in-keeping was to be expected, with the fine white and black stone; and to which I allied some time ago, is, now it is finished, something absurd; no other word is really suitable. It was to have produced a "new effect," but the "new effect" of white brick and white stone did not answer apparently, for it was painted red all over. A child could hardly have drawn a more unsatisfactory building; it looks like the first production of a pupil. On the roof have been stuck meaningless globes or balls of ungracefully proportions by way of finials that have caused some speculation among well-meaning neighbors, an xian to give even "the devil his due," as to what they could be for. They are so large and awkward as to attract the attention of even ordinary citizens, who are not supposed to know much about the correctness of things.

The Corporation of the City of Montreal, together with the Im-perial Government, after many experiments, appear to have arrived at last at a definite and apparently successful scheme for preventing the annual spring floods. The surplus water in the spring is turned "like a river" to the sea coast, and the water will be very great. At summer-level the water of the river is some fifteen feet below the wharves and steamboat piers, and on there wharves, every spring, the cars loaded to the top with freight-sheds; freight-cars are run on permanent tracks from the railway company's stations; the steamboat companies put up their fences and ticket-offices, and the whole river front on the wharves are crowded. At this time, which last anything from a hundred feet or so back from the edge of the wharves rises the stone-river, another 15 feet or 15 feet, on the top of which is the road-way all along the front of the city, with a slight iron balustrade of
Among the other matters which Mr. Waterhouse referred to were

the constitution of the new County Councils under the Local Government Act of 1900, a subject on which there have been no

considerations of council members with regard to compensation for interfering with rights of light, the recently-published biographies of G. E. Street and Sir W. H. Richardson, and the complaints that architects at the present time. A very significant reference was made to the Board of Works scandal in the Presidential address, and a number of visiting architects came to hear the speech. One paragraph of the extract from Mr. Whitehead's (a former President) address being given was:

“Architects may be elected members of that Board just as bar-

isters, solicitors, and doctors may be so elected. It would be ridicu-

ulous to expect that they would not, or that they would not be

likely to, become members of an influential body. What we should

worry about is, whether they may have any pecuniary interest in some of its building

transactions. But I shall run no risk of censure when I say that a number of

the Metropolitan Board of Works, ought not, from that moment, to have any

professional connection whatever with the purchase of land

offered for sale or lease by the Board; nor should be profes-

sionals engaged in the supervision of construction, whether

on land which is the property of rate-payers, whose agent and

representative he is.

The Commissioners of the Board have issued an interim report, in

which the conduct of Alderman Saunders, about whom I have

told you some little anecdotes in my previous letters, and a brother

professional, Mr. Fowler, is condemned in unmistakable terms;

although the Commissioners find that, except in three cases, it is

no evidence to show that the fact of their having been profes-

sionally employed caused them to act at the Board in a manner different

from what they might have done had they not been members

of the Board. A number of letters have already been received by the

semi-official organ of the City of London, regarding this expulsión

as more important than the action of the Commission itself.

It has been a matter of no little comment in the City that Alderman

Saunders has been allowed to continue in office while we hear

nothing concerning the corporation in the face of the evidence that has been disclosed.

A public appeal was made to him to resign in to-day's City Press,

but, unless he does not see the necessity, will not be accepted.

Aldermen have referred the matter to their Privilege Committee for

an obvious purpose.

UR城乡 societies are once more in the

full swing of work, and the papers tell us that, with readiness.

speaks more or less tediously, delivered by all sorts of men on

all sorts of subjects. You remember I told you, in one of my former

letters, that the new President of the Royal Institute of British

Architects (Mr. Waterhouse) had opened their doors to the

public, perhaps the first place among our English contemporary

architects. There was a very good attendance at the opening

meeting, which was as enthusiastic as the dignity of the members present permitted it to be.

Mr. Waterhouse, in his speech, did not suggest any new

or startling reforms, but contented himself with a general retro-

spect, incidentally giving attention to his ideas on certain debatable

points as he passed on. He referred with great satisfaction to the

fact that the numbers of the candidates for the compulsory exami-

nation for the Associateship of the Institute showed a very appreci-

able increase year by year, and gave it as his opinion that the course

pursued by the Institute in establishing this examination was far

more likely to conduct to the welfare of the profession than any

hastily-conceived registration scheme. This will doubtless be of

no small advantage in London and other great cities, for there

large bodies of students are wont to congregate, and the sight of other men preparing

for an examination has a very stirring effect on their comrades who could fear no competition, and a parallel may be drawn between

architects to pass this examination, and I personally know of two

cases where men have seceded at the examination, but, finding that the

fees of the members were not generally warranted by the salaries

they were offered in the race of life, they yielded to the inevitable, and

are now busy preparing for the next examination. You can see

from all this that the Institute only wants time to virtually achieve

"registration" of a much higher and nobler type than was attempted

by the memorable bill of last spring.

What I am afraid of is that the new radical "Society" will strive its utmost to force the Insti-

tute to adopt its policies, and a paradox may be attempted at

the above-salient result, and, as it is pretty certain to be made, it is the

opinion of a certain section of the Institute members that some action

in the direction of a compulsory examination of the whole profession

ought to be made. Whether this be so or not, it will be necessary

for the Royal Institute of British Architects to be strictly on

the alert. The very commendable idea of holding examinations in the presence of the students followed up, and one will shortly be con-
ducted at Liverpool.

Among the other matters which Mr. Waterhouse referred to were
The Society of Architects gave their annual Conversazioni at the Arts and Crafts Exhibition last week. I did not attend, but judging from reports it seemed to have fulfilled its promoters' expectations.

Two new theatres have been recently opened in London and two others are in course of erection. It is difficult to see how they are to pay in the present state of London theatre life, but the proprietors of course, know best. At the Shaftesbury, recently, the patent iron fireproof curtain proved refractory and would not go up. Under these circumstances the performances would not have been appreciated and consequently it did not take place. These erratic performances of fireproof curtains are certainly to be deprecated from the managers' point-of-view, not to mention the audience's, and patents would do well to bear this fact in mind.

The everlasting controversy about the demolition of the two churches in the Strand has been again set on foot by an appeal of the Heritor of St. Mary-le-Strand for funds to put his church in order.

SUGGESTIONS FOR THE CONDUCT OF ARCHITECTURAL COMPETITIONS.

EMPLOYMENT OF ARCHITECTS. — COMPETITIONS.

The best way to obtain good results in the design and construction of any building is to employ a competent architect outright, choosing him in the same manner that experts in other professions are chosen: on the ground of general or special fitness for the proposed service, as shown by his character and education, his judgment of the constructional and decorative work, and his business-capacity and training; these qualifications to be ascertained by investigation, examination of his executed works, and his reputation with competent judges. If, for imperative reasons, this course cannot be pursued by the committee or others having in charge the erection of a public building, and a competition is considered necessary, it is for the interest of all parties that it should be so conducted that the best men shall take part; that they shall be encouraged to do their best; that the best they offer shall be selected, and that the author of the successful design shall be employed as architect on the usual terms; provided the building is built and he is competent. To insure such result it is necessary that the conditions shall be clear and adequate, and alike for all, and that there be absolutely fair play in judging the designs and in awarding the work, and that the decision shall rest in the hands of competent persons.

The following paragraphs contain practical suggestions for securing the best results in competitions:

OPEN OR PUBL. SECTION I. — ADVICE.

1. It is absolutely essential to a successful issue that the projectors of a competition should employ a competent architect as adviser, and he should be named in the advertisements and conditions. The adviser should neither be a competitor for the work, nor should he in any event have any professional interest therein, except that he should receive from the projectors a proper fee for his services.

The duties of the adviser should be:

(a) To take a clear and definite statement of their wants, and to draw up proper terms to regulate the competition.

(b) To select from all offered the designs which conform to the terms of the competition, and to reject all others.

(c) To advise the projectors on the relative merits of the designs admitted to the competition.

SECTION II. — CONDITIONS.

1. In a public or open competition, it should be clearly stated whether or not the invitation to compete is issued by parties having authority to employ an architect and erect a building.

2. The number and scale of drawings required should be distinctly stated, and they should not be more in number nor to a larger scale than necessary to clearly explain the design. If perspective views are required, they should be taken from a fixed point of view and distance, and be uniform in size, number, and mode of rendering, without imaginary accessories, and with no shadows except of the building itself.

3. The absolute requirements of the building should be fully stated, but no distinction should be made between those conditions that are imperative and those which are simply advisory, and the terms should be such as to hamper the judgment of the competitors as little as possible.

1. A trait issued by the Boston Society of Architects, December, 1888.
If any limit of cost is set, it should be clearly stated what is to be included in it.
4. A type-written description of the building should accompany each set of drawings, which should give as clearly as possible such information as cannot be shown on the drawings concerning materials, methods of construction, and decoration.

No written should be allowed on the drawings.
5. Each drawing and the description should be distinguished only by a number and a letter attached to the bottom of the outside of a sealed envelope containing the author’s name and address.

No alternative designs or other drawings than those called for by the client should be received.
6. The time for preparing the design should be made long enough for adequate study of the problem and the proper preparation of the design. The proper preparation of the fair, and the time functions should be made for the ordinary occupations of competitors.

If possible, the time for preparing the design should be stated.
7. A design should be excluded from a competition:
(a) If any attempt is made by its author, directly or indirectly, to influence the selection or to influence the decision of the judges or their advisers.
(b) If it is not submitted by the due time named in the conditions.
(c) If any particular it violates the conditions as already stated.
(d) If it exceeds the limit of site.
(e) If it is prepared by the designer, or by an experienced contractor employed by the authorities to estimate on all the designs, it shall be found that its probable cost will exceed the limit named in the conditions.
8. It is advisable that all the designs admitted to the competition shall, with the consent of the clients, be publicly exhibited after the final decision.

The decision of the projectors shall be announced at or before the time of exhibition.

The work, if carried out in any shape, should be placed in the hands of the architect selected under the terms of the competition, and at the usual rate of compensation (five per cent. on the full cost of the building). But, if, on the other hand, the unsuccessful competitor should prove to have had slight experience in building, the rights of the clients would such reserved; and, in such case, the architect would have the right to select another architect of position from among the competitors.

11. In an open competition prizes should be awarded aggregating not less than two per cent. on the proposed cost of the building.

12. As all drawings are the property of the architect, those of the unsuccessful competitors should be promptly returned as soon as the work is completed. The preparers of the drawings are not entitled to the returns of the copies of the pre-prepared designs. Rejected designs should only be used, in whole or in part, by agreement with and compensation to their authors.

SECTION III. CLOSED, OR PRIVATE COMPETITIONS.

1. Closed, or private competitions are always preferable to open, or public ones, from which they differ in that the architects to take part are selected for their supposed special fitness for the projected work.

In these competitions the names of the competitors are usually known in connection with their designs, and it is customary to consult them in the preparation of the conditions, and to pay to each unsuccessful one a fee in accordance with the importance of the building and the amount of work required from each; giving the execution of the work outright to the successful architect on the basis.

A professional adviser may profitably be employed in these competitions also if the number of competitors is large.

PROFESSIONAL PRACTICE AND CHARGES, AS APPROVED BY THE BOSTON SOCIETY OF ARCHITECTS.

1. For full professional services, except as hereinafter mentioned, the customary charge is one per cent. on the full cost of the work, subject to the architect’s design.

2. For works of less value than $10,000, and for alterations, a special charge in excess of the above is made.

3. For monumental work, and for all works in which the expenditure is mainly for skilled and artistic labor, as furnishings and furniture, decoration, stained-glass, or the like, and for such works as may be divided into distinct classes of materials, the charge is regulated by special circumstances and conditions.

4. In several similar but distinct buildings erected at the same time from a single specification and one set of drawings, and under one contract, the commission is charged on the cost of one such building, and a separate charge is made in respect to the other.

5. The commission is reckoned on the cost of the work, including all professional services, except as herein specified.

6. In case preliminary sketches only are prepared, the charge is one per cent. of the estimated cost.

7. In case of the abandonment of a project after the drawings and specifications have been prepared, the client is paid for the work done, and is at least one-half of the full commission.

8. In the determination of the costs of the project by the director of the client, the additional charge is in proportion to the work done.

9. All charges are on an account, one-half of the commission on estimated cost at the signing of contracts or the beginning of the work, and other payments successively as the work progresses.

10. Except as herein specified, preliminary sketches, working drawings and specifications in duplicate, general supervision, examining and parcelling, professional services, and all such services should be paid for by the client.

11. All necessary travelling expenses are to be paid by the client.

12. Drawings and specifications are the instruments of service, and the property of the architect.

SUPERVISION OF WORKS.

13. The supervision or superintendence of an architect (as distinguished from the continuous personal supervision which may be secured by the employment of a clerk-of-the-works) means such inspection by the architect of the numberable of a building as to satisfy him that the construction, or execution, or attention as he finds necessary to ascertain whether it is being done in accordance with his specifications, and to enable him to decide when the successive installments or payments provided for in the contract or agreement are due or payable. It is to be distinguished from constructive engineering, which is the art of defining the true intent and meaning of the drawings and specifications, and the cost of such services, not in accordance with their principles.
Bardsley's Patent Wood Door Knobs.

The engraving represents No. 101 Hall Knob: a style which is meeting with great favor, as it allows up the grain of the wood nicely, and makes a handsome appearance in any house. We furnish them with a bronze rose, either desired, instead of the wood rose shown in the engraving. Besides the regular woods which we carry in stock, we make the Knobs to match special timbers in such woods as Indian Oak, Red Oak,核桃木, Hifish, Hird, and Maple, etc. These Knobs are first-class in every respect, beautifully and drcarly finished, and are warranted not to come loose or give out in any way.

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ADDRESS THE EDITORS.

DURHAM DRAINAGE FITTINGS

Fig. A.

Are made with an interior shoulder (as in Fig. A) securing flush inner surface. Ordinary joint fittings have an interior depression (as in Fig. B) and are not suitable for drainage purposes.

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Panteon de San Francisco, Puebla.

Panteon Santa Clara, Toluca.

MEXICAN BURIAL GROUNDS.
A CERTAIN shrewd worldly wisdom is shown by some publishers of periodicals who have fixed the beginning subscription years in any other mouth out of the twelve than in January, when the temptation to practise unwise economies is strongest. With us, however, other considerations overbalanced this advantage and our subscribers are once more invited to renew their subscriptions at a time when many will find the request unwelcome and unseasonable. We have done what we might to gild the pill, by arranging certain "club rates" which will be found set out on one of the advertising pages.

WE draw attention to a document in another column, which has a bearing on the competition for the enlargement of the Massachusetts State-House. The opportunity is so good for making an impression, not only on the Commission in charge of this particular competition, but on the public generally, that we propose to publish this declaration of principles weekly, adding to the list of signers the names of those architects and draughtsmen who may from time to time associate us to append their signatures. It is a first-rate chance for the profession to "range" itself openly for or against improper conditions of competition, and we ask architects in every section of the country to send us their authorization to add their names to the roll of protestants; and that there may be no verbal inconsistencies in the way, we have interpolated two words, bracketed, in the preamble.

WE commend to the attention of the Legislative Committee on the Extension of the Massachusetts State-House the terms of the competition, which was recently announced, for the new Italian Parliament-House. The building is not to cover an extremely large area, but a year is given for the preparation of the designs, and the execution of the work is promised to the successful competitor, unless the Government should fail to agree with him as to the terms of his employment and remuneration. In that case he is to receive twenty thousand dollars for his sketches, and the Government is to retain them, and carry them out as it may see fit. The authors of the designs placed successively next to the first are to receive money prizes, five thousand dollars being set apart to be divided among them as the Committee may think best. Unfortunately the competition is limited to Italian architects, or we should advise our brethren in Massachusetts to try their fortune in Rome, where what they can do appears to be so much better appreciated than among their own people.

ONE of the most extraordinary groups of buildings in existence is certainly that belonging to the Institut Pasteur, which has just been inaugurated in Paris. It is not that the architecture is particularly strange, the buildings being rather plain brick and stone structures, designed with true French refinement, but the purposes of the various parts, as marked on the plans, which we find, with an interesting account, in Le Génie Civil, are startling enough even for Parisian taste. The Institute itself, as every one knows, is the fruit of a public subscription which was opened in 1886, after M. Pasteur had already inoculated three hundred and fifty patients, and in two years and a half reached the end of three million francs in money. The quarters occupied by M. Pasteur in 1886 were altogether inadequate to accommodate the multitude of patients who flocked to him, and, as soon as it was found that the subscription would be successful, the Commission appointed by the Academy of Sciences secured a large piece of ground in the Vaugirard quarter, on which has now been constructed a group of ten buildings, surrounded by a pleasant garden. The main front, on the Rue Duot, is ornamented by a group in bronze by the sculptor, Truffot, representing one of the great benefactors of the human race in the person of Pasteur. To the left and right of the building are patients fighting with a mad dog. Behind this agreeable work of art, which is the gift of the city of Paris, rises the façade of the main building, containing the apartment of M. Pasteur, with kitchen, laboratory, rooms for students and assistants, library, and so on. Beyond this, and connected with it by a wide corridor, is the building where patients are treated. The ground-floor of this is divided, one side bearing the suggestive title of the hydrophobia wing, while the other is the general wing. In the hydrophobia wing we find a reception-room for patients, offices for registration and for archives, an inoculation-room, a bandaging-room, a room for patients requiring temporary rest, an operating-room, an inoculation-room, a reception-room, "this being, of course, the storage-room for the inoculating virus, which is obtained from the spinal marrow of rabbits. Over these rooms are various subordinate services, with a laboratory of "applied microbe," and the rest of the building is devoted to laboratories, a museum, an archival, collections, and so on. The grounds about these two buildings, the entrance to which is guarded by a porter's lodge, are laid out in promenades for patients, and in the rear is a sort of zoological garden, containing a large stone building for mad dogs; a group of kennels for healthy dogs intended as food for science; an aviary, the object of which we are unable to guess; an aquarium; a building for animals of various kinds under treatment; and stables, sheds, keeper's lodging, and stores.

The whole plan is laid out with much care for the active service which it is called upon to perform. Few persons in this country realize how great a work M. Pasteur has done since his first inoculation for hydrophobia in 1885. We have heard arguments, sneers, and assertions of all sorts about him, and we imagine that a good many people have concluded that his discovery has proved a failure, and that after killing a large number of patients his treatment has been abandoned. Instead of this, the records of the cases show that in two years and a half, up to July 1, 1888, five thousand, three hundred and eighty-four patients had been inoculated for hydrophobia in Paris. In many cases they were inoculated too late, and the sufferers were seized with hydrophobia before the inoculation could take effect; but, including all these cases, the mortality in 1886 was only thirteen out of every thousand persons treated, while in 1887 it was eleven in a thousand, and in 1888, to October 1, only eight in a thousand. As the period of incubation for the virus, before the inoculation takes effect,
is fifteen days, it is fair to eliminate from the mortality those who died of hydrophobia within the fifteen days before the treatment, and with these cases excluded the mortality for each year would be reduced about one-third. Certainly, if a person who has been bitten by a mad dog, by going to M. Pasteur for inoculation, can have the chances of his dying of hydrophobia reduced to one in a hundred and fifty, the result is of the highest importance, and it was allowed to run at large; and the annals of the affiliated establishments show that similar results follow the treatment in other hands. It will surprise many readers to learn that there are now more than twenty "hydrophobia institutes," on the Pasteur system, in various parts of the world. Of these, seven are in Russia, a country where hydrophobia is very common; one at Bucharest, in Roumania; five in Italy, at Naples, Palermo, Milan, Turin and Bologna; one at Vienna, one at Barcelona, one at Rio de Janeiro, one at Buenos Ayres, and one at Havana; and two more, one at Chicago and the other in Malta, are in process of organization. At some of these affiliated stations many patients are treated. At the one in Odessa eleven hundred and thirty-five persons have received inoculation; at Warsaw six hundred and sixty-five had been treated at last accounts, and at Moscow six hundred and thirty-three. Many of the cases in Russia come from the bite of mad wolves, and are terribly severe, but the treatment, under which the mortality was at first from three to eight per cent, has been modified by experience, so that now the deaths average considerably less. In Italy, there are eight hundred persons have been inoculated with remarkable success, but the statistics cannot be compared with those of other countries, owing to a lack of the municipal government of Naples, which, hearing some of the familiar arguments of Pasteur's opponents, so summarily to confound the establishment in that city, so that it had to be closed after curing two hundred and thirty patients. In seven months afterwards nine persons died of hydrophobia in the city, and the establishment was called into existence once more.

Mr. J. A. Gotch, of the English Architectural Association, who is one of the best of authorities on Elizabethan domestic architecture, read a paper last month before the Association on "Elizabeth and Victoria," which contains an unusual amount of common-sense in dealing with his subject. As we know, archaeology, particularly architectural archaeology, is a sore point with most Englishmen. As Mr. Gotch himself said, when he began, twenty years ago, to interest himself in the domestic building of the sixteenth century, an architect was something of a rarity but Gothic was regarded as hopelessly disordered in mind, if not hopelessly perverted in morals, and although Mr. Ruskin, with his fervid nonsense about the "fool flood of the Renaissance," and other things that he happened to like or dislike, has long been forgotten as a critic of architecture, the faculty of less discerning architects, who have or have not adopted this or that Dutch, Italian or other style, and beholder people who do not know or do not care about their particular hobby with a zeal which leads the average student of architecture to imagine that his spiritual condition must somehow depend upon the moods which he permits himself to notice. In amateurs this state of mind is a matter of no particular importance, but, in young architects, the notion that all beauty is to be looked for in a particular style is the precursor of paralysis of the faculty of design, and such men as Mr. Gotch, who can trace the origin of particular forms and criticise them dispassionately, do a great deal of good in the profession. Everything one remembers that during the reign of Elizabeth England was seized with a building fever. An immense amount of money had accumulated in the hands of people of rank, partly, perhaps, from the income of the church estates confiscated by Henry the Eighth and distributed to his favorites, partly from the plunder brought into the country by the privateers which preyed on the commerce between Spain and her new American colonies, and partly as the natural result of a long period of peace and prosperity under the government. All these men were liable at any time to raids from their neighbors, and were obliged to keep permanent garrisons in their castles, there had been little opportunity for making these anything better than extensive, but gloomy fortresses; but the wisdom and experience of those gentlemen and of the statesmen who followed the defeat of Spain, then the most dreaded power in Europe, combined to develop a sense of security and patriotism, which showed itself, as such a feeling has in repeated instances in other countries, in a passion for erecting buildings better suited than the old ones to the new thoughts and hopes that had arisen in their owners.

The number and richness of the mansions erected within a few years is almost incredible. Many noblemen and gentry who had lived in the country for several generations so long the deep decay of the Roman empire that they were not allowed to run at large; and the annals of the affiliated establishments show that similar results follow the treatment in other hands. It will surprise many readers to learn that there are now more than twenty "hydrophobia institutes," on the Pasteur system, in various parts of the world. Of these, seven are in Russia, a country where hydrophobia is very common; one at Bucharest, in Roumania; five in Italy, at Naples, Palermo, Milan, Turin and Bologna; one at Vienna, one at Barcelona, one at Rio de Janeiro, one at Buenos Ayres, and one at Havana; and two more, one at Chicago and the other in Malta, are in process of organization. At some of these affiliated stations many patients are treated. At the one in Odessa eleven hundred and thirty-five persons have received inoculation; at Warsaw six hundred and sixty-five had been treated at last accounts, and at Moscow six hundred and thirty-three. Many of the cases in Russia come from the bite of mad wolves, and are terribly severe, but the treatment, under which the mortality was at first from three to eight per cent, has been modified by experience, so that now the deaths average considerably less. In Italy, there are eight hundred persons have been inoculated with remarkable success, but the statistics cannot be compared with those of other countries, owing to a lack of the municipal government of Naples, which, hearing some of the familiar arguments of Pasteur's opponents, so summarily to confound the establishment in that city, so that it had to be closed after curing two hundred and thirty patients. In seven months afterwards nine persons died of hydrophobia in the city, and the establishment was called into existence once more.

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Autumn Journeys in Mexico. \(^1\) – IV.

**Puebla.**

Puebla is reached by a branch of the Mexican Railway running from Aplazco, about eighty-five miles from the city of Mexico, and one hundred and seventy-five miles from Vera Cruz. The journey is made from the capital about the middle of the forenoon; if from Vera Cruz, late in the afternoon, reaching Puebla about night-fall—a delightful time of the day for travel in Mexico. An English compartment-car is provided for the comfort of the traveller, and the road runs down a broad valley, about thirty-five miles, with three now-capable mountains, Popocatepetl, Iztaccihuatl and Orizaba, constantly in view.

Puebla is a city of about seventy-five thousand inhabitants which no tourist in Mexico should fail to visit. In the character of its buildings, and in the number and magnificence of its churches, it is the rival of the capital. Unlike nearly all other cities of Mexico, it is of Spanish origin, having been founded in 1530 by about forty families of Spanish colonists, under the leadership of the Franciscan friar, Torribio Benevento, better known as Motolinia, or the poor and humble. It was called La Puebla de los Ángeles, or the town of the angels, until after the French invasion of Mexico, when it was renamed Puebla de Zaragoza, in honor of General Zaragoza, who commanded a gallant defence of the city against the French army in 1862. This battle of the 5th of May (Cinco de Mayo) has given to the republic one of its principal national fiestas. It was by no means a decisive battle of the war which it began. The French troops were on their way to the capital, and, after this repulse, retired to Orizaba, then advanced again, captured Puebla and occupied the capital, causing the Republican Government to retire to the northern part of the country. The French held the capital while the monarchical party organized and established an Empire, electing the Archduke Maximilian of Austria, Emperor. Puebla remained in the hands of the Imperialists until towards the overthrow of the Empire in 1867, when it was taken by the Republican General Torrío Díaz, now President of Mexico. For a long time I sought an explanation of the enthusiasm which greeted the annual return of the Cinco de Mayo. Once I was told that it was the only victory ever won by Mexicans over a foreign foe. Every other victory won by Mexicans on Mexican soil was over their own countrymen. Perhaps that is as good an explanation as any. But there may be another reason why so much is made of Cinco de Mayo. Many of those at present in power in Mexico (the President among them) were in the battle of Puebla on the 5th of May, 1862. It was for their sakes that the day became famous.

The city is attractive in its situation and in its general characteristics. Being the see-city of a Roman Catholic diocese, it possesses a cathedral, which happens to be much handsomer than that at the capital. It was begun prior to the year 1536, and was consecrated in 1649. It is possible that a building of a hundred years earlier date is comprised within the sagrario or parish-church, which adjoins the cathedral. The cathedral contains some handsome paintings by Mexican artists, and the interior decorations are worth close study. There are other churches equally interesting, each possessing some thing worth seeing either in the way of architectural features, paintings, wood-carvings, statuary, or relics. One of these, the Church of San Francisco, built in 1667, possesses an arch for the support of the choir-gallery, which is so flat that no one believed it would remain in place. The architect who planned it had less faith in it than any one else, and did to escape criticism and, perhaps, less bearable punishment. Yet the arch remains, at the end of two hundred years, as firm as ever.

A characteristic of the architecture of Puebla is the extensive employment of tiles— pictorial tiles frequently—upon street fronts. The entire front of a building will sometimes be a mosaic of glazed tiles. The city is well kept. Besides a main plaza (characteristic of every town in Mexico, however small), it has several smaller plazas, and its two fashionable drives or paseos, as they are called, are very attractive. Near the town are quarries of tessel, Mexican onyx (or Puebla marble, as it is there called). This material is worked up into ornaments of every description, and may be obtained at very reasonable prices. It is extensively used in the interior decoration of churches in Puebla and elsewhere.

To most tourists a visit to Puebla would be incomplete without including a trip to the famous pyramid of Cholula. It is only seven miles distant, and is reached by horse-car. Readers of Prescott will not fail to remember the conspiracy which Cortés discovered in Cholula, and revenged by the massacre of three thousand Cholutes. Of the pyramid then existing there remains what appears to be an irregular hill, crowned by a church. It has been referred by archaeologists to a period antecedent to the conquest, and to the race of Toltecs or Olmecs. At the time of the conquest a temple was found upon its summit, dedicated to Quetzacoatl, the "Fair God" of General Lew Wallace's charming romance. This was thrown down by the Spaniards, and a Christian church was built in its place, but not the one now standing there. If the tourist be only interested in what appears to the eye of the ordinary observer, he will ascend the mound and enjoy the view from the summit. At the foot of the mound appears the city of Cholula, regularly laid out, containing a market-place, to which still clings the old Aztec name of Tecomán. I attempted to count the churchs in sight from the summit of the pyramid, but the view is so extended and the churches are so numerous that I gave it up. Cholula itself contains over twenty Pueblos, which is in itself view, contains more than thirty, and scattered over the broad valley are many more. There are other mounds in the immediate neighborhood to suggest the possibility of other pyramids, but they do not appear to receive any recognition from the Mexican archeologists.

The boys of Cholula are not lacking in enterprise, and boast the tourist with fragments of idols and other clay figures, which they claim to have found in excavating around the base of the pyramid. Their genuineness may be questioned. But, in climbing around the pyramid, I found what might be called an Indian arrow-head, but what was more probably the point a of maquahuitl or battle-axe of the primitive races. It was of obsidian or volcanic glass, perfect in shape, and well preserved. The genuineness of such a relic, or its value, could not be questioned. May other visitors at Cholula be as fortunate as I was.

Arthur Howard Noll.

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\(^1\) Continued from No. 629, page 285.
ILLUSTRATIONS.

HOUSE OF JOSEPH B. CHATTE, ESQ., STOCKBRIDGE, MASS. McCIN, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gillette Print timed only with Gillette and Imperial editions.]

ST. ANDREW'S CHURCH AND PARISH-HOUSE, BOSTON, MASS. ALLEN & KENWAY, ARCHITECTS, BOSTON, MASS.

THESK buildings represent in some respects a new departure in church architecture. It has long been felt that to combat the moral difficulties of modern city life the church must provide something more than Sunday services, and hence most of our churches have many benedictive and educational agencies connected with them. Trinity parish in its off-shoot, St. Andrew's, seeks to furnish room in one group of buildings for these agencies. The church, the parson of which is the principal feature of our sketch, is withdrawn some seventy feet from the street to avoid the noise of a busy thoroughfare. At right angles to the church and extending forward to the street is what is called the parish-house. In the three stories of this building, space is provided for a dispensary, a girls' industrial club, rooms for the Sunday-schoo and sewing-schools, a boy's reading-room and gymnasium, an office for the clergyman, and a large hall for lectures and concerts.

CENTRAL PARK TERRACE, MINNEAPOLIS, MINN. MR. W. D. KIN- BALL, ARCHITECT, MINNEAPOLIS, MINN.

This block of eighteen houses was built about two years ago. Of the material, two colors of lime have evidently been used without regard to the best custom in the conduct of such matters in the sole end and aim of which should be to secure to the State the best service by making sure that "the best men shall take part; that they shall be encouraged to do their best; that the best they offer shall be selected; and that the author of the successful design shall be employed as architect, provided the building is built and he is compensated accordingly."

The conditions announced are faulty — First. In that they are not drawn up in accordance with the best custom, it is shown that an expert adviser will be employed to aid the Commission in their choice. Second. That no assurance is given that the successful competitor will be employed, but, on the contrary, it is distinctly stated that all promisial competitors are to relinquish all ownership in their plans to the State, without any further claim to compensation or employment.

Third. Even if the first prize in the competition were as it should be, the execution of the building, the actual prizes offered would still be entirely insufficient compensation to the authors of the drawings placed second and third.

For the above reasons, we, the undersigned architects, citizens of the State of Massachusetts [and elsewhere], protest against this form of competition, which, in our opinion, is not for the best interests of the State or our profession, and we, therefore, decline to enter it: CARB, EVERETT & MEAD.

WHEELRIGHT & HAVEN.

JOHN A. FOLEY.

JOHN A. FOX.

GEO. M. YOUNG.

E. S. NHVEW.

LONGFELLOW, ALDEN & HARLOW.

EDWIN J. LEWIS.

ARCH. S. JACOBS.

H. LANGRIOF WARE.

WALTERS & RICHARDS.

WM. ROWCH WARE.

HARTWELL & RICHARDSON.

COASTS & SARS.

T. M. CLARK.

PROTEST AGAINST THE COMPETITION FOR THE MASSACHUSETTS STATE-HOUSE.

THE Commonwealth of Massachusetts has, by its Commissioners, advertised for designs for the State-House extension, said designs to be furnished in open competition. The conditions of the competition, as colored in the above, have evidently been framed without regard to the best custom in the conduct of such matters in the sole end and aim of which should be to secure to the State the best service by making sure that "the best men shall take part; that they shall be encouraged to do their best; that the best they offer shall be selected; and that the author of the successful design shall be employed as architect, provided the building is built and he is compensated accordingly."

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WM. ROWCH WARE.

HARTWELL & RICHARDSON.

COASTS & SARS.

T. M. CLARK.

ALLEN & KENWAY.

RAND & TAYLOR.

TWO CUSTOMS, JR.

STERCH & CADOT.

SHEPHERT, RITAN & COOLIDGE.

RITCH & TILDEN.

SNELL & GREGGISON.

SHAW & HUNNEWELL.

SCOTT & PESTON.

L. WEISHORN.

FLASER & HARRR.

KARL PENDEL.

ARTHUR LITTLE.

PEABODY & STEARNS.

WINSWOW & WETHERELL.

MEDITAL HOUSES. — IX.

COUNTRY HOUSES.

Fig. 40.


H8 was said at the beginning of this article, we may now turn to country houses with mans. The manner is the dwellinghouse, a chevalier, who does not possess the right of high and low jurisdiction, but who is a landed proprietor, and who owes only to the lord of the manor personal military service. The country house, the "masse," is the dwelling of the tenant, the planter, the farmer, the peasant. Country people remodelled their houses much less often than the people of the towns, because they are too poor, and because their wants vary little. The citizen of our day has preserved none of the habits of his ancestors, while the peasantry in the midst of the nineteenth century led nearly the same life as of the fourteenth.

The lower we go in the social scale, the less difference we find between the country houses of the Middle Ages and those of to-day, which were built in the French provinces which have been particularly withdrawn from contact with the people of large cities, such as certain parts of Languedoc, Corrèze, Aveyron, Berry, Auvergne, Haute-Marne, Morvan, Jura and the Vosges, we still find similar dwellings which have been unaffected, and furnish us, probably by transmission, examples of dwellings of the Gallo-Romanic rustic. In these dwellings we recognise the employment of certain methods of constructive work, serve all the characters of a native art; and, though the material be coarse and the workmanship rough, the application of the principle is true, and, above all, stamped with that sublime charm which attaches to all primitive arts for those who know how to see it. There still exist in the wood of Morvan several dwellings of the peasantry in which an ancient countryman, returning after sixteen centuries, would find no change; and we have seen, ourselves, on the borders of the Loire, the Seine, and in the Vosges, peasants living in grottos hollowed out by the hand of man, which are preserved as they were when first seen by the Roman armies.

The variety of these country dwellings is one of the proofs of the preservation of the ancient traditions. While all our city houses of to-day are very much alike, the reverse is true in the country: the cottage of Picardy has no resemblance to that of Brittany; these differ essentially from the cabin of the Morvandian, which, in turn, is not at all like those of the Frans-Countois, of the Auvergnat, or of the Bas-Languedocian. I have chanced to stop in certain French villages where each house is built on a pattern of its own, quite primitive in character, and remote from the methods of our modern civilization, in which everything tends to obliteration of individuality. It would be difficult to classify the houses of the peasantry into epochs, as has been done in the case of city dwellings; and, in fact, the transmission of several marked types through the whole medieval period would render the attempt quite futile. We believe that in some provinces the same kind of rural house has been built since the invasion of the barbarians, and it is difficult to distinguish a dwelling of the tenth from one of the fourteenth century.

We will content ourselves, then, with discussing some of the most characteristic types, without assigning dates too closely to the precise period. These don'tieles, built generally with the aid of the most simple means, have withstood the modifying effects of time, and preserved their primitive characteristic not only by the constant reproduction of the same pattern, but also by the almost indestructible nature of the same materials, and a remarkable conservation of the old houses, at least, those which seem to have undergone the least alteration, are found in the middle country or in the East. In Morvan, the old houses of the peasantry are mere masses of loped-up stones. The walls are built of great blocks of granite, and are broken only by small openings. There is a very low ground-floor, serving as cellar, • Translated from the French of Viollet-le-Duc, by Mr. A. B. Bibb. Continued from page 201, No. 677.

Fig. 41.
Church of the Ascension
Sierra Madre, Cal.
RESIDENCE OF MR. CHARLES A. PILLSBURY MINNEAPOLIS MINN. D. 1888
storehouse, lean-house, or pigsty; a door raised one or two metres above the ground, with stairs and landing built into the wall; and a ceiling of heavy beams, a garret above, protected by heavy timberwork, covered with layers of stone called "davies" (Fig. 40).

Each house contains only one room, with its chimney. If one wishes two rooms he builds two houses, joined by the gables. In this dwelling there is no decoration, nothing which shows a taste for the elegant art. The wall is hardly squared; the floor is covered with earth beaten down over a layer of stone, sand, or clay.

In Nivernais and Upper Burgundy, on the contrary, we find traces of art in the peasants' houses. The lintels of the doors are laid with care, the posts are well finished, the interiors are plastered, and sometimes covered to their full height with a wainscot. The timbers are carefully squared, and even squared from the very ancient times having replaced the rude covering of stone. The outside staircase is well placed, the landing has beautiful railings of stone, and the formers of the ceilings project over the front and are framed into the rafters, forming a pent-house (Fig. 41). These dwellings of the Burgundian country-side are often ornamented with care, and affect certain architectural forms.

well-preserved peasant's houses in the village of Rongemont, between Monthar and Aisy, furnish proof of this. These houses, which date mostly from the beginning of the thirteenth century, having their gables to the road, are built with remarkable care (Fig. 42), and almost all have a story above the ground-floor; but it must be added that this village was the dependency of a rich abbey.

In the neighborhood of religious establishments, the houses of the country people are found better constructed and more carefully built. We have said the ground intended for the dwellings of the peasantry around religious agicultural establishments was divided into equal parts. "We think," say M. Delisle, "that this example has been often followed in our province (Normandy), where for a long time the word 'bois' has had the meaning of yard or hovel. The 'bois' were ordinarily long, rather than wide, whence the widely-spread term of 'long bois.' At one of the ends of the 'bois,' each one built his cottage. All the doors opened on the side of the road, which thus became the street of the village." This arrangement is observable at Rongemont, as in several other agricultural centres belonging to the fourteenth century, and commonly built of stone. Sauvage, in the province of Mansura, says that the ground intended for the dwellings of the peasantry around religious agricultural establishments was divided into equal parts. "We think," say M. Delisle, "that this example has been often followed in our province (Normandy), where for a long time the word 'bois' has had the meaning of yard or hovel. The 'bois' were ordinarily long, rather than wide, whence the widely-spread term of 'long bois.' At one of the ends of the 'bois,' each one built his cottage. All the doors opened on the side of the road, which thus became the street of the village." This arrangement is observable at Rongemont, as in several other agricultural centres belonging to the fourteenth century, and commonly built of stone.

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to the soil, and have made few modifications in the local customs since the fourteenth century. Figure 44 is one of such rural houses.

The system of working the fields was generally replaced by the system of limited leases in the thirteenth century. The barons preserved the ownership of their lands and simply ceded the cultivation of them to husbandmen for a limited time and on settled conditions. "Several causes," says M. L. Delisle, "favored the development of these holdings and made them preferable to perpetual grants, which only were known in the first centuries of feudalism.

It was stipulated by the contract of enfiefment lost, with time, the greater part of its value. It was an inevitable consequence, not only of the depreciation of money, but also of the revolution which affected the relation of money to the article of consumption. On the other side, the waning strength of the feudal régime tended to deprive the lords of the principal means which they formerly possessed of plundering their enfiefed domains. They were led to treat the farmers, and to relieve themselves of the expense of improving and of plundering their lands, and were no longer dependent on the fortune derived from their rents, whose nominal value was not altered, but whose real value because more and more insignificant."

Sometimes the needy baron forced the farmer to pay down on the signing of the lease the total amount of his rental for several years.

It is evident that these were in truth terms onerous for the prior, and tending to enrich the laborer. In Normandy the rural dwellings became of considerable relative importance, and were modified more rapidly than in any other province.

On the Mediterranean coast we occasionally find country-houses in the shape of a tower or small turret belonging to a very ancient epoch, but these dordicules were more often inhabited by pirates than by agriculturists. There are several of them between Toulon and Cannes. Figure 45 gives one of these, which is still entire, built on a bluff at the entrance of the village of Cannet, near Cannes, and about four kilometres from the sea. It consists of a square tower having two stories and a ground-floor, without communication with the outside. The door, raised three metres above the ground, was accessible only by means of a ladder, which could easily be taken in to avoid troublesome visitors. The first story, or, more often, the second (for there is no communication with the ground-floor, except by a trap in the floor of the first story), is broken by six machicoloids in the form of scutteis, and there are no windows.

The first floor has no opening except the door. From this floor, that of the machicoloids is reached by means of a wooden ladder. The elevator of the steps which decorate the lintels of the door indicates a very ancient epoch.

At Cannet this tower is known by the name of "the brigands' house." The story is related in round-terms. There are still to be seen at Corse several buildings of the same character.

Country dwellings, arranged so as to be a refuge for men living in isolated places, and probably at odds with their neighbors, are found also on the western coast. One of the best preserved and most interesting is found near Bordeaux (Fig. 46). It was formerly surrounded by a fosse fertilized by water. From the level of the water, a staircase of twelve steps laid in the wall led to the raised door. Probably a plank was thrown across the fosse when any one sought to enter. The door opened into the single salon, which was provided with chimney and lighted by an open hearth. They reached the cellar through a trap cut in the middle of the room.

The spiral staircase ascends to the second story, which has a chimney like the first; a sort of cage, with loop-holes and machicoloids, hangs from the wall above the entrance-door. There are several of these dwellings on the coast between Bordeaux and Bayonne, and even beyond as far as Saint-jean de Luz. It is very probable that they date from the English occupation of Guinée. In Suffolk County, in England, there is a small place (Wenharn Hall) built in brick after this same style, which dates from the end of the thirteenth century. It forms a parallelogram, with a spiral staircase in a tower at one of the angles. The entrance is raised, and is reached by a stair set in a lectern that rises at one corner.

The "maisons croisées" of the cemeteries are worthy, too, of note. They were free and beyond the reach of the secular laws, being under the guardianship of the monasteries, and were famous as the refuge of beggars and sick persons. Their distinguishing mark was a cross of wood upon the roof-ridge.

THE END.

THE DEMAND FOR THE CLERK-OF-WORKS.

EAST ORANGE, N. J., December, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs,—I am glad to see a disposition in the profession to require the services of clerks-of-the-works, at buildings which its members may be required to superintend, and that you are ably advocating the measure.

The present price of five per cent is barely sufficient to pay for a well-considered design, with the necessary detail drawings and specifications, and without an additional charge for the time which is expected to devote the time to supervision which the average client now demands, and which he thinks he is liberally paying for. The client should pay the salary of a clerk-of-the-works; the architect would be relieved from much that is irksome to him, and as a result could devote more time to study, to the proper development of his plans, and ultimately, to the best interests of his client.

A conscientious architect will often pause and consider whether he is best following the dictates of duty by devoting more time to supervision and less to proper thought and consideration of detail in the office, or vice versa, and frequently, when it seems imperative, from circumstances, to take the former alternative, it is at the cost of evening work—time which should be devoted to study, relaxation or social intercourse.

An architect has not only to deal occasionally with dishonest contractors, but with ignorant or incompetent ones, and their careless employés. To maintain his reputation, or to satisfy himself that his work is being properly performed, he will often find himself devoting more time to one building than is just to himself or other clients; and when the contractor discovers that he understands himself thoroughly, he will leave him, and go to a new instead of the architect, when visiting the work. An architect frequently has a client who is unsuspicious, fault-finding, and who thinks he pays only for his whole time during the erection of a building.

As supervisor, the architect is supposed to do about as follows: — to be an expert in every material and work that enters into the construction of any building, competent to judge quickly whether the contract is being fulfilled, and to see that the different trades follow in prompt order, and that each branch of the work is completed to such point there shall be no delay in general progress; to look after the construction of interior or other works in the shops; to instruct divers mechanics on points that may be at fault; to have general care of the building that it be not damaged by the elements; to attend to correspondence (under certain circumstances considerable, even for a house of moderate expense); in short, to be "spotter," general foreman, clerk and janitor.

There are architects able in design and ingenious in planning, yet who have not the slightest mechanical or constructive skill,
A CORRECTION.

To the Editors of the American Architect:

I notice an unfortunate error in the last letter from Washington. The answer to Mr. Griffin's question in reference to his position as superintendent of the Congressional Library, should read "I am not under the architect," whereas it was printed, "I am under the architect." This omission makes the difference between the architect as the head, and the engineer as the head. His advice that a building should have one head is good; while the supplemental clause, making the superintending engineer practically as head, is quite as erroneous. I also wanted to point out, that in leaving the duty of inspecting the building to the engineer, instead, to eventuate in the army engineers monopolizing public buildings; the work and country being filled with more unfaithful, unartistic, and monstrous masses of sterile and hopeless structures, more than in the case, as it is, that the educative effect of good working being lost to the community at large, and the architect on such work being turned into the draughtsman.

Washington Correspondent.

THE OWNER'S ACCEPTANCE OF A BUILDING.

December 21, 1888.

To the Editors of the American Architect:

I would like to have some information in regard to taking possession of a building. A contractor had plans drawn for a private residence with residence and took the contract. It being in another town, so he put there a foreman to attend to it and build in accordance to plans and specifications (the other party had also a set of plans), the party referring the owner sent from the other parties to inspect building, making changes, the owner calling there also several times, thus making changes. The local builders made complaints to the foreman, but on examining their errors they were not verified; the owner made no complaints during the work.

Finally the owner was notified by contractor that the building was completed, and to call and accept it. The owner called, moved in, and saw the building. He found that a fourth of the building had been completed, and the only part of the contract four-tenths of which had been paid, but he refuses to pay any more. I am called in as an expert, but I am under the impression that after having been there himself, and having had other parties there to inspect work, and taking the keys without any objection, that he formally accepted the work and has to pay balance due to contractor. After having taken possession, he made all kinds of changes, without notifying contractor. He has never been to the building, and the owner says he will not pay the contractor's account. By letting me know the customary rules or referring me to similar cases, you will confer upon me a great favor.

Yours respectfully,

Subscriber.

The law is well settled that the owner does not accept a building by taking the keys and living in it, nor does he thereby waive the right to reject the work. To reject the work and to have the right to reject it, he must notify the contractor in writing. The notice must be a written one, and if he does not give the proper written notice within the time limit of the contract, then the contractor can make the owner pay for them. If they were not necessary in order to build the building in conformity with the contract, the contractor sought to have the owner pay for them. If they were necessary in order to build the building in conformity with the contract, the contractor should have been given the opportunity to have them made. The owner should be required, and has given him reasonable opportunity for making them, or of employing other persons to make them; and it has been held that if the owner does not do so, then the contractor is entitled to have the owner pay him for what it would cost him to make the work, and it is the owner's fault to the contractor, and not to himself or the work, and the owner say whatever it cost actually beyond this.

AMERICAN ARCHITECT

LAYING MASONRY IN COLD WEATHER.

December 21, 1888.

To the Editors of the American Architect:

Dear Sirs,—Can you tell me how to lay masonry in cold weather, whether it is or is not desirable to use much or any cement, and if the addition of salt would help to keep out the frost from the mortar of the foundations? We are just about to start a large building, and the probability is that most of the work will be done in very cold weather as the building must be done by early spring. Also, what is the experience of American architects with cultured mortar in cold weather? Can or cannot this be used? By an early answer to these questions you will greatly oblige.

Very truly yours,

Rogers & MacFarland.

[For a brick building, built rapidly, and with the thin walls and poor masonry commonly employed both in America and Europe, the more cement a mortar contains, the more it is injured by freezing. The addition of salt will considerably improve mortar, but the injury is likely to be caused while "setting down" the mortar, and will tend to keep them permanently damp. For the foundations it is not necessary to use much cement, and use the least amount and best way will be to build the stones, by them on a mild day, and immediately cover the mortar with hay or straw, and then let them stand out in the front. In any case, we strongly advise the architects to warn the owner, at the outset, that if he insists on having masonry done in the winter, he will take no responsibility for the consequences. They will use such skill as they possess in the direction of the work, winter-built brickwork cannot be made as good, under any circumstances, as that built in summer, and if the season should be unfavorable, with sudden changes of temperature, it may be very much worse.]

THE PROPOSED NORTH RIVER BRIDGE.

CHICAGO, ILL., December 18, 1888.

To the Editors of the American Architect:

Dear Sirs,—The design for the proposed North River Railroad Bridge at New York City, published in a recent number of your paper, is so striking an engineering problem and will be so graceful and dignified a monument if erected, that I cannot forbear to criticize one of the minor details which seems to be out of harmony with your other work. I refer to the attempt to make an architectural composition by putting architecture on top of the towers. The construction of them is of cast iron, over which is placed an architectural cap of cast iron in lieu of conventional work shown below. The effect results one of the African chief who adorned himself in a European costume consisting of a stove-pipe hat and linen collar. It needs no argument to point out that this day to provide for an architectural cap of cast iron is in bad taste, either from an architectural or engineering standpoint.

Another objection to the design of the towers is that the upper cap is made to rest on a slender column while the massive corner piers have apparently nothing to support. Of course any architect knows that the cable must be supported inside independently of this column, but it is made to appear as though this is not the case in any respectable design that it is actually strong. It must look strong and the piers or columns that support heavy weights must appear sufficient to perform the duty imposed upon them or the design will be a failure no matter how strong the actual construction may be.

The difficulty of giving artistic forms to constructive iron-work has long been recognized and the problem is one worthy the study of the best engineers and architects, but it is well-known that success does not lie in the design of concealing the construction by a mask of cast iron which in turn is made to imitate stone.

Very respectfully,

N. S. P.

THE TRAVELLING SCHOLARSHIP FOR NEW ENGLAND ARTIST PAINTERS.

To the Editors of the American Architect:

Dear Sirs,—If you will kindly tell me how long a student must reside in New England to qualify himself for the "Travelling Scholarship," I shall be extremely obliged. The question comes before the Board of Trustees, and I wish, as a sub-writer, to ask why the editors are so decided on this point. If not inconsistent, will it be possible to give some reasons—why that question admits of no doubt?

Respectfully yours,

Pictor Ignotes.

[We have referred this question to the authorities of the School of Design and Painting of the Boston Museum of Fine Arts, and received the following answer: "Resident of New England is understood artistically; that is, persons who were born in New England and are perhaps not very well instructed. But the examination is over for this term."—Ed. American Architect.]

THE ADVANTAGES OF THE ARCHITECTURAL COURSE AT COLUMBIA.

BOSTON, MASS., December 17, 1888.

To the Editors of the American Architect:

Deer Sirs,—Referring to the item in the American Architect of December 8, in which "Columbia" is given, unquestioned, the first place as an American School of Architecture—I wish, as a sub-writer, to ask why the editors are so decided on this point. If not inconsistent, will it be possible to give some reasons—why that question admits of no doubt?

Respectfully,

T. R. Kimball.

[Our correspondent could answer his own question after thoughtfully reading and comparing the descriptions of the several architectural schools of which we have recently published. The special advantages of the course at Columbia are: a corps of instructors who have had a long and wide experience; a compulsory course of study of four years' duration; a superior equipment; a Board of Trustees and Faculty thoroughly broad-minded and progressive, and, not least, the advantages of location.—Ed. American Architect.]
As to the use of colored mortar in cold weather, if the joints of the facing are of the colored mortar for four inches or so from the face, the work can be made to look tolerably well by repeating the worst places in the spring. If the mortar is dried by the fire or the sun before it is put on, at the joints, as is sometimes done, it is likely to fall out in place next summer and the effect will be the same which those who belief "should bear in mind is, that the sun is as much to be dreaded as the frost. In very cold weather, it is advisable to keep the East or South walls, if liable to freeze at night, and thaw by day, on the side facing the sun, heading over toward the sun in the spring. It is not easy to soften this, but it is always done by adding plumes of white oak, and coverings or shading employed. — Ed. American Architect.

TRADE SURVEYS.

Tartar could be no better time than the present to note two or three of the fundamental difficulties with which the business men are obliged to contend. The worst feature of these difficulties is, that they promise more complications. The first one is the enormous producing capacity of the factories, the enormous consuming capacity of the volume of capital not particularly employed, and further, the growth, daily, of the market, etc., etc. With this great increase in produc- tive capacity and the necessary abundance of production and productive capacity ought to be occasion for the business, but as trade is organized, the actual productive capacity to consume does not increase with the capacity to produce, and this is the trouble starts, pointing to periodic over-production, depression and dis- arrangement of trade and financial matters. The great difference in the revenue productive capacity before the commercial perturbations will cease long before it begins to make the assumption that the productive capacity to consume does not increase with the capacity to produce, and this is the trouble starts, pointing to periodic over-production, depression and dis- arrangement of trade and financial matters. The great difference in the revenue productive capacity before the commercial perturbations will cease long before it begins to make

FUNERAL CEREMONIES IN PARIS. — In all countries death and the ceremo- nies and customs attending are observed as well as in any country, thanks to the excellent organization of the Compagnie des Pompiers-Funérailles, which forms, so to speak, the keystone of the arch in all the city regulations. The halls in the court-yards are the store-rooms, the stables, the coach-houses and the garage-rooms. Everything is black, sombre and silent; everything is regulated, and the eye is fixed on the immediate object. The porters, or bearers commonly called "croupiers," have their apartments in the cellar, where they are kept every morning, 400 in number, to await orders — gloomy, serious, clad in various styles, some with blankets, but most of them in jackets. Over this room are other rooms for the bearers, running down the middle in double rows. Each cupboard is numbered and fitted with a lock, the key of which the correspondingly numbered croupier keeps. In these wardrobes are kept the uniforms of the bearers, who are to go out on service and undress when their service is over, only wearing their regulation costume while on duty. The masters of cere- moneys, who are also the masters of the house, are provided with a cocked hat, coat, knee-breeches, silk stockings, buckled shoes, a coat, and a white handkerchief. This personnel is paid by the day, so much for each funeral. His duty is to arrive at the house in time to fix the order of the precedence among the mourners and to start the funeral. Under the direction of the master of ceremonies, M. Fumey, the coffin is placed in a well-lit carriage, with gas-jets and full of rows and rows of coffins of all sizes and qualities. This cellar contains a stock of 15,000 coffins ready for use, varying in length from six feet two and one-half inches down to twenty-seven and one-half inches, which are the regulation maximum and minimum sizes of dead French humanity. For persons taller than six feet two and one-half inches a coffin has to be built on purpose and to order. On one side of the cellar are the head coffins, and in one corner a stock of square boxes in which coffins are packed for travelling by sea. There is a rather attractive sight on the left. Over the door of the cell are some huge coffins, with a circumference of six or nine feet, down which some of the giants of the human species are conveyed. Likewise near the door are thirty broad-leaved coffins, peculiar in form, on two wheels, bright green and lined with black; these coffins are used only when some terri- ble fatality has occurred, when the price of the coffin has to be cut; the inner lining and of the covering pall, are all regulated by an im- natable tariff. In 1879, during the siege, the little broad-leaved, painted green coffins numbered three or four thousand. It is a curious fact that all the horses had been killed for food. — New York Mail and Express.

ONE WAY TO SECURE A COMMISSION. — The selection of M. Chapu as the sculptor for the statue of Homére de Balzac, although approved by Frenchmen, has caused bitter disappointment to M. Marquet de Vas- selot, who for twenty years has had one of the bearers, who drew, was destined to make a statue of the novelist. The committee having charged M. Chapu $10,000 or $12,000, and sought a sculptor by the visitor, the artist in a select number of the bears, who had been the subject of the subject, and of the bearing of the bearers. Finally, it was considered that the work was to be done and M. Chapu was charged. The work was done and all M. de Vasselot's dreams. He had prepared himself for the work by making four or five busts of Balzac, he had made models of a monument by the hands of several of the sculptors who had been. He himself confident to create figures of at least three hundred of the characters. M. de Vasselot would not be called a very successful sculptor, but he had retained a few models, and was determined to make his mark by the monument of Balzac, then the bearers. When he had failed, he his work was not to be praised, but he was not likely to care about any other commission. Of course, he failed, and he would not say that he could make his mark by the monument of Balzac, then the bearers. When he had failed, the sculptors is then to its successful rival and has not the circumstances before him with an appeal to his generosity. To a man in M. Chapu's position, what is one monument more or less, while the victory means less to M. de Vasselot and misery to his family? In a case of the kind, what is to be done? If M. Chapu gave up his commission, would the committee give it to the sculptor who was so eager to obtain it? Many claims might be set up, and the task of the commission was to select the more effective. The inevitable disappointment which was felt by Benjamin Haydon under similar circumstances. All his life he was interested in the duty of the State to give the commissions for mural paintings, and he was executing of their behalf the powests when he was to receive them. His joy was great when it was announced that the Houses of Parliament were to be adorned in this way. He took part in the competition, and the smallest prize was not awarded to him. M. de Vasselot is, therefore, not the first artist who has been foiled in the ambition of his life. — The Architect.
The exterior of this house is stained with Cabot's Creosote Stain, for Shingles, Fences, Clapboards, etc.

These Stains are very durable and give a much more artistic effect than paint, while they are cheaper, and very easy to apply.

Our Stains contain no water and are the only exterior Stains that do not contain kerosene.

Prices are 50, 75, and 75 Cents per Gallon according to color.

Send for Samples on Wood, and Circulars.

Samuel Cabot, Jr.
70 Kilby St., Boston, Mass.
MODERN HEATING.

Father Time as he journeys on his weary way in the twilight of this 19th century might well be surprised at the progress the world is making in every shew of its industrial structure, and stop and wonder how and why we mysterious and active people are so different and more practical and less romantic than our predecessors were of a century ago.

Why do we want to change so wonderfully and rapidly, he asks? Why not be content with the good days of long ago? He would have us grow more in the way of Shakespeare's description of us as mere players on the World's stage. With our exits and entrances, advancing our growth in life from the infant to the soldier "seeking the bubble Reputation at the cannon's mouth," and not advancing into civilization and enlightenment as we would and must have it. Reputation in a peaceful and industrious manner, protecting ourselves when necessary by Brotherhoods, Labor and Trades Unions when properly managed and under right-minded leaders, against the monopoly of Trusts and the concentration of Capital of now-days.

In this enlightened century as the rising generation grow in civilization, and progress in social reforms and life, they feel that they must bend all their energies and thought with each other to provide more to the comfort, welfare and happiness of the home, and have the convenience and ease of travel as a luxury, and true we do find that the home is showing the touch of the hand of Dame Progress in our crowded cities. Houses are being built side by side in as friendly a way as space will allow. All down the ages, home above everything else has commanded first our best and most sincere attention. Travel may be a pleasure to most of people with all its modern advantages, but as the poet well puts it,

"Whatever realm to see where'er we roam,
Our first country is at home."

As to its architecture, this country has been making great progress within the last five years as much heat as is required to raise it from 32° to 95°. This heater would render a solid body hot by daylight, and still the steam produced by it has only 212° of sensible heat. Thus it is shown that the use of steam as the agent for heating is no longer an experiment, but is accepted by the public as the most healthful and agreeable agent now in use. To prove to you its popularity especially in New York City, where so many blocks of homes and stores are being erected every year, uptown and at its suburbs, we need merely to mention that Messrs. Clapp & Barron, New York agents for the Bronson Steam Heater, made by the Weston Engine Co., of Painted Post, N.Y., have just closed with a large contract to steam heat twenty-two apartment-houses uptown, New York. The contract distinctly says that none but this well-known "Improved Bronson," must be used in every house. The manufacturers of this heater are well-known and representative business men of Western New York, a firm of a well-deserved reputation and highly respected for their integrity in every detail in the business world. They have facilities which are unequalled for producing heaters in large and small orders promptly, and always prepared for any demand in this line. Their New York representatives are active and pushing business young men, and are in a position to provide for the comfort and happiness of the many and crowding homes now being erected within their jurisdiction. We commend them to your favorable consideration. They always take pleasure in answering inquiries, and will make plans, specifications and estimates free of cost to all parties sending them dimensions of the buildings they wish heated.

WESTON ENGINE CO.,
PAINTED POST, N.Y.

HAIKES, JONES & CADBURY, manufacturers of Plumbers Supplies, Philadelphia, Pa., have lately built extensive additions to their factories. They have now a wood-working homes steam is the best factor. The natural laws governing the generation of steam, the absorption of the heat of the fire by the water, its conversion into steam, its transmission of this heat mysteriously hidden in the vaporous mass to the various apartments of the home, there to give off this heat by conduction in radiators reconverting it into water, returns to its heater whence it first came only to continually repeat the process.

Prof. B. Silliman of Yale College, says:

"This is the best and most desirable way of getting heat. The west-eyed boy running hotter and hotter, and hotter and hotter."

Also, "Steam Heating is the healthful and agreeable agent now in use."

The Bronson Steam Heater.

They always take pleasure in answering inquiries, and will make plans, specifications and estimates free of cost to all parties sending them dimensions of the buildings they wish heated.

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stands, Tub-casings, Closet-seats, etc. They have put in new and improved machinery and employ only the most experienced and competent workmen. This enables them to turn out good work at a small cost. Their magnifi- cient show-rooms are well worth seeing, being filled with all kinds of appliances of the highest order. Four complete Bath-rooms are fitted up, one with a Copper Tub, one Enamel-iron, another Tile and another with an all-Perforated Tub. Each is perfect in its way. The closets manufactured by this firm are well and favorably known in every section of the country. Among some new and ornamental classes are the Enchased Electrolyte, Wyoming, Buffalo. They are all "Wash-outs" and every one sent out is warranted to be perfect.

**THE "TIMBY" BURGLAR-PROOF SASH-LOCK AND VENTILATOR.**

Among the unique things that have been put on the market nothing is more valuable, comparatively, in the line of house building than the Timby Sash-Lock and Ventilator. This device is not only novel, but quite effective for its intended purpose. It is designed to be set into the frame window, the center of the lock in line with the center of the meeting-rails of the sash, and is operated by means of a sliding thumb-nut on a face-plate attached to the inside stop. This lock is very simple in construction, easily operated, strong and durable, and automatically locks either or both sashes in any position desired, thereby affording the means of perfect ventilation, and at the same time perfect security against sneak-thieves. A kicking device in the thumbnut prevents the possibility of manipulating the lock from the outside when windows are left open for ventilation. The lock, therefore, accomplishes the double duty of affording at once security against forcible entry and ventilation to any degree that may be desired. It can be applied to any window, as it adjusts itself to varying thicknesses of sash or inside stops, and does not interfere with applying weather-strips or inside blinds.

The accompanying illustration shows a section of window frame with the lock applied, with the thumb-nut moved upward, releasing the upper sash—the cut being semi-transparent, to show the inner construction of the lock, actuating spring, etc. The bolts are made from the best malleable iron, the case from wrought-steel, the face-plates and thumb-nuts from brass and bronze metal, highly polished and lacquered, presenting a very handsome appearance when applied. There seems to be nothing about the construc-

tion or operation of this device to render it liable to become disarranged; it should be very durable, and must form a very substantial and desirable lock, affording much greater security and convenience than the centre sash devices in common use. The circular of the manu-

facturers gives full and explicit directions for applying and operating, so that no difficulty will be experienced in attaching them. The device seems to have much merit, and we commend it to the notice of our readers.

**JENKINS & TIMBY, NEW YORK, N. Y.**

**NIGHTINGALE FLOOR SPECIALTIES.**

The above is a section of the Nightingale Wood-Block Tiling Floor which has now been on the Market here fifteen months. It is being extensively specified by architects in different parts of the United States, especially impossibility for them to be lifted without the aid of a hammer and chisel, and not even then without destroying the blocks. The Composition also prevents dry-rot and dampness. Several millions of feet of this floor have been laid during the last few years under Mr. Nightingale's supervision in England and Ire-

land, in places where parquet tiles and marble floorings are often laid, the advantages over such being its noiselessness, solid- ity, warmth, and the doing away of chipping, cracking, and working loose of the floor from the foundation. The floor is in use the following buildings, and up to the present writing it has been specified for use in forty-six other buildings in various places: Royal Arcanum Club, Brooklyn; Dr. Browster's House, Brooklyn; Dr. Wunderlich's House, Brooklyn; Lawyer Keogh's House, New Rochelle; Niagara Insurance Offices, New York; The Jessup Mansion, Spring Lake; Mr. Montgomery's House, Parkville; Mrs. Eames's House, Fordham; Robbins Island Club-House; Belvedere Hotel, New York; Masonic Club, Brooklyn; Western Union Telegraph Building, New York.

Section above shows a system of making a fireproof, immovable, solid and noiseless floor over wooden beams or joists, doing away with the rough boarded floor, also dispensing with all kinds of deadening, pugging, beam-linings, fitting in wet con-

crete between beams, and the like methods of an unsanitary and destruc-

tive nature usually adopted. The fireproof fixing blocks are very light, being composed of coal-ashes, cinders, plaster-of-Paris and lime. They are moulded to shape and are hard and dry and free from all moisture before leaving the factory and being placed in position over or between the wooden beams. This saves caulking and like methods adopted and is indispensable to all who are and have been troubled and put to great expense by leaky floors. A perfectly level and well bonded floor is formed, strong and durable in all its parts, one solid compact mass. For a cheap, strong and lasting floor possessing the above advantages it has no equal yet placed before the public.

**FIRE AND SOUND PROOF FLOORS.**

1. Is the main girder resting on wall B and on pillar D.
2. Are the small iron joints resting on main girder A and on wall at C.
3. The iron joints B is in concrete and forming both floor and roof.
4. P shows a portion of the floor C laid with patent solid and noiseless Wood Block Tiles.

The illustrations above give a general idea.
of what is known as "Nightingale's Flat Concrete Construction," which is in use in hundreds of works, mills, mansions, barracks, factories, stores, banks, flats, offices, etc., in England. Small 3-inch by 1-inch rolled-iron bolts weighing 8 ounces each, 24 per foot, are fixed at 18 inches apart (forming the network) and bedded in the concrete, resting at each end upon walls or girders as the case may be. The cement concrete is 5/4 inches thick, including 1 inch of cement floating to a true level (which is allowed to consolidate and become hard and entirely free from all moisture) upon which rests the thoroughly seasoned wood-block tiles after being prepared in a special manner, each being bedded in a damp-proof adhesive and preservative composition, thus avoiding sleepers of all kinds and rendering the floor a solid, impervious mass into which neither fire, water, dust, rats nor vermin can possibly penetrate. This makes the floor fireproof both above and below. This system of fireproofing has been found to be economical, easy of adaptation and possessing great strength, rigidity and highly fireproof character. The floor is constructed so that it is entirely in one mass, consequently it is almost wholly free from lateral pressure. No thrust is transmitted to the walls, the walls being tied in and strengthened. It has been subjected to various times to severe tests, and has been accepted by the Insurance Companies on account of its fireproof qualities. It has been very thoroughly tested as to its sound-proof qualities acting towards sound as a brick wall towards sunlight and is therefore of the greatest utility in all public buildings. No better test could be given than a school-room for boys over a lecture or meeting room, and yet in cases where this system is in use, those in the lower lecture-room are absolutely ignorant of when or how the boys leave the room above. These advantages are of paramount importance not only in public buildings and offices, but also in apartments.

The firm's name and address is the NIGHTINGALE FLOOR IMPROVEMENT CO., 157-163 BROADWAY, NEW YORK.

The steam plant which is to be erected by the Ball Engine Company of Erie, Pa., at Union City, Ind., is nearly completed, and it is the purpose of the local company to get everything in readiness so that they can illuminate their city on the 4th of July. The Electric Light Company at Trinidad, Colo., have met with such pronounced success that they have found it necessary to increase their capacity and to this end have ordered another engine from the Ball Engine Company, of Erie, Pa. The Paterson Electric Light Company of Paterson, N. J., have their building nearly completed. The system to be used is that of the Thomson & Houston Company, of Boston, Mass., and will be the finest equipped station in the United States; the steam-plant consists of five 125 horse-power engines, which will be erected complete in every detail by the Ball Engine Company, of Erie, Pa. The city of Rome, Ga., will be lighted with electricity; the Thomson & Houston Company, will furnish the electrical apparatus and the Ball Engine Company of Erie, Pa., has been awarded the contract for one of their celebrated steam-plants. The

Ball Engine Company of Erie, Pa., has been awarded the contract for furnishing power for the Atlantic City Electric Light Company of Atlantic City, N. J. The Ball Engine Company of Erie, Pa., will furnish engines for the Newark & Schuylkill Electric Light Company of Newark, N. J. A large plant will be erected by the Ball Engine Company of Erie, Pa., to operate the Thomson & Houston system of arc lighting for the City Gas-Light Company of Norfolk, Va.

BALL ENGINE COMPANY, ERIE, PA.,

NOTES.

A recent issue of the Scientific American contained an exhaustive description with numerous illustrations of the works and manner of construction of the Gorton Boiler, manufactured by the Gorton and Lidgerwood Company, which is now so popular for house heating purposes.

The Chrome Steel Works, Brooklyn, N. Y., manufacturers of the celebrated Chrome Steel now used extensively throughout the country, have bankers and others engaging in vaults and safe work to insert in their contracts: "Chrome Steel and Iron 5-ply manufactured by the Chrome Steel Works of Brooklyn, N. Y.," and then call upon them to furnish a certificate stating that they have supplied the successful bidder for their work, with their material, as there are several cheap imitations of Chrome Steel which safe makers and others are persuaded to buy, because they can buy them at a less price than the genuine Chrome Steel. These imitations are of course represented to be equal to the genuine article, which they are not, taking like all counterfeits the peculiar and remarkable qualities of the genuine.

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Factory, 157-163 WEST 29th STREET, NEW YORK, N. Y.
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Is superior to any other Portland Cement made. It is very finely ground, always uniform and reliable, and of such extraordinary strength that it will permit the addition of 25 per cent more sand, etc., than other well-known brands, and produce the most durable work. It is therefore the most economical to use. 8,000 barrels have been used in the foundations of the Statue of Liberty. Architects and those interested in Portland Cement will please send for my pamphlet, which will be mailed free on application. It contains valuable directions for the employment of Portland Cement, a table of results of the strength of the Dyckerhoff Cement when mixed with sand and broken stone in various proportions, together with testimonials of eminent Engineers, Architects and Consumers.

E. THIELE, 78 William St., New York.
SOLE AGENT FOR THE UNITED STATES.

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EDWARD SMITH & CO., VARNISH MAKERS,
158 WILLIAM STREET, NEW YORK.

WOOD BLOCK PLAIN LEVEL.

System of Making a Fireproof, Immovable, Solid and Durable Floor over Wooden Beams, without the aid of Deaflining, Puffing, Beam linings, Mineral Wool, filling in of wet Concrete between the beams and like methods of an unsanitary and destructive nature usually adopted. This forms a perfectly level and well bonded floor, strong and durable in all its parts, independent of all who are and have been troubled and put to great expense by leaky floors. Perfectly Watertight. No bowed floor required to be laid over Wooden Beams; FIREPROOF FIXING BLOCKS being need instead.

NIGHTINGALE FLOOR IMPROVEMENT CO.
151 Broadway—NEW YORK.
THE DURHAM SYSTEM OF HOUSE DRAINAGE.

The Durham System may be broadly described as a combination of scientific design, proper materials, and correct mechanical construction,—a common-sense application of obvious means to secure a result of vital importance.

The design of the work, the materials used, and the workmanship employed are an entire departure from the ordinary plumbing practice.

The result attained is a system of pipes which are independent of the building for support, which cannot be cracked or broken, and whose joints are permanently gas-tight beyond the shadow of a doubt.

Proper mechanical construction is the foundation of good drainage. The Durham System is a drainage apparatus constructed with wrought-iron (steam) pipe and heavy cast-iron fittings of special shapes, screwed together. This apparatus, when erected in a building, is steam-tight, elastic under pressure, and at all points absolutely invulnerable; it will last, unimpaired, as long as any building will stand—without any outlay for repairs.

Patented.—The Durham System is fully covered by patents. No patent could be obtained on the use of wrought-iron pipe, or screw joints, for drainage purpose; but the combination of wrought-iron pipe and special screwed fittings, which constitute a "new and improved" drainage apparatus, is patentable.

The cost of the Durham System to the public, however, is no greater for the patents. They were secured for protection, and are not used for extortion.

MECHANICAL ADVANTAGES.

Joints.—The screw-threaded on the pipes and in the fittings are cut by powerful machines, run by steam-power, to standard gauge, so that they exactly correspond. The threads are tapering, so that the further the pipe enters the fitting the tighter becomes the joint between the two. The threads are first covered with a thick paste of red-lead and oil and the pipe then screwed home by means of steam-fitters' chain tongs, by which a man can exert a powerful leverage. This work requires no skill—merely strength—and it is done in a moment. A laborer can make a tighter screw joint in one minute than a plumber with his materials could make in one hour.

Exposing Pipes.—Pipes should not be buried underground (within the building) nor hidden within the walls. It is a great satisfaction to be able at any time to examine drains and soil-pipes without the expense of tearing up. With the Durham System there is absolutely no objection to their being in plain sight everywhere; there are no joints between floor and ceiling; the pipes can be painted or bronzed, and do not betray their use or purpose in any manner. They simply look like steam-pipes,—which they actually are,—and the public have long been accustomed to the presence of steam-heating pipes.

In the New York Cancer Hospital 3000 feet of our drainage pipes are in plain view, except where they pass through the floors. At the School of Mines, Columbia College, the store is open, the sense of its strength, and the effect of the interior condition of his hands, or remove an obstruction, without incurring a plumber's bill of expenses.

Tests can be made conveniently when the Durham System is finished, by screwing plugs into all openings and turning on steam, or filling the System with water to the tops of soil-pipes. No other than a pressure test of drainage is of any value.

DURHAM HOUSE DRAINAGE CO., OF NEW ENGLAND,

207 TREMONT ST., BOSTON, MASS.

THE EVERETT WEATHER-PROOF WINDOW.

To the untinted the accompanying cut may seem unintelligible, but it represents a device of more than ordinary merit. The left-hand portion of the cut shows a section through a window exhibiting the two sashes, upper and lower, the parting-strip, a portion of the window-frame and the stops holding the sashes in place. By observing the cut it will be noticed the parting-strip is covered on each side and a sort of overgrown comma will be noticed, with its head in the sash and tail in the core. This comma is the gist of the whole invention, and represents a rubber-strip which is fastened in the sash, fitting a groove made to receive it and into which it is drawn, the blade represented by the tail of the comma extending out and forming to the core in parting strip from either side a complete barrier to the passage of wind or dust, obviating the necessity of other weather-strips. The portion of the cut to the right is a section of the meeting-rails of the upper and lower sash, and the small rail at the bottom represents the stop-bead at the bottom of the window, the comma in each case being a rubber-strip, thus surrounding the window completely by a rubber-strip, and forming the most perfect weather-stripping imaginable.

Architects would do well to look into this as it has been thoroughly tested and is now specified in most of the best houses being put up in New York City. It is a permanent fixture and does not disfigure the windows. The device is a very simple one and reflects credit on the ingenuity of the inventor; who is also the manufacturer. We might remark that this device is as readily applied to old work as new, but for further information we refer our readers for circulars and prices to

J. W. EVERETT,

11 EAST TENTH STREET, NEW YORK, N. Y.

The Linoide Manufacturing Co., of Boston, has recently been established for the purpose...
TABLE OF COMPARISON BETWEEN COST OF COOKING BY COAL AND GAS.

The following Table of Comparison shows the result of a careful test made by the Goodwin Gas Stove and Meter Co., of Philadelphia, between articles cooked on a Peerless Range No. 8, and a No. 7 Sun Dial Gas Stove, giving their weight before and after cooking, and their cost.

TABLE OF PEERLESS COAL RANGE NO. 8.

<table>
<thead>
<tr>
<th>ARTICLE</th>
<th>How Cooked</th>
<th>Before Cooking</th>
<th>After Cooking</th>
<th>Weight</th>
<th>Time</th>
<th>How Cooked</th>
<th>Before Cooking</th>
<th>After Cooking</th>
<th>Weight</th>
<th>Time</th>
<th>How Cooked</th>
<th>Before Cooking</th>
<th>After Cooking</th>
<th>Weight</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluefish</td>
<td>Baked</td>
<td>2 lbs.</td>
<td>3 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Rib of Beef</td>
<td>Baked</td>
<td>9 lbs.</td>
<td>9 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Baked</td>
<td>9 lbs.</td>
<td>9 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Baked</td>
<td>9 lbs.</td>
<td>9 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Chicken</td>
<td>Baked</td>
<td>8 lbs.</td>
<td>9 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>8 lbs.</td>
<td>9 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>8 lbs.</td>
<td>9 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Beef Steak</td>
<td>Baked</td>
<td>12 lbs.</td>
<td>13 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>12 lbs.</td>
<td>13 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>12 lbs.</td>
<td>13 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Loin Pork</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Sweet Potatoes</td>
<td>Baked</td>
<td>5 lbs.</td>
<td>6 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>5 lbs.</td>
<td>6 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>5 lbs.</td>
<td>6 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Carrots</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>Boiled</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Turnip</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Bread</td>
<td>Baked</td>
<td>5 lbs.</td>
<td>6 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>5 lbs.</td>
<td>6 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>5 lbs.</td>
<td>6 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Nage Pudding</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
<td>Boiled</td>
<td>4 lbs.</td>
<td>4 lbs.</td>
<td>0 lbs.</td>
<td>31 m.</td>
</tr>
<tr>
<td>Lemon Pie</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
<td>Baked</td>
<td>3 lbs.</td>
<td>4 lbs.</td>
<td>1 lb.</td>
<td>31 m.</td>
</tr>
</tbody>
</table>

Total time from lighting of fire until everything was ready to serve, 5 hours and 40 minutes. Of this 5 hours 40 minutes, 1 hour and 20 minutes was occupied in heating the fire. Total weight of coal, 44 pounds. At the end of the time the fire was ready for more cooking, 1 hour 40 minutes, 12 pounds, 1150 cents. Kindling, 1 cent.

12,500 cents.

MARYLAND SERPENTINE.

MARYLAND Serpentine or "Green Marble" as it is familiarly known to the trade, is found in the serpentine belt as it passes through Harford County, Maryland, and belongs to the class of metamorphic rocks; it is a hydro-silicate of magnesia, containing no lime whatever, it is a mixture of percentages of oxides of chrome, nickel and iron which give it its varied shades of green color, and there are occasionally, small thin veins of dolomite passing through the mass. It takes a perfect arid an extremely fine and brilliant polish; it does not weather, but retains its polish as well as granite; there have been severe tests made of this quality by being exposed to the weather, and after a year's time there was no perceptible change in the polished surfaces, after which covering with water were as bright and fresh as when first put on, nor were the rubbed or rough surfaces changed in any way.

As an ornamental stone, for wherever a green color can be used, there is no superior now known, and it is particularly adapted for Wainscoting, floor and window tiling, mantel facing, ashlark work, columns, pilasters, pedestals, monument work, etc. The peculiar, non-weathering qualities render it particularly suitable for out-door work or anywhere exposed to the action of water, or the atmospheric gases which usually are so destructive to marble work.

Professor Frel. A. Genth, of the University of Pennsylvania, after a personal examination of the quarries in Maryland, reports in substance as follows, viz.:

"It is a variety of massive serpentine, somewhat resembling Williamsite, and shows sometimes a slightly slaty structure. It occurs in various shades of green, from a pale, leek green to a deep blackish green, and from a small admixture of magnetic iron more or less clouded, rarely with thin veins of dolomite passing through the mass. It is translucent to semi-opaque. The analysis of a deep green variety, gave the following results:

Silica Acid 40.00
Alumina 1.37
Magnesia 14.23
Niccolous 0.08
Manganese 0.03
Magnesia Acid 0.09
Magnesia 0.06
Manganese 0.02
Iron 0.00

It is of a green color due to the oxides of chromium, nickel and iron present. It is susceptible of a very fine and brilliant polish, and forms an admirable, a significant ornamental stone, which not only on account of its durability, but also of its beauty, is superior to anything similar that is known.

It belongs to the same class of ornamental stones as the so-called verde-antico, which is a white marble more or less clouded with dark green, sometimes called "Emerald". It is a mechanical mixture of predomiating green serpentine with white marble; but is superior to either in respects. In the first place it will stand weathering better than either; how little effect the atmosphere has upon it is evident from the examination of rocks on the mountaintop, which have been exposed for thousands of years, are not weathered to a greater depth than about 1/4 to 1/8 of an inch and are quite fresh and green below. In a polished condition it appears to me to be practically almost unalterable, as the polished surfaces do not admit of the absorption of atmospheric agencies, which cause the decomposition."

(Signed) WILLARD H. MORSE, M. D.

This stone has been introduced upon the market within the last year or two and is received with great favor by the architects and builders and has been used for ornamentation to a considerable extent in a great many of the large public and private buildings which are now in course of erection or recently completed; a few of the most prominent are: New Public Buildings, Philadelphia, Pa.; Equitable Insurance Co.'s New Building, New York; Bullitt Building, Philadelphia, Pa.; Donce de Leon Hotel, St. Augustine, Fla.; State, War and Navy Dep'ts. Building, Washington, D. C.; Fletcher Building, Wichita, Kan.; Wilmington Savings Fund Society Building, Wilmington, Del.; James Everson's Russian and Turkish Bath Building, New York. Behind this success is the wide-spread use of this article and numerous private buildings and residences.

There is also a black variety of this serpentine which is fully equal to Glen Falls black, for tiling, bordering, bases, etc., and much more durable.

Particular attention is called to the fact that this is not the Chester Co., Pa., serpentine used for ornamentation and especially for private houses. The Chester granite is a qualitative mass of magnetite, pyrites and numerous other minerals, whereas the Glens Falls is a perfectly pure green stone, with a very slight admixture of magnetic iron, while the Chester granite is impregnated with it. Glens Falls has a dense green and a more pronounced black hue, and is richer in composition than Chester granite. It is a perfect black marble, and is extremely fine and regular in texture, and is a most useful and elegant material for domestic purposes. It is also used extensively for the purpose of decoration, and is found in many fine buildings in New York City and elsewhere. It is also used extensively for the purpose of decoration, and is found in many fine buildings in New York City and elsewhere. It is also used extensively for the purpose of decoration, and is found in many fine buildings in New York City and elsewhere.

Table of Comparison of Percentages in Loss After Cooking

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breaks small to cold, this current ter, when trap. tend lys other as of must it pose adequate accomplishing it submitting in;:

TRAP SIPHONAGE. We have before called attention to the McClean Vent, of which we present a cut, showing it in a somewhat different form, suited for use where a side connection is needed, rather than the older form opening from below. In referring to this device, it may not be out of place to refer to the question of back-venting, and one of the advantages this vent offers as against the usual form of running a vent-pipe to the roof. Either one of these systems proposes accomplishing the same object, namely, supplying air to the sewer side of the trap, thus saving the seal of the trap by relieving it of atmospheric pressure which otherwise would cause its siphonage. And for accomplishing this purpose both are adequate under ordinary circumstances, but there are frequently cases where back-venting by pipe-connection falls of its purpose; as when a house is so situated that it is more difficult to move the column of air than to siphon the trap, in which case the trap must suffer, as in fact it frequently does; but this is not the only defect; this system of back-venting tends to create a strong and constant current of air through the vent-pipe which tends to evaporate the water in the trap. This is especially liable to happen in small traps or those not frequently used, such as the traps under wash-trays or basins in spare rooms, where this costly and intricate system of plumbing is liable to prove anything but effective as a security against sewer-gas. In other words, this system does too much; it does not stop its work when it has prevented siphonage, but by evaporation as effectively breaks the seal; especially in this true in winter, when the air outside the dwelling is warm to the utmost degree of dryness by the cold, and upon entering the warmer pipes of the house finds its power of absorption immediately raised and attacks the water-seal in every trap with the utmost avidity. No better proof of this can be given than the fact that in very cold weather the top of the pipe opening on the roof is frequently closed by the moisture frozen there. This defect is not found in this vent, for immediately upon the flow of waste water stopping, the vent closes and the passage of air stops, and besides, the air passing into the pipes by this vent is the warmer air of the building not the cold, dry outside air, and the tendency is rather to precipitate moisture in the pipes than to cause evaporation. We have in former reference called attention to experiments made to test this appliance, but enough has been said to show the advantage of this system of back air over the system usually adopted, to say nothing of the large expense involved in the complicated systems in general use. If we were to prophesy regarding future plumbing systems, we should say they would tend in the future towards greater simplicity, and the present complication, the more in use and the less frequently enforced by law will come to be regarded as the outgrowth of a period of mechanical lucy.

DU BOIS MFG. CO., NEW YORK, N. Y.

MORTAR STAINS. The pleasing effects attainable by the use of Mortar Stains has led to their wide-spread adoption by architects and builders, especially in the beautiful suburban towns adjacent to large cities, for where the demand for them is steadily upon the increase. The character of the coloring matter used is of course, an important consideration, and as results are not always immediately manifest, too much care cannot be exercised in their selection. Competitive tests of the different brands all point to the "Pecora Mortar Stain" as the most desirable, especially in the thoroughness of its coloring, economy, permanence and absolute imperviousness to atmospheric changes. Neither heat, cold or dampness will cause it to run or bleach and in no respect does it alter the condition of the mortar, quicken the set or induce it to crumble. No more haste therefore is necessary in striking the joints than with ordinary white. Careless analysis also does not leave its freedom from all substances injurious to the workman and likewise demonstrates the absence of gas, oil and all impurities which tend to hinder the process of hardening. It is incapable of change and therefore cannot possibly increase the white deposit common to brick fronts, and being reduced to a smooth paste it assimilates readily with the mortar, while we have the testimony of competent experience that a given quantity of this stain will color one-third more mortar than any in use, so that, all points considered, "Pecora Mortar Stains" are by long odds the most effective and economical of all.

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THE PRINCIPLE OF THE SANITAS WATER-CLOSET.

The requirements for a water-closet are, (1) simplicity, (2) quickness and thoroughness of flushing, (3) freedom from unsucured parts, (4) economy in construction and water consumption, (5) compactness and convenience of form, (6) apply of standing water in the bowl, (7) accessibility and visibility of all parts, including trap, (8) smoothness of material, (9) strength and durability of construction, (10) facility of cleaning, (11) security against evaporation and siphoning, (12) ease and convenience of flushing, (13) cleanliness in operation, and (14) neatness of appearance.

The pan-closet must be discarded, because it violates all one of the above requirements. The valve and plugger closets must be discarded, because they violate all but the sixth and twelfth requirements. The ordinary so-called long and short boppers are to be rejected, because they violate...
fresh supply descends automatically from the pipe as soon as the surface sinks below its mouth. Inasmuch as in the construction of the closet, this mouth, or level above the bottom of the water-seal, it is evident that water will instantly descend from the pipe before the seal can be broken. This seal is four inches deep, and the mouth of the pipe is midway between the top and bottom of the seal, or, in other words, two inches below the normal level of the standing water in the bowl.

Fig. 36 represents the actual construction of the closet.

The action of the apparatus is as follows:

1. The cistern-valve, being raised, the balance of atmospheric pressure is restored, the water-column in the pipe instantly begins to move, and, since it connects with the water in the closet below its level, it acts noiselessly and effects a thorough flushing.

2. A novelty in the general principle of construction involves corresponding novelties in many details.

3. The lower end of the supply-pipe is not simply opened at a single point below the water level, but is conducted to two places independent of each other, the first being intermediate between the overflow of the trap and the bottom of the seal, as is shown in Fig. 35, and the second at the bottom of the trap.

4. The form of the mouth proper of the "inert bottles" and supplies water to the flushing-rim, and the second furnishes a jet which lifts part of the water out of the trap and bowl by its propelling power. Since both jets enter below the level of a large body of standing water in the bowl, their noise is damped, and, as the supply-pipe always stands full, they act instantly, and the flushing of the closet is very rapid.

5. The lower jet causes the water and waste matters in the closet to sink into the neck of the bowl. Meanwhile, the upper jet fills the passages and annular chamber leading to and surrounding the flushing-rim, overflows, and descending into the neck of the bowl, falls upon and drives out the waste matter collected in the neck quietly and without waste of water.

6. The cistern-valve being again closed, movement in the supply-pipe immediately ceases, and the water in the flushing-rim and passages leading thereto, falls back into the closet and restores the normal level of the standing water in the bowl and trap.

The form of the closet bowl is shown in plan in Fig. 37. The standing water has the shape best calculated to receive and deodorize the waste matters falling into it. It is deepest at the back of the closet, and very deep at the point where the waste strikes. Its surface is long and comparatively narrow, and is not round or elliptical, as has hitherto been customary. The reason of this is simple, and will be understood upon reflection. We know that the user of a closet will sometimes sit forward, and sometimes back on the seat, according to circumstances, but it rarely, if ever, happens that he will sit laterally out of centre, insomuch as this would be extremely awkward and uncomfortable. Hence the water surface should have considerable longitudinal extension, while much less lateral extension is required; and we have found, that the narrower the water surface, in certain limits, the more easily, quickly, and economically in respect to water consumption will the waste matters be expelled. By examining Fig. 36 it will be observed that the under surface of the bowl is horizontal from front to rear, except at the outlet, and that this surface is immersed under an inch or so of water. It will also be observed that the water-level in the flush-rim is largest in the front and rear, and gradually diminish as they extend round to the sides. The result of this combination is that the upper flushing water jumps on top of the waste matters and acts to the best possible advantage in driving them quickly out, and the closet can be easily flushed in three seconds by less than a gallon and a half of water.

A stream of water may be rendered noiseless, however rapid and powerful its movement, by properly directing it into a body of water larger than itself, provided the point of entrance be below the surface. It is not sufficient to do this in the manner usual in the old form of English and French siphon-jet closets, because the jet in these at once throws the standing water out of its way, and then makes an uproar even more appalling than the ordinary flushing stream. In these "siphon-jet" closets, the water used for cleaning the upper part of the bowl, when used in combination with the jet in the trap, is not only insufficient to keep the lower jet covered, but makes a most disagreeable clamor of itself, after the usual manner with modern closets.

The upper flushing stream should furnish a body of water nicely calculated to keep the lower stream just covered, and should itself be noiseless. The former result is easily attained by simply adjusting the size of the upper and lower flushing openings in proportion to each other; the latter by constructing a chamber into which the upper flushing stream may be projected before it enters the bowl.

The upper part of this chamber forms an annular ring and surrounds the flushing-rim. Being above the level of the standing water in the bowl, it receives only clean water. Being constructed in such a manner as to drain itself back into the closet bowl after each flushing action, it will make the flushing-rim proper, empty, and surge less times excepting during the moment of flushing. The upper jet discharges into the standing water in the lower part of this chamber, and its sound is instantly and permanently deadened. The water rises in the annular chamber and overflows through the flushing-rim to descend quietly into the bowl, lubricates the seat, and assists the lower stream in expelling the wastes and flushing the closet and drain-pipes.

In order to make a perfectly permanent and efficiently tight siphon-connection, metal plates, or shoes, are used. These shoes are cast to exactly fit the porcelain base. The shoe has a four and one-half inch hole in it, correspondingly with the outlet hole in the water-closet.

The lead pipe which is to connect the closet with the iron soil-pipe is to be first flanged over the four-inch pipe above the seat, and bolted to the soil-pipe at the shoe at the floor, and the closet is then set in place on the shoe and screwed down by means of four brass machine-screws which are furnished with each closet. The holes in the outerware base correspond with the threaded holes tapped in the shoe. A mixture of red lead and putty is used between the earthenware base and the threaded recess in the shoe. This hardens the whole becomes, as it were one piece, and the closet is thus independent of shrinkage or settling of the floors. All movement takes place in the flexible lead-pipe below, which should always be used between a closet and the rigid iron soil-pipe. The joint thus becomes a permanently sewer-gage and valve joint which cannot be injured by jarring, settlement, or shrinkage in the building.

It will be observed, by referring to the perspective drawing, that the closet is provided with a cistern overflow connection at the flushing rim.

The same pipe may serve also as a ventilating pipe. By connecting this with a proper ventilating flue above the cistern, in the manner shown in the drawing, Fig. 38 (on p. 44), the seat and bowl of the closet may be ventilated. Such ventilation is serviceable at the moment of usage of the closet, but it is not needed for the bowl and trap themselves, which are kept odorless by their construction and arrangement for flushing. It is well, however, always to ventilate toilet-rooms, for the purpose of removing the vapor and gases generated during their use by the occupant and by the gas burning, and as good a place to locate the ventilating outlet is under the seat of the water-closet in the manner described.

Let us now examine our table of desiderata, and see in how far this closet conformed to the various items.

1. **Simplicity.** We find here the simplest form possible with closets. The trap and the bowl are one and the same thing. Each forms half of the other. The flushing is accomplished by the pressure of the water only, and without machinery of any kind in the closet.

2. **Quickness and thoroughness of flushing.** The manner of flushing is attained by having the supply-pipe receive a full and steady supply of water, so that the action at the lower end takes place simultaneously with the lifting of the valve, and all delay and loss of power occasioned by the water falling from the cistern through the pipe and against the resistance of the enclosed air is avoided. The two water jets of water is, moreover, as already described, so as to accomplish the removal of the waste matters with the utmost speed, in virtue of their cooperation.

3. **The thoroughness of the flushing or cleaning action.** Without a given quantity of water, is evidently in direct proportion to the rapidity and direction of the action, being assumed that the surfaces to be flushed are properly constructed to receive it, as is the case with the closet under consideration. The form and volume of the standing water in the bowl is such as to protect the sides from being fouled.
by adhesive matters. The solid and heavy wastes, which are the adhesive ones, cannot fall against these sides. If liquid or semi-liquid matter is projected against them they will not stick. Therefore these sides require not so much great force as a uniform distribution of the flushing water. The parts which require scouring force are those below and beyond, including the trap and the main soil and drain pipes, and it is these parts which in this closet receive it. The scouring action on the back portion of this, and the modesty of the closet, while it is free from the siphoning action on fixtures below the latter; for air freely follows the discharge and prevents the formation of a vacuum.

3. Freedom from all unscored parts. The closet contains no crevices in its construction, and has the minimum extent of surface, interior and exterior, possible in a water-closet, and, as such, will be found in keeping with economy, strength and durability possible with water-closets.

4. Economy in construction and water consumption. Being constructed of a single piece of earthenware of compact and simple form, this desideratum is met. The consumption of water is reduced to a minimum, in the manner already explained. No loss of power is sustained in the supply-pipe, and each drop in the closet is used in the most effective manner, to concert with the rest, to produce a rapid and thorough flush.

5. Compactness and convenience of form. The closet occupies the minimum of space, as may be seen from the perspective drawing. The outlet is under the centre, which facilitates its setting.

6. Ampleuse of standing water in the bowl. The flushing water has the proper form and depth, and its surface is calculated to stand at the most desirable distance below the seat of the closet. It will be seen, upon reflection and experiment, and in testing different forms of water-closets, that the nearer the seat the surface of the standing water can be brought, the loss liability will be for sparing when the closet is used. But, if the seat be made so that the surface could be brought so near that the soil would actually touch it before falling, there would be no spattering at all. But, of course, it should not stand so near as to come in contact with the person. The distance established as the best, all things considered, is five inches below the top of the flushing rim, and this distance has been adopted in the case of the Sanitas closet.

7. Accessibility and visibility of all parts, including the trap. A study of the drawings will show that this desideratum has been attained. The closet and trap, as well as its supply-pipe and cistern, may easily be emptied by a sponge or ladle when the house is closed during the winter.

8. Smoothness of material. The closet being constructed of glazed earthenware in a single piece, and everywhere with easy bends, this requirement is fully answered.

9. Strength and durability of construction. The compact and simple form of the closet, the central position of the base under the bowl giving material firm support, the strength of the material, and the soundness and reliability of its soil-pipe connection, give it the greatest strength and durability possible with water-closets.

10. Facility and reliability of joining. There is but a single, simple, and strong brass coupling connection to be made with the supply, and a single connection with the waste-pipe. The small coupling at the flushing-pipe for a seat-cistern and cabinet overflow may be used or closed up, as desired.

11. Security against evaporation and siphoning. The new principle of supply already described, together with the unusual depth of the water-seal, render this closet practically secure against loss of seal through evaporation and siphonage.

12. Ease and convenience of flushing. It is only necessary to pull the valve-chain and immediately release it again to obtain a sufficient, and no more than sufficient, flush. The trap and bowl refill themselves automatically after the flush. The valve may also be operated by a simple seat or door attachment, if desired.

13. Noiselessness in operation. This very important desideratum has been much neglected in modern water-closet construction. It has hitherto been assumed that it would be impossible to combine noiseless action with a powerful and rapid water scour. Nevertheless, this has been accomplished in our Sanitas closet in the manner already described; and the closet may be used in becoming secrecy, as is agreeable to civilized people, and without the usual "flourish of trumpets," which so ridiculously proclaims the fact to the household whenever any one has sought a moment of special privacy.

14. Neatness of appearance. Now that the wise custom of setting all the plumbing fixtures open is becoming every day more general, it is important that every fixture should be so designed as to present an agreeable and appropriate appearance. By this we not only save the expense of paneled woodwork, but secure better workmanship and healthier houses.
Perhaps the most exhaustive tests that could be applied to Portland Cement were made on "Back Cross" which was selected by the Library Commission after reports made by General Meigs and Licent-Cel. Peter C. Hains recommending it for the concrete foundations of the Congressional Library Building, Washington, D. C., as the most suitable for the work after other brands had been condemned.

It is remarkable for its absolute uniformity and capacity to carry a larger aggregate when compared with other well-known brands of cement, which makes it the most economical to use.

We learn that it is more extensively employed than other kinds in the construction of the New Croton Aqueduct, and some is purchased by the New York Dock Department for construction of breakwaters on the river front.

To those interested in this subject a pamphlet under the caption "Some Information on Portland Cement" will be sent on application to Howard Fencing, 23 Liberty Street, New York.

The Chalmers Spence Company of New York, whose asbestos goods, more particularly their removable pipe and boiler coverings, are well known throughout the United States, removed their Philadelphia office, July 16th from 32-34 South 2d Street to 21 Strawberry Street, where their representatives will be pleased to show their asbestos specialties and explain their merits to all interested parties.

The Whittier Machine Company are putting into the Sherman House, Boston, a new hydraulic passenger elevator operated by their pressure tank system. They are also putting into the building No. 19 Nily Street, occupied by Mr. J. C. Pang, a new hydraulic passenger elevator operated by their pressure tank system.

**BUILDING INTELLIGENCE.**

*Reported for the American Architect and Building News.*

**ALTERATIONS.**

**Philadelphia.**—*Stout St., a cor. Market St.;* steel addition to feed-plan; owner, Jacob Zell, 230 Philadelphia Ave.

*Frankford Ave., w. b. Green and Kaan Sts., facing to stone building; owner, Walter Scott, 424 Franklin Ave.

*Frankford Ave., w. b. Oxford St. and Columbia Ave., steel frame building and interior alterations; owner, William Wulfsborg, 1803 Cathedral St.

*Twentieth St., w. c. Twelfth Pl., French roof on dormer; owners, Stacey, Reeves & Sons, 161 Filbert St.*

**LEIPPER'S BETTER SYSTEM.**

**Leipper St., No. 436; two-st'y addition; owner, James Blackby.**

**South St., No. 758, addition to back building and bay window; owner, Chas. T. Brown, 250 Florida St.**

**Pine St., w. cor. Wood St., two-st'y addition; owner, C. Geo., 301 Vine St.**

**Ninth St., No. 183, rear, two-st'y addition; owner, Thomas A. Lynch, 1609 North Fifteenth St.**

**Olive St., s. b. Grace and Cotton Sts., cor. addition; owner, John Steifeler, Mannayunk Ave., near Shur's La.*

**HOUSES.**

**New York, N. Y.—Champlin Ave., w. s. 75th & Hitter Pl., two-st'y brick and frame dwelling, tin roof; cost, $4,000; owner, Mary A. Connolly.**

**Thirteenth St., architects, Arentz & Meyer, 202 Allegheny Ave.**

*One Hundred and Fifty-fifth St., n. s. 1527 N. Boulevard, 10 three-st'y brick dwellings, tin roofs; cost, $83,000; owner, Mary B. Gaver, one Hundred and Forty-third St. and Eighth Ave.; builder, John H. Walls, 438 Twenty-fourth St. and N. Fifteenth St.*

**Forty-second St., n. s. 1727 Nelson Ave., six-st'y brick dwelling, tin roofs; cost, $84,400; owners, Angelo Monfte, 116 East Fifth St., architects, Schenck & Flatt, 20 Bible House.*

**Eighty-fourth St., n. s. 1900 Eighteenth Ave., three-st'y brick dwelling, tin roof; cost, $49,000; owner, Machine Mound, 112 Thirty-second St.; architect, John M. Dunn, 1130 Broadway.*

**Ninety-first Ave., n. s. 2162 5-31 One Hundred and Eighty-fourth St., twenty-five brick and frame dwelling, tin roofs; cost, $25,500; owner, John W. Hutchinson, 231 West One Hundred and Twenty-third St.; builders, Cooperative Building Fire Insurance Association, 65 Broadway.*

**West End Ave., w. b. Eighty-third St., ten four-st'y brick dwellings, mansard, tile and slate roofs; cost, $105,000; owners, Robert H. Lins, 12 Thirty-second St.; architect, Jas. H. Tufts, 100 Broadway.*

**East End Ave., n. b. Eighty-fifth St., ten five-st'y brick dwellings, mansard, tile and slate roofs; cost, $150,000; owners, Robert H. Lins, 12 Thirty-second St.; architect, Jas. H. Tufts, 100 Broadway.*

**Philadelphia Ave., n. s. 235 5 South Street, three-st'y frame building; cost, $23,000; owner, Robert J. Perry, 235 South Twenty-second St.; architect, Bower, Aspinwall & Russell, 10 Broadway.*

**Washington Ave., n. s. 691 One Hundred and Sixtieth St., twenty-five brick and frame dwellings, tin roofs; cost, $55,000; owner, John Mauer, 1193 Washington Ave.; architect, Adolph Pfeiffer, 2723 Third Ave.*

**Perry R. Tune, brick and stone dwellings; architect, Bower, Aspinwall & Russell.*

**Philadelphia.**—*Federal St., n. s. Twenty-fourth St., five twenty-five dwellings; contractor, George S. Spiegel, 1623 Hicks St.*

**Ninth St., w. s. 230 Twenty-fourth St., and Leigh Ave., thirty-three dwellings; contractor, D. C. Schaller, 2723 North Sixteenth St.*

**Sixth St., w. s. Berks St. and Montgomery Ave., thirty-five dwellings; contractor, John H. Bracken, 2312 East Dauphine St.*

**North Fifteenth St., n. b. Forty-third and Market Sts., ten four-st'v dwelling; builders, C. F. Wells & Sons, 460 Spring Garden St.*

**Roosevelt Ave., s. b. Forty-sixth and Market Sts., twelve four-st'y dwellings; contractor, Chas. E. Greek, 450 North Fifteenth St.*

**Mill Grove Ave., n. s. 1670 Germantown Ave., ten thirty-five dwelling; builder, Ashton S. Tourism, 551 Germantown Ave.*

**Rivanna Ave., n. s. 2110 Diamond St. and Susquehanna Ave., thirty-five dwelling; contractor, Chas. E. Greek, 450 North Fifteenth St.*

**Hepa St., w. s. 1670 Diamond St. and Susquehanna Ave., thirty-five dwelling; contractor, same as last.*

**Sizy-third-and-a-half St., s. b. Arch and Race Streets, thirty-five dwelling; builder, William Douglas, 330 North Sixteenth St.*

**Ninth St., w. s. 1716 Huntingdon and Talley Ave., thirty-five dwelling; contractor, Henry G. Schall, 204 North Twenty-second St.*

**Douglas St., s. b. Junipha and Howard Sts., five thirty-five dwelling; owner, James Mode, 1700 Dauphin St.*

**Mather St., n. s. 20 Three Hundred and Twenty-fourth St., two thirty-five dwelling, owner, same as last.*

**Biddle St., w. s. 20 Thirty-third and a half St., fee four owners, William Eastman & Sons, 681 Dauphin St.*

**Huntingdon and Federal Sts., 11 thirty-five dwelling; contractor, Henry R. Brown, 152 Aramingo Ave.*

**Broad St., n. s. 1716 and Thirty-second St., three thirty-five dwelling; contractor, E. J. Connally, 428 Washington St.*

**Twenty-sixth St., w. s. 1716 Eighteenth St.; contractor, E. P. Hall, 237 North Thirty-fourth St.*

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TO: Owners, Builders,etc.

The Board of Directors of the Draughtsmen's Exchange, Philadelphia, have prepared plans for a three-story frame dwelling, to be erected at 315 North Thirteenth Street, Philadelphia. The building will be in accordance with the plans submitted by the undersigned, and is to be constructed of brick, with a basement, and will be three stories high.

Plans and specifications are on file at the offices of the Draughtsmen's Exchange, 1019 and 1021 North Twenty-second Street, Philadelphia. A copy of the plans and specifications may be had for the sum of one dollar, payable to the order of the Draughtsmen's Exchange.

R. E. FRENCH, Architect.

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A. G. NEWMAN, late NEWMAN & CAPRON MANUFACTURERS OF Fine Bronze Hardware, Bank, Office and Store Railings in Bronze or Brass. Antique Furniture,- Trimmings. Electrical and Metal-Hanging Burglar- Alarms.

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PORTLAND CEMENT

Is superior to any other Portland Cement made. It is very finely ground, always uniform and reliable, and of such extraordinary strength that it will permit the addition of 25 per cent more sand, etc., than other well-known brands; and produce the most durable work. It is therefore the most economical to use. 8,000 barrels have been used in the foundations of the Statue of Liberty. Architects and those interested in Portland Cement will please send for my pamphlet, which will be mailed free on application. It contains valuable directions for the employment of Portland Cement, a table of results of the strength of the Dyckerhoff Cement when mixed with sand and broken stone in various proportions, together with tests and testimonials of eminent Engineers, Architects and Consumers.

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NIGHTINGALE'S
Flat, Concrete Fireproof Construction,
AS ADOPTED IN HUNDREDS OF
Works, Mills, Factories, Banks, Flats, Public Buildings, etc.

System of Making a Fireproof, Immo able, Solid and Noiseless Floor over Wooden Beams.

without the aid of Dadoing, Pegging, Beam Flanges, Iron and Steel. Beams are made of concrete between the beams and like methods of an unsound and destructive nature usually adopted. This forms a perfectly level and well bonded floor, strong and durable in all its parts. Indispensable to all who are and have been troubled and put to great expense by leaky floors. Perfectly Waterproof. No boarded floor required to be laid over Wooden Beams, FIREPROOF FIXING BLOCKS being used instead.

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151 Broadway, - NEW YORK.
IMPROVED EAVES THOUGH GUTTER AND ANGLES.

We introduce here cuts of what have proved to be great labor-saving devices for the timber, and which are rapidly growing in popularity. The merit of these articles lies not alone in the fact of their being time and labor saving, but is in a large measure due to the excellent quality of materials used, the superior workmanship bestowed upon them, and the facts of their being nicer in appearance, more durable and far less likely to become leaky than troughs and gutters made in the old way. The manufacturers, Hatten, Galpin & Co., Binghamton, N. Y., are greatly encouraged by the favor which these goods are meeting, particularly in the West through Chicago jobbers. They say that if this trade continues to increase, as it has lately been doing, Chicago will "take the belt."

The question is often asked, which is best for eave trough and gutter, terne or tinplate? This firm say on this point: "From experience and numerous tests, we are satisfied that terne is much superior to tin for such cases. While terne cost less, they are worth at least twenty-five per cent more than tin for troughs and gutters. The tough, heavily leaded IX terne that we use for our eight-foot seamless troughs will, with proper care, remain good as long as any other part of the building."

The longest of the cuts shown on this page represents the eight-foot seamless eave trough made by this house. It is made half round in sizes from four to ten inches, IX and IXX terne, IX bright tin, B.B. galvanized-iron, and sixteen-ounce braziers' copper. The other long cut presents a slide view of eight-foot wide gutter. It is made of 14, 17, 20, 24 and 28 inch terne, tin, copper and galvanized iron. Another cut will be recognized as representing end views of wide gutters. Special designs of trough and gutters are made to order. Among the special advantages claimed for these goods by the manufacturers are these:

1. The metal used in our troughs and gutters is the best grade to be obtained in America and Europe; our IX and IXX terne plates are coated by the old process on "Martin-Scimens" soft sheets; these troughs will last four times longer than short length IC troughs; they are straighter, stiffer, stronger, and improve the looks of the building; they save the labor and solder of six joints in every sixteen feet; 100 feet can be made and put up quicker than for Messrs. Abram Fench & Co., of Boston. Also, they are constructing for the Piedmont Manufacturing Company of Piedmont, S. C., six steel boilers, each 24 feet in diameter, and one two ton freight elevator; and for the Victor Cotton Mills, Charlotte, N. C., three steel boilers and one freight elevator.

"Gilbertson's Old Method" Roofing Tin has been specified by the Architect of the new B. & O. Depot, at the foot of Smithfield Street. One thing certain, the coming generation are sure of a good roof from rain and storm while waiting for trains at the B. & O. The Builders' Gazette, Pittsburgh, PA, Aug. 15, 1888.

HATTEN, GALPIN & CO.

A P R O P R I A T E D  H O U S E S.

Chicago, Ill.—J. M. Gambell, alterations, Halsted St.; cost, $15,000; architect, J. Thomas; L. Silverman, three-sty' addition, Dearborn Ave.; cost, $5,000; architects, Adler & Sullivan.

ALTERATIONS.

Chicago, III.—J. M. Brown, 2 three-sty' flats, Monroe St.; cost, $5,000; architect, C. B. McFerren.
G. Geising, 2 twenty-sty' flats, West Polk St.; cost, $2,000; architect, L. Williams.
J. Shepard, two-sty' flats, West Fourteenth St.; cost, $1,000; architect, F. P. Boland.
W. W. Henderson, 3 two-sty' flats, West Lake St.; cost, $20,000; architect, I. K. Kohl.
F. Knaack, two-sty' flats, West Twelfth St.; cost, $2,000; architect, J. Chavette.
M. Kossak, two-sty' flats, Wall St.; cost, $3,500; architect, J. E. Barlow.
G. Bleckhoff, two-sty' flat, Cleaver St.; cost, $8,000; architect, J. H. H. Miller.
M. H. Carters, two-sty' flat, West Fourteenth St.; cost, $3,000; architect, T. H. Warfel.
E. S. Wendell, four-sty' flats, Blue Island Ave.; cost, $5,000; architect, Edward A. Manheim.
J. M. Gamble, two-sty' flats, West Lake St.; cost, $8,500; architect, C. S. Thomas.
M. Ledebur, three-sty' flat, West Fourteenth St.; cost, $8,500; architect, J. P. Depauw.
A. Amundson, three-sty' store and flats, West End St.; cost, $7,000; architects, Lutken & Thibodeau.
J. Gnotzlawski, two-sty' flat, Grifiten and St.; cost, $5,000; architect, M. Tozukawa.
S. Koch, three-sty' flat, La Salle Ave.; cost, $7,500; architect, J. Zittel.
T. Smirk, three-sty' flat, West Seventeenth St.; cost, $8,000; architect, P. Stager.
S. Hanson, two-sty' flat, West Ohio St.; cost, $2,500; architect, C. R. Roshumman.

FACTORIES.

Boston, Mass.—Aron & Co., 200 A, four-sty' factory, flat roof, 20x80'; owners, Pearson, Corrigan Co.; builders, Webster, Dayton & Co.

APRIL AND BUILDING NEWS.

ADVERTISERS' TRADE SUPPLEMENT.

No. 75.

SUNDAY, SEPTEMBER 1, 1888.

VOL. XXXIV.

HATTEN, GALPIN & CO., MANUFACTURERS.

HATTEN, GALPIN & CO.

BINGHAMTON, N. Y.

NOTES.

The Whittier Machine Company are putting in one of their double-screw freight elevators.

BUILDING INTELLIGENCE.

Reported for the American Architect and Building News.

APRIL AND BUILDING NEWS.
Modern Perspective

A Treatise upon the Principles and Practice of Plane and Cylindrical Perspective.

AN INVINCIBLE BOOK FOR ARTISTS, ARCHITECTS, DAUGHTERS AND CIVIL ENGINEERS.

BY

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Professor of Architecture in the School of Mines, Columbia College.

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They are made to slide entirely down to the floor, into pocket, out of sight, in any height and position. No additions necessary. Will slide on cost, cheaper than the hinged blind, and will last double the length of time.

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AND-

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White-Lead made,

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Art Galleries.

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First Presbyterian, Westfield, N. J.

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West Harlem, N. Y., New York.

Presbyterian, Birmingham, N. Y.

Trinity Presbyterian, Montclair, N. J.

Presbyterian, Jersey City, N. J.

Church, Jordan, W. Y.

First Congregational, Winfield, Mass.

First Baptist, Franklin, Ind.

Enoch Ave., Congregational, Cleveland, O.

Second Congregational, New London, Conn.

Twenty-second St., Davenport, Iowa.

Second Reformed, Hudson City, N. J.

First Place M. E., Brooklyn, N. Y.

Second Presbyterian, Providence, R. I.

Reformed, Canton, N. Y.

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Write for Illustrated Catalogue.

FIG. 5.
Section showing Flat Fireproof Construction where iron joists rests on bottom flange of main girders and in which all ironwork is entirely protected from fire.

System of Making a Fireproof, Immoveable, Solid and Noiseless Floor over Wooden Beams.

without the aid of Deadening, Pugging, Beam linings, Mineral Wool, filling in of wet Concrete between the beams and like methods of an unsanitary and destructive nature usually adopted.

This forms a perfectly level and well bonded floor, strong and durable in all its parts. Indispensable to all who are and have been troubled and put to great expense by leaky floors. Perfectly Watertight. NO boarded floor required to be laid over Wooden Beams. FIREPROOF FIXING BLOCKS being used instead.

NIGHTINGALE FLOOR IMPROVEMENT CO.
151 Broadway, new York.
CABOT'S "ANTI-PYRE."

This is the first and only protection against fire that is cheap. It is the only liquid fireproofing we know of that is not dissipated by prolonged heat. Wood treated with this, if exposed to direct flames, will slowly char and emit inflammable gas at the point attacked if the flame is very hot, but the fire cannot spread, and entirely ceases as soon as the heat is removed. It is the only fireproofing that can be applied with a whitewash-brush by any boy. It is an excellent protection against colds and draughts, and can easily be applied so as to fill the cracks between boards, thus answering the purpose of plaster. An excellent fireproof substitute for back-plastering, if heavily applied, "Anti-pyre" prevents all danger of fire from sparks, hot coals, explosions from any cause, and spontaneous combustion. It can be used on all woodwork which needs protection from fire, and is not exposed to the direct action of rain. If used on outside work, a coat of linseed oil or of paint should be used over it. It is a complete substitute for tinning, and entirely avoids the two objections to that fireproofing; first, the expense; second, the possibility of the fire getting behind the tin, and doing its damage where it is almost impossible to get at it.

Of course, no fireproofing of this nature renders the combustion of the wood impossible, but it does make it so difficult that there is no danger of the fire spreading, even when there is unusual exposure.

We may mention that we have sold many thousands pounds to the Calumet and Hecla Mining Company, since their last fire, for the protection of the timbers used in the mine.

Among the places where it can be used to a special advantage are the following:

Interior walls of chemical-works, gas-works, boiler-houses, rubber-works, saw-mills, saws, tanners' and carriers' shops, varnish-factories, oil-distilleries. All places where naphtha and benzene are used. Oilcloth factories. Around house-furnaces, furnaces and steam pipes, chimneys, paint and oil stores, paint-shops, picker-houses, flour-mills, storehouses, laundries, etc.

It can be had in any color desired. In estimating for a given surface, it is safe to say that one gallon will cover fifty square feet, two coats heavily applied, on rough wood; if used on smooth wood, one gallon will cover about one hundred and fifty square feet, two coats.

It is put up, ready for use, in one and five and ten gallon pails, fifteen and twenty gallon kgs, twenty-five and thirty gallon half-barrels, and in barrels containing forty to fifty gallons.

For samples on wood and further information, address, SAMUEL CABOT, 70 KILBY STREET, BOSTON.

SCREWLESS-FASTENING KNOBS.

There has long been a desire on the part of architects and others for a door-knob which would dispense with the ordinary side screw, that is, the screw which holds the knob to the spindle and which unless nicely fitted has a tendency to shake loose and drop out, permitting the knob to come off in the hand, which as all know who have had the experience is a great annoyance. The illustration shows a recently patented method of overcoming this imperfection. In applying these knobs the roses are first screwed to the door, the spindle on which one knob is already fastened is passed through the door, the lower shank A is put in place, the nut C pushing the washer B before it is turned up against the inner shoulder of the shank A, the knob which has a square aperture to fit on the spindle is next pushed on and the shank A is screwed upon the part D drawing the knob to its place and covering up the washer B and nut C. This forms a neat and secure fastening, it is impossible for the knob to pull off, the spindle is not weakened by drilling, and there are no disfiguring screws through the face of the knob as in other so-called screwless fastenings. Wood knobs with this fastening are furnished by the manufacturer at a slight advance in cost over those with the ordinary fastening.

It will not be out of place to mention here how popular the use of wooden door-knobs for interior doors has become. The undersigned, who was the originator of this class of goods, started their manufacture seven years ago and has built up quite a large business. He has not been without imitators, but by maintaining the quality of his goods and reducing prices as circumstances justified he has been enabled to keep in front of his competitors.

A. BARDEN, 59 EM ST, NEW YORK CITY.

THE Whittier Machine Company are putting up the building on the corner of Knuekand and Washington Streets, owned by the Hill estate, one new passenger and two new freight elevators all to be operated by their hydraulic hoisting machinery upon their Pressure-Tank system.

They are also about to put into the Continental Bank Building, Boston, a passenger-elevator operated by one of their double-screw, high-speed steam hoisting-machines.

WELLS RUSTLESS IRON.

The Wells Rustless Iron Company, 21 Cliff street, New York, had for some time previous to this year been manufacturing patented ironware under the Bower-Barff patents. A year or more ago, however, they began experimenting with a new process, the invention of Mr. W. T. Wells, the president of the company, and since the first of the year they have been using the Wells process exclusively. Iron protected by magnetic oxide has become
such a popular article in many lines of trade that a description of this new process will be of interest to our readers. The charge of iron or steel articles to the amount of some 12,000 pounds weight is placed in an ordinary muffle or heating-chamber and there gradually heated during a period of some twelve hours. It is important not to heat any part of the charge so as to blister it, and yet every part must be raised to the dull-red heat required by the process. The inventor prefers to use the gas made by the well-known Siemens Producer in heating the charge and to admit air in limited quantities into the chamber along with the gas coming from the producers, just enough to consume the latter and give a small flame in the chamber. During this operation the dampers are opened, permitting the escape of the products of combustion into the chimney. The heating must be gradual so that the charge will be raised in temperature evenly and equally and all blisters avoided. The increase of temperature should be so regulated that the maximum of heat is reached at the end of about twelve hours, though if a smaller charge than the one mentioned is used a shorter period will suffice. The surface of the charge by this gradual heating is apt to become somewhat oxidized both to red and to darker oxide, but the effect is irregular and patchy where it does appear at all, and is not of any general importance in the result. The next and final step in the process is to turn on a mixture of steam and carbonic oxide gas when the chimney damper is closed. In this atmosphere of steam and carbonic oxide the charge is left for some five hours, more or less. The heat of the charge at the beginning of the operation is a dull-red and air should be excluded as far as possible. The steam need be under little or no pressure, and may or may not be super-heated before introduced into the chamber. This final step of the process is the essential one, in which is produced the desired result of black or magnetic oxide. The furnace employed is an ordinary muffle or heating-chamber of the usual construction. It does not require any special appliances to make it absolutely air or steam tight, or capable of standing high pressure, as the Wells process does not require elaborate or costly apparatus. The magnetic oxide produced by this process is described as very hard and comparatively elastic. It stands frictional wear well, but is apt to be injured by hammer blows or rough usage. Wherever the coating is removed rust will form, but it will not bow down and raise the adjacent coating. The works of the Wells Rustless Iron Company are situated at Little Ferry, N. J., but a short distance from Jersey City, where there are furnaces for treating all kinds of iron and steel. The process is especially adapted to wrought-iron pipe for water conveyances, grape frames and fencers, architectural iron work, slip-work, gas, culinary stoves, cast-iron soil-pipes and plumbers' castings, etc.

THE WELLS RUSTLESS IRON CO.
6 Clifty St., New York.

ELEVATORS.

We take great pleasure in calling the attention of our friends and customers to our sample elevators, a freight and passenger, placed in the immense Park Building of the Centennial Exposition, Cincinnati.

Our passenger elevator is operated on the 11-ton pressure-system, the Ladd & Dunn Company, of Cincinnati, furnishing the necessary pumps and tanks.

The freight-elevator is run from the city water-main, and is fitted with our patent variable device, whereby a great saving of water is accomplished.

We thus show two styles of our elevators, both of which represent a class of workmanship, which places them foremost among modern hoisting-machines for safety, speed and durability.

We extend a cordial invitation to all to call and personally examine the elevators, and to ask any information they desire of the attendant, who will be pleased to supply it, and to extend any courtesy in his power.

THE JAMES L. HAVEN CO.
CINCINNATI, O.

WROUGHT IRON FENCE.

The annexed cut illustrates a recent improvement in the construction of wrought-iron fence, invented by us. The special feature of this fence consists of the U-shaped bottom rail, a sectional view of which is shown in the illustration. The pickets pass through both flanges of the rail, and are securely fastened between them, (method patented), so as not to be removed, forming an absolutely rigid panel and one that will never sag. We are manufacturing all styles and sizes of this fence, having recently shipped two cars-loads, and are now filling a large order for the City of Natchez, Mississippi, besides various orders for all parts of the country. Any one requiring wrought-iron fence would do well to secure our catalogue and prices, as our fence is better and cheaper than other styles in the market. We are also manufacturers and contractors of building iron work of every description, and make a specialty of wire work, brass work, etc.

J. E. BOLLES & CO.
DETROIT, Mich.

NOTES.

The sales of Babcock & Wilcox boilers for July and August, 1888, are as follows: Maginnis Cotton Mills, New Orleans, La., third order, 720 horse-power; Pierce, Butler & Pierce Flasquer, Barcelona, for new Electric Station, Valencia, 416 horse-power; E. Atkins & Co., Boston, Mass., for Cuba, third order, 156 horse-power; The Shelby Iron Co., Shelby, Ala., 222 horse-power; Ingo's Cieneguita, Abreu, Cuba, 146 horse-power; Western Electric Co., Chicago, Ills., 208 horse-power, Western Electric Co., for N. Y. City, second order, 448 horse-power; Leon Pequin, Vendue, France, 46 horse-power; City of Sandwich, Illinois, 61 horse-power; Louis Fontaine, La Madeleine les Lits, France, 61 horse-power; Grand Ave. Railway Co., Kansas City, Mo., second order, 200 horse-power; Gordon & Maxwell Co., Hamilton, Ohio, second order, 146 horse-power; Takata & Co., London, England, second order, 83 horse-power; Irbracher & Davis, Buffalo, N. Y., 246 horse-power.

Mfg. Co., Syracuse, N. Y., 298 horse-power; J. Arce & Co., City of Mexico, Mexico, second order, 61 horse-power; Morel & Verbeke, Gant, Belgium, 163 horse-power; Corporation of Glasgow, Glasgow, Scotland, 220 horse-power; Rew & Co., Plymouth, England, 19 horse-power; East River Gas Light Co., Ha
ez, France, 63 horse-power; Vanderbilt Uni
versity, Nashville, Tenn., second order, 82 horse-power; Worcester Polytechnic Institute, Worcester, Mass., 51 horse-power; Gordon's Mills Paper Co., Aberdeen, Scotland, 280 horse-power; Impresa Concesionaria de Aguas Sub
terraneas del Llobregat, Barcelona, Spain, 61 horse-power; Millward, Bradbury & Co., Liver
erpool, England, sixth order, 61 horse-power; G. W. Gall & Co., Liver
A unique example of glass work is now on exhibition at the rooms of the Tiffany Glass Company, 333-5 Fourth Ave., New York. It is a window made for a residence in San Francisco, consisting of three long openings, the centra of which is occupied by a full length figure of a matronly clothed in delicate pink; over her head is carelessly thrown a thin veil which hangs in easy folds and is caught at the ends so as to carry the apple blossoms which she has gathered. The coloring is delicately Whistler-like. The pose of the figure is extremely graceful. The side openings are filled with rather conventionalized floral patterns in faint pink and light yellow. The title given on the window is "Spring." The Tiffany Glass Company considers it a great success in the handling of delicate tones.

During the past week a glass window has been on exhibition during the evenings, at the Fifth Avenue Art Galleries. The subject is "The Talking Well." It is from a painting by Mr. Benedict, now in the Corcoran Gallery at Washington. The coloring is rich, and the design and perspective well managed. The second window is also executed by the Tiffany Glass Company.

The works of the Ball Engine Company, Erie, Pa., manufacturers of High Speed Automatic Cut-Off Engines are being crowded to their utmost capacity with orders for their engines. Among their recent shipments are the following: H. B. Scholl, Col., Elec. Illuminating Co., two 60 horse-power engines; Seeger Garsity Co., St. Augustine, Mex., one 25 horse-power engine; City of Greenville, S. C., one 100 horse-power engine; Thompson-Houston International Elec. Co., Australia, one 60 horse-power engine; Atlantic, N. J., Elec. Lt. Co., one 200 horse-power engine; Olean, N. Y., Elec. Lt. Co., one 60 horse-power engine; Paterson, N. J., Elec. Lt. Co., three 100 horse-power engines; Paterson, N. J., Elec. Lt. Co., one 80 horse-power engine; Lynn, Mass., Gas Light Co., one 100 horse-power engine; Electric Improvement Co., Santa Clara, Cal., one 80 horse-power engine; Akron, O., Elec. Street R. R. Co., two 200 horse-power engines; Pensacola, Fla., Elec. Lt. Co., one 100 horse-power engine; Danville, Pa., Elec. Lt. Co., one 50 horse-power engine; Brattleboro, Vt., Gas Light Co., one 80 horse-power engine; Walla Walla, W. T., Elec. Lt. Co., one 35 horse-power engine; Thomson-Houston International Elec. Co., Hogs, Japan, one 25 horse-power engine; Ada, O., Electric Light Co., one 80 horse-power engine; Blaisdell & Pride, Jacksonville, Fla., one 40 horse-power engine; W. W. Cummer, Cadillac, Mich., one 100 horse-power engine; Paul Kuhnke, Clyde, O., one 25 horse-power engine; City Gas Light Co., Norfolk, Va., one 80 horse-power engine.

The Whittier Machine Company have recently constructed for the West End Street Railway Company, corner of Diemens and Roxbury Streets, Roxbury, a freight elevator for their stables. Also for the Hotel Gladstone, corner of Broadway and 85th Street, New York, an hydraulic elevator operated by their pressure tank system, and for Mrs. Lowell's building, No. 2 Beacon street, Boston, an hydraulic elevator for passenger service.

The celebrated "Gorton" House-heating Boilers, manufactured by the Gorton & Edgewood Manufacturing Company, New York, are meeting with much favor abroad. The company lately shipped two No. 1 Rollers to Jannes Covert, Havre, France.

Mr. F. H. Fink, 551 Pearl Street, New York City.

Dear Sir,—The magnificent reflecting chandeliers, made from special designs, furnished by you and placed in the West Harlem M. E. Church, corner 129th Street and 7th Ave., New York City, is simply grand. So neat, chaste, and graceful in design that it commands the attention and elicits favorable comments from everyone who views it. It lights our main audience room abundantly with as pleasant a light as it seems possible to produce; we rarely use it to its full power. To say that we are delighted with the fixture would hardly express our satisfaction.

Some of the members of our Building-Committee are largely connected with the building interest in this city, and they each endorse the appropriateness of the fixture.

Respectfully, Bartlett Smith, C. Fraser.

SOUTHWARK FOUNDRY AND MACHINE COMPANY, Engineers, Machinists and Boiler Makers, WASHINGTON AVE., AND FIFTH ST., PHILADELPHIA.

PORTER-ALLEN AUTOMATIC ENGINE. ALSO MANUFACTURERS OF BLOWING ENGINES, REVERSING ENGINES, STEEL AND HYDRAULIC MACHINERY, BOILERS, TANKS, ETC.

Steam Hammers, Centrifugal Pumps, Rolling-Mill Work.

Inquiries Solicited.


A great improvement over all other blinds, slides up and down in the window like a sash, move easily, and stay where placed. No hinges, hence no swinging, sagging and tangling with curtains and window drapery. Must be seen to be appreciated. Excel any other sliding blind in the market for economy, durability, neatness, appearance, etc. Also the most perfect arrangement for fly screens, consisting of an additional section which slides same as the blind; very much admired by all.

They are also made to slide entirely down to the floor, into pocket, out of sight, without any additional expense, 25 cent. cheaper than the hinged blind, and will last double the length of time.

No one ever experienced less trouble in use. Architects are specifying them. They always give satisfaction.

The only blind that is furnished with an Automatic Burglar-Proof Lock, free of charge.

Agents wanted everywhere. Send for Illustrated Catalogue and prices to

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Wood - Working Machinery, FOR PLAINING-MILLS, SASH, DOOR AND BLIND FACTORIES, CABINET AND CARRIAGE MAKERS. Send for Catalogue.
PORTLAND CEMENT

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THE HAYES FIREPROOF METALLIC LATHING, ETC.

The Hayes system of Lathing is composed of Sheets of Iron or other metal, 40 inches by 90 inches (or less), over the surface of which, at near intervals, are openings five-sixteenths by the e-fourths of an inch, produced by a process of puncturing; the flanges around the openings are pressed forward and curved outward, forming lips and hooks which clinch or hold the mortar to the surface of the sheets, while at the base of each opening is formed a matrix into which the mortar is pressed, and by which perfect dovetailed clinches or bonds are obtained; the process imports to the sheets an undulated surface, giving it additional strength. The plaster is spread over the surface of the sheets, embedding the lips and hooks and filling the matrix, thereby permitting a degree of coalescence which insures most perfect and substantial work. There is an entire freedom from expansion, contraction, or other organic action, which would be liable to injure the bond. The coating can only be removed by picking it off in particles.

Less mortar may be used than upon any other fire-proof lathing and it may be applied stiffer than ordinary.

Scratch coating is entirely dispensed with, as is also hair.

For one coat work this lathing affords a most effectual foundation.

These lathing sheets can be readily bent so as to adapt themselves to any feature in architecture, such as pilasters, columns, niches, groins, cornices, wainscoting, bases, casings, angles, trimmings, etc. Large caves are formed without brackets, supports or furring, and entail no cost beyond the plain surface.

Country residences may be lathed on the exterior and the beautiful effects of cut stone designs may be made in Portland Cement, such as the teacity of this lathing that all fears as to the falling away of the plastering will, upon inspection be instantly removed.

**Fireproof partitions.**

This system of lathing permits of the con. struction of strong partitions of from 1½ inches thick, finished with double-plastered faces, made by forming in the lathing sheets, which by virtue of the peculiar punctures are already rigid, a series of ribs such as are made for lathing, and which are secured to each other back to back as shown in Figures 6 and 7 and when necessary for an increase in strength they may be reinforced with a framework of land or haw iron or with angle or T iron, as shown in Figures 8 to 11, the lathing being secured to the frame with suitable clamps, the plastering on both sides aiding in binding the whole together so that very substantial walls are afforded.

These partitions or walls may be adopted with great advantage especially in elevator shafts, stairways, hallways, offices, bed-rooms, closets, on about the stages of theatres, boxes, etc., affording the greatest protection against fire and great economy in room. Fireproof floors for hot air may be formed in like manner, avoiding the necessity of restricting them to the brick walls.

A fireproof floor may be made by nailing the lathing sheets over the boarded surface, and then with a proper mixture of gravel, sand and cement, or other suitable material, a permanent and effective fireproof floor will be produced, which may be arranged in variegated colors or ornamental design, or may be laid in tles or tessellated pavements, or it may also be readily applied to old plastering in like manner as suggested to the floors, occupying but three eighths of an inch in thickness.

For bath-rooms, wash-rooms, laundries, etc., by covering the floors as before described, and by turning up the lathing on the walls, a perfect cemented troughed floor may be made.

It will be economy, even should this lathing cause an increase in the first cost of any building, to adopt it in lieu of the old time wooden lathing; the increase, if any, would be but trifling, and in no case is warranted in appplying it. One coat of mortar is dispensed with; furring for cornices and other
of construction found to be more appropriate.

This lathing is furnished in iron plain, for the lathing sheets of suitable sizes, plastered (plain or modeled) as panels, sills, window-saftings, trimmings, etc., may be prepared in the workshop and set up in their final position. These may be reinforced with bar, angle or T iron similarly arranged to those described for partitions.

Very fine work has been done on this lathing with King's Windsor Cement, and Alcanant Plaster, and it is especially adapted for all kinds of plastic materials, the clinching hooks taking the place of fibrous bonds with a most beneficial result.

The sections above referred to and especially the method of framing for doorway shown in Figure 12, may be varied, and other methods may be substituted. The thickness of the plastering coat shown in the drawings and in models which have been prepared is no criterion as it may be made thinner if desired.
to receive and deodorize waste matters, and the overflow point is raised much higher than usual, in order to retain a deep body of water, and hence a deep water-seal in the bowl. It should be noted that the water is deepest at the rear of the closet, at the point where soil would most likely to strike the sides.

"The top of the bowl is provided with a flashing rim, into which the flashing water enters in a novel manner. To avoid the usual noisy operation of the flush, and also the frequent spattering, the flashing water is conducted into a large body of water below the normal water level, as shown, from where it overflows into the flushing rim, and discharges down the sides of the bowl. A part of the flashing water is directed, independently of the stream which feeds the flashing rim, to the bottom of the bowl, where it enters through a jet or nozzle arrangement, discharging with great force into the ascending leg of the closet trap. This removes part of the water from the trap, and causes the jet to force the water in the bowl to sink into its neck, where it is more easily acted upon by the upper flush. Meanwhile the upper jet lifts the passage, leading to the flushing rim, and, overflowing, descends upon and drives out the waste matter which has descended into the neck. The lower jet is always covered by water from the upper flush, the construction and proportions being such as to ensure this result. Hence both jets are noiseless.

"In ordinary trap-jet closets no provision is made to ensure the covering of the jets, and a load roar is occasioned. These closets, moreover, are emptied by siphonic action produced intentionally in the trap, and this emptying by siphonage adds to the roar a disagreeable 'gulping' sound, caused by the sudden rush of air into the dip as the water escapes. Both of these causes of noise are avoided by the flashing principle of the Sanitas closet.

"The action of the Sanitas closet is almost instantaneous, it being possible to flush it easily in one second, and with less than a gallon and a half of water.

"Another peculiar feature of the flushing of this closet is the Sanitas water-closet supply-pipe, in which all delay and noise occasioned by the water passing from the cistern down the service-pipe, when the pull is operated and the cistern valve is lifted, is avoided by constructing the supply-pipe on the principle of an inverted bottle, so that the water shall be hung in it below the cistern valve as far down as the standing water in the bowl, simply by the pressure of the atmosphere. This supply-pipe is, therefore, always full of water, the pipe being closed at the top by a cistern valve, and at the bottom sealed by the water in the closet-bowl. The flush is thus made to act instantaneously. The closet is self-sealing, for the moment the water in the trap is lowered to a certain point just above the dip of the trap, water follows from the upright supply-pipe until the trap is refilled up to the overflow line. There is thus provision made for re-establishing a perfect deep water-seal if the latter should be lost by evaporation, or by other cause. The latter case will but rarely occur, as the trap has more than the ordinary depth of seal. Evaporation, on the contrary, is constantly going on in houses closed during the summer months, and it is here where the ad. vantage of the self-sealing closet and the Sanitas water-closet supply become most apparent. Finally, the very part of the closet-bowl and trap is readily accessible, and at al times open to inspection, it is easy to remove, by a sponge or otherwise, all water from the closet in houses to be left unoccupied during the winter, in which plumbing work is most exposed to freezing."

Of the pantry-sink he says: "A very convenient arrangement is what is known as the Sanitas pantry-sink, in which the stand-pipe is provided with a simple lever movement to lift it from its seat, if it is desired to empty the sink. The volume of water discharged from such a sink through a very large outlet, and concentrated beyond this in a trap and waste-pipe of small caliber, causes a thorough flushing of both, and prevents the grease from adhering to the sides of the pipe."

Speaking of basins, he says in a recent publication: "Much the best form of basins of which I have knowledge is the stand-pipe outlet basin, or Sanitas wash-basin, manufactured in Boston by the Sanitas Manufacturing Company; and since this fixture will, in my judgment, soon supersede all former devices, and since it has so many superior features of simplicity, convenience, and sanitary construction, I shall describe it fully." Then follows a detailed description of the fixture, saying among other things: "It is of the utmost simplicity and of great convenience in use, while its appearance is, if anything, even more pleasing than that of the usual form of bow!"

SANTAN MANUFACTURING CO.,
207 Tremont Street, Boston, Mass.

The Whittier Machine Company have recently put in for Messrs. P. & F. Corbin, New Britain, Conn., a freight elevator.

NOTES.
The sales of Babcock & Wilcox boilers for September, 1888, are as follows: Somersett Fibre Co., Fairfield, Me., 120 horse-power; Latrobe Steel Co., Latrobe, Pa., 502 horse-power; Edinburgh Taper & Sail Cloth Co., Ltd., Leith, Scotland, 156 horse-power; La Española Industrial, Barcelona, Spain, 168 horse-power; La Española Industrial, Barcelona, Spain, second order, 480 horse-power; Oliver & Roberts Wire Co., Ltd., Pittsburgh, Pa., fourth order, 146 horse-power; Electric Light & Power Co., Melbourne, Australia, 1500 horse-power; Kansas City Electric Light & Power Co., Kansas City, Mo., second order, 1339 horse-power; Louis Franke & Co., for F. D. Dale, Whitehall, N. Y., second order, 75 horse-power; Providence Steam & Gas Pipe Co., Providence, R. I., 71 horse-power; Farmer & Brandon, London, England, 20 horse-power; Moet & Chandon, Epernay, France, 240 horse-power; De la Royere-Massueil, Brussels, Belgium, 46 horse-power; Alexander B. Bary, Moscow, Russia, 46 horse-power; Alexander B. Bary, Moscow, Russia, 126 horse-power; Alexander B. Bary, Moscow, Russia, 30 horse-power; Alexander B. Bary, Moscow, Russia, 20 horse-power; Societa Anonimana Raffineria de Zaccheri, Ancona, Italy, second order, 372 horse-power; Excel-

in*|der Electric Co., for S. Weisheber & Co.,

Brooklyn, 50 horse-power; Jackson & Sharp Co., Wilmington, Delaware, fourth order, 208 horse-power; Jackson & Sharp Co., Wilmington, Delaware, fifth order, 51 horse-power; Gubruder Sulzer, Winterthur, Germany, 140 horse-power; Louis Peckinpaugh, La Madeleine, Lille, France, 175 horse-power; C. B. Cortrell & Sons, Westerly, R. I., second order, 104 horse-power; Cortland Wagon Co., Cort,
land, Y. N., second order, 104 horse-power; Sprague & Darling Reel Co., Philadelphia, 1750 horse-power; Imperial Company de Agua Subterranea del Llobregat, second order, 61 horse-power; Alexander Smith & Son, famous builders, South Boston, N. Y., eighth order, 104 horse-power; Sociedad Matutina de Electricidad, Madrid, Spain, 186 horse-power; Mills & Hill Co., Osgood Building, third order, 188 horse-power; New York Life Insurance Co., Kansas City Building, fourth order, 616 horse-power; Process Co., Syracuse, N. Y., eighth order, 416 horse-power. Making the total sales for September, 16,200 horse-power.

Soft Steel Plate is taking the place of iron for bridge, ship, tank and structural work generally, and is being used to make the railroad bridges for Sheared and Universal Rolled Plate, of the grades above mentioned, as low as are quoted for iron plates for similar purposes. If in the market for structural material, inquire of the writer. No delays in filling orders.

At the Homestead Works we have recently completed a Shaking Mill. This unique reversing mill is designed, especially for reducing large steel ingots into slabs. Mills of this type have been built to reduce steel slabs, of all grades, either of Bessemer or Open-Hearth quality, of widths ranging from 18" to 48", of thicknesses varying from 4" to 24", and of any specific lengths.

If you are requiring steel slabs we shall be glad to quote prices.

Orders filled promptly. Capacity, four hundred tons daily.

CARNEHIE, PHIPPS & CO., LIMITED.

The Gorton & Lidgowood Co., 96 Liberty Street, New York City, have lately received orders for boilers which will be used in heating a large building 60 by 200 feet, and three stories in height, in the Brooklyn Navy Yard. These boilers are cast, and in the same factory, to which there will be six of the Gorton boilers in use in the Navy Yard, one of which has been in use three winters, giving entire satisfaction during that time. By the terms of the contract entered into May 2d, 1888, to the Gorton & Lidgowood Co., from Chief Civil Engineer, P. C. Asser-

In reply to your inquiry, I would state that the No. 5 Steam Generator furnished and put up by Mr. Gorton in this Navy Yard, in 1885, has given good satisfaction, and has been in continual use the past three winters for heating an isolated building of 75,000 cubic feet, and 4 stories in height, at a cost of less than half the amount of coal being needed than was previously used to supply the horizontal boiler used for this purpose. It will be especially, as the writer states, as the many arrangements of fuel and water feed system will be well. We have recently put up a No. 4 300 horse-power boiler in this yard, as we expect this boiler to any other means of heating by steam.

The four new boilers will be fitted up with a new type of raking lever shaking attachment to the grate.

Mr. J. T. Fink, of 555 Pearl Street, New York, whose reflectors and reflecting chandeliers are so generally introduced in public buildings, reports many orders on hand; among these the construction for lighting the Jefferson Exposition, New York, has under way: the Tompkins Avenue Congregational Church, Brooklyn, N. Y.; Sumner Chapel, First Presbyterian Church, Brooklyn, N. Y.; First Presbyterian Church, Galveston, Texas; Asbury Memorial Episcopal Church, Episcopal Church, Providence, R. I.; Cambrian Presbyterian Church, Murfreesboro, Tenn.; Reformed Church, Athens, N. Y.; Opera House, Carbondale, Pa.; Los Angeles Theatre, Los Angeles, Cal.; Art Galleries of Messrs. Bouss, Valadon & Co., 306 Fifth Avenue, New York; Galerie des Beaux Arts, 142, Boulevard des Capucines, Paris, France; G. W. Linniger, Omaha, Neb.; the American Art Galleries, New York, for the Vegetarian Exhibition — and several orders from foreign countries.

The Whittier Machine Company have recently constructed for the Whittier Cotton Mill, Mass., several horizontal steel boilers, each five feet in diameter.

The CENTURY.

SOME FEATURES IN 1889 — THE NOVEMBER NUMBER BEGINS A VOLUME ART ENTERPRISE KENNAN'S SUCCESSFUL SERIES.

"The growth of The Century Magazine, although in one sense phenomenal, is but the natural result of a quick appreciation of what the reading public demands, and of a studied effort to render that which was supplied in too meager a supply. It has always been the desire of the conductors of The Century that it should be the One Indispensable Periodical of its class; that whatever other publication might be desirable in the family circle, The Century should be the one that would offer the best conditions for the appearance of the art and literature pertaining to culture. Its unprecedented circulation would seem to be the response of the public to this desire and intention of the conductors of the magazine; and this popularity again lays the foundation of everything else that the publication has done. We anticipate that the volume, whatsoever it begins with the November number, now ready, and the following is a list of some of the most important features of the year, most of which begin in this number.

The Century Galleries of Italian Masters.

 Exhibited by a series of pictures, which, except in a few cases, will be signed and authenticated, and which are bought by the writers themselves. In one of the most important art works upon which the Century magazine has ever entered, and in order that the fullest educational results may be derived from the pictures, they will be published in historical order, with brief critical papers by W. Stidman and Mr. Cole. The first of these, with engravings and notes on the Byzantines and Cluny, is in November.

Strange True Stories of Louisiana.

Collection of George W. Cable, author of "Old Creole Days." "The Grandmother," the first one of which, entitled "I Met Old Man, Gump," appears in November. Some of these stories are merely transcribed or translated by Mr. Cable from the original manuscripts; others are accurate narratives by him of actual occurrences.

The Siberian Railway System.

The remarkable series of papers which Mr. George Kennan is now furnishing to The Century upon this important subject is attracting the attention of the civilized world, and the papers are being reprinted in hundreds of foreign languages, and translated into all languages, but are read by the thousands, if not by the millions, in any language. The San Francisco Chronicle says that, in these papers, "Mr. Kennan has lifted the veil and revealed a condition of affairs which the outside world has hitherto deception or right moral view of.

F. W. MURRAY.

Lincoln in the War.

The authorized "Life of Lincoln," by his private secretaries, Messrs. Nicolay and Hay, now appearing in The Century, is holding the attention of thousands of readers. In the forthcoming chapters the authors will describe the author's life on the battlefield and other leading generals of the war, with the members of the cabinet and other prominent men. Lincoln's plan for the gradual abolition of slavery will be fully explained.

The Romance of Dollar.

A serial novel by a writer new to readers of The Century, Mrs. Mary Hartwell Catherwood, begins in the November number, with a preface by Francis Parkman, the historian. It is a story of devotion and herism, based upon events in the early history of Canada. The author, as Miss Parkman says, "is a pioneer in what may be called a new departure in American fiction." Written by Henry Sandham.

The Old World Illustrates.

Occasional illustrated papers by Mr. Edward L. Wilson, on Bible subjects treated in the International Sunday-School Lessons, will appear from time to time during the year, and there will be articles on existing monuments connected with the Old and New Testament narrative, by various writers. Among them: "Lincoln's "Triumphs,"" by Mr. Daniel C. Magee; "The Carnival of Venice," by Mr. Thadeus DeWitt; "The Emperor Napoleon," by Mr. C. P. Corner; "1000 Years of English Literature," by Mr. C. A. G. Bullen; "The Romance of Calvary," by Mr. W. S. B. Childs; "The War of the Reformation," by Mr. W. E. Lee; "The Romantic Art," and many others.

The Reviews and the Features.

A series of full-page engravings from original drawings by Mary Hamiton Eaton may be found in each number of The Century for the coming year. These designs are the artistic result of a long residence in the far West, and are characteristic of the landscapes and costumes of a large portion of the country. The first, "Looking for Camp," is in November.

The New Number.

Concerns, besides the serial features already mentioned, an article on "The Giants of the City of London," by Mr. F. H. Penzell; "Unpublished Letters of Lord Nelson, with two portraits of the hero of Trafalgar; a short story, "Mistaken Premises," by Mr. J. A. G. A. Talbot; "Ottawa Writers and Their Work," by Mr. C. W. F. H. B. L. Sharp; fuller illustrated papers on English Cathedrals (with a chapter on Westminster Abbey); short stories by leading writers, novelettes (to be announced later), essays, etc., etc.

Other features to be begun later include: Charles DeKay's illustrated papers on Ireland,—the ethnology, customs, landscape, etc.; a series of humorous and pathetic Irish-American stories, by Mr. E. A. Bedell; a series called "The Romance of Stonewall Jackson," by Mr. G. W. H. H.; "Becher's Missionary and "Weisen Soldier"; more of Mr. Buckley's papers on Spiritualism and Clairvoyance; further illustrated papers on English Cathedrals (with a chapter on Westminster Abbey); short stories by leading writers, novelettes (to be announced later), essays, etc., etc.

Terms. A Special Offer.

The regular price of The Century is $4.00 a year. In order that new readers who begin with November, 1888, may get all of Mr. Kennan's Siberian papers, we make a special offer of 10 years' subscription from the first number of The Century (50, to which the Siberian papers were begun), for $5.00; or a year's subscription from November, 1888, with these twelve back numbers bound in two handsome volumes, for $7.50. Dealers everywhere take subscriptions and supply numbers which will be sent, prepaid, from the office of the publishers, The Century Co., 33 East 31st Street, New York.

The Century is indeed a great living picture of the world's interests and movements, and a joy in its location to every appreciative reader. Mr. Kennan for The Century does himself, his friends or his invalid an inestimable service. —The Methodist, Baltimore.
The Barite Hollow & Porous Brick Company.

This Company, as its name implies, makes a specialty of the manufacture of hollow-brick and porous terra-cotta for fireproof buildings. The use of these materials for fireproof-construction has become so universal that it is scarcely necessary to describe them. The accompanying cuts show the usual forms of hollow-brick for fireproof floors and partitions.

In addition to these, blocks or slabs of porous terra-cotta are made for wall-furring, column-covering, roof-lining, etc. The porous terra-cotta can be easily cut and fitted, and will receive and hold nails so that slate or other roofing can be nailed directly to the roof-blocks.

The Barion Hollow & Porous Brick Company was incorporated in 1882, and at once secured a large share of the trade in this line. Since then their business has steadily increased so that it has been necessary to enlarge the plant each year, and at the present time it is, without question, the leading firm in the trade.

They make a specialty of large contracts, and have every facility for furnishing large quantities of materials at short notice.

Among the more important buildings for which they are now furnishing the fireproofing materials, are: United States Trust Company's Building, New York City; Bank of America Building, New York City; United States Army Building, New York City; American Museum of Natural History Building, New York; Fidelity Title & Deposit Company's Building, Newark, N. J.; Girard Life Insurance & Trust Company's Building, Philadelphia, Pa.; United States Court House and Post-Office Building, Reading, Pa.; New York Life Insurance Company's Building, Montreal, Canada; Canadian Pacific Railway Station, Montreal, Canada; City Hall, Fall River, Mass.

The Company has also lately added a department for the manufacture of buff front-bricks of various shades and fire-bricks of all grades. Illustrated catalogues will be sent on application to the Barion Hollow & Porous Brick Co., 152 Broadway, New York City.

The Whittier Machine Company, have recently constructed for the Yale and Towne Manufacturing Company, Stanford, Conn., an hydraulic freight-elevator.

The Chrome Steel Works, Brooklyn, N. Y.

The city of Brooklyn, N. Y., though it cannot be classed with Pittsburgh and like cities, as a great centre of the steel industry of the country, is entitled to a place of distinction in this particular. The steel-manufacturing interests of this city, have increased wonderfully of late years. One of the representative concerns of this character located in Brooklyn, is the Chrome Steel Works, established in 1887 on Kent Avenue, Keap and Hooper Streets, and of which Mr. S. H. Kuhn is the president, and Mr. C. P. Haugban, vice-president. The foundry, rolling-mill, melting, hammer and other shops, which hitherto covered nearly two acres of ground, were enlarged in the spring of 1887, and gas was substituted for coal in the heating and melting furnaces. The new plant necessary for this change was made complete in every respect, even to the gas generator for the manufacture of the gas used, and the productive capacity of the works was increased twofold. Another advance step was taken this year when it was found necessary to have additional "rolling" facilities, and the works were further enlarged by the addition of a wing 80 x 150 feet. The establishment now presents an imposing appearance and takes rank with any of its class in this country or abroad, and here is turned out in large quantities the well-known "Chrome Steel."

Ordinary or carbon steel is a compound of iron and carbon, the proportions of carbon being from 0.5 to 1.5. It differs from iron merely in the amount of carbon contained in it, and so we see carbon steel is a mere condition of iron, than a distinct metal. To demonstrate how closely iron and steel are related, it is only necessary to mention that whereas cast-iron contains about 3.5 per cent of carbon, and malleable-iron contains 0.4 per cent, carbon steel contains about 1 per cent; thus being a sort of intermediate between cast-iron and malleable-iron. Chrome steel differs from carbon steel in the substitution of chromium for carbon in its manufacture. It is an alloy of chromium and iron, the proportions of which are accurately weighed and scrupulously exact in every grade: both metals, uniting perfectly in alloy, become integral in their unity, producing a uniform steel, which it is claimed is much superior to the carbon steel. Though it is an easy thing to claim superiority over competitors for almost any article of manufacture, it is seldom however, as easy to establish the correctness of the claim. In this case the superiority of "Chrome Steel" is readily recognized, and lies in the fact that, when properly hardened, steel made in this way cannot be cut by the finest saws, drills or chisels, as it is much harder than such tools are made. It is excessively tough when hardened, and will not deteriorate by the continued application of great heat, and unlike carbon steel may be worked in large masses, with perfect reliability—a quality of vital importance in the general use of steel. It has been favorably reported upon by the authorities at the United States Navy Yard, Washington, D. C., who after having subjected it to severe tests, say, in the course of a letter to the manufacturers, enumerating its good qualities: "It will do from three to four times more work in all the various kinds of tools than carbon steel will." Chrome steel may be made quite ductile and soft by using chromeisen instead of spiegelisen in the Siemens's steel process, when the resultant may be tempered to several grades of hardness within well defined limits. It is capable of being welded and worked as easily as wrought-iron, while it may be made into all the various forms required for machinery without the danger of being destroyed by over-heating. Its adaptability for manufacturing purposes is apparent.

The Chrome Steel Works, manufacturer what is known as their Chrome tool-steel, in rounds, squares, octagons, and irregular shapes. This is very desirable for making tools and like purposes. A boring tool of Chrome steel, properly proportioned and tempered, will stand to bore and turn cast-iron or other metal that is too obdurate to yield to the persuasions of the best tempered and "highest" grade of carbon crucible steel, made from the best iron.

A large fly-wheel for a special purpose, with a narrow rim, and thirty-two feet in diameter, was found to be so hard on its "face" that it could not be turned with tools of the best carbon steel. Grinding and clipping were attempted, but the surface was like glass, and resisted all efforts. Tools of Chrome steel at last compelled the iron to yield to a costly
casting was thus saved. This is, but one of the
many instances in which the superiority of
Chrome steel as a tool steel, has been most
strikingly and satisfactorily demonstrated.

As this material when properly hardened
will not yield to the saw, drill, hammer or
chisel, it is found extremely desirable for
window-guards, gratings, doors, and other con-
structions where absolute safety is not alone
desirable, but necessary.

The manufacturers of this popular product,
also make besides their regular tool-steel,
what is called their five-ply combination plates,
consisting of alternate layers of welded Chrome
steel and iron. This material has met with
much favor among architects, builders and
bankers for burglar-proof vaults, and safe
manufacturers have found it singularly well
adapted for making burglar-proof safes. A
jail or prison the cells of which are con-
structed of this material may be truly said to
wear three sets of those made of the best cast-
iron. They also manufacture tappets, cams
and boxes for stamp-mills, and crusher-plates
and shell-cells, used in the crushing of ores
and rock, and also cast to pattern in all shapes
such as crak-shafts, gears, pinions, stamp-
dies, parts of steam-pumps and hydraulic
presses. The best and withal the most satis-
factory way for our readers who are desirous
of learning still more regarding these works,
would be to visit them, and see for themselves
the enormous quantity of steel that is pro-
duced and furnished by

THE CHROME STEEL WORKS,
BROOKLYN, N. Y.

THE ECONOMY FOUNDRY.
On June 4th, last, the J. F. Pease Furnace
Company, of Syrnyseu, N. Y., brought a piece
of property in that city, of about 240' x 210'
in dimensions, situated three-quarters of a
mule from the Company's main works on Wil-
low Street, and about the same distance from
the centre of the city. The property is located
on the corner of Euclid Avenue and Sand
Street, one block north of West Genesee Street,
and fifty feet south of the main line of the
West Shore Railroad. One week after the
purchase, ground was broken for the erection
of a foundry, pattern and machine shops for
the Economy Foundry Company, a concern
organized some time previous and composed
of Frank A. Austin, draughtsman, Jno. Aldin-
ger, machinist, William H. Brown and M. C.
Redlin, foundrymen. On September 15th,
a little over three months after its commence-
ment, the plant was practically completed and
the first iron was successfully melted. The
buildings erected cover about one-half of the
lot and were especially constructed by the
Pease Company to increase its facilities and
enable it to meet the constantly increasing de-
mand for the Economy Combination Heater
and Economy Warm-Air Furnaces, which
oughly light the foundry-room in every corner.

On dark and cloudy days the light is intensi-
ified with the effect of making the interior many
degrees lighter than the outside. This experi-
ment of Mr. Austin's has been a great success,
and the Pease Company boasts of having the
lightest as well as the best-equipped foundry
in Central New York. (Annexed cut of trans-
verse sectional plans shows angles of the roof,
etc.) The windows on lower angle of the roof
are pivoted in the centre of top and bot-
ton, and when open admit same amount of
light as when closed. The windows on the
upper angle are alternated with ventilators.

The cupola, made from the original design
of Messrs. Brown and Austin, has a total
height of forty-four feet and inside diameter
of sixty inches—shell of % wrought-iron—
height from bottom to charging-door on the
second story, twelve feet. The wind-belt on
the outside of the shell is connected by two
side pipes of eleven inches in diameter with the
main blower pipe, of eighteen inches diameter,
which is supplied by one No. 8 Sturtevant blower made by B. F. Sturtevant, Boston. The inside of the wind-belt is connected to the inside of the cupola by two rows of eight tuyeres each, the lower row being fourteen inches from their centre to bottom of the cupola, and the upper row sixteen inches from centre to centre of lower row. The cupola readily melts ten tons of metal per hour. The foundry-room is supplied with two large cranes of forty-four-foot radius and twenty-seven-foot jibs, which together with the side-trams are ample to handle castings in every portion of the room. On the east side is a core-room containing two large core-ovens, one accessible by the cranes for heavy work.

As shown in the annexed plans, the general and private offices are located in the southwest corner of the first floor of the main building and well away from the noise of the machinery in the works. The large shipping-room of 60' x 70' is ample for its purpose, and is equipped with a Fairbank's Dornant Scale, while the south shipping-door opens onto a large wagon scale of the same make. The motive power for the plant is furnished by a sixty horse-power boiler made by the Phoenix Foundry Company, of Syracuse, and a fifty horse-power engine made by the Straight Line Engine Company of the same city. The four-inch Clements band-saw, a twenty-inch Clements buzz-planer, a sixteen-inch Clements swing-saw, a Monely planer, a twenty-four Clements pattern lathe with twenty-two-foot bed, an eighteen-inch Prentice drill, a No. 2 rip-saw, made by Wetherby, Rugg & Richardson, and a standard diamond emery grinder. In the mill-rooms are used two each twelve, sixteen, twenty and forty inch mills, and in the cleaning-room No. 7 diamond grinders with two 24" x 20" wheels.

The whole building is heated throughout by exhaust steam from a plant furnished by E. P. Bates & Co., of that city, which heats 2,700 surface feet of radiation. The entire plant, excepting the foundry-room, is protected from fire by Automatic Fire Extinguishers made and erected by the Providence Steam & Gas-Pipe Company and connected to a tank of 5,000 gallons capacity situated on top of the foundry roof. The extinguishers are also supplied from four-inch city mains.

The shaftings, hangers and couplings were furnished by L. S. Graves & Son, of Rochester, and have been so arranged that 112 feet of main-line shafting on the first floor drives all the machinery on the two floors of the building. The water for the boiler is supplied from a cistern of 1,000 hogsheads capacity, situated under the machine-shop. The buildings are to be lighted by electric light from a plant in the works. Two elevators made by E. W. House of that city, are used in the building.

The Economy Foundry Company will make all of the castings for the Economy Furnaces and Heaters, and will also make a specialty of contract-work for all kinds of gray-iron castings, draughting, designing, pattern-work, machine-work, etc.

J. F. Pease Furnace Company, Syracuse, N. Y.

The Whittier Machine Company have recently put into the New England Hospital for Women and Children on Dimock Street, Roxbury, an hydraulic passenger-elevator.
As we review our business of manufacturing the Stuart Window and Door Screen for the two years past, the comprehension of its enormity not only impresses us, but we are amazed by the unique, if not marvellous phases that the facts present; and the peculiarity generally suggests others, we pursued them with some interest, though to a somewhat extreme length, and we doubt not a short narration, presenting them as they occurred to us, will interest your readers.

Manufacturing the Stuart Window and Door Screen was commenced by us in 1885, though our business of that year was scarcely more than a beginning, our sales were small compared to later developments, but they very soon increased in volume, necessitating an almost immediate revolution in our modes of manufacturing, demanding at once new machinery of the most improved pattern, many times doubling the number of workmen at first employed, requiring new and larger buildings, crowding us to adopt new and quicker methods, so, that at the end of the second season we found, instead of one article simply added to our line, we had actually added an industry complete in itself, the volume of which may be clearly comprehended by a perusal of the following desiderations obtained from our books showing all sales to October 1, 1888.

The sales of the screen-frames (as of every article in our line) are recorded in books, specially gotten up for the purpose, and they will show sales of each day during the year, they being posted daily, so the accuracy of the following facts are vouched for by us. The number sold to date mentioned, of the "Stuart Window-screen" is 386,220 sets, which would supply 64,370 dwellings, allowing six screens to each; and of the "Stuart Doors," the number sold is 75,789, which would provide screen-doors for 37,884 dwellings, allowing two doors each.

In linear feet the moulding used for windows amounts to 12,081,849 feet, and of the doors the moulding measures 5,077,088 linear feet, — in miles the total is something more than 2,871, and being laid end to end would reach from New York City to San Francisco, or from Victoria, B. C., to the City of Mexico.

We have made, for use on the same, of the Sturt Door and Window corners 214,889 pounds, or 107 tons of castings, which together with the frames make a total weight of 2,771,129 pounds, or 1,385 tons, to move which would require 126 freight cars of ten tons capacity, that amount being an average earload on account of the bulky nature of the goods.

The windows are packed in cases containing three dozen each — size 44" x 18" x 16", requiring 10,728 cases. The doors are packed in cases of one dozen each — size 90" x 9" x 16", requiring 8,314 cases for the doors, making together 155,501 cubic feet, from which a column twenty-five feet square and over 200 feet high could be made — all of finished frames ready for shipment.

Indications point to a vigorous increase in business the coming season, and our present space being inadequate, we are taking steps to provide for it, and have in course of construction large and commodious warehouses especially arranged for this branch of our industry.

F. C. STEARNS & CO., SYRACUSE, N. Y.

**Riefler's Drawing Instruments.**

It is a well-known fact that in order to produce satisfactory results the mechanic must have good tools. For the draughtsman it is of the utmost importance, in making detailed plans to have strictly accurate and reliable drawing instruments, as poor tools will cause an endless amount of annoyance as also expense. We have secured the United States Agency for Riefler's celebrated drawing instruments, which, although comparatively new in this country, have already gained the highest reputation for excellence in workmanship and advantages in form and construction.

Every architect, mechanical draughtsman, engineer and others should examine these goods and be convinced of the superiority over the ordinary style of mathematical instruments.

Figures 1 and 2 show the construction as applied to a drawing compass. The legs of the instrument are cylindrical thus increasing the strength, while the amount of material and space occupied is not greater. The points are cone-shaped and screwed into the eyes with the utmost accuracy, and can therefore be replaced when necessary, at a small cost. The needlepoints are of very hard steel of same size as an artist's lead, which can be substituted at pleasure since they are of equal diameter.

A very important improvement over the ordinary drawing instruments is the formation of the joints. A portion of the cylindrical rod is reduced in diameter and split to effect a tight joint, with a wedge provided to prevent turning. This is made as a corresponding socket of same diameter, thus forming a uniform surface on outside with joint scarcely noticeable. The manner of construction is so perfect that the parts cannot easily wear out, and the projecting screws together with the annoyance of losing same, are avoided. The shifting of legs of instruments while in use is avoided by the means of screw clamps. The illustrations represent the exact size of instruments both of which will produce equally fine small work.

The Bow-compass (Figure 3) is very desirable for describing minute circles and can be adjusted to suit the requirements of the draughtsman.

Of the other instruments we might also mention the Dotting-Pen which is of same remarkably fine finish. These are furnished with either three or six wheels of standard designs. The Ruling-Pens are of finest possible workmanship and each carefully examined before leaving the factory.

All persons requiring reliable and accurate instruments, should examine these goods as they are second to none in quality, while their construction offers decided advantages.

Weed's T-square Holder, for which Messrs. F. Weber & Co. are also agents is an ingenious contrivance and of great value to every person using a T-square. The slipping of square is thereby avoided, while it enables the draughtsman to hold board at an angle. Illustrated price lists will cheerfully be sent to any address, by F. WEBER & CO., PHILADELPHIA, PA.

**NOTES.**

It is not generally known that the Chalmers-Spenice Company, N. Y., well-known manufacturers of Asbestos goods, have lately put upon the market a new patent removable covering styled their Class "C" Covering. It is formed of pure asbestos fibre, in cylindrical sections, three feet in length of the exact size of the pipe to be covered, and is made by a special and improved process of manufacture. It is destined to become very popular with steam users.

The Chrome Steel Works, Brooklyn, N. Y., are kept busy filling orders for their well-known Chrome Steel manufactures. Their five-ply combining plate, consisting of alternate layers of welded iron and Chrome Steel, are used largely in the construction of safes, banks, safe deposit vaults and cells of jails. This material is absolutely fire and burglar proof.

The Whittier Machine Company have recently put into the Mt. Kisco House, N. Y., a new steam hoisting machine for their elevator, and have recently constructed for the Dover Water Works, Dover, N. H., two horizontal steel boilers, each five feet in diameter.