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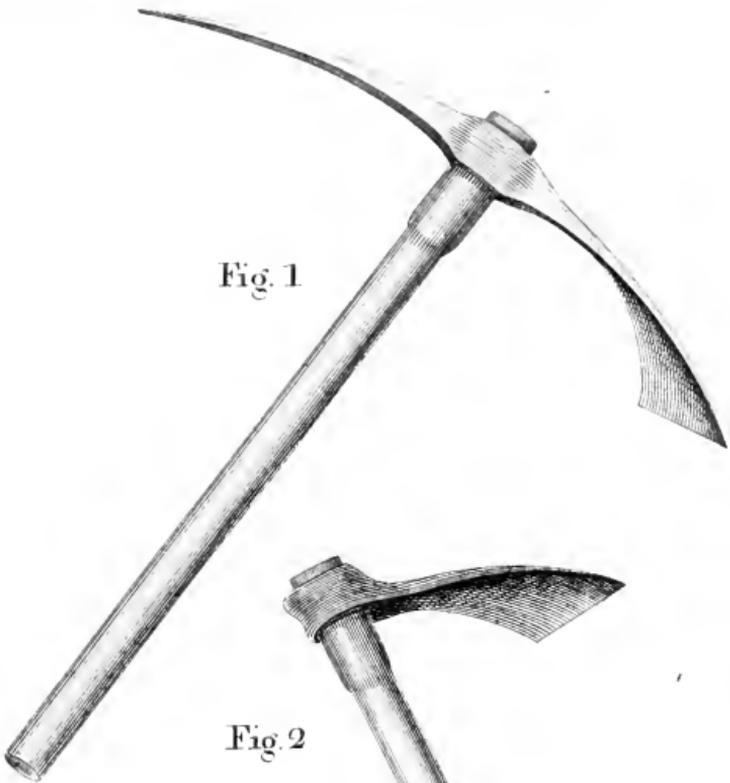


Fig. 1

Fig. 2



Fig. 3



Fig. 4



Fig. 5

THE
PROFITABLE PLANTER.

A Treatise
ON THE
THEORY AND PRACTICE
OF
PLANTING
FOREST TREES,

IN
Every Description of Soil and Situation;

More particularly on

ELEVATED SITES, BARREN HEATHS,
ROCKY SOILS, &c.

Including Directions for

The PLANTING and MANAGEMENT of

Permanent Screens;

WITH USEFUL HINTS ON

SHELTER AND ORNAMENT.



SECOND EDITION, ENLARGED.

BY W. PONTEY,

ORNAMENTAL GARDENER,

AUTHOR OF THE FOREST PRUNER, AND PLANTER AND FOREST PRUNER TO
THE LATE AND PRESENT DUKE OF BEDFORD.

HUDDERSFIELD:

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1808.

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TO THE FIRST EDITION.

THOUGH the writer of the following pages has, for several years, had considerable practice, as a contract planter, he means not to attach more importance to it than that of being enabled, by industry and observation, to ascertain principles, which he was previously persuaded were founded in reason and nature; nor does he pretend to any superior share of abilities; but, attached to the interests of planting, (much more from choice than necessity,) he has, from early life, when viewing the works of others, not contented himself with seeing that they were successful or otherwise, but has reasoned and inquired, in order to discover why they were so;—and he now presents a part of the result, for the decision (and, he hopes, the benefit) of an impartial public.

*On contract planting, — see title
"Planting" in Dictionary of
Agriculture. —*

The following are selected from many others

Testimonies, in Favour of the first Edition.

“ We recommend the Observations of Mr. Pontey to the Notice of all Persons, who may be in Situations where they can apply them.”
British Critic, July, 1801.

“ The Directions for the Management of Plantations display great Judgement, and are apparently the Production of extensive Experience; while the Arrangement of these ornamental Additions to a House, in a picturesque View, merit the Attention of the Builder.”
Critical Review, June, 1800.

“ Pontey, a professional, and apparently a competent Judge, asserts that our own is equal, or rather of the same Quality as Foreign Deal.”
Modern Land Stewa. †, p. 345.

“ The Author seems a Patriot not solicitous about his individual Profit, as a contract Planter, but this Treatise will recommend him to all who meditate extensive Plantations.”

Agricultural Magazine, August, 1800.

“ A Pamphlet has lately been published, entitled, a Treatise on the Cultivation of the Larch and Scotch Fir Timber, &c. by Mr. Pontey, octavo, which places the advantages attending the culture of this Tree (the Larch) in a strong point of View. And which I recommend to the Perusal of those who wish for further information on this subject.” *Lambert's Description of the Genus Pinus, 1803.*

ADVERTISEMENT

TO THE SECOND EDITION.

AS this second edition of a work, originally very small, has been long promised, but much longer called for, it may be necessary to state some reasons for delay:—The very favourable reception of the *first* edition, naturally put the author upon endeavouring to make a *second* more worthy of such notice, by extending the design to the planting and management of Forest Trees in *general*. In pursuance of which it occurred, that the *latter* subject was much more imperfectly understood than the *former*; and hence the propriety of a work devoted *entirely* to that object. Under this impression, the whole of his leisure was, for a considerable period, devoted to the composition of the “FOREST PRUNER,” which was published in December, 1805; a *second* edition of which has just made its appearance. Since the above cause of delay, many others have occurred, chiefly of a professional nature; for he could not consider the *want of time*, a sufficient apology for

feuding that into the world, of which he might afterwards be ashamed.

It will be observed, that though the present is called a *second edition*, it may be considered as nearly a *new work*; the former being chiefly devoted to the cultivation of Larch, and Scotch Fir; and hence, though most of the sentiments are retained, a regard to method, has rendered it necessary to write most of the work anew.

By adopting the method of treating the different parts of the subjects *separately*, much of the confusion and repetition, common in books on planting, and gardening, are avoided, and the work, of course, *much shortened*;—a matter calculated, at least, to accommodate the reader. One of the easiest tasks, that falls to the lot of an author, is that of enlarging on subjects *generally known*; but this very convenient circumstance the author has declined, from a full conviction, that, on a subject which affords so little entertainment, the book which contains the most information, in the *least compass*, will be the most read, and, of course, be found most generally useful.

As the method of moving plants somewhat large, or of planting single trees, belongs exclu-

sively to the business of *ornamental gardening*, *Movin*
 and as the author has some intention of making *large W*
 that delightful science the subject of a *future ef-* *foreign*
fort, it is here omitted. If he should be found *to Italy*
 qualified to trace its *principles* to their true
 source, so far as to furnish rules for its *practice*,
 he will have produced what may be called a
 chart, equally calculated to direct the *employer*
 and the *employed*. The truth is, that so long as
 pleasurable and disgusting scenes remain dif-
 ferent, both in their nature and effects, so long
 will the principles of this art remain *stationary*
 and *capable of demonstration*. That others should
 hold a *different* doctrine, he does not wonder;
change of taste is a convenient apology for perpe-
 tual alterations and absurdities. But if taste
 is really founded in reason and nature, it will,
 in a great measure, be found *permanent*, and
 must necessarily command *general assent*. It is,
 in short, a taste so founded, with a corresponding
 practice, that the author means to explain and
 defend should he undertake such a work.

To persons, who only write *to serve the*
little interests of self, the day of *publication* is
 naturally a day of *anxiety*;—the author, how-
 ever, has no such fears; for since the same means
 which, in *former instances*, procured him *public*
approbation, have been used in the *present*, he
 has no doubt of experiencing similar support.

ADDRESS.



unlike
object of
the
Willows
It is known, that the *united efforts of a few* will frequently effect what may be impossible to an *individual*. Under this idea, the propriety of inviting the assistance of persons of *industry and observation*, has long suggested itself, as likely to be of essential service, in investigating the properties of those species of British Timber, which are not in general use; such as the *Firs, Poplars, and Willows*. Undoubtedly, the value of any article depends much upon a knowledge of its proper application, or, in other words, of the uses it is fit for; and certainly no one can assert, with truth, that we have more than very *limited and vague* ideas of the proper uses of such timber. We know, that most of them may be grown very rapidly, some of them on soils of very trifling value, and others in a way so as to detriment the lands or herbage very little: We know, in short, how to *cultivate* the whole, with abundant success; still we can never make the proper use of this knowledge, until better instructed in the *matter of use*. Undoubtedly, different persons are in possession of facts, that would greatly assist, in elucidating the subject, if we had the means of collecting them. And it may also be observed, that facts, from *different quarters*, must produce more conviction than what is furnished by *one*, however respectable. I cannot suppose any person, possessing such useful information, could wish to withhold it; and, therefore, beg leave to solicit such communications as may tend to show, for *what purposes* these species of timber are proper, or the reverse. These communications, or, at the least, their substance, it is intended to print separately, by way of *appendix* to this work, so soon as a quantity is collected, that shall be deemed of sufficient importance, for that purpose.—They will appear either with the writer's signature, or otherwise, as may be most agreeable to himself. On such a subject it is almost unnecessary to say, that no *anonymous* communication can be noticed. The communications may either be addressed, by letter, to the *author*, at *Huddersfield, Yorkshire*, or sent at Mr. *Harding's*, Bookseller, *St. James's Street, London*.

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 Miscellaneous observations 180 to the end.

THE

Profitable Planter.



AMONG the different objects of improvement, which present themselves to the attention of persons of landed property, that of Planting will always hold a distinguished rank:—probably, if it were inquired, on which of them a person, so situated, could expend a portion of his disposable income to the greatest advantage, the decision, in at least eight cases in ten, would be in favour of Planting.—Indeed, the matter comes recommended by so many considerations, that it is somewhat difficult to conceive how

can
 advan
 made
 study

any one, in affluent circumstances, can excuse himself in the total neglect of it.

In addressing these, I may, for the present, omit the arguments usually adduced upon such occasions, as motives for Planting, (as part of them will be attended to in the sequel,) and content myself with mentioning, how well this pursuit is calculated to gratify one of the most predominant and useful passions implanted in the human breast, namely, a love of posthumous fame :

“ For who, to dumb Forgetfulness a prey,
 “ This pleasing anxious being e'er resign'd,
 “ Left the warm precincts of the cheerful day,
 “ Nor cast one longing, ling'ring look behind?”

Most certainly there are few who do not feel an innate desire, and even an anxiety to be remembered, by posterity with gratitude:—but, to be so remembered as a public character, can fall to the lot of only a few;—nor, in many instances, will

the memory of the virtue and usefulness which adorn a private station, even among the higher ranks of society, long survive, except some honourable and visible memorial be left behind;—and what is there that can so cheaply, suddenly, and certainly effect the purpose as Planting? This, at least, is obvious,—whoever plants to a considerable extent, becomes a benefactor to his own posterity and the public; and, therefore, while his work remains, the man will not be forgotten.

The park at Castle-Howard furnishes a very striking proof of the influence of the passion alluded to.—On one side of a lofty and noble pillar, erected to the memory of the Duke of Marlborough's victories, is the following:

“ Charles 3rd Earl of Carlisle, of the
 “ family of the Howards, erected a Castle
 “ where the old Castle of Hinderkelf

“ stood and called it *Castle Howard*.—He
 “ likewise made the Plantations in this
 “ Park, and all the Outworks, Monu-
 “ ments, and other Plantations belonging
 “ to the said Seat.—He began these
 “ Works in the Year 1702, and set up
 “ this Inscription Anno Domini 1731.

“ If to Perfection these PLANTATIONS rise,
 “ If *they* agreeably my Heirs surprize,
 “ This faithful Pillar will *their Age* declare,
 “ As long as Time these Characters shall spare.
 “ Here then, with kind Remembrance, read his Name,
 “ Who, *for POSTERITY*, perform'd the same.”

It is impossible to read the above, and contemplate the objects around it, without rendering to the memory of that truly great man abundantly more than he has claimed.—It is, indeed, worthy of notice, that after building what, in compliment to antiquity, he called a castle, (but which may more properly be denominated a palace,) with numerous appendages, in a style of grandeur which has seldom

been equalled, (never, perhaps, surpassed in this island,) he seems to have expected more credit from his exertions as a Planter than a Builder;—though no one can suppose the expence upon the former to have amounted to one twentieth part of that upon the latter.

There is, undoubtedly, a great deal more in this inscription than barely meets the eye;—for does it not operate as a standing reproach, to every son and daughter of affluence, who, regardless of posterity, “like some poor player, fret and strut their hour upon the stage, and then are seen no more;”—while, to those of an opposite description, it whispers this salutary lesson, “Go thou, and do likewise.”

It is among the advantages which the modern has over ancient practice, that what was once considered as a great undertaking becomes *now* a mere trifle.—

From the best observations I have been enabled to make, there seems no doubt but the expence which would have planted five acres sixty years back, would now plant twenty, provided the business be managed upon a frugal system;—and, therefore, if we state the matter as it affects a person of landed property, we shall find one great reason why so little of it was done.

If the rental of land have been doubled within the time mentioned, and an acre would then cost, in planting, four times as much as now, a gentleman must then have devoted the rents of eight times as much land to plant an acre, as at present; and, where the rent of land is trebled, the difference would be as twelve to one;—of course, we see such proportion holds out every facility to Planting, while the value of its produce is every where astonishingly increased.

It may here be objected, that the increase in the value of land furnishes an argument *against* planting; which is readily admitted, so far as lands of a middle value are concerned, and where shelter and ornament add nothing to value.—But are there not numerous situations, on almost every estate, which in themselves produce but little, and mock the darings of the cautious cultivator,—which only require to be planted with judgment, to become abundantly productive in timber?—And are not the situations likewise numerous, where planting becomes absolutely necessary on account of its shelter?—Nor are instances wanted where a bare, flat surface of country may be so diversified and ornamented, by patches of planting, as to add to the real or saleable value of the property, abundantly more than the expence, besides the marketable value of the wood.—The necessity for planting in the vicinity

*It will
answer
plant
: will be*

of a family mansion will be noticed separately.

advantages
skill.
asking-
Having mentioned some of the inducements to plant, I may next advert to the advantages of skilful management;—for certainly it may be laid down as a rule, which admits of few exceptions, that the most skilful is the *cheapest planter*; for the following reasons:

species
of plants
First, Such a one will seldom err materially, in regard to the proper species to be planted on any given soil or situation.

size
Secondly, He cannot err in regard to the proper size of plants.

degree
of labour
Thirdly, He will devote so much labour to the preparation of the soil, as the particular circumstances of the case render necessary, and no more.

I.

In regard to the first, every one must have observed what disappointment and loss is frequently occasioned by unskilful management in that respect; and no wonder, if persons will proceed in the business without rule, (that is, by resolving to plant certain species on particular spots, without regarding whether the situation be in all respects proper or not,) or by the advice of persons possessed of neither experience nor observation in the business.—In fact, while men of no experience consider this part of the profession as sufficiently easy, those of a different description always consider it as less or more difficult, in proportion as the soils and situations differ from such as they have been used to work upon.—If it were not a grating truth, I could produce numerous instances, where large sums have been *wasted* in this way, while the proprietors were unconscious that they were not pro-

1.
Plants m
be suit
soils

ceeding by the most prudent and skilful methods.

II. Secondly,—in regard to the sizes of plants:—Here again the losses of planters have been great indeed.—Leave an unskilful planter to himself, and he generally errs, in using plants which are too large; and, consequently, enhances the risk and expences, without at all forwarding the business; while if he proceed by imitating persons of better skill, and plants small ones, but neglects to attend to such circumstances as the probability of a rank herbage, &c. he may, by that means, have them smothered.—Indeed, it very frequently happens, that plants which prove of a proper size in one part of a field, are much too large or too small for another; and, therefore, it is evident, considerable discrimination is necessary in this respect.

Thirdly, as to the preparation of the foil;—most certainly it requires a degree of skill which few ever have, or ever can, attain;—as it includes a knowledge and due consideration of very numerous circumstances, such as, all the various qualities and depths of soils, with the different degrees of humidity and exposure,—the proper species and sizes of plants, &c.—all of which should, in a greater or less degree, influence the matter of preparation. Undoubtedly, there are cases where ten pounds would be well expended in preparing an acre of ground for planting; but certainly the cases are abundantly more common, where one eighth part of the money may well do the business.—The difficulty rests in distinguishing, not only the difference between these extremes, but of their intermediate parts; and, therefore, on all these grounds, we may safely conclude, the most skilful will generally prove the *cheapest* planter.

III.

Dependent
on, & under
greatly
of soil.

Consistent with what has been advanced, it is evident, that the most profitable planter is he who can manage so as to cause the land to be most productive, at the least expence.—Being well convinced that, in a great majority of cases, the liberal use of the Fir tribe is essential to the purpose, I shall now proceed to examine the opinions and prejudices which have been every where prevalent concerning them, and have hitherto, very unfortunately for the country, prevented their being so cultivated as to become generally useful, as large, substantial, and valuable timber.

The man of science, in common with the carpenter, knows the use of an oak or an ash, but, with respect to English-grown Firs, generally contents himself with the received idea, that *they are of little value*; and hence it is only of late that they have been extensively cultivated

for profit;—previous to which, though *Eng. in*
 much had been written, on the planting of *Firs.*
 oak, ash, &c. for timber, we were com-
 monly *taught* to consider the planting of
 firs as principally for shelter or ornament.

Since the time that the foreign fir tim-
 ber was first introduced into this country,
 its usefulness and consequent reputation
 have been constantly increasing; and hence
 we import, annually, immense quantities,
 at an enormous expence:—the facts are
 indisputable, though it does not admit of
 a doubt that the species, so highly valued,
 will grow extremely well here. A circum-
 stance sufficient to induce the reflecting
 mind to inquire, whether it be not possible
to avoid the greater part, if not the whole,
of that expence, by extending and im-
 proving their Culture; and to feel asto-
 nished, that a subject of such immense im-
 portance should have hitherto met with so
 little attention.

The motive for such inquiry will be greater, when we seriously reflect on the present scarcity, and consequent advance of price; and our ideas will probably turn to the day, not long elapsed, when Fir Timber was sold at little more than one third of what it now is. Indeed, so long as we depend upon foreign markets for a supply, it is impossible to foresee what means *may* be used, and what circumstances *may* arise, to increase such scarcity; consequently, impracticable to form any opinion of the *price* that *may be exacted*, or the *inconveniences* and *injuries* which the want of such Timber may produce.

Whoever has attentively examined the subject; and has the *interest of the nation at heart*, must certainly see the necessity of thoroughly investigating, whether there be any thing, in the *air* or *soil* of our country, to prevent the growing of *good fir timber*.

That we have few English-grown firs *Enquir.*
of sufficient scantlings for the larger purposes of building, will readily be admitted;—but whence proceeds the deficiency?—Prejudice says, “we cannot grow “them *good*,” and ignorance and indolence have hitherto very generally assented to the assertion. But should it be found that such conclusions are contrary to truth, and that the scarcity in question is the consequence *only* of erroneous notions, it will certainly be useful to expose them, to trace their causes and effects, and to furnish those observations which experience has suggested; for theories, however plausible, are by no means the *guide*, a prudent man ought to follow, in the science of planting and growing timber; because, while satisfied with commonly received opinions, though it is probable we may be right, there is a chance of our being wrong; and he is a very inattentive observer, who, acting as a plan-

ter of firs, does not discover, that, if men had not usually taken their ideas upon trust, the business must, long ago, have been reduced to somewhat of certainty.

They would have found out, not only what firs grow best in particular soils and situations, but the specific sorts which thrive in most of them; and, moreover, would clearly have ascertained the properties of the timber of all, or at least of so many of them as would thrive on bleak and barren ones, and, therefore, likely to be most profitable. But, unfortunately, instead of having got thus far on the road of knowledge, very few have yet made any progress; and, what is worse, many see not yet the necessity of such a journey.—In short, they have no idea of reaping any advantage from it*; why,

* The author has very great pleasure in observing, that such inattention, which might be considered as

therefore, should they labour for that which cannot profit?

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Of the truth of these remarks we have ample proof; for the planters of the last age generally used Scotch Firs only, in a manner that leaves us at a loss to discover what end they had in view, unless it was the rehearsal of their own funerals; certainly, if their object was use, shelter, or ornament, they in a great measure mistook the means.

That the planters of the present age greatly surpass those of the last, is acknowledged; as they generally use so much of variety on every soil, that, enough of the proper sorts may ultimately

highly disgraceful, is *now*, in some measure, done away; as planting of Firs, with the direct idea of profit, is practised to an extent hitherto unprecedented; of course every species of information, tending either to facilitate or elucidate the business, must be highly acceptable.

be selected for Timber:—still such variety affords no proof of skill, but the contrary; as is abundantly shown by the methods most frequently adopted in thinning; the *most valuable* being usually cut down, to make room for the *most worthless*.

The reader will observe, that, by the *most valuable*, I mean such as would be worth the most money in a given time, (suppose thirty years;) and by the *most worthless*, such as would produce the least in the same period:—quantity and quality being out of the question, except as they affect the price.

I would premise further, that, consistent with the preceding, I pay no regard to established opinions; for, should I find even the oak and ash mixed with larch, Scotch and spruce fir, and the former making but little progress, while

the latter were flourishing, I should not hesitate to call them inferior;—nay, were both in a thriving state, yet, if it seemed next to certainty, that the former would not fetch ten pounds, when the latter would be worth twenty, I should treat them only as objects of secondary importance.

If the foregoing be the only true method of estimating the value of trees planted for profit, it is evident that the modern planters, with every few exceptions, have acted upon mistaken principles, and must continue to do so, till better acquainted with the qualities of larch, Scotch, and spruce fir timber.

Undoubtedly, till a very late period, English firs have been considered as of little value, except for shelter and ornament; and hence the undistinguishing havoc to which they have been subjected:

Scotch Fir indeed, it is not at all to be wondered at, when we consider that not a few writers, who have undertaken to direct the current of public opinion, represent them (in addition to the above purposes,) as best of all calculated for the *honourable* and *permanent* situation of *Nurses*.

Seeing then the consequences to which such opinions directly lead, and being perfectly convinced they are equally unfounded and detrimental, it may be useful to advert, shortly, to the leading causes from which they seem to have obtained currency;—and especially so, as most workmen are so completely prejudiced as to be unwilling to give the article a fair trial.

To meet such ideas, however, we may consider that, for many years, the Scotch firs were the only species commonly planted; and these at very considerable distances; in consequence of which, they would

retain their lower branches till they got *English* very large; and hence the timber, upon being cut up, is uniformly found so full of Knots, as to be disqualified for most purposes to which foreign fir has been usually applied, and therefore the article deservedly fell into disrepute.

When the above truly barbarous taste subsided, we find the Scotch firs again exhibited *alone*, either in masses or small clumps; where each plant, having less space, would grow much less knotty than before; and hence a temptation to use such as were thinned out while young, for numerous purposes.—But here unfortunately it seems to have been overlooked, that this fir, in a sheltered situation, grows very quickly for many years; and never acquires much of density in an early stage of growth.—most certainly neither of the descriptions adduced were fit to be put in competition with

Foreign Deal; and yet it may safely be asserted, that a large proportion of the latter description, with a very small one of the former, composed at least nine-tenths of the documents upon which public opinion was formed, previous to the last six or seven years.

Good sometimes arises out of evil, and so it has happened here; for the extravagant price of foreign fir has of late induced many people to make trial of some of the best trees in their possession, of different sorts; and the result has been so far favourable as to occasion much of the extraordinary increase in planting which has been noticed.

In the business of investigating the natural properties of Firs, (to which a considerable degree of my attention has been devoted for several years,) it has afforded singular satisfaction to find them uni-

formly superior to what previous preju-^{English.} dices had taught me to expect. In truth, after a careful examination of every specimen that has fallen in my way, up to the present period, (January, 1807,) I can safely affirm, that I have discovered no *natural defect*, which will, ultimately, disqualify any of the species, commonly cultivated, from being used, either generally or partially, as a substitute for the foreign.

It is true that, with respect to the Scotch and Silver Firs and the Weymouth Pine, the young quick-grown wood is somewhat soft or spongy; but does not something like this prevail in several parts of both the vegetable and animal creation, without at all impeaching the strength or value of the matured subjects of either? Certainly, in regard to the firs in question, every observation has shown that the Timber improves with age, probably in

grows in the same proportion as the growth decreases after a certain period.

Observe, it is not said that even such young timber would not be durable if properly seasoned, and used where constantly dry; as I conceive these points are by no means ascertained:—but were such the case, we have others, namely, the *Larch and Spruce Fir*, which, if properly managed, may safely be depended upon, as durable, in every period of their growth; whether exposed or otherwise; and, therefore, no question or doubt needs be entertained, as to their liberal use for every purpose, where they can be procured large enough.

It has fortunately happened that, in the course of the last five or six years, the Larch has got into considerable repute; as wherever a quantity of it is to be sold, from the size of a common rail upwards,

it never fails to command purchasers, at ^{English} a good price. This may be considered as one of the cases where general opinion can scarcely be supposed to err; because it has been corrected by experience.

Formerly, no distinctions used to be made;—ENGLISH FIR, was the general name for the whole species; and the idea it conveyed was that collected from the use of Scotch Firs only. Now, almost every purchaser has some idea of distinctions; which could only arise from some evidence of difference in value:—In short, almost every one gives the Larch a decided preference over them all, though, perhaps, few persons have more than very confused ideas of its specific properties.

We need not here adopt the stale method of extolling the Larch upon the credit of antient authors, who seem to have imitated each other, in detailing circum-

stances too surprizing for readers of common understandings to believe; especially as some of their statements have been found completely erroneous*; but we may say, that experience has warranted an opinion, that the Larch is equal to the Foreign, for all the general purposes to which that article is usually applied, and superior to it for many others, among which are the following:

First, It may be grown abundantly clearer of knots, provided some little attention be paid to pruning it. Every one knows that the Knots in Foreign Timber affect its value, exactly in proportion as they prevail in number and size; as both

* Many old books tell us, that the Larch will not burn, which is false: for though it does not burn so freely as other Firs, it burns quick enough to be ranked among the best sorts of wood fuel; and hence, where such is used, the faggots are much esteemed, as being *a good and durable* article.

have a tendency to affect its strength and appearance. *Larch*

Secondly, It is much tougher ;—a circumstance which, connected with its durability, will fit it for numerous purposes, in boards of the least possible thickness.—Three eighths of Larch must, in almost any case, be superior to half an inch of Foreign Deal.

Thirdly, Supposing it once well seasoned, it is afterwards much less liable to shrink.

Fourthly, It may be speedily seasoned, at any time of the year, as it admits of a very considerable degree of heat, without endangering its cracking.

Fifthly, It is much superior in colour, as the application of raw linseed oil only, turns it to a beautiful nut-brown. *9th*

*gives a receipt for staining larch of a
gamy colour.*

an article which is universally allowed to be superior to the White, when exposed in boards to the influence of the atmosphere. These knots are certainly the remains of branches, which rotted while they still hung upon the trees:—but nothing like this is ever found in a Larch board, or on a tree; though we are sure the latter has been subjected to exposure as well as the former.—To this fact (in its own nature more convincing than assertion from any quarter,) I will only add, that every observation I have made has tended to impress the same idea as is usually entertained of the heart of oak. We know that it must decay at some period, though we have no certain method by which to guess—*when* *.

* Such persons as feel particularly interested in understanding the properties of Larch, may find the subject discussed, considerably more at large, (with an account of some experiments,) in *The Forest Pruner*, p. 79.—107.

The Spruce Fir being considered as next in value to the Larch, naturally calls for the next attention. Perhaps we may lay it down as a maxim, in regard to trees generally, that the utmost attention should be paid to ascertaining the properties of such as are found to grow freely in a great variety of soils and situations; because these circumstances hold out an almost irresistible inducement for persons to plant them freely; and hence, though in general good is done, in some cases considerable damage may ensue.

The case of the Spruce Fir particularly calls for such attention, as it grows rapidly on almost every description of soil, from a very stiff loam, and such as possess a considerable degree of humidity, to a very dry sand; provided the situation be not very much exposed.—It will readily be admitted, that the tree is exceedingly ornamental; but, with regard to the pro-

erties of its timber, very little appears *to be known with certainty.*

As to myself, I readily confess that, till a late period, I did not discover in it any striking proofs of superiority; and hence, upon former occasions, I passed it over somewhat slightly;—now, however, the case is different, and, therefore, I take the earliest opportunity of giving my reasons for such change in opinion.

In observing the state of this fir, in plantations where the trees formerly grew thickly, and never were pruned, it appeared a very striking circumstance, that branches which had evidently been dead many years, (some of them probably more than twenty,) were found, uniformly, not only *found* but *tough*;—a convincing proof of DURABILITY. Still I believe this circumstance, which, properly improved, *ought* and *would* have established

its reputation and use, has operated directly to the *contrary*; because wherever the trees stand so thin as that their lower branches can grow to a considerable size, these continuing attached to the stems for many years, (whether living or dead,) must inevitably cause them to grow extremely knotty, and hence to be rejected for general purposes.—Indeed, we cannot wonder if workmen use their utmost influence in depreciating an article so extremely difficult to work, in comparison with foreign timber, and which, in addition to being tedious, not unfrequently damages their tools; all which would be completely avoided by means of pruning.

It is now more than twelve months since my attention was particularly attracted to the subject, as above; during which time many observations have been made; all of which tended, directly or indirectly to confirm my opinion of its

durability, whether used in exposures or ^{or spruce} otherwise; with the exception of the case of trees used WHOLE, as rails, &c.—as in drying they never fail to crack; and hence the part is exposed to alternate drought and moisture; against which not even the heart of oak is completely proof.—As far as my observations have extended, the same remark will apply in regard to rails made of *Green Whole Wood*, of every description.

The specimen of Spruce Fir which ac- ^{specimen}companies this treatise, is part of a beam, that had been in a building about twenty-four years; which, on being taken out, proved as found (the bark included) as when first made use of;—nor did its appearance leave any reason to suspect it to be less strong or durable, or at all inferior to any foreign beam whatever. Yet a point still more important remains to be noticed:—IT WAS NOT OLD WOOD.—Its

Spruce diameter being eighteen inches, under the bark, where its age was fifty years.

Here then let us pause a moment, to consider what use prudent planters ought to make of the important fact just stated: in doing which, it will readily occur, that the matter is of too much consequence to be fully credited and acted upon, without further investigation; and, therefore, it is incumbent upon them to use every means within their power, to collect such facts and documents as may tend to establish or discredit it:—This is all I desire or want; for if men will only be earnest in this sort of investigation, no further arguments will be necessary from me, to induce them either to plant, prune, or preserve the Spruce Fir.

But there is another point of view, in which the article is extremely valuable; namely, as being (all circumstances confi-

dered) the best plant we have for the general purposes of shelter; as it grows close, and, in proper situations, very quickly. Where it has free space, it retains its lower branches alive to the ground, to the utmost period of its existence; so that we can easily avail ourselves of its shelter to any moderate extent. This tree naturally forms itself into a narrow cone; its breadth, however, may be easily increased, by cutting off its head; or readily reduced, by pruning, without materially injuring its foliage:—Indeed, its form is so much subject to management, that I have seen it shorn, so as to form an excellent sheltering hedge.

Of the innumerable cases in which this tree may be useful, as a shelter, it is neither possible nor necessary to speak here; but I should consider myself inexcusable in omitting to notice one, in which it is qualified to be most essentially servicea-

Prunus

Prunus
the tree

Fence

Spruce ble; as it materially concerns a description of persons who are particularly entitled to attention and respect,—I mean the planters of oaks.

Planting of firs among oaks, as well as other deciduous trees, in order to shelter and draw, or perhaps, more properly, to force them up, has long been practised; yet, I conceive, it has been little considered how far the Spruce is superior to the Scotch Fir for general purposes. The point, however, appears self evident, from what has been advanced, with the additional circumstance, that the former will retain its lower foliage, in less than half the space which the latter would require; and, therefore, that part of its shelter cannot be lasting, except we are willing to sacrifice much space, and content to grow it as faggot wood only;—while, as to the other, the space required would be very moderate, the shelter complete and dura-

ble, and the wood, ultimately, of considerable value. *Pruce*

Where the air has somewhat free scope round an oak, it produces numerous side branches; some of which swell, so as to rival the principal leader,—which a complete shelter is directly calculated to prevent; as a branch never either swells or shoots freely if it do not point into an open space. In the growing season, every tree becomes a traveller, in search of air and light; and, therefore, they never tower so rapidly as when they have the most of both above them.

But there is another consideration, which of itself ought completely to influence the choice of trees planted for Nurseries. The very name conveys the idea that they are to be displaced, at no distant period; and, therefore, common sense seems to dictate that, in every possible case, they

some
arch.
some
habic
an early
stage of
growth.
 should be of such sorts as are most of all valuable at an early stage of growth; properties which are common to the Larch and Spruce Fir; and, therefore, they should be preferred in that department, wherever the soil and situation proves suitable.

Certainly when an oak planter (consistently with the last hint) makes use of such Nurseries, he goes far to obviate any possible risk; for should the oaks not grow to expectation, it is highly probable one or both of the others might answer, or even exceed it; and thus a crop of excellent timber would be secured.

some
high price
 I know only one objection that can be fairly urged against the general and liberal use of Spruce Firs, as Nurseries and Principals, which is—their *price*. Hitherto they have been usually considered as more ornamental than useful; and

hence, while the consumption has been small, the price in nurseries has been kept rather high.—It may seem a paradox, but still it is a fact, that, as the demand for any species of forest trees increases, the price decreases, till it becomes very moderate:—nor is the trade any loser by it; as an increased demand, frequently aided by an improved mode of culture, seldom fails to more than cover the difference.

Considering what has been advanced, in regard to the properties of the Spruce Fir, it is presumed, that little doubt can be entertained of the propriety of preferring it to the Scotch, on every soil and situation equally proper for both: a case very common, though by no means universal. The leading exceptions, which I have observed, are a black sandy and moorish soil, that naturally produces nothing but heath, and very bleak exposures. On the for-

Spruce

*Will not
grow on
black, s.
soil, pro-
ducing
nothing
but heath,
or
very bleak
exposures.*

Spence. mer they seldom vegetate more than just to keep them alive; in the latter they grow better, but too slowly to render it desirable to plant them. As the first sort of exception is, in a considerable degree, applicable to the Larch, and the latter to trees in general, it has long been an object of much solicitude with myself, to find means to reduce them within the least possible limits; the result of which will be seen when we come to treat distinctly of the *Methods* of Planting and obtaining Shelter.

Butcher's. But presuming that, after all which has or can be done, in regard to the circumstances just mentioned, numerous and extensive tracts will remain, upon which the Scotch Firs ought to predominate, I shall next proceed to notice its properties.

Writers in general seem agreed, that this tree is of the same species as that from

Scotch Fir.
 which we have the foreign Red Deal;—
 and, if such be the fact, little doubt need
 be entertained of its latent good qualities ;
 notwithstanding the disgrace under which
 it labours ;—and as to the matter of affi-
 nity, I see no reason to doubt it ; the or-
 der in which the knots are placed, their
 liability to rot, and the testimony of indi-
 viduals who have visited the countries
 from which we import that article, all
 seem to tend to establish the point. Still
 the one is usually found of a much finer
 grain, and much heavier and stronger than
 the other ;—which is clearly imputable to
 its being grown in a colder atmosphere,
 and, consequently, much slower than ours.
 The real difference, however, is only in
 appearance, when two old subjects hap-
 pen to be contrasted ; as then the ques-
 tion of weight and strength depends more
 upon the part of the trees from which the
 specimens are taken, than the country
 from which they come.

Scotch pine - If it be true, that we can raise abundance of the article, upon almost every description of soils, which are nearly or altogether unproductive; and if it be clearly ascertained, that knottiness and want of density are the only defects of the article; it must likewise be true, that discovering the means of preventing them, becomes not only an individual but a *national concern*.—It may be easy, in some cases, for an author to detect error, but it is indeed herculean labour to induce the bulk of mankind to adopt its opposite.

It has already been intimated, that the knottiness of fir timber, generally, would easily be prevented by a good method of pruning;—(for proof of which, the reader is referred to *The Forest Pruner*;)—and, therefore, it remains only to be considered, how far the want of density is curable by any means short of age; for that is evidently its most natural one.

Probably we may here gather a useful hint, from what is said to be the practice in Ruffia and Sweden, namely, the disbarking of the stems of the firs, to the length of two or three feet, at least a year before they are intended to be taken down; which disbarking and falling is done only in winter; a practice which could not have generally prevailed, on any grounds short of admitted utility.

And see what is said in the *Penit* *in his Forest Prunings* Jan. 98, 9.

If we could show clearly in which way such method operated, a very important point would be gained; but as that seems impossible, I shall dismiss it with just observing, that if it could be found that, under such operation, the last efforts of lingering life would be spent in expelling the watery matter, or in expending it to support the foliage, and substituting rosin in its place, we should then have sufficient data on which to found a system for the

o
Archie. Fir. improvement of every species of young fir timber.

with 927
in 1800
in 1800
We certainly shall soon have a large supply of this description; and, therefore, the study of its improvement and properties becomes matter of more than common interest. Experiments, to elucidate this important point, should be made, again and again, by persons who have means and leisure, on free-growing trees of different ages.—From what I have observed, of the superior quality of the wood of young ones, which have been, for some time, stunted in growth, (in consequence of sudden exposure, or being overhung by others,) I have great reason to suspect, that cutting off nearly the whole of the branches, two years before the period of taking down, would go far to effect the needed improvement; as, after the operation, they would grow very slowly.—Observe, this being an extreme case, the branches should be taken

off not less than six inches from the stem, *Fir timber.*
to prevent bleeding.

It may here be observed, as a general remark, that though building timber is usually cut from large fir wood, (such being nearly as cheap as the small,) still but little of it is used in large scantlings; and, therefore, it is evident, that by much the greater part of a modern building may be done with small ones; and hence native produce might be liberally made use of in them, at a much earlier period than is generally imagined. Great strength can be required only in a few cases, easily provided for; Durability becomes essential in all: and, therefore, we may state it as a question, well worthy of general discussion;—Under what circumstances may the durability of British-grown Fir Timber be safely depended upon?

Scotch Fir. I need not dwell long on the facility with which the Scotch Fir accommodates itself to almost every description of soil and situation.—It may, indeed, be called “The Planter’s Forlorn Hope;” as where it fails, the case is truly desperate. For instance:—it is planted with success, on the most barren commons, where no other tree or plant (the Heath excepted) will grow. On scites which are elevated, and exposed to particular currents of wind, it often proves the only tree that can be got up, except so far as others may rise under its shelter. In the sea breeze too, it is frequently observed that, while every plant around it bends from the blast, as if seeking protection, this holds its head erect, and bids defiance to the noxious gale.

It is not said, however, that, in any of these cases, the trees grow uniformly as quick as under more favourable circumstances: still it is truly wonderful to ob-

serve the quickness of their progress, after they have got sufficiently established in the ground, and are large enough to shelter each other.—Why they do so on a barren heathy soil, it is not easy to conceive; all we know with certainty is, that this tree will not only live but thrive, where most others would do neither.

In the case of exposures, where the soil is tolerable, the reasons for such thriving are somewhat obvious. The plant is not only extremely hardy, by nature, but its shoot and leaf (spine) are stiff; and hence neither can be much subject to damage from violent winds;—still, in such cases, it never grows rapidly till each plant, by contributing a part to the general stock of shelter, resists the winds and improves the atmosphere; and hence their accelerated growth.—It is admitted, that such shelter could not be lasting; but it would afford the means of rearing a durable one,

*Scotch
Fir.* consisting of every thing proper for the purpose. And thus, by the use of this degraded plant, we see the easy means of doing what would be otherwise impossible; namely, rearing a Crop of Timber, of any description proper for the soil, in elevations which, naturally, would grow such trees no better than bushes. The value of such shelters, as they affect the surrounding lands, will be attended to under a separate head.

Clear ideas of what will grow and thrive upon the situations just mentioned, are essentially necessary to almost every one who plants upon a large scale; and, therefore, an author, who can distinguish between truth and error, would ill discharge his duty if he did not, to the utmost of his power, enforce the one and oppose the other.—In a modern book on planting, now in many hands, we have the following, “ The native Pine (Scotch

“ Fir) has long been planted as a nurse,
 “ but the practice is now much relinquish-
 “ ed. Nor is it founded in reason; since
 “ there is no foil or situation in which
 “ the Larch and Mountain Ash will not
 “ far surpass it in growth, while young.”

*Aspenium
 the Larch
 grow in
 soil do.*

Observe the latitude of the passage,—
 “ *No foil or situation,*” &c.—Still I will
 venture to affirm, that whoever should
 plant any of the heathy parts of the chain
 of hills which separates Yorkshire from
 Lancashire, Cheshire, and Derbyshire, in
 the manner implied as above, would find,
 to his cost, that this “ *Practical Planter*”
 had reckoned without his host; as *neither*
his nurfes nor his nurflings would grow,
 except so far as the Larch might happen
 to penetrate into the under stratum (a sort
 of reddish sand, full of loose stones;) where,
if the situation were not much exposed,
 it might make tolerable progress; but cer-
 tainly not otherwise.

*Not in
 heathy
 soil.*

Larch. What I have just advanced stands upon very different grounds from either mere theory, or slight, or recent practice; for I have been annually employed in planting upon the said hills for, at least, sixteen years; during which, no instance has occurred of the Larch doing more upon the heathy soil than just growing enough to keep alive, till it penetrated the under stratum. And though experiments have been repeatedly made, by planting the oak, ash, fycamore, and birch, (most of which produced a few leaves the first season,) the plants have all died; except a few (probably not more than one in a hundred) of the latter; and their progress has been very slow.

But, again:—It will scarcely be doubted, but a great proportion of the heathy soils in the country are similar, both in appearance and composition, to the foregoing; and, therefore, we may conclude,

that, so long as like causes produce the same effects, they *alone* will not produce deciduous trees:—indeed, the heathy soils about Woburn strongly confirm the fact; for there great quantities of such trees, of almost every description, had been planted, (the Mountain Ash included,) previous to my engagement; of which, none have grown except so far as they have penetrated into the under stratum, where the heathy soil happened to be thin; and, among them, the Larch has succeeded best. Many of these, however, have remained completely covered with moss, and nearly stationary, for many years; yet most of them have, at length, recovered gradually; which could only happen in consequence of their roots getting into the under stratum:—for such as were planted in pits, or broken ground, grew well from the first.

*Heathy
Soils.*

But enough of heathy soils;—let us see if, haply, our author has been more

Larch?
all the
service for
shelter.
 correct in regard to exposed and elevated
 scites; where, of course, *the most perfect*
shelter is absolutely necessary.

Here we may ask any one accustomed to observations on such subjects, if he ever remarked the Larch to be as little affected by the winds as the Scotch Fir, on such situations?—And again, Do not deciduous trees constantly extend their branches horizontally, so as readily to intermix with each other?—but they cannot do so with the Firs; as there is little of either light or air in their interior; and, therefore, when mixed with them, such can only shoot freely *upwards*. Besides, the Larch, for several feet from its top downwards, has a very light spiral head; of course, *there* its shelter bears no comparison to the Scotch Fir, at any season.

The absurdity of planting the Mountain Ash, as a shelter, will be evident, by

Considering, that if it grow fast it produces but very few branches; and if it grow slowly, so as to produce more, it will be too low to afford protection. At best four of this plant would not shelter near so much as one Scotch Fir; and, what is worse, four of the former would cost more than eight of the latter; and, after all this extra expence, we should neither have a tolerable shelter, nor (if our author is to be credited,) a timber tree of value. He says, in describing its properties, “As a
 “ timber tree, however, it is of little use;
 “ being only valued by the wheel-wrights,
 “ to which they prefer Birch and Beech.”

*Mount
 Ash n.
 said ab
 for she*

Presuming that the useful inferences from the foregoing cannot escape the attentive reader, I shall close my observations on the properties of the Scotch Fir with remarking, that heathy soils and elevated situations compose, jointly, at least half the land likely to be planted for pro-

Scotch Fir
the only
one which
will thrive
on the one,
and the best
primary shelter
on the other,
it must always
be regarded
as one of
most extensive
usefulness.*

It is a
solitary
instance
of prejudice
in regard
to Scotch
Fir Timber.

* The following is a striking, though by no means a solitary, instance of prejudice, in regard to Scotch Fir Timber.

A gentleman, who had a quantity of large trees on sale, brought me a sample; observing, that "it fetched only a very low price." As the timber seemed in every respect good, except being somewhat knotty, in consequence of having been grown in the manner noticed at p. 28, it seemed evident to me, that neither the fellers nor buyers had more than very inadequate ideas of its value.—In order to try this point, in regard to the former, I had a conversation with the person employed to fell it, in company with the owner, on the properties of the Fir wood produced on that estate; when he expressed his decided opinion, that "the Scotch Fir wood was very indifferent in quality." However, on producing the above-mentioned sample, he (not knowing where it had been grown) declared it to possess "all the natural properties of Capital Tim-

It would be thought somewhat foreign to the present subject to enlarge on the properties of the other firs, commonly cultivated as plants which are more ornamental than useful; such as the American Spruce, Silver Fir, Weymouth Pine, Pineaster, &c. as all of them are dear, some tender, and others apt to fail on being removed;—still, as they are highly ornamental in proper situations, and as every plant which is so adds something to the real or marketable value of a place, they clearly belong to the subject, and will continue to do so, as long as taste and nature shall equally contribute to the

*English
Firs. —*

*more or
: names
than
: full.*

“ber; and that he had great doubts if any soil in this
“country would produce its equal.”—This was the more remarkable, as he was then in the daily habit of superintending the sawyers, who were cutting up trees of the same age, and grown on the same spot of ground; many of which, being smaller in scantling, were, of course, finer in grain, and more dense than the sample produced.

+ Pineaster recommended by Mr. Nathan as growing in America: probably better than the Larch &c

formation of ornamental gardens. Of the properties of their timber, however, I have little to remark, except that, in every case, its density seems to increase with age; and if, as we have abundant reason to believe, the durability of fir wood depends principally upon the resinous matter found in it, there is no doubt but all of them might be used for numerous building purposes, after having attained a reasonable age.

In a book professing to develop the principles of profitable planting, there seems much propriety in particularly noticing such trees as are in themselves highly valuable, but which, from different causes, are either not generally known, or not in merited reputation. The species now alluded to are—the Witch Elm, the Huntingdon Willow, the Upland Willow, the Black Italian Poplar, and the Hoary Leaved Poplar or Abele.

First, *The Witch or Scotch Elm*.—This tree is well known in some parts of the country, where it grows spontaneously; though but little in others, where it does not;—as planters have generally considered it either as an inferior article, or as one likely to do mischief in plantations, from its quick and straggling manner of growth: nor do they seem to have at all considered, that if not the first in point of hardihood, it certainly is one of the second; and the same may be said in regard to the variety of the soils in which it grows freely.

*Witch
Elm.*

*Witch
Elm
various
soils*

The western part of the west-riding of Yorkshire is rather proverbial, for the coldness of its atmosphere, while much of its soil is retentive and thin, upon a clay bottom. On these, where the appearance of most other trees proclaims the want of proper accommodation, the lengthened shoots and increasing trunks

Witch Elm, of this evidently evince the contrary.—
 Certainly on every situation and foil, not
 peculiarly bleak or sterile, it is a quick
 grower; while it would appear, that its
 timber is quite as good, if not better, than
 the other species of Elms; and, there-
 fore, one would suppose it merited gene-
 ral attention.

Witch Elm, It has happened, however, that, in ad-
dition dition to the awkward mode of growth
 already noticed, there is a very prevalent
 mistake concerning it, which requires to be
 obviated.—In the quarters where it is best
 known, the carpenters esteem it highly,
 but generally call it, the ENGLISH ELM;
 while, in the nurseries, a very different
 article goes by that name; and hence,
 where the former is intended, the latter is
 commonly procured at a much superior
 price; and no wonder, as they are either
 raised from layers, (a very tedious pro-
 cess,) or are grafted on the Witch Elm;

which method is certainly preferable, as far as regards the purchaser; for such not only grow abundantly faster than the others, in equal soils, but never throw out suckers; as the Witch Elm produces none.

The objection already stated, to planting this tree in mixed plantations, deserves attention, as there are few situations where it would not overtop, and consequently damage many other sorts; of course, as a principal, it had best be planted alone. Yet such plantations would be much improved, by introducing a quantity of Spruce and Scotch Firs, with the Birch, by way of nurser; as all the four sorts would do well together on a stiff and somewhat thin soil, where many others would not.—The shelter would very much correct the propensity of the Elms to produce straggling branches, as well as promote their towering; besides

Witch Elm.

Does not produce suckers.

Witch Elm planted alone a principal.

taking off the appearance of naked stems, and a square heavy surface; while the pruning necessary would be very trifling indeed.

In recommending this plant for an indifferent soil, it is not to be inferred that it is improper for almost every description of good ones; as perhaps few trees would so well deserve such situations, in the vicinity of places where it may be wanted for the purposes of the boat builder, cartwright, &c.

*The
Huntingdon
or Swallow-Tail
Willow.*

The Huntingdon or Swallow-Tail Willow.—This plant, though well known as a pollard, has been very little cultivated as a timber tree; and hence furnishes a striking instance of the supineness of mankind, in regard to the properties of many sorts of wood. Every one knows the willows are quick growers; and yet it is considered as a sort of heresy to suspect that the wood

of any of them can be at all durable.—
 There is beside an objection to this wil-
 low, inasmuch as it usually divides itself
 into a number of large arms, before it ac-
 quires any tolerable length of stem:—this
 defect, however, is to be imputed entirely
 to ignorance or inattention; as few trees
 require so little management to be made
 grow with a long, clean, and straight
 trunk.

*Quantity
Willow*

As a pollard, this willow is, in many
 places, found considerably profitable; still
 I do not recollect to have seen a rood of
 it growing as timber any where, though
 no doubt can be entertained of its obtain-
 ing purchasers; as, with extensive useful-
 ness, it is also considerably durable; a
 property which it appears may be much
 augmented, by steeping some months in
 water, as is frequently done with oak sap-
 lings; an excellent practice, and worthy
 of imitation every where.

*Huntingdon
Willow.*

*the
Black Italian
Poplar.*

If the question were asked, in which way I thought a quantity of good, deep, and somewhat moist land, in a situation not exposed, nor possessing any local advantages, could be turned to the greatest profit? I should say,—by planting it with some or all of the following articles, namely, the Huntingdon Willow, the Abele, and the Black Italian Poplar; as all of them succeed best in that sort of Soil, are remarkably quick growers, and would (except in the first instance,) require only the same sort of management.

*Advantages
for deep
soil.*

The advantage of a deep foil over such as are shallow, so far as regards the production of timber, are considerable, and well worth the planter's attention; though it may fairly be questioned, if more than a foot in depth essentially benefits the general purposes of agriculture:—For, first, trees generally penetrate into or make use of *the whole depth*; and, therefore, though

the soil nearest the surface is commonly found most fertile in timber produce, and it is admitted that the same sort of fertility which influences the growth of grain and grafs materially affects the growth of trees,—yet it is obvious the latter will thrive in soils where the former would not;—and, therefore, the quantity or depth of soils is always an important consideration; and more especially so where proper species of trees are selected to suit them; as it is difficult to describe any that are so completely sterile as to be incapable of producing one or more sorts of useful timber.

*Advant
of a deep
soil.*

Another consideration is,—on deep soils the trees cannot fail to vegetate somewhat regularly, through the whole of their proper growing season; being but little affected by the droughts, which often very materially retard the growth of such as are planted on thin ones.—The reasons are obvious:—Roots that are near the sur-

*mountain
for deep
soil.*
 face, in a parched soil, cannot extend them-
 selves in search of the necessary food of the
 plant, otherwise than very slowly; and
 hence its increase is retarded in propor-
 tion.—But how different is the case of such
 as have part of their roots lower than any
 considerable degree of drought can pene-
 trate; as, at such seasons, the lower soil,
 being acted upon by the warmth and
 drought so detrimental in the other case,
 are *best* qualified to assist in the business of
 vegetation; and, therefore, the roots in
them not only materially contribute to
 support the head of the plant, but to en-
 able the others to perform their proper
 functions. A healthy tree has a general
 circulation through every part of it; so
 that if one has what may be called ne-
 cessaries, the others are never found in
 want. Besides all which, the surface of
 deep soils cannot be affected by ordinary
 droughts, to any considerable depth;—as
 the heat and drought acting upon them

occasion their imbibing a considerable quantity of moisture from below. In short, it is among the advantages attached to planting trees, that, in numerous instances, they convert the USELESS into USEFUL: They are, in fact, a sort of miners, who can find gold, where every other description of miners would seek for it in vain.

Two circumstances jointly hold out peculiar inducements to plant these trees in such places, as they not only soon grow strong enough to be in no danger of damage from cattle; but they grow so exceedingly tall, that the land may soon be returned into pasturage, and become no less productive in grass than before, while there is an astonishing annual increase in the produce of timber.—Most people must have observed, how freely the grass grows under the willow pollards, which have *short stems* and spreading heads, though not more than ten or twelve feet asunder; and,

cutting down
Willow
side with
is may
ground
the crops

therefore, no doubt need be entertained
 in regard to the herbage, if the trees had
 stems of four or five times that length, and
 stood fifteen or eighteen feet from each
 other.—Indeed, taking into account the
 manure, (or, at least, the rich vegetable
 matter, furnished by the decomposition of
 fallen leaves,) it seems highly probable
 that land, so cropped, would produce
 more pasturage than another part of the
 same field, employed for that purpose
 only.

now to
last, -
here into
of the pasture

Here two methods, of preparing the
 soil for such a purpose, present themselves:
 The first is trenching the ground about
 eighteen inches, or, what is called, two
 spits deep; laying the sward reversed in
 the bottom of the trenches.—This method
 would certainly very much accelerate the
 growth of the trees, but then the expence
 of it would be from seven to nine pounds
 per acre; and that is not the only objec-

tion; for, as the ground would be turned up lower than the common fertile depth, it would be found only in few cases in a condition to bring a crop of grain the first year, with the plants; a matter well calculated to reduce the expence of planting, &c.

*How to
when the
decisions
be return
to pass*

For this reason, I should recommend that land, previously in grass and intended for such purposes, should be sown with oats the year preceding; and, in order to the swards being as much rotted as possible, the ploughing for that crop should be done early in winter. In the autumn following, on the ground being cleared and sufficiently moist, it should be ploughed at least twice; as deep as the plough could possibly reach, and harrowed after each operation; so that it would be sufficiently broken to receive the plants, with a crop of oats, ⁽²⁾ the following spring. The latter, however, should, in the first place,

(2) Though oats are rather preferable, Mr. Penty says they may be sown with any crop.

must necessarily immediately precede the planting. — The crop, when ripe, must be carefully reaped, not mown. See 170.

[76]

on the ground

be sown and harrowed in; after which, the planting should immediately follow; as, in that case, it might be done on soils so prepared, without materially injuring the grain; for, with respect to the willows, a niche, made with the spade, would be sufficient to let in the set;—and, as to the Abeles and Poplars, they should be of only one year's growth; and, therefore, might be planted, without moving much of the soil.

The best willow sets, for such purposes, are made from shoots of two years' growth, of not less than about three quarters, nor more than one and a half inch diameter. The length may be from ten to twelve inches; of which, not more than two are to be left out of the ground.—These sets should have their tops a little sloping, but the bottoms are better cut somewhat square.—The distance between each plant should be four feet. ^(c)

Note. The Poplar sets should have been one year in the nursery: when about one half of the will be, it to plant out. The other half

The only further attention necessary, during the summer, would be to go over the willows, as soon as they had formed shoots from three to six inches long, and to slip off all, except the strongest, from each set; after which, neither they nor the poplars would require further dressing, till both had grown two summers, from being planted; and then they would properly come under the general system recommended for the management of plantations in *The Forest Pruner*.

The fence for such a purpose, being only a temporary matter, might be cheaply made by sinking a ditch about half a yard, and raising a bank, about fifteen inches more. A hedge, or bearding, on the top of it, about a foot high, and placed rather projecting outwards, would complete the business. This should stand

The growth of the B. Italian Poplar, they need not be planted closer than 6 feet from each other. — See p. 163. —

is to plant where I designed returns pasture
 fix or eight years, and be then displaced, so as to leave the field level as before*.

* Fully aware that the success of planting speculations must be influenced by many varying circumstances, I seldom venture upon calculations; still, by reasoning from the rapid growth of the sorts of trees under notice, upon every soil that is proper, we find a sort of criterion by which to form an average estimate of what may be the profit of them; before and after the first seven years from planting.—It would seem a moderate estimate to suppose that two crops of grain, from good land, previously old sward, would defray the rent and taxes for the two first years, and, also, the expence of planting and fencing; but were it to prove a few Pounds short that would not materially affect the ultimate result. Suppose then the rent and taxes ^{of an acre} to be Three Pounds Ten Shillings annually, that, with compound interest, would in seven years amount to about Twenty-eight Pounds Ten Shillings.—To this we oppose the supposition that the plantation increases in value, Five Pounds the first year; and to increase more by Thirty Shillings the next, and so on for six years; at the end of seven the acre would be worth Sixty-seven Pounds Ten Shillings, a profit of about Thirty-nine Pounds.

Red
 The Upland or ~~bad~~ twigged Willow.—

Why this tree has obtained the appellation of Upland is by no means clear, but probably it has been supposed to grow better than the other Willows in such situations; which seems not to be the fact, as the Huntingdon Willow grows very rapidly on

Upland Willow

Observe, it is not said the trees would then be worth so much to fell, as that is by no means the proper mode of valuing a thriving plantation; the right method is to have a regard to what may be their probable future increased value; and by that means to estimate their present one; as, for instance, a quick growing tree, now only worth Six-pence to fell, may easily be worth Eighteen-pence in four years more; and hence there could be no impropriety in valuing it now at Nine-pence, or one third more than its present saleable worth.

About the age of seven years the thinning should commence; and, therefore, an annual produce might be had from that time forward; but as no data exists, by which to estimate its value, the safer method is to calculate upon an increasing annual produce for at least ten years longer; during all which time, as well as afterwards, no doubt need be entertained of an annual

*At age 7
 thinning
 should be
 commenced*

land a dry foil, of moderate depth.—However
Willow. as neither of them flourish so abundantly, there, as on moist ones, they are never likely to be cultivated extensively, except upon the latter. Probably, in different parts of the country, the two species may be known by names very different from the above, but still it is evident they are everywhere esteemed in preference to the others, as we very rarely find a Willow Pollard of any other sort.—In summer they may ea-

produce of Twenty Pounds per acre, besides the value of the herbage, from the time of the fence being displaced.

Evelyn, speaking of the Abele, says “ the Dutch “ look upon a plantation of these trees as an ample “ portion for a daughter, and none of the least effects “ of their good husbandry.”—We know that this excellent hint was addressed more than one hundred and forty years ago to thousands who had the means of benefiting by it, and yet, how lamentable!—we are yet to learn where is the single acre that was planted in consequence!!!

fly be distinguished at a very considerable distance, as the Huntingdon appears of a light green, while those of the other, though darker in fact, appear of a hoary or silver-like hue; in consequence of being covered with a sort of down.—In winter we distinguish them by the shoots of the former being brown, and somewhat brittle, especially those from two to four years' growth; while those of the other are of a dark red, and very tough. Their manner of growth and shape of the leaves are much the same; nor does there appear any material difference in the timber or quality of their wood;—still, in almost every instance, the Huntingdon appears to be the quickest grower; and, therefore, where it can be procured, most worthy of attention*.—The plate of the

*Upland
Willow.*

* It would have been particularly gratifying to have been able to produce some decisive proof of the durability of these sorts of Willows; but as I can state nothing positive from my own knowledge, it must suffice to

*K

* Mr. Poutney says, he intended to refer to both species.

*Lyons and
Millar.*

Willow in Hunter's Evelyn's Silva, gives a very correct idea of this species.

Undoubtedly these Willows are both calculated for extensive usefulness, as Timber, but unfortunately, for want of a good method of training them as trees, in the first instance, and, in consequence of very limited and vague ideas of their properties, they remain, as from time immemorial, classed among the woods of lowest value.

The Black Italian Poplar.—As this species is not mentioned in either Evelyn or Millar, it seems to have been introduced into the country since the latter work. An opinion which, I think, is confirmed by the circumstance, that no old trees of

remark that every thing I have gathered from either the observations of myself or others, goes to establish the fact; while not one circumstance has appeared (prejudice excepted) to discredit it.

it are to be found any where; and, though it is now common in the northern part of England, we very rarely find it in the south; while the Lombardy rears its ungraceful form every where.

*Black
Italian
Poplar*

Unfortunately, most persons take their ideas of the Poplar tribe from the *appearance* of this plant only;—an impression so far unfavourable, that, with many, the whole species are in disgrace.—But though expectations (which were much too sanguine,) have been, in a measure, disappointed, in regard to the Lombardy Poplar, it by no means follows that such will be the case with the Black Italian:—indeed, matter of fact proves, that, as the one sinks, the other rises in the scale of estimation, so far as they are known:—and hence, with myself, it is matter of doubt, whether the very extraordinary encomiums which used to be lavished on the former, at its introduction, were not, in

Black
Italian
Chiar. fact, founded upon the merits of the latter.

It is quite as likely that the Poplars of Italy, in general, should have been observed, as those of Lombardy in particular; and it is far from clear that both are not grown in every part of the country; and, therefore, a very trifling mistake might lead to the consequence now alluded to.—We know that the merits of the one are abundantly superior to that of the other; but why the latter should have been introduced by so many encomiums, and the other none, is difficult to conceive, except by supposing, that, somehow or other, they have exchanged both names and reputations.

The Black Italian is very different from the Lombardy in form, as it almost uniformly rises with a light but regular conic head; being so hardy as generally to pre-

serve the same leader, from the ground to an immense height; in consequence, its stem is remarkably straight; and hence, in plantations, very trifling attention will form it *clean*, to any reasonably required height.

This tree is an astonishingly quick grower, on every sort of soil that may be called tolerable, though it certainly luxuriates most of all in deep fertile ones; while its timber is applicable to purposes sufficiently numerous; among which is that of making very good floors; and, therefore, no doubt need be entertained of its always commanding purchasers.

In that sort of planting which perhaps may be considered as most of all profitable, namely, that which adds to the comfort and consequence, and, of course, the value of a place, previously scantily furnished with that important appendage—WOOD,

(a) W. Pouty recommends it to be planted in the best of the cultivated land at Slougham.

Black Italian Poplar.
 this tree is excellent; as, in judicious hands, it may be made to produce very considerable effects, while many others (highly esteemed) would produce them in prospect only.—In short, for distant scenery, where WOOD, not species, is the *immediate object*, this plant, hitherto in many places a stranger, is clearly superior to all the family of the forest*.

* As the Lombardy Poplar is well known from its peculiar erect manner of growth, it affords the easy means of describing the Black Italian by *comparison*.—The leaves of both are very much alike in colour, shape, and turn, the only difference being in the latter producing them somewhat larger than the former, though not near so large as the other Poplars, whose leaves are at all similar. The branches of the latter grow much less erect, and, likewise, much thinner upon the stem.—The only other distinction necessary is the bark, which on a stem or branch, of from two to four or five years' growth, is always found smoother, and of a much darker colour than any of the poplars that are at all like it in other respects.

The Abele or Hoary Leaved Poplar.— *Abele*
 In bringing this article under notice I cannot help remarking on the utility of an author introducing samples, in preference to mere descriptions of valuable woods, hitherto but little known and less understood, as is the case with the present subject; certainly it was something like this that first convinced me of its extraordinary worth; as, though in common with other people, I have been in the habit of reading descriptions of the Abele, it was not till a late visit to my honoured patron Lord Sheffield, at Sheffield-Place, Suffex, that I had any clear ideas of its being any other than a *white*, and, also, a *light*

As, in my professional excursions, southwards, I have been generally disappointed of meeting with the article at the nurseries, and have frequently had other sorts substituted in its place, there can be no impropriety in saying here, that, whoever finds a difficulty in procuring it, may be furnished with the true sort, of any useful size, by addressing a line to the author.

Alele wood, of extremely quick growth, and rather inferior than superior to the general sample of poplars.

That Nobleman, who upon every proper occasion manifests a decided partiality for national produce, has lately made some Floors of this Wood, which, in appearance, are superior to any floor I have seen, whether of Deal or Oak; and, as to durability, I see no reason to doubt of that, if the density and weight of the article be considered, in connection with such testimonies as books afford relative to the point.— Floors, however, are only *one* of the many *inferior* purposes for which it is applicable; as it is certainly proper for almost every article of furniture usually made of mahogany. For the lighter descriptions of it, now so fashionable, it may be made a very good substitute, without any other addition to the natural colour of its heart than the means

cabinet makers generally resort to, in or- *Abele*
 der to heighten the colour of such wood;
 and with respect to the sap, and where
 more of colour is required, the aqua-fortis
 stain will instantaneously produce it, so far
 as that it would be difficult to distinguish
 it from real Mahogany.—Indeed, it is e-
 qual to the best, in colour and smoothness
 of surface; and much superior to the plain
 or inferior sorts in those respects, as well
 as transparency and variety; and it has
 the further advantage over Mahogany, and
 most other woods, that it takes but little
 of either oil or rubbing, to produce upon
 it the sort of mellow shining surface, so
 much admired in furniture that has been
 some years subjected to proper attention*.

* It is evident, that notwithstanding all which has
 been said by authors, (and certainly they have been
 by no means sparing of their encomiums on the timber
 of the Abele,) something more is necessary to induce
 men to either plant it liberally, or take proper care of *Sam*
 what they have growing.—If the improved samples,

Planting on Steeps.—As these are situations confessedly unpropitious to the cultivators of the soil, they naturally fall under the cognizance of planters.—But, though most of these can easily see the propriety of *planting* them, few are ap-

produced with this treatise, added to the circumstance of the plainer sorts of mahogany being now worth Sixteen Shillings the solid foot, produce no beneficial effects, I shall say that prejudice has indeed usurped the place of common sense.

Lord Sheffield, who kindly furnished me with the wood for samples, has several extremely large and tall trees of this species, most of which have been planted rather for ornament than use, being in the avenues.—They are somewhat brittle, and, therefore, liable to be broken by the winds on exposures; some of his Lordship's have suffered in this way; after which they very much resemble the trees so much admired in the pictures of Salvator Rosa; who most probably took a hint from their picturesque appearance.—Nor has Homer done them less honour, as the following description evidently alludes to this species only, the appearance of all the other sorts being very different:

prized how peculiarly they are adapted to the purpose; or that there are five respects in which they are clearly superior to levels.

*As
cutting
on steep*

So falls a Poplar, that, in watery ground,
Rais'd high its head, *with stately branches crown'd,*
(Fell'd by some artist with his shining steel,
To shape the circle of the bending wheel,)
Cut down it lies, *tall, smooth, and largely spread,*
With all its beauteous honours on its head.

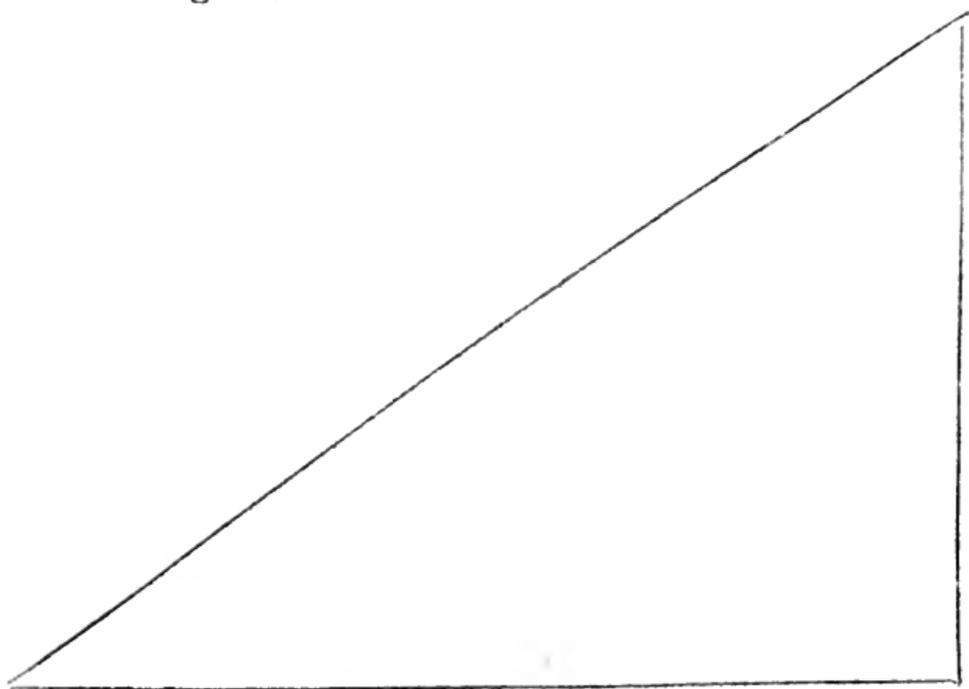
POPE.

From this we gather, that the wood was then in use for making wheels, (perhaps, water wheels; and, if so, it furnishes a proof of its durability in moisture:—but if not, it shows the high opinion then entertained, of the strength and toughness of its timber.)

There is a variety of this poplar, which the planter, who wishes for quick growth, will do well to keep clear of.—Its leaves are rather less, with a surface somewhat more shining, and of a darker green.—The underside of the leaves is whiter as the down is finer, and lies much closer than that on the others.—This does not grow near so quick as the other, and usually goes by the name of the Shining Leaved Poplar.

*Similar
n. steep.*

First.—They admit of a greater quantity of trees being planted upon an acre, or otherwise they allow to every one an increased quantity of surface.—To demonstrate this fact, which has been long and frequently the subject of dispute, we have only to observe, that, in measuring a steep, the dimensions of its *base*, and not the *surface*, is or ought to be taken: of course, on steeps similar to the annexed figure, the base and the surface differ



as five to four; and, therefore, in soils of ^{Planting} equal depth, a saving of one in five is ^{on Steeps.} clearly gained, by planting upon such a steep. Where the ascent is less, the saving will be less in proportion.

Secondly.---Trees planted on steeps have likewise an increased quantity of air. To prove this, we have to consider that as, upon the average, each tree must rise above its fellow, equal to the proportion of the ascent, so each will have so much the greater quantity of surface exposed to the influence of the atmosphere:—where a moderate portion of *that* is wanting, we may have trees tall, but they will be proportionably weak; where too much is admitted, they will be stiff, but short; a steep serves, in some degree, to moderate the two extremes; and, therefore, as well as on account of the increased surface, it is evident, that more timber may be reared upon them than upon levels.

Counting on steep. If the face of a steep be concave or convex, or partially so, the trees will be more sheltered than if it present a more even surface; as, in either case, the current of the wind, instead of sweeping in a straight direction among the stems, or upon the summit, will be broken in particular places; and hence much of its force will be lost.

Thirdly.—On steeps, trees are more sheltered than on levels of equal elevation.—In considering this matter, two points of the compass are out of the question; as when the wind blows *along* the steep, its effects must be much the same as from blowing along levels. When it blows from behind, or down such steep, there will be a calm among the trees, except such as are near the summit. But, to counterbalance this advantage, it may be supposed, that, when the wind blows *up* the steep, its force will be consider-

ably augmented, by what is added in the ascent; which certainly must be the case, so long as the surface is somewhat bare.—The matter, however, becomes materially different, so soon as the trees get a few feet high; as, from that time, the wind has to travel over a sort of hollow surface, and, in doing so, great part of it sinks in, and dies away among the branches.

*Planting
on Steeps*

Fourthly.—It appears that, by planting on steeps, more of the adjoining lands will be sheltered, than by planting the same quantity of ground on a plain.—Here, for the same reason as in the last case, two points of the compass must be left out of the question.—As to the plain beneath, it will be completely sheltered to a considerable distance, provided the planting extend to the summit of the hill; as the trees will have a tendency to throw the current of the wind considerably above the level of the plain at its feet.

D. L. L.
to Hedges.

The effects of the winds blowing up a steep have been mentioned:—on this head it is to be noted, that the effect on the grounds beyond the steep will be observable at distances, in proportion to the strength of the blast; certainly the most violent will operate at the greatest:—for as the wind, in driving up a steep, gets augmented by the level current, it, by that means, becomes so powerful as to drive the current, which otherwise would sweep along the summit, to some height above it; when the strength of both being reduced, by resisting each other, they descend to the ground together, at a distance from the top of the hill; greater or less in proportion to the level of the surface;—where the ground falls, the shelter operates to an extent almost beyond credibility.

On levels, the current of wind sweeps immediately along the heads of the trees,

from one end of the plantation to the other; while very little of its force is lost by sinking in among the branches*.—Certainly such situations present nothing con-

*Planting
on Steeps.*

* At Stanmer, near Brighton, the seat of Earl Chichester, several of the tops of the hills, which are directly opposed to the sea breeze, have been planted: in these cases, many of the verges of the plantations exhibit a close front, quite from the ground; something similar to that of a clipped hedge, but, sloping much the same as the ground below them. The height of the front ranks of the trees differing, in proportion, as they approach to or recede from the brinks of the steeps while almost every branch and twig bends from the blast.—This circumstance, added to that of the trees having been planted very thick, and each producing a flat head, serves to conduct the whole current of the wind to every part of the plantations within its reach; in consequence, no tree can tower *there*, (the Scotch fir excepted,) otherwise than as they rise *en masse*.—To remedy the evil in some degree I have advised, to thin such fronts considerably; as, by that means, much of the current will sink in, and be lulled among the front trees; which, in themselves, can only be valuable as shelters to the others.

considerable, either to break, elevate, or dissipate it; and, therefore, it must fall to the ground, not only much nearer, but with much greater force than in the other case; and hence the effect of the shelter will be proportionably less.

In many situations, advantages may be gained, by planting the higher parts of steepes with the tallest and quickest growers; as such means produce a sort of concave summit, which absorbs more of the wind than an inclined plane; and likewise throws the remainder higher; of course, its descent would be at a greater distance, and the shelter increased accordingly.

Fifthly.—As whatever is ornamental adds not only to the *ideal* but the *marketable*, and, of course, the *real* value of an estate, we may observe, that planting on steepes has an extraordinary claim to

attention, as producing one of the noblest species of scenery, at an expence which, compared with that of most other improvements, must be considered as trifling in the extreme.—I need not dwell on a feature which may be called equally bold and beautiful, A HANGING WOOD; as that is universally acknowledged;—but may just touch on some matters not so generally known:—for instance, contrasted with planting on a plane, that on a steep gives the idea of abundantly more in quantity; as, on a plane, most of the ground seems to be lost, except from some particular point where a bird's eye view can be had of the trees.—The whole surface of a steep, on the contrary, may generally be seen from many points; and, when covered with wood, always appears larger than its real dimensions.

It should be observed here, that, to give the greatest possible idea of size,

the higher termination of such planting should, by extending beyond the summit, be hid from the principal points of view, and more especially so when it serves to bound a lawn or park ground. When such is the case, and the plantation is of considerable length, it should have one or more large breaks through it; as these, with the concealed termination of the planting, would give the idea of *continuation* to such ground, and the woods would appear to be large and *within* them, instead of proclaiming, as it were, their *termination*, and exhibiting, at the same time, a stripe of planting perfectly inconsiderable*.

* The delightful residence of Blythe, near Bawtry, will soon present a striking practical instance, of the effects which may be produced by the sort of planting just mentioned. The park grounds, in front of the mansion, are chiefly flat; but, to the left, are terminated by rising grounds, *planted*:—the two ends with Oak the centre with Firs:—the whole showing clearly that *the Park ends there*.—At the same time, the

When the surface of a steep to be planted happens to be somewhat regular, or an inclined plane, and the higher part of such planting will be seen from below, the object *then* is to *improve* and not *conceal* it; as in the latter case.—For

heavy appearance of the firs point out from the house, their own termination, as well as that of the oaks, which otherwise would not be discovered, as they extend somewhat beyond the summit of the hill.—It happens, that the winds have torn up many of the firs, and the rest are by no means in a thriving state; I have, therefore, suggested the propriety of taking them down, and converting that space into grafs; which will present the idea of the park ground being continued between two considerable oak woods; as the view will only be terminated either by the horizon, or trees, at not less than three miles distance. I may observe too, that at present, there is no approach to the place from which it can be seen otherwise than partially, and to great disadvantage; a defect which the proposed means will completely remove; as from a road, situated just beyond the highest point of the intended break all the fine features of the place will, *instantaneously* burst upon the traveller!!

Planting in hills. this purpose, some of the tallest and quickest growing trees may be introduced into the highest side of it, as mentioned under the last head;—as such means would, at once, increase the apparent size of the planting, and the height of the hill; and, and at the same time, present a sort of concave surface, which would be considered as abundantly more bold and beautiful, than one either convex or an inclined plane.

Adopting of Species, best of all suited to the soils, is a matter well worthy of the planter's most deliberate consideration: certainly they who neglect it, have no well founded claim to the appellation of Profitable Planters.—Nothing can be more absurd than the planting of extensive tracts with many sorts, confessedly with an eye to profit, without due regard to *selection*; for though, in most soils, any of the common sorts of forest trees will grow,

yet, in almost every instance, some one or more will be found luxuriating abundantly more than the others; and, hence, it is the planter's business to use his utmost sagacity to ascertain the species, either before he begins, or, at least, before he has made much progress in the business.

*Selection
of species*

In doing this, I would seriously caution him against trusting to Theory, provided more satisfactory means prove within his reach; a circumstance very seldom wanting.—The method I have generally adopted, when consulted upon such subjects, is to make an excursion among the trees in the neighbourhood, and to examine the soil where any sort or sorts are found most thriving, in order to determine how far it corresponds with that intended to be planted.—In fact, I never give a decided opinion till *repeated observations* have satisfied myself as to the most proper *species*.

*Timonia
neighbour
ing soil
and time*

Selection of species. It will readily be supposed, that, in doing so, an old planter cannot easily divest himself of what he has previously learned; and hence should it prove, that the species, *supposed* to be most proper, was not found growing in the neighbourhood, inquiry should be made for the nearest place where it might be met with on a similar soil, or as nearly so as circumstances would admit; by which means, it could rarely happen but the selection would prove very good, if not the best which the soil admitted of.

Perhaps the necessity for such observations will be evident, upon considering, that every soil, exhibiting the same sort of appearance, does not possess exactly the same sort of properties.—For instance, on stiff soils, the Larch has, of late years, failed very much; which, however, does not prove that some of them are not well calculated for the article; as, at Woburn, they

grow as well upon soils moderately stiff, as upon the sand; which circumstance, I presume, may be imputed to the former being considerably calcareous, or what may be called a species of Marl.—On chalk lands, we observe the soils on the surfaces to differ materially; some are very stiff, and others very light, and yet the Larch is found to grow freely on both descriptions; which may probably be imputed to the cause just noticed, namely, the calcareous matter found in them.

*Selection
of species*

*Larch grows
freely in
Chalk, & in
the stiff
in light.*

Again, the Oak is generally observed to flourish most on a loamy or somewhat stiff soil, often where it is very much so; but yet I do not recollect to have seen it flourish abundantly on stiff calcareous soils any where; though it will be readily admitted, that on some of them it grows much better than on others.

L. octid.
L. specios.

The foil about Sheffield-place, before mentioned, produces timber in general, quicker than any other which has fallen under my particular observation; and, what is most remarkable, the Oak and the Larch flourish *equally* upon it; though it would seem too light for the former, and too stiff for the latter*.

* In order to ascertain the constituent parts of this foil, so remarkable for the production of timber, Professor Davy submitted one hundred parts of the entire foil to analysis, which produced the following result:

Water	3
Silex	54
Alumine	28
Carbonate of Lime	3
Oxide of Iron	5
Decomposing Vegetable Matter .	4
Loss	3

100

Again:—It appears, that the growth of several sorts of trees is materially affected

Pontes says, the quality of the soil at Naughton, generally speaks, bears a

ted by the degree of mineral taint found in the soil;—a circumstance which never directly meets the eye.—Above Mines, and in their neighbourhood, we seldom find the timber growing freely. The Larch seems particularly averse to such situations, while the Oak and Witch Elm appear less affected by them than timber trees in general. In short, it may be safely asserted, that, though experience will generally enable us to form a pretty accurate judgment of the species most proper for any given soil, yet observation added to it, will furnish a much safer guide; and, therefore, no one is excusable in neglecting it.

When the planter has fully availed himself of the foregoing general observations, he may probably find an advantage in attending to the following descriptions of the soils, upon which the more useful species of Forest Trees will grow and thrive.

*Elective
of species*

*How
has seen*

grows freely

The Larch

is, in fact

scarcely ever

to be seen

situations

Soils

in places

where

plants

*• suitable
• soils* First, *The Oak*.—This generally seems to grow quickest on a deep and somewhat stiff soil, but yet any person of observation must have seen that it grows well on every species that can be called good. On sand and very stiff clays it will grow too, but very slowly; and, therefore, an attempt to raise it on such cannot be considered as *profitable planting*

The Ash.—Grows most freely on a deep loamy soil, more particularly if it be in a considerable degree calcareous.—It likewise grows well on the more tenacious sorts of Bog Earth, after they have been drained. *Generally*, we may remark, that its quickness of growth depends upon a tolerable quantity of moisture, and not a small one of what may be called natural fertility, of which it is a prodigious consumer.—However the toughest, and, of course, the best Ash, in quality, is usually found to be

produced on a soil *light*, but neither very *moist* nor *fertile*.

*Suitable
soils.*

The Elm.—Under another head (see p. 65,) the properties of the Broad Leaved Witch or Scotch Elm have been noticed. The Narrow Leaved, or what is usually called, in the Nurseries, The English Elm*, is rarely found in plenty, except where the soil is *dry, light, and moderately rich*.—It is true, we often find it thriving tolerably, in plantations, avenues, &c. where the soil is *stiff, moist, and poor*; but, in such cases, it will generally be found, upon examination, that it has been grafted, as is usual, upon the Witch Elm; and hence on these, as on every other soil, its growth is considerably accelerated.

Elm.

* It is probably called *English Elm*, from the circumstances of its abounding in the hedges, in many parts of the country; but, since I have never known it to produce seed, and know that in such places it propagates itself by suckers, I think it improperly so called.

Suitable Soil

*Narrow
leaved
&c.*

Among both men and books, it remains matter of dispute, whether the timber of the *English* or *Witch Elm* is best. Undoubtedly each may be preferable for particular purposes; and certainly they must differ in quality, in some degree, from the circumstances of age, soil, &c. Such a dispute, however, seems proof sufficient that both are very good; and therefore, choice, and the situations may determine the sort to be planted, provided it be duly noted, that the latter grows most freely on every soil, and that the former grows but very slowly on indifferent ones; except it has been grafted upon the latter*.

* I have lately procured a new sort, apparently a variety of the *Witch Elm*, which grows quite as erect as the *English*, and abundantly quicker than either that or the former. If the timber do not prove of inferior quality, it will be a valuable acquisition, in both useful and ornamental planting; as, in a few years, it may be sold at the same price as the grafted *English Elms*.

The Beech.—This tree may be said to be peculiarly the inhabitant of dry soils, including sand, gravel, and chalk; on all of which it grows very freely. On stiff ones too it will grow, but not near so well; and hence it deserves no place on them, otherwise than for shelter, or to produce variety.

The Spanish Chestnut.—This tree, like the last, is found to thrive best in a dry soil; and like it too, will make prodigious progress where it is far from rich.—On sandy ones, where the oak would make but slow progress, I have seen this grow extremely quick; and, therefore, in such cases, the latter should be substituted in the place of the former.—Its wood and bark are known to possess the same valuable properties as the Oak, in an eminent degree; while it is, in a measure, exempt from what may be called its principal defect, namely, the perishable nature of its sap or younger wood—Hop-poles and staves of this wood

*Wettable
Soils.
of Chestnut.*

are esteemed every where, for their great durability, which, of course, have but little of heart in them. On wet or stiff soils, in the northern part of the island, the shoots of this plant seldom get sufficiently ripened; and hence their extreme ends are often killed by the winter's frosts; and, therefore, attempts to raise it on them, for timber, usually prove fruitless*.

* I have really been astonished to observe the rapid progress of this plant on sandy soils; more particularly at Berry Hill, near Mansfield. If the proprietors of lands in that quarter, who are anxious to raise oaks upon them, would, instead of planting thousands of that article upon an acre at a great expence, content themselves with planting two or three hundred small Chestnuts among Larch, Firs, &c. and take care to prune them, either annually, or every second year, as they are apt to form double heads and large branches; and likewise take care the other trees did not over-top them, I am persuaded they would, at a very trifling expence, provide a supply of the best species of timber, to succeed the firs, &c. Perhaps, on the sandy soils in that quarter, more planting is done and doing than on five times the

The Sycamore.—Perhaps few trees will grow and even thrive (the Scotch Fir excepted,) on a greater variety of soils than the present subject; for it seems to reject none but Bogs, and the most barren heaths: still it evidently luxuriates most of all on a deep and fertile loamy soil, where, of course, it is not stinted in regard to moisture. I have observed a large tree of it growing freely on the side of a brook, where a constant stream washed more than half of its base; its other roots being in a dry soil. This proves it thrives in a considerable degree of wet; still it may have too much; for I have seen fine thriving trees, of twenty years' growth, killed by the water soaking from a stream on a higher level, and keeping the soil, (naturally a dry one,) in which they grew, constantly wet.

same space in any other part of South Britain. — Should the above hint be generally adopted, posterity will have reason to say, It was well that ever the author *traversed Sherwood's barren Sands.*

*of suitable
Soils.
Sycamore*

*Suitable
soils.*

70. 76.

Poplars and Willows.—Having already introduced the Black Italian Poplar, with the above, and the two best species of Willows for Timber, and shown what are their most favourite soils, it needs only to be added here, that, though they are all regarded as aquatic plants, all of them which we consider as valuable for timber, will thrive better in a very moderate than a great degree of moisture; and they will also grow freely on a dry soil of tolerable depth;—nor do they refuse either a stiff soil or a sand, provided they are not very barren.—In truth, were we but half as well apprized of the various purposes to which their timber might be *properly* applied, as we are of the quickness of their growth, I am persuaded they would then be considered as subjects worthy of general attention.

The Larch.—As the extraordinary value of this article gets, annually, better un-

derstood, there is so much the greater need of clear ideas of the nature of the soil, upon which it will ultimately succeed; for as, hitherto, it has been planted indiscriminately on most sorts, and failed generally on some, and partially on others, there is some danger of its cultivation being discouraged.

*Suitable
Soils.
- rich*

Why this plant should be attacked by insects, on lands *deep, rich, and good*, where it had previously grown well, while it has continued to flourish in spite of being so attacked, on soils every way inferior, seems extremely difficult to account for; the fact, however, is obvious; and, therefore, without indulging in objectionable theories, we may certainly pronounce it an unsafe speculation, to plant the article liberally on *stiff, humid, or deep rich soils*, except they should likewise be considerably calcareous.

*Attacked
by insects
on good
land.*

*Historical
Notes.*

Perhaps no part of South Britain has suffered so much, from the ravages of the insect, as the South West part of Yorkshire; as there the best and richest lands have suffered very generally. On the moors, also, there are many instances of considerable damage. Of the latter, however, it must be observed, that the crust or surface, (a black moorish or heath soil,) which is certainly unfavourable to the article, differs as much in depth as from five to fifteen inches, and we frequently have both extremes in the distance of three or four yards. The second stratum is generally such as the plant will thrive in; and it is, likewise, in most places, of considerable depth; and hence it is that the trees, planted *in it*, usually grow well from the first; while such as are planted in the surface soil only, never make much progress, till their roots have penetrated through it; mean time, (of late years at least,) such

have been found almost uniformly infested with insects.

*Suitab
Soils.
Larch.*

It should, also, be observed, that though such under stratum is all of the same colour, (a reddish sort of sand,) and generally full of loose stones, it differs materially in quality:—where the least quantity of stones appears, the soil has the least of grittiness, and there the Larch succeeds the best;—where the stones are most plentiful, the soil proves proportionably sharp, and there the plant thrives so much the worse. Still, though the above may be considered as a general result, cases have occurred where the plants have failed partially, where they had previously grown well, and where their roots were (apparently at least) in the better sort of soil only; a circumstance which seems almost to puzzle conjecture. But still, if two trees have grown nearly alike, and almost close to each other, for several years,

*Suitable
Soils.
Larch.*

and the one gets afterwards much infested with insects, and the other very little, we may be sure there is a cause for the difference, and that it must be with the roots. If the whole of one set continues to work their way through a deep and favourable soil, while a part of the others meets with obstructions, from loose stones, with but little of earth among them, or solid rock, as must often be the case in these moors, we shall then have accounted for the *cause*,—*a deficiency of earth and moisture*. One tree must, in consequence, be much weaker than the other; and it is well known, in regard to fruit trees, that such are always most subject to be infested by insects. Certainly nothing has yet appeared to show, that a very large proportion of these extensive heaths is not well calculated for the production of this very valuable tree, but past events have shown the necessity for just and careful discrimination.

It is, indeed, highly consolatory to find, by collecting facts from many distant parts of the country, that though, on most of the sandy and calcareous soils, the insect has been very numerous, yet, hitherto, its effects have been but little prejudicial; and, therefore, we may reasonably conclude, that they are peculiarly favourable to the plant; and hence, *on them, its cultivation may be most safely extended.*—Indeed, when we consider of how little value many extensive tracts of both descriptions are, for the general purposes of agriculture, and how much the reverse for the production of this article, as well as many other species of timber, we can assign no reason why more of them are not planted, but that their value, in that respect, has hitherto been but imperfectly understood.

As to the insect, there is reason to hope that we have seen the most destruc-

Suita
Soils
Larch.

Sandy &
Calcareous
Soils in
Farrina.

*Suitable
Soils.
Larch.*

tive of its efforts; for, in the quarter that has been mentioned as the scene of its former triumphs, as well as every other which has come under my notice, its ravages seem to have been upon the decrease for the three last seasons; and, during the present, it has done so little harm that, were it never again to become more numerous, it might be considered as no longer formidable.

The Scotch Fir.—The astonishing manner in which this plant accommodates itself to every description of soil has been mentioned, (see p. 54;) in addition to which, it may be observed, that the only cases in which it will not thrive is a bog, too wet for any plant, (aquatic excepted,) and a clay, too stiff for any part of the vegetable creation to thrive in. In the latter case, the reason of the failure is obvious; and, as to the former, it can only be imputed to the moisture; as, in a *drained* bog, the

plant luxuriates prodigiously. It need not here be said, on what species of soil this tree will thrive best, as it is rarely planted with an eye to quick growth only; nor do I think the matter clearly ascertained; and, therefore, it may be enough to observe, that wherever any tree will grow freely, (the aquatics excepted,) the Scotch fir will do the same. Its peculiarly valuable properties, such as growing on heath soils, and on exposures where no other tree will thrive, have been particularly attended to, p. 54—62*.

* It has often been observed, in the nurseries, that this plant exhausts the soil less than any other; as, after a crop of it, the ground is always found in a condition to bear other articles. Whether this arises from the circumstance of smothering it only, or from the plant subsisting on less quantity, or a different species of nutriment, is not clear; but, perhaps, all of them may, in some degree, contribute to produce the effect spoken of.—We know, that it can subsist, and even thrive, on a nutriment which would starve most other trees; and we know too, that its roots being but little

Suitable
Soils

The Spruce Fir.—The proper soil for, and the extraordinary value of this article, have been noticed at length, p 38—48, and, therefore, here it seems necessary only to press upon planters the advantages of using the plant liberally, in order to promote the towering of such deciduous trees as are intended, ultimately, to form the bulk of plantations.

Here I may particularly remark, that both authors and planters are in the habit of erring egregiously, in regard to

fibrous, are hence so much the less calculated to exhaust the soil. The ash has already been noted as a prodigious exhauster, but it only is so in proportion to the extraordinary quantity of its fibres. Perhaps it may be found, that plantations, mixed with Scotch Firs, usually produce a greater weight of wood upon a given space, than where it is excluded; and, if so, it can only be accounted for by supposing, that some or all of the causes above mentioned contribute to produce such an effect.

the proportion of principals and nurfes; as they generally use as many, or more, of the former than the latter; though it is very eafy to fhew, that they ought to use three times as many of the latter as the former. For inftance, when trees are planted at four feet apart, each occupies a furface of fixteen feet; of courfe four of them will occupy fixty four, or a fquare of eight feet; and, therefore, if we plant three nurfes to one principal tree, all the former might be difplaced, gradually, and the latter would ftill ftand only eight feet apart.

It has already been remarked, that nurfe plants fhould, in every poffible cafe, be fuch as are moft valuable at an early period of growth. It is repeated here becaufe the idea is of much the fame importance to the Profitable Planter, that a good foundation is to a builder;—the point is indeed of the firft importance; and, therefore, any *prudent* planter fhould

*Suitable
Soils.*

*Prun-
Fii.*

*There
be three
nurser
one pr
:pal*

*Suitable
Soils.
Grass
Fir.*

Dutch.

have it engraved, as it were, upon his memory;—the consequence of which would be, a liberal use of the Larch and Spruce Fir, for the above purpose, in every case where they would grow freely:—Still it is not intended they should exclude all others, more particularly the Birch, which, with most of the properties of a good nurse, such as numerous branches and quick growth, on any tolerable soil or situation, is, likewise, highly ornamental. It is not, however, like the others, a wood of general application; and, therefore, much of its value depends upon local circumstances; and hence, before planting much of it, it should be considered for what purposes it would be wanted in that quarter; and, likewise, the probable quantity; as a very moderate one will overstock the market, with an article of timber not useful for general purposes.

Selection of poles

It must be acknowledged, that the errors of extensive planters are neither few nor small;—but yet I do not hesitate to assert, that all the rest are trifles, in comparison of the mistakes in regard to proper species for this purpose.—If we cast our eyes over the list of the more common sorts of deciduous trees, we shall find that, with the exception of the Larch, the uses of their poles, up to three or four inches diameter, are far from numerous; and hence it is easy to overstock any neighbourhood with them, for they will seldom bear the expence of long carriage.

*European
3 to 4 in
diameters
will stock
a neighbour-
hood.*

*Not a
carriage*

I could point out an estate, situated where firing is very scarce, that would produce more poles and faggots, the coming winter, than the proprietor can dispose of for a dozen years to come; nor would lowering the price very materially increase the demand:—The consequence of which is easy to foresee; the plantations

²
*consequence
of a bad
: in the
plants.*

^o
 consequence will be very much damaged for want of
 of a bad selection of plants. timely thinning; mean time the propri-
 etor's return, from them, but trifling.
 If the value of the larch and spruce fir
 had been known previous to planting,
 and also that the soil is much more pro-
 per for them than any other article of
nearly the same value, they would natu-
 rally have obtained a preference, and the
 plantations would *now* have been highly
 productive, as the immediate neighbour-
 hood would have taken off a large quantity
 of both, at a good price; but, unfortu-
 nately, *there* we find almost *none* of the
 former, and *but* few of the latter.—In
 short, the estate exhibits some hundreds
 of acres of thriving plantations, upon
 which no expence (supposed to be need-
 ful) has been spared; and yet I see no
 reason to think, they are now of more
 than half the value they might have been
 made, at a much less expence, by attend-
 ing to a proper selection.

I could point out many other extensive plantations, which consist almost exclusively of Scotch firs, though the soil is equally proper for the spruce and larch. In these cases we usually find the market overstocked; and, hence, either the price of produce is kept low, or the thinning is neglected, but more commonly both.

*Consequence
of a bad
selection*

Perhaps we shall be somewhat near the truth, in observing, that where Scotch firs are in tolerable plenty, a moderate sized tree of it will fetch about half, and a pole one third as much, per foot, as the foreign fir timber; which disparity could not happen, if there were not a doubt of durability in the one case, and a certainty of the want of it in the other; neither of which would *now* be the case, in regard to the larch; and as to the spruce, the spirit of investigation now abroad insures its worth being duly appreciated very soon.—The present high price of foreign wood leads

*to certain
of plants.* to two desirable consequences:—It not only stimulates to plant, but to look into the properties of native produce.—In some cases, it creates a necessity for doing that which may ultimately prove highly useful, in the way of experiment.

*planting
mixture
the above
quantity,
on
the same
together,* Perhaps it is a new idea, that a much greater weight of wood may be produced, on any given quantity of land, by planting in mixture, than by using any one species only; and if so, ornament and utility may be said to go hand in hand. The fact, however, is of a nature not to be either easily or suddenly demonstrated by experiment; and, therefore, we must appeal to observation, in the first place. For myself, I have long been satisfied that such was the case; having never yet seen a quantity of any one species growing together, which left the idea of an abundant produce upon my mind; though the

reverse has often been produced, in the case of mixtures.

*Selection
of plants*

The agriculturist uniformly counts upon producing the greatest quantity, by repeatedly changing the *species*; and the instances already produced are sufficient to show, that trees have what may be called a choice in their food, so far that they do not thrive equally on the same soil. We know, that some trees penetrate deep, while others have most of their roots at and near the surface; of course, by using both descriptions, the soil is more completely occupied. It may, likewise, be reasonably supposed, that the decomposition of a mixture of leaves produces a matter more favourable to the production of trees, than the produce of any one species applied to itself.—On the whole it appears, both reason and experience will fully warrant the conclusion, that the great-

*Advant
of a mix
Plantat*

est possible quantity of Timber is to be obtained by planting mixtures*.

Preparation of the Soil for Planting.

If we were to take our ideas of this subject from what might be found in books, we should be led to think, that any thing short of a very expensive preparation would be the height of folly; or rather, that it amounted to a species of insanity; as it would be equally a *waste* of Land,

* It has frequently been remarked, that deciduous trees thrive much better among firs than when planted alone, and the difference has been usually imputed entirely to the shelter afforded by the latter: undoubtedly such shelter is, in most situations, highly beneficial; but it should be noted, at the same time, that all the resinous tribe are different in nature, as well as appearance, from deciduous trees;—the former (it appears) cannot so far exhaust the soil as to render it unfit for the production of the latter. If this idea be correct, it is evident that, in order to raise plantations of any sort of deciduous trees, quickly, we should plant much less in

Money, and Trees.—If, however, we look somewhat attentively into the matter, we shall find such as are most loud in praise of preparation, are men who have learned little, or perhaps nothing from experience;—for true it is that, exactly in proportion as they have been taught in *that school*, will be their means of distinguishing between what sort of preparation is necessary, practicable, and politic, and the reverse.

Most certainly the public have no reason to thank writers, who talk about preparation, without making the necessary

quantity of *it* than of firs. If five hundred and fifty of such species were allowed to an acre, they would stand about nine feet apart, which is quite near enough to produce a tree of any tolerable size and figure.—We are sure, that the same species consumes exactly the same sort of nutriment; and, therefore, every *extra plant* of it reduces what ought to support such as are intended to remain as *tenants of the spot*.

*(Preparation
of Soil.)*

Quint-

Preparation of Soil distinctions; as it serves to throw difficulties in the way of what is in itself equally beneficial to society and individuals; by representing it as abundantly more tedious and expensive than it is in fact.—However a little consideration may show any one, how little such are acquainted with the business; for, were it otherwise, they must reason very differently;—from a knowledge, that at least nine tenths of the lands, allotted to useful planting, are either too *steep, stony, bushy, or heathy*, to admit of the sort of preparation alluded to;—or otherwise too *sandy* to need it.

Undoubtedly, sands and heathy soils comprise jointly, more than two thirds of the land likely to be planted for any purpose in the country; and, as to the former, a little reflection will show, that an expensive preparation is perfectly unnecessary, as nature has, in a great measure, fitted

them for the purpose it is intended to serve, namely, to provide a loose soil, in which the roots of the plants may meet with but little obstruction.—Sands are generally found *light enough*; and, therefore, the difficulty chiefly rests in the *foul* condition in which they are often found; but, even in such cases, a fallow may and generally ought to be avoided; as most sands are, to a considerable depth, as favourable to the production of trees as the surface; and, therefore, we have only to discard the turf, &c.—and then to loosen the sand below, and ultimately to plant in a hole some inches deep*.

* The advantages of this method seem evinced, by what has happened, in the last seasons to the planters on the sands in the neighbourhood of Sherwood Forest. *There*, I am told, many have lost more than half their plants, in consequence of the long continued and excessive drought. In the planting done there, under my direction, the above method was followed, in consequence of the land being extremely foul, upon

Separation of Soil. Undoubtedly, a fallowed surface would occasion the trees to grow quicker in the first place, but there are several drawbacks upon that advantage; as first, the loss of plants would be much greater in the first instance, as they would have neither shelter nor shade, as in the other case;—secondly, the vegetable matter, previously upon the surface, would be lost to the trees; which, otherwise, would be found highly beneficial, after they get so close as to smother and rot it.—The greatest drawback, however, remains;—the expence

which, the loss has proved trifling, except, in one instance, being part of a plantation of about twenty year's growth, where the plants failed generally in the first instance, while they did well on three sides of it; as was the case with a quick hedge on the fourth:—*there* we lost about half the quantity planted, being larch and spruce firs only.—As there seems no way of accounting for the failures on this spot, but by supposing some latent defect in the soil, I purpose to try to remedy it by exposing a quantity, from each failing hole, to the influence of the atmosphere, during the coming winter.

of the fallow, which, in itself, would be more than ought to finish half the planting; and, therefore, though it may often be practicable, it can but feldom be proper.

Preparation of soil

As to heathy foils, we find many of them to differ but little from the laft, fo far as the production of trees is concerned; becaufe a thin cruft of fuch foil, upon a fanddy bottom, is extremely common; which is fortunate to the planter; as he needs but to difcard to the black furface Earth, and to plant, in the fand below, as directed for the laft cafe.

Heathy

In regard to deep heathy foils, they are only qualified for the production of the Scotch Fir; and that article is well known to poffefs the property of penetrating into foils the moft tenacious; and, hence, it may be faid, to require but little affiftance from either the plough or the

Deep heathy foils.

Soil. spade; and yet, with a sort of hardihood almost proverbial, it is one that suffers materially from exposure in the first instance; a fact which many planters have experienced much to their cost.—It happens, that most heathy soils are, likewise, *exposed*; and, therefore, a preparation, which would extirpate the heath, its natural shelter, would endanger the success of a great proportion of the plants; and therefore, though very expensive, it is far from a safe method.—In some cases, where the heath is very long, it may occasion great difficulty in the holing, and, likewise, the smothering of many of the plants. In this case, the best method is to burn it down, at least one season (but better if two seasons) before planting; as, otherwise, the exposure would occasion the sort of loss just mentioned.

Perhaps our knowledge of the internal structure of plants is too limited, to en-

able us to define clearly the state of languor or disease, into which they are thrown by removal, or the separating of that intimate connexion which subsisted between their roots and the soil. Still, experience teaches us, that certain causes will produce certain effects; and it is from careful observations on these, jointly, that we come to a tolerable knowledge of what is necessary to the safe removal of trees. We know, for instance, that, on elevated ground, much exposed to the weather, the frosts and winds of a very moderate winter will kill a tolerably large fir, though it should be removed with the whole of its roots, and planted with every possible degree of care; and, likewise, staked, so that the wind could scarcely move it at all.

*Deposited
of soil*

*Specimen
of soil
transmitted
to me.*

As, in this case, the plant might be observed to be in a dead or dying state, before the want of moisture could have con-

Superstitious
of Soil. attributed to produce such effect, we can
 impute it to nothing but the cold; because
 had the same tree been planted in a shelter,
 and similarly treated, it would certainly
 have survived its removal.

We know, also, that the more we reduce the roots of plants in general, (particularly firs,) so much the more are they subject to suffer in removal.

A plant, which retains only its largest roots, requires a greater degree of heat and moisture, to set its vegetative powers in motion, than one which likewise retains its small ones. We can seldom remove a tree without the loss of a part, (generally a large proportion) of the latter; and hence we infer the necessity of sheltering firs, in the first instance, as far as the circumstances of the case will admit; and, also, the propriety of managing, so that they may require as little of it as possible.

We can, for instance, remove a Scotch fir, of one foot high, without losing many of its small roots, while one of two feet would, in that operation, lose most of them.--Almost any situation naturally produces what will, in a greater or less degree, shelter the former, while very few will afford it to the latter. This fir is, at best, a bad rooted plant, or one which makes but few roots, and these long ones, in proportion to its height; therefore, by considering all these circumstances, it is presumed, the causes of the heavy losses that so frequently follow the planting of large ones, on bleak situations, may be naturally accounted for.

*Separation
of Soil.
From
the
ground.*

Consistent with the above ideas, independent of avoiding a heavy expence, I never advise the breaking up, and, of course, leaving bare, an exposed and healthy soil, but, instead of it, make holes among the heath, (in the manner that will

*How to
prevent
healthy
soil
from
being
lost.*

Separation of ground.
also to
land on
clay or
sandy soil.

be directed;) constantly making use of plants small enough to be sheltered, and yet not so small as to be smothered by it; of course, they are planted both in shelter and shade.—The former prevents their being starved, in the way that has been mentioned, and also prevents *wind-waving*, which would otherwise form a cavity round their stems, so as to admit of drought, and occasion considerable loss.—The latter, by partially excluding both the sun and wind, prevents them from much exhausting either the moisture of the soil or the juices of the plants; and hence the business of vegetation must be earlier set in motion, and more regularly carried on, than where the case is otherwise.

Having now attempted, at least, to develop the principles which ought to influence the practice of planting sandy, light, and heathy soils, wherever economy

is a leading object, we may next advert to the case of stiff ones, which are confessedly the most difficult; because, though it may be easy to cause the plants to *grow* on *them*, it is quite another thing to cause them to *thrive*; and, therefore, except where particular circumstances call for it, I am no advocate for planting such as are more than moderately tenacious, especially if they, likewise, prove *shallow*. It is admitted, that a tolerably strong soil may be highly productive, in some species of timber; more especially, if deep:—a thin, stiff one, however, cannot be so productive, as both its quantity and quality have a direct tendency to stint the growth of the plants, in all seasons, but more particularly so in dry ones.

When the planting of such soils becomes necessary, it is a fortunate circumstance if they happen to prove in grass, and capable of being ploughed; as, in

Pebo. ca.
of 9, 2000
Stiff soil

shallow

*Reparation
of Soil.
Tuff Soil
inclines*

that case, the easy means are afforded of bringing the roots of the plants and the rotted sward in contact;—the latter of which will not only produce nutriment for the former, but a more easy means of extending themselves, in every direction, in search of it. A soil naturally stiff becomes abundantly more so, by being long under tillage: by fallowing we can clear such of noxious weeds, but cannot prevent them from running together again in consequence of the next steeping shower.

The best method I know, of preparing such for planting, is to plough them, and take a crop of any sort of grain they will produce, the season before they are intended to be planted; wherever a choice is presented, that which will be most smothering should be preferred, as having the greatest tendency to rot the sward.—In autumn, after the crop had been reaped, and the ground moist, but not wet, it

should be well harrowed, and that immediately followed by holing with the spade; which work should be done by *chopping the soil* to the width of about a foot, but not deeper than the furrow, and then placing it round the sides of the hole, rather flat, so that the frosts may easily penetrate it during the winter.

*Deposited
of ground
stiff soil
shallow*

As the difficulty of working such soils is obvious, so there is a necessity for attending to them just at the critical season, such as we usually experience, repeatedly, in autumn; it can be of little consequence whether it prove in September or October, so that the ground be in proper order.

And observe, it is more safe to plant such soils rather late in spring, than early; as, in the latter case, the soil would seldom be found dry enough; and hence the plants would be crammed into a clod of clay; and would, likewise, be in

the separation
of ground
from Soil.
the hollow

danger of being thrown out of it, by such frosts as might happen afterwards, without being at all benefited by such as had happened before. On the contrary, by late planting, we secure all the benefit of the winter's frosts, without the danger from them just mentioned; and, likewise, can plant when the soil is sufficiently tender, but not so wet as to stick together; with little danger of success. Under this management, it is meant to make use of part of the harrowed soil, on the surface, by drawing it round the trees, so as to raise the former surface about two inches, to the breadth of about eighteen. The reason for this is, to afford the opportunity of placing the trees sufficiently deep, without putting their roots lower than the track of the plough, and the direction of the decomposed turf; a matter highly important to the growth of the trees. Such soils certainly afford but few advantages, and, therefore, there is so much

the more reason to avail ourselves to the utmost of such as we find. Consistent with what has been advanced, the best plants for such soils will be the Scotch and spruce firs, with the witch elm and the birch; the firs not more than nine the others about twelve inches high.—The variety may be increased by other species; but it is presumed, in such cases, the above will generally be found the quickest growers.

In soils of the above description, which are incapable of being ploughed, the reversing of the turf is indispensable; because the surface soil will be abundantly more light and fertile than lands of the same sort, which have been often turned and mixed by the plough. Indeed without *turning in the surface*, in order to put the best soil in the direction of the roots of the plants, I know of no method

Preparation of planting, in such a case, with any rea-
of ground sonable chance of success.

Soft Soil.

Shallow

The method will be to turn the turf completely, with all the soil adhering to it, with the spade, in as large portions as may be found convenient; as such method would not only be the most expeditious, but under it, less of herbage would vegetate, than if turned in smaller portions; it would, likewise, afford the means of planting in the centre of the flags, which of course, would be for some time, tolerably, clear from weeds; hence much of the danger of smothering the small plants would be avoided.

On such lands, we usually find a very tough sward, which should be in a measure reduced, either by a crop of grain, or being fallow through the following summer. Certainly nothing would, ultimately, be lost by the delay; for as, after it, the

ground would be found mellowed, and the herbage rotten, so the risk from drought, which otherwise would be considerable, would be nearly done away, and the plants for two or three years, be found to grow much quicker than if planted a year sooner.

*Superior
of growth
stiff soil
shall*

As such turning the soil is to be considered as tantamount to the ploughing directed in the last case, the season for the operation, and method of making the holes, should be the same; and the same will apply to the manner of planting, size, and species of trees, &c. only as here there is no harrowed surface; therefore the soil to deepen that immediately round the trees, may be collected from any other part of the surface, where it is found in the best condition.

A soil similar to the foregoing, previously under tillage, is among the cases by no means favourable to the hopes of the

erative planter; if, however, he has particular
ground reason for planting them, he must likewise
Soil. resort to particular means of preparation;
fallow the most effectual of which would be found
 to be a fallow, so far complete as to ^eirradi-
 cate not only the perennial, but the ^tgrea-
 ter part of the annual weeds; for, other-
 wise, they would inevitably smother a
 great proportion of the very small plants,
 which alone are proper for such situa-
 tions, except the additional expence, of
 hoing among them for two summers, was
 submitted to. It is not here supposed,
 that the most complete fallow would en-
 tirely preclude the necessity for hoing,
 or, at least, cutting down part of the weeds,
 but it certainly might very materially re-
 duce the business. An autumn fallow is as
 peculiarly fitted for the irradiation of an-
 nual, or weeds produced immediatly from
 the seeds previously lodged in the soil,
 as a summer one is for the destruction of
 such as are produced from roots. It is

among the disadvantages of fallows, made preparatory to the sowing of wheat, that the grain is usually sown about the time when the seeds of weeds are most of all disposed to vegetate, on the soils under notice; a very unfortunate circumstance, but not at all applicable to the case in hand; as here the stirring of the soil, which occasions the destruction of such weeds, may be protracted to a much later season. In mild autumns, we often find seeds to vegetate freely to the latter end of December, it is not then too late to stir the soil, if it do not prove too wet.

*Separate
of grain
Stiff Soil
shallow*

The necessity for forming such lands into somewhat narrow ridges is evident, for otherwise the water would lodge *in* and *upon* them, in winter; which would not only damage the plants, in the first instance, but cause the soil to bake so hard, in summer, that the trees would make but little progress in it. The soil from

Superficial
ground
Light Soil.
Shallow the furrows would likewise be beneficial, by contributing to the general depth. If it be objected that such ridges would confine the spreading of the roots, it may be answered, that, before the plants could require much space, a soil would be accumulated in the furrows, (except on considerable declivities,) sufficient to cover the small fibres, so that they would cross them; after which, the plants would derive support from the adjoining ridges, in addition to their own.

Sloping lands. In lands somewhat steep, the ridges had best be formed with a moderate fall *aerofs* the declivity, and these again crossed by ditches, at from forty to sixty yards distance, to take off the water, and prevent it from washing the soil down the furrows.

The species of plants for this purpose should, of course, be the same as in the foregoing instances; but the size should be

less, as such are best qualified to accommodate themselves to these unfavourable soils: The best sizes, I conceive, to be Scotch firs of two years old, spruce three ditto, birch two ditto, and witch elms the same; all of which should have been one year transplanted, in order to improve their roots. Where variety is an object a few of other species may be put in the margins; such as the oak, sycamore, hornbeam, mountain ash, laburnum, &c. as all of them will grow, though not so well as the foregoing; the sizes should, of course, correspond with the others.

*Prepara
tion of
ground
stiff soil
shallow*

Before I dismiss the subject of thin stiff soils, it may be well to impress upon the mind of the reader the peculiar usefulness of the Scotch fir in such situations; as, by its shade and shelter, it tends at once to meliorate the atmosphere, and the soil. The former is obvious; and, as to the latter, no plant is so well qualified to thrive

*Scotch
Fir.*

Reparation upon them, and of course, so speedily to
the ground smother and decompose the vegetable mat-
ter soil. ter they produce; indeed, from the time it
shadows gets to six or eight feet high, the rotting of
 its spine furnishes not only a nutriment, but
 a conductor for the roots of the other trees;
 as its *soil*, shelter, and shade all contribute
 to promote their spreading; and, of course,
 their success in the search of that essential
 article *food*. A root, protected by the shade
 of a Scotch fir, will travel, as it were rapidly
 and in safety, not *upon* but so near the
 surface that, by the time it gets half an inch
 in diameter, it frequently bursts its scanty
 covering, after which, we may perceive
 to a demonstration, that every part of the
 soil is completely employed in support of
 the trees.

depth. The management of a stiff and some-
 what deep soil, capable of being ploughed,
 will differ in three respects, from the
 first case; as first, the furrow should be as

deep ploughed as could be laid tolerably flat; secondly, the harrowing may be omitted, as the trees may be planted level with the surface: thirdly, firs, of a foot, and deciduous trees, of eighteen inches, may be used. Where such lands have been previously in tillage, a fallow will be necessary, if the ground prove foul, but if not, it may be dispensed with; as where plants of sizes as above are used, trifling attention will prevent them from being smothered.

*Repetitive
of ground
Stiff soil
deep.*

Where such soils are incapable of being ploughed, holing with the spade should be resorted to in autumn. The size of the holes about fourteen inches wide, and ten deep, if the soil will permit. When one hole is made, the sward from the next is to be taken off, and placed with the grass side downwards, in the first. About one third of the remaining soil may then be thrown upon the sward to press

Preparation it down, and promote its rotting; and
of ground the other two laid close round the hole,
with soil not in large lumps, but broken a little,
etc. so as to benefit the more by the winter's
 frosts. This case would require plants of
 the same sizes as the last.

Deep
land. The previous preparation, of once
 ploughing and a crop of grain, is certainly
 applicable to every soil, that has been
 some years in grass, and is capable of being
 ploughed; it being not only a *good* but a
 very *cheap* method; the difference in value
 between a crop of grain and one of grass
 being generally in favour of the former,
 considerably more than the expence of the
 ploughing.—Undoubtedly this method
 leaves the ground in a situation peculiarly
 calculated to forward the spreading of the
 roots, and to promote the general growth
 of the trees; and, besides, the holing after
 such crop, would only cost about half as
 much as after grass. The general differ-

ence of management for a thin and a deep soil has been just adverted to.

While recommending the use of the plough, the case of a thin chalk soil naturally presents itself; as these have been found abundantly productive in many valuable species of timber; mean time, the elevations in which they are very commonly found, stand in the utmost need of shelter; while the losses which have followed planting such of them as have been long under grass, shows clearly the difficulty of the business. Generally these losses have happened from the circumstances of drought and exposure; and, therefore, means should be used to guard against both. To effect the former, in an easy and cheap manner, I know of no means so proper as the sort of ploughing and cropping just adverted to;—still it will sometimes happen, that the soil will not be productive in grain; but, even in that case, the ploughing will apply; if

*Separate
of grow
Grass
- - -*

*Thin
soil.*

Preparation of ground to which chalk oil.
 the foil is too poor to make it desirable to sow grain, the loss in letting it lie fallow for one season cannot be much; it must, at least, be abundantly compensated in the success of the plants.

As thin chalk foils are generally rather light, they do not require to be long exposed to the frosts; and hence so much the more time may be allowed for the sward to rot, before part of it be turned up by holing. It may lie reversed from October in one year to December in the next, or fourteen months, and still leave time enough for the frosts to operate, so far that the foil may easily be separated from the grass roots.

The difficulty in planting such foils is threefold;—for, if planted early, the frosts often throw the trees out of the ground. If planted late, the drought frequently kills them; and generally the exposure is

such that many of them fail by that means. There is, however, a method of protecting the plants against all these evils, which, in common cases, cannot cost more than 8s. or 10s. extra expence, per acre: it arises out of, and forms a necessary appendage to the method already pointed out; it is this:—After the trees have been planted in the usual manner, part of the furrows, most distant from the trees, is cut into lengths of about twelve inches each; and one of them laid on each side of every plant, not close, but so as to form a cavity, just wide enough for the lower branches not to be pressed together by the soil: the direction of the cavities must cross the principal current of the wind.

*Preparation
of ground
which
soil.*

The way in which this simple process effects the specified purpose, is almost too obvious to need explanation; but, as it applies to a branch of the art which cannot be too much extended, I may observe,

separata that the pieces of the furrows so applied,
is not a D. prevent either the sun or wind from dry-
in chalk ing the foil, otherwise extremely thin.
oil They, likewise, prevent the frosts of spring
 from penetrating so low as the roots of
 the plants; which, by congealing the mois-
 ture, raise the surface; and hence either
 loosens, or throws them out of the ground;
 of course, by this method, planting may be
 done *early*; a matter highly important on
 thin light soils: on these it is also very de-
 sirable to plant as shallow as possible; by
 this means, the higher parts of the roots
 may be placed not only level with the sur-
 face of the ground, but something above
 it, by drawing together a little foil to
 cover them.

As this case admits of only very small
 plants, so the shelter from wind-waving,
 afforded by the flags, would be considera-
 ble; for as the firs, which are most of all
 subject to suffer by it, should not be more

than five to seven inches high, the broad or branched part of them would be screened, so far that the plants could be little damaged by it.

*Deprecate
of ground
the cha
soil.*

As, in this case, there is no danger from weeds, very small plants only should be made use of; say larch and Scotch firs of two years, spruce ditto, three ditto, ash, beech, birch, fycamore, &c. two ditto, all of which should have been transplanted.

The quantity of each species should be varied, in proportion to the exposure: where most bleak, *there* a considerable proportion of the Scotch firs, with a tolerable quantity of the birch, should be used; where least so, the other articles will be more proper; more particularly, the larch; it being, all circumstances considered, by far the most beneficial article that can be planted on such soils; and hence, in planting of *them*, the sheltering of *it* should al-

haration
ground.
in chalk
oil.

ways be matter of the first consideration; and, for that purpose, the Scotch fir and birch will always deserve a preference.

The general usefulness of both, for such purposes, is well known; still it may be useful to remark here, in regard to the birch, that, on such soils, it usually rises faster, and hence overtops and crowds the other trees. When, as this happens frequently, in four or five years after planting, it will be proper to cut it down close by the ground, early in spring, which will occasion it to form several shoots instead of one stem; each of which, producing numerous branches, placed low, will form a very close shelter;—generally in the course of the first summer, they will rise to be as high as the trees they are intended to protect; so that, early in the second, such plantations will appear to be rising much more regularly, and better sheltered than before.

Perhaps no better proof can be advanced, of the want of a good method of planting thin chalk soils, than the considerable losses in plants so frequently found upon them; and this fact again points out the use of some directions, in regard to replacing such failing plants. As ploughing is, in this case, out of the question, so the method that nearest approaches to it should be adopted; which is, to cut out the whole foil, (sward included,) where the trees are intended to stand, in circles of about eighteen inches diameter; and to turn these, with the grafs downwards, into the same holes they were cut from, the time for rotting the sward, and the other circumstances of this case, should be the same which has just been detailed, with this difference, that, upon account of the shelter from herbage, &c. the plants may be larger, and they may usually be conveniently protected from drought and spring frosts

*Preparat
of grow
thin. cha
soil.*

*Separation
of ground* by making use of part of the grafts, to cover the raw surface round them.

*Deep and
light soil* The method of preparing any foil that is deep and light, need not be long dwelt upon:—If the principles already advanced be duly attended to, it will not be difficult to discover, in regard to them, what may be proper; and the reverse for different situations. Generally, it may be observed, that the more of vegetable matter there is found upon the surface, and the greater will be the advantages to be obtained from turning it in;—and certainly no means is so practicable, in large designs, as the use of the plough, followed by a crop of grain. In good foils, producing rank herbage, there is always great danger of smothering the trees, except they are planted so large as to greatly enhance the expence, and be in other respects improper. By using means to rot the herbage, we change what would otherwise destroy the plants, into a

nutriment highly beneficial to them; indeed, by so doing, they are soon enabled to rise above danger from such circumstances. It is true, that, under this process, we may still expect some quantity of weeds, but they would be such as would be much easier kept down, than a general crop of grass, &c.

*Preparation
of soil.*

On lands light but poor, the quantity of vegetable matter upon the surface is seldom great, nor is there much danger of the herbage smothering the plants; and, therefore, the simple method of holing, by turning the produce of the hole *making*, into that *last* made, will frequently prove the most proper as well as convenient. Undoubtedly there are persons who wish to resort to the *best methods* only, without regarding the expence; particular situations warrant an extra expenditure. In the bulk of cases, however, the fact is different; and, therefore, we best promote

*Light
from soil.*

Separation
of soil. the business by duly attending to cheapness
of method.

Light soil

As light soils do not require the operation of frosts to reduce them, so where there is no sward, or not many large or root weeds, it may be sufficient to only *turn over* (and break the soil where needful,) in the places where the trees are to stand.

Small
patches
of ground.

The method of preparing small patches of ground for planting, by digging or trenching, is well known to every practitioner; and, therefore, is only introduced here for the purpose of observing, that wherever such expence is thought necessary, the keeping the ground clean, for two or three years, or till the plants will, in a great measure, smother the herbage, will generally prove the same: for where quick growth is essential, cleanliness of appearance is usually of consequence. Slight

crops of potatoes, with short tops; or turnips, may be admitted into such plantations with advantage, for two or three years, as they create a necessity for annually digging or stirring the surface, and tend very materially to accelerate the growth of the plants. It may be objected, that such crops must impoverish the soil, and no doubt but such is the fact, so far as common vegetables are concerned, but as to the production of wood, it has already been shown that its support depends, in a great measure, on a different species of nutriment; and hence I could never observe that such cropping damaged it materially.

The preparation of rocky soils proves sometimes rather difficult, yet certainly most of them, which are of little value for the general purposes of agriculture, are qualified to be highly productive in timber; and hence such little difficulties should

*Degradation
of soil.*

*Small
patches
of ground*

*Rocky
Soil.*

Reparation
of ground
 never be permitted to stand in the way of planting them.

Rocky Soil.

It is of much less consequence than most people imagine, whether trees are planted regularly, so as to cover the whole of the surface, or irregularly, (clouded,) as will often be the case on rocky ground; for, in either case, the whole of the soil will be completely occupied to a considerable depth. Where we cannot plant regularly, upon account of the rocks, the trees should stand something closer than ordinary distances round them; because there all of them have an extra supply of air, and most of them sufficient of soil. At planting, however unfavourable appearances may be, it is not possible to know what particular plant or plants will not ultimately thrive, providing soil enough can be found to cause them to grow in the first instance.

The holes in such ground have generally been made by the alternate use of the spade and mattock, a very tedious process; in lieu of which, I have, for many years, made use of the latter only, ^(a) the tool being peculiarly adapted to the purpose, (*see the frontispiece*;)—the sward being taken off as thin as possible, with the broad end, and the soil loosened *in the hole* with the other, instead of taking it out and laying it on the sides, in the customary manner. In this operation, the larger stones are taken out, so as to leave broken soil in the holes, sufficient in quantity to plant trees, of the intended size; generally a small one.

*Operation
of ground
Rocky soil*

Where few stones are found, the soil left will usually fill the hole; where there are more, it is frequently left hollow, as on light open soils;—it is of little consequence whether the trees be placed level with the surface or not, so as they have

(a) In good ground the spade only should be used.

separation
of ground
Rocky
Soil. - but a sufficiency of soil to grow in. It must also be observed, in regard to this process, that no regard is paid to burying the herbage, as it usually proves of a nature that would not speedily rot; hence after much trouble in regard to it, it would be found to considerably incommode the business of planting.

2) earth must not be buried. See p. 162.

It may be observed besides, that where light soils are so fertile as to produce herbage that will readily rot, that soil alone will be sufficiently fertile for trees to thrive in. In short, by keeping the mattock tolerably thin, the herbage is taken off with very little soil adhering to it.

Frequently, in making these holes, the scarcity of soil renders it necessary to break down more of some side or sides of the hole than was first bared, in order to increase the quantity of earth; in this case, little regard is paid to the surface herbage

as the tool to be employed in planting will readily separate it from the soil, after the latter has been exposed to the winter's frosts. If, in making a hole, a stone be found too large to be readily taken out, it may be left in, and the hole made to one side of it; regular distance being, as before intimated, found to be of little consequence.

*Preparation
of ground*

In preparing the sides of steep, the herbage is found particularly useful in forming a sort of buttress to support the soil; as here it is of importance to plant trees on a level, in order to hold the water in its descent. In this case, it is not so necessary to pare the herbage thin, as on levels; for the greater part of it gets covered so as to rot, and soon becomes beneficial to the plants. Perhaps no situations, inaccessible by the plough, can be so effectually and cheaply prepared for planting as precipices; seeing a quantity of soil is very readily moved, by working it down the hill

*Sides of
Steep.*

Preparation
of soil.
steeps. with the mattock, to form the levels for the trees, large enough for the roots to spread in freely, and likewise to retain the moisture; hence the only disadvantage of such *steeps*, so far as planting is concerned, may be easily obviated.

Stony &
heathy soil. On soils at once stony and heathy, (a case very common,) the mattock proves peculiarly serviceable, in moving the one and cutting the other; matters extremely difficult to be performed with the spade; certainly, without the use of some such tool, the expence of planting, upon many situations, would be greatly enhanced. It will be observed, that, in preparing heathy soils, the method is just the same as on rocky ones; the heath being struck off as thin as possible, and the soil stirred and left in the hole.

In closing the subject of preparation, I would observe generally, that every soil, *the heath must not be cut in the hole: as the roots would rot in 20 years.*

intended to be planted, will be benefited by being broken up, some months previous to planting: on stiff ones, the reason of this operation is obvious, frost is necessary to reduce them. It is not so easy to say why a light one, which has been long broken up, retains moisture better than one newly done, but the fact is well known; and, therefore, though no advocate for early planting, I am decidedly so for autumnal preparation, in every case where it is convenient.

*Preparation of ground
any soil
be planted
spring
be broken
in autumn
preparation
observed
situation*

The distances proper for forest trees to be planted, have been much the subject of discussion; on this head I have had but one opinion, for many years. In general cases, a distance of four feet is certainly close enough; ^(a) as, at that space the trees may all remain till they become saleable; as timber, rails, spars, &c. are of considerable value every where; ^{use} ~~fine~~ wood only in some places. Where the produce, ne-

Distances proper for planting

(a) Intervals of 6 feet recommended for Poplars - pa. 76. - The order should not be in right angles, - thus $\begin{matrix} \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot \end{matrix}$ but thus - $\begin{matrix} \cdot & & \cdot \\ \cdot & \cdot & \cdot \\ \cdot & & \cdot \end{matrix}$

Distance necessary to be thinned out of a plantation, is
20 paces of considerable value, there is little danger
in planting of this business being neglected. Where it
 is of little, the reverse proves almost constantly the case; few men can set about thinning a plantation, which is not likely to pay well for the trouble, without considerable reluctance.

<i>Trees</i>
43.560
10.890
<i>4212</i>
<i>Trees</i>
1742
1210
889
600
537
435
360
302
257
222
193
170

Another strong objection to thick planting is the extra expence thereof;—at three feet apart, an acre requires 4840 plants; at four only 2722; a difference of more than two fifths; or thus in the latter case, three pounds will plant more land than five in the former; the difference is indeed so striking, that, unless better arguments be advanced in support of the former distance than I have yet heard, I shall continue to be an advocate for the latter.

It is admitted, that elevated exposures should be an exception to the rule, but

<i>Feet</i>	
at 17	13
18	13
19	12
20	10
21	9
22	9
23	8
24	7
25	6
26	6
27	5
28	5
29	5
30	4
31	4
32	4
33	4
34	3
35	3
36	3

To find how many trees will stand on an acre, at any particular distance from each other, let the distance from tree to tree be multiplied into itself for the divisor, & let

38	30
39	28
40	27

even here I consider three feet distances as too little, because, by standing so close, the plants soon destroy each other's branches; hence, when we begin to thin, we find the removal of every tree makes an aperture which there is no means of repairing.

Distance proper for planting

and what

At three feet distance, the plants will stand about one fourth closer than at four; and, from repeated observations, it appears clear, that few forest trees grown closer, will be strong enough to stand erect in exposures. I, therefore, see no reason to recommend planting at less than the former distance.

Respecting the ultimate distance—see Forest Planter p. 196.

In regard to the sizes of trees for planting, the particular cases have been mentioned where very small ones would be proper: the best general rule is, to proportion the size of the plants to the goodness of the soil; the best of the latter

size of Plants.

in an acre in the division. — The product will be the answer. Thus—

$$\begin{array}{r} \text{Feet—} 4 \\ \quad 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} \text{Feet—} 143560 (2722 \\ 16 \overline{) 32} \\ \underline{115} \\ 112 \\ \underline{36} \\ 27 \end{array}$$

Size of Plants requiring the largest of the former. Still on bleak exposures this rule will not hold good, as there the plants should never be large, for otherwise the greater part would fail from the circumstance of wind-waving, and of those that succeeded, few, if any, would make much progress for several years: firs of a foot, and deciduous trees of eighteen inches, are large enough for such places, if the ground prove but indifferent, and have no shelter upon it; but if it be good, so as to produce strong and tall herbage, plants of somewhat larger sizes should be admitted, as those of the smaller size would be in danger of being smothered.

However as, in planting large designs, soils which are good and well sheltered but seldom occur, the most useful sizes of plants, for general purposes, will be the same just noted; viz. firs of a foot, and deciduous trees of eighteen inches. When mentioning the sizes of trees, it should

*in planting seedling oaks - see Hunter's Evelyn
la. 77. 82.*

always be understood of transplanted ones; *Size of Plants.*
 because, in at least nine instances in ten, *Transplanted.*
 such are stiffer and better rooted than feed- *Better rooted than Seedlings.*
 lings: still it sometimes happens that, in
 consequence of a thin crop, seedlings may
 have every requisite good property, and
 so far there is no objection to their use.

It may be observed too, that none but *Advice*
 good rooted plants will succeed on a bad *stages of*
 foil, while, on a good one sheltered, none *small*
 but very bad rooted plants will fail; a *plants.*
large plant never has so good a root, in
proportion to its size, as a small one; and
 hence we see the propriety of using such
 on good foils only. For instance, we can-
 not use large plants on stiff foils with any
 reasonable hopes of success; and the
 chance is still worse if they prove likewise
 exposed; as neither case affords the means
 of speedily furnishing the plants with roots
 that will have a regular proportion to
 the size of their heads;—hence the cir-

Size of
Plants
 culation of the sap is impeded, and the plants become stunted in growth; under which circumstance, it not unfrequently happens, that the small quantity of sap furnished by the roots, instead of ascending to the tops, to furnish leaves and shoots, breaks out into sprigs, by the surface of the ground; a clear proof of the impeded circulation just noticed.—Small plants, on the contrary, lose but few of their roots in removal; therefore, though planted in very moderate sized holes of pulverised earth, soon find the means of making roots, in proportion to their heads. Besides, such are in some degree sheltered. In short, *it should never be forgotten*, that as, in being removed, a plant of two feet loses a greater proportion of its roots than a tree of one, and one of three feet a greater proportion than one of two, and so on, in proportion to its former strength and height, so the larger the plants, so much greater is the state of languor or

A quantity
of
small
plants.

weakness into which they are thrown, by that circumstance; and hence, in proportion to that state of weakness, should be our efforts to restore them to their usual health, by such means as choice of soils, preparation, shelter, &c. If we can, indeed, manage at the outset, so as to restore to them what may be called a good constitution, they will generally, afterwards, be found able to contend, not only with the boisterous elements, but an unfavourable soil.

Advantages of small Plants.

In regard to the sizes of holes for trees, it is to be observed, that, on light soils, completely broken up, the hole is large enough that will hold the roots of the plant, when extended; on stiffer soils, a few inches more room is necessary. In both cases it is to be observed, that some benefit would arise from having the holes made early in winter; still that benefit will be in proportion to the tenacity of the

Sizes of Holes.

Diameter or circumference: same

In a sandy loam, of moderate tenacity, W. Poutey recommends holes to be dug in autumn; & trees to be planted in April. The holes should be 3.4 feet diameter.

holes should be of the size, ^{made} by one
spade. But of earth being dug ~~out~~ up,
by 3 chops of the spade, bringing up the
earth with the last. [170]
take [

Sizes foil; on stiff ones, for instance, it will be of
of holes. much advantage, on sands of very little. (2)

Circum. On lands not broken up, it is obvious
circum a large hole must be, in every case, an ad-
vantage; but much greater on stiff than
light ones. A large plant requires abun-
dantly more space, beyond its roots, than
a small one, the difference may be as much
Depth as from two to eight inches. Depth also
is of much consequence, where the gene-
ral depth of foil admits of it. Still we have
no business to penetrate lower than the
strata in which the trees will grow: On
stiff ones, abundance of mischief is often
done by this means; as it includes the
double disadvantage of putting the roots
of the trees, and the best of the foil, into
a hole capable of holding water, both of
which lead to consequences so obviously
at variance with the success of the plants,
that, I trust, it need only be mentioned
to be avoided.

At Slougham W. P. O. recommends the
holes to be made in October for planting
Nuts, where circumstances do not
prevent it. 71

On the whole it is evident, that holes retain moisture, in proportion to their size and depth; and, therefore, except under particular circumstances of difficulty, small ones are never to be recommended. As to the form of holes, it is to be noted, that they should always be round, and widest at the bottom.

*Sizes of
holes.*

Form.

It will be observed that, in the general, I am an advocate for early or autumn preparation of the soil, with spring planting; from a full conviction that, provided the former is duly attended to, but little of loss would happen under the latter. It is true, that where the former is neglected the case proves exactly the reverse, and most generally from the circumstance of drought, in consequence of the soil not being duly mellowed by the winter's frosts.

*Autumn
Preparation
Spring
Planting
Recommended.*

Sometimes, however, losses happen from the plants being dried, by being long

These
plants
come
from
any
part of
the ground,
adding
mounds.

out of the ground; a matter always to be avoided as much as possible. That, however, cannot be done completely when they are procured at a distance; and, therefore, when such arrive and appear rather dried, the best method is to puddle their roots, previous to planting: if they seem very much dried, it would still be better to lay them in the ground, for eight or ten days, giving them a good soaking of water every second or third day, in order to restore their vegetative powers; for it well deserves notice, that a degree of moisture in soil, sufficient to support a plant recently, or immediately, taken from the nursery, would, in the case of dried ones, prove so far insufficient, that most of them would die in it.—The puddling here recommended may also be of great service in all cases of late planting, where small plants are used: my method is (after puddling,) to tie them in bundles, of two or three hundreds each; and thus send them, by a

cart load at once, to where wanted; where such bundles being set upright, close to each other, and a little straw carefully applied to the outsides of them, may remain without damage in a sheltered situation, any reasonable time necessary to plant them. Where loose soil happens to be convenient, that should be substituted in the place of straw.

A puddle for trees is made by mixing water with any soil, rather tenacious, so intimately as to form a complete puddle, so thick, that, when the plants are dipped into it, enough may remain upon the roots to cover them.

The process of puddling is certainly simple, and its expence too trifling to deserve notice: its effects, however, in retaining, if not attracting moisture, are such that, by means of it, late planting is rendered abundantly more safe than it otherwise

Page, the expense of planting an acre of (say) *platan*
 at 4 feet intervals would be (including of plants) 13.
 of (say) *poplar* at 6 feet — — — — — 6.
 In p. 164. [174]

Puddling would be. It is an old invention, and hence it is truly astonishing that it is not more frequently practised. If we could but persuade people to adopt it generally, in spring planting, I believe the prejudice in favour of autumn practice would soon be done away. It is truly astonishing how generally and strongly that prejudice prevails; I, therefore, beg leave to observe here, that it is advisable only in few cases, while spring planting may properly apply to all. In short, the nature of the business is such, that a great proportion of it can only be well and safely done at that season. — *The latter end of February and all March will include the planting season.* —

of planting The common method of planting is so far known to every Gardener, that little need be said upon it here. It may, however, be necessary to explain what may be called a good one.—The root of the plant is to be dressed, by shortening the straggling, and taking off the broken roots:—

M. Pontez says, any good common labourer will plant 1500 roots here, by this method, in a day, without any assistance:—according to what I have seen, ^{or 1.500 per thousand} would yield him an earni-

Should be, per hundred trees, —
 Digging holes (p. 169) — 4
 Planting — (p. 174) — 2
 In all — 6.
 i. e. ¹⁷⁵ for thousand — 5. —

The hole is then to be made ready, by *Method*
 either taking out earth, or putting it in, *of planting*
 and breaking it where necessary; the plant
 is then to be placed in it, with two or three
 inches of the stem beneath the level of the
 surface; the best or finest of the soil is then
 to be put to the roots, and distributed
 amongst them, by shaking the plant; in
 which operation, it should be drawn up so
 as to stand very little, if at all, deeper than
 it did in the nursery; the rest of the soil is
 then to be put in, and the plant fixed firm
 and set straight with the foot; after which
 leveling the surface completes the business.

Two things, in regard to the above
 practice, I have frequently observed to be
 mismanaged, viz. the custom of planting
 too deep, and a bad mode of fastening the
 plants. When I observe a quantity of
 plants thriving ill, where the appearance
 of the soil is favourable, I generally sus-
 pect the former, and have frequently found

*A much more simple & expeditious mode of
 planting is described by D. Hunter 1^o.
 Silva p. 77. 82. 1^o for seedling plants.
 3^o 62. & p. 75. 82. & 290 of 2^o Edition.*

Method of planting. several inches of stem within the surface of the ground, and the roots of the plants beneath the best part of the soil; a matter no otherwise completely curable than by replanting. The other circumstance arises chiefly from gardeners being little habituated to any but garden practice, and hence on something like garden soils they perform pretty well; on sands, however, they generally leave the plants too loose, and on stiff soils usually fix them too fast;—the truth is, we can scarcely tread the former too much and the latter too little, so that the plants, if small, will resist the wind; and as to large ones, they should be staked in preference to hard treading.

Tools. Having, for nearly twenty years, adopted, what I may be permitted to call, *An improved method of Forest Planting*; by means of tools invented for the purpose, (*see the plate*;) it will be necessary here to explain, in some degree, their forms

*See an expeditious mode of planting seedlings with a spade: S. Hunter's Ev. 77
and with a gimblet. V. 82.*

and uses:—The first is a mattock, made *Method*
 particularly light, with one end about *of plants*
 four inches broad and thirteen long, from
 the centre; the other a pike, its length
 about seventeen inches. The use of this *Tools.*
 tool on heathy, tough, stony soils and
 fleeps, has been already described, (see
 P. 159—162.)—*On good & light soils, the*
spade must supersede it. — See p. 170.

The other tools are called planters, the
 forms of which may best be seen by the
 plate. No. 2, is a sort of hack or hoe, of
 the length of eight inches from the eye;
 the face or edge four and a half broad,
 and the handle twelve long; the heel or
 part behind the eye is made stronger than
 the other parts of it, in order to act as a
 maul, in breaking such clods as may be
 necessary.

No. 3 and 4, have been introduced of
 late years, as improvements upon the
 foregoing; being better adapted to soils

i. e. in lieu of N.º 2. — They cannot ²supersede
N.º 1. — And N.º 1. alone would answer for
planting seedlings. — P. 1. See p. 159.

Method full of roots, stones, &c. they are, like-
planting wise, easier to work, as they penetrate
 to an equal depth, with a stroke less vio-
Soils. lent than the former: they are also less
 subject to be clogged up, by a wet or te-
 nacious soil. The length of the prongs
 of both should be about eight inches, and
 the distances between them, in No. 3,
 one and a half: ^(w) in No. 4; two inches: this
 should be made somewhat stronger than
 the former; it being intended chiefly for
 very stony lands, or where the soil wants
 breaking, in order to separate it from the
 herbage, &c.

No. 5, is a section, to show the form
 and strength of the prongs applicable to
 No. 3; one of the sides being to be in-
 wards, or towards the planter.

It will be observed, that these tools are
 chiefly applicable to plants of any size up
 to about two feet, or such as are generally

*W. Poutey recommends N.º 3 for
 planting at Slougham. —*

used for great designs, where they are used as a substitute for the spade, in the following manner. The planter, being provided with a basket holding the plants required, (the holes being supposed prepared, and the earth left in them,) he takes a tree in one hand, and the tool in the other, which he strikes into the hole, and then pulls the earth towards him, so as to make a hole large enough to hold all its roots; he then puts in the plant with the other and pushes the earth to its roots with the back of the planter; after which, he fixes the plant, and levels the soil at the same instant, with his foot; so that the operation is performed by one person with a degree of neatness and expedition which no one can attain to, who uses the spade. It is known to all planters, that but few labourers ever learn to plant well and expeditiously, in the common method, without an assistant:—This method, however, requires neither help nor dexterity; as

*Method
of planting*

Tools.

Method. any labourer of common sagacity, or boy
of fifteen, or even a woman, may learn to
 perform it well in less than half an hour.
 The facility with which these tools will
 break clods, clear the holes of stones, or
 separate the soil from herbage, the roots
 of heath &c. (the former being previous-
 ly mellowed by the frost,) may be easily
 imagined.

Shelter In the foregoing pages, many observa-
 tions have been made on the different spe-
 cies of trees, best calculated for the pur-
 pose of sheltering or nursing each other,
 so far as the general prosperity and value
 of plantations are concerned. We proceed
 next to treat of shelter, not only as it re-
 lates to the above objects, but, as it may
 be made subservient to the improvement
 of property generally, as well as the im-
 mediate vicinity of a family mansion.
 Here, however, I find two circumstances
 completely different in their nature, so

intimately connected, that it seems the most convenient method to speak of them together.

Every one, who has any distinct ideas of the nature of trees, will readily agree that they are capable of producing what all the intelligent part of mankind allow to be of the utmost value, viz. ornament and shelter;—they are indeed so inseparable, from their nature, that it is almost impossible to plant a large number without, ultimately, producing a considerable degree of both:—The fact is, that a thriving plantation, however misplaced, becomes, with the bulk of mankind, an object of regard, approaching almost to veneration; perhaps the idea of utility, inseparably connected with such objects, goes far in stamping the impression.

If such then be the effects of trees, as operating upon the human mind, without

*renamed
letter.* regard to arrangement or propriety of situation, we are not to wonder at the astonishing effects they are capable of producing, when every mass, group, clump, or individual tree, has its proper place and station, and when their species, and even forms, are made subservient to these purposes: for *then* it is, and *not before*, that we see what a great professional man would have properly called their natural "capabilities."—The modest mansion and the splendid palace are equally indebted to their aid; for when the architect, the mason, sculptor, painter, and the numerous professional train, usually employed in decorating mansions of affluence, have exerted their utmost efforts, the whole, without trees, may be compared to a beacon upon a hill; an object to be looked at, but not enjoyed, except by persons who do not share in the common feelings of mankind.

To say, in how many ways trees contribute to benefit a country residence, would lead me far beyond my present object; I shall, therefore, only just briefly notice a few of them; as, first, they add greatly to the ideal size and consequence of the mansion itself; suppose, for instance, a house to stand so as to be seen in common with other buildings, distant hills, the sky, or any object larger than itself, its height and dimensions will be apparently reduced by being so contrasted. On the contrary, should trees be introduced between the building and such objects, so that the eye is in a measure confined to the contemplation of the former only, it immediately appears increased in beauty, size, and comfort.

Improvement of prospects.

Secondly, the shade and shelter afforded by trees may, if rightly managed, be made to give, what may be called, a new atmosphere: They will, as far as necessary,

shade & shelter.

*Shade &
the Sun.*

equally exclude the impetuous blast and the scorching ray; and thus it is that they contribute to health, by inviting to the enjoyment of an invigorating excursion, in every season, not unusually intemperate.

Green.

Thirdly, trees may be generally made the means of *shutting in* such objects as appear desirable, and of *shutting out* the reverse. For instance, if the view from the mansion commands some beautiful grounds, trees properly arranged will generally lead the eye so far to these objects, as to give them a force or expression before unobserved;—and the same observation will apply to water: a small piece, by artful management, in concealing the terminations with trees, may often be made to appear as a continued river.

Fourthly, by means of trees, the apparent size of a lawn may generally be considerably increased: not certainly by

planting a continued belt round it, as is *Picturesque* very commonly practised, but by bold projections and breaks, so managed that the ground may appear to continue through the latter. Frequently, by the skilful use of such means, lands not the property of the same proprietor may be made to appear part of the demense.

Such then being a part (certainly but a small one) of the ways in which trees may be made to benefit a country residence, it clearly behoves the proprietors of them to consider how such objects may be obtained with certainty, for they are not the fruits of chance, but means; and such means must be proportioned to the end. It is not the study of painting, the art of drawing, or a facility of writing large treatises, that will qualify a man for the creation of the sort of rural scenery just adverted to; nor can the professional gardener, whose life has been principally devoted to far different

Recommen-
 dation.
 in orna-
 mental
 garden.

 objects, be supposed at all equal to the
 talk; it is only to be expected from the
 man of genius, taste, observation, and ex-
 perience; one, in short, who has a head to
 plot and a hand to execute, not only the
 great and essential, but even the most mi-
 nute parts of the business.

The works of an ornamental gardener,
 who rests in theory only, may aptly enough
 be compared to base coin, it may look well
 and even *pass* for a time; by and by, how-
 ever, it wears worse, the copper is seen
 through the silver, and that again assumes
 the place of the gold; the proprietor la-
 ments his loss, and so may, with good
 reason, the owner of an ill planted shrub-
 bery, while the designer adopts the poets
piteous lamentation. "Vegetation spoils
 "every thing;" which, by the way, only
 proves that he could abuse what he
 did not properly understand. The truth
 is, that, as such designers do not know the

proper situations for the different species of plants, that business is left to accident, and hence most of them prove misplaced; of course, the planting gets gradually into disorder, in much the same proportion as it would have improved, had it been properly executed.

*Consequence
of want
skill.*

To instance one of the many respects, in which the works of such designers get annually worse, I may notice the case of screens. In the immediate vicinity of a house, such things are peculiarly desirable; and yet very generally mismanaged. In the course of a few years, we usually find what should continue a close one, possessing the properties of shade, shelter, and retirement, degenerate into an open grove; and hence, both its character and use are in a great measure lost. Nor can this be wondered at, if men continue to plant and treat both in the same manner only.

Screen.— A little observation may serve to convince us, that every screen must degenerate, in the way just noticed, if part of the plants composing it have not the properties of growing bushy, of retaining their branches very low, of producing closer heads on being pruned, of shooting afresh from the ground on being cut down, and of growing under other trees. Nor can any screen long retain these properties, except they are carefully promoted and encouraged, by frequent attention. Of course, a screen should consist of three descriptions of plants: viz. trees proper for principals, for underwood, and for the fronts.

*From the
nursery, &c.
by the
gate: from
the
by the* As all the grounds, to be planted in the immediate neighbourhood of the mansion, should be prepared by trenching, or digging at least, so the principal trees for them should be somewhat large; if they differ as much in height as from three to

eight feet so much the better, as these with the underwood, which should differ in height from three feet to one, would collectively soon exhibit a closeness of bottom and a lightness of summit; circumstances without which such screens can never be more than in a limited degree either USEFUL, BEAUTIFUL, THRIVING, OR LASTING.

Screens

It should be remarked, that, in plantations of this description, trees which form very close heads should be sparingly used as principals: the fir tribe for instance, should chiefly be used near the verges least seen, and more especially where the screens are narrow; as there they should be rather dark; for otherwise we lose much of *apparent* breadth. But it is to be noted, that though such verges should be darkened, this method would have an extremely bad effect, were the close heads of such trees to rise so high as to exhibit a

Screen. close summit to the distant beholder; as that would reduce the apparent breadth at any season, by bringing forward the distant outline; the effect, however, would be much the worst in winter. Still persons need not be afraid of using a moderate quantity of firs, as principals, in such places; because, where they are allowed tolerable space, they seldom rise so quick as the bulk of deciduous trees; and should too many appear, some of them may be taken down in preference to other species, when thinning becomes necessary; so that the effect alluded to might be completely avoided.

Presuming that an equal quantity of principals and underwood make an excellent proportion of plants for a screen, the method of planting them will be found very easy; as the size will sufficiently mark the distinctions. If the whole ground is holed, so as to plant at three feet distances,

and half of these are planted with each description, the plants would ultimately stand at regular distances. It is not intended here to dictate what proportion of each individual species should be made use of, or how mixed, but certainly a regular mixture of either principals, underwood, or front trees, would be one of the worst that could be adopted. *Green.*

The list for underwood may comprise all or part of the following; First,—beech, hornbeam, lime, oak, and common thorns, of about two feet high; as these will bear to have their heads reduced occasionally, and will spring afresh from the ground upon being cut down.

Second,—Birch, horse chestnuts, mountain ash, and laburnums of two feet:—these shoot freely on being cut down, but become unfightly on having their heads reduced.

Third,—Spruce and silver firs of one foot;—these will grow under other trees where the cover is not very close, and may be made to form broad bushes, by frequently mortening their leading shoots.

Fourth,—Common hollies, laurels, box, and privets, of a foot high:—the general properties of these are well known; all of them grow very well under trees, more particularly the three former.

In planting of screens it will be necessary to leave two ranks of holes, in the principal fronts, open; in the first place, in order to be filled with front plants only.—For which purpose, the foregoing list of underwood will all be proper, with the addition of areatheaphraffi, ornamental thorns, golden willows, &c.—as these, collectively, could not fail to form that closeness and variety of front, which is always desirable, but very rarely seen.

Possibly some persons may suppose, *Shrew* that such methods would be particularly expensive:—the fact, however, is otherwise; for it is to be recollected, the number of plants would be the same as is commonly used; three feet being the usual distance for such purposes: mean time, only half the plants need be large, or of the common sizes.

If the plants for any given design, planted in the usual method, be supposed to cost twenty pounds, we may, by that rule, estimate the expence of the improved one, as under:

	£.	s.	d.
Half of the plants being of the usual size and value }	10	0	0
One eighth of them double do. . . . }	5	0	0
Three eighths of them being of half the common value . . . }	3	15	0
	£ 18 15 0		
	£ 18 15 0		

Screen. Here we see that, after making ample allowance for such plants as are of more than common value, a perfect ornamental and lasting screen, possessing every desirable property, may be planted for less than what is usually devoted to one which proves completely the reverse; and the circumstance is the more provoking, as mismanagement of this sort is rarely discovered till it is almost impossible to retrieve it: prevention is said to be better than cure; in this case, it certainly is abundantly less difficult. The former requires nothing but what is easy, it is only substituting a good method in the place of a bad one. The cure can only be effected by much time, considerable labour, *some skill*, and *not a little expence*: still the worst of it remains to be told; it requires a sacrifice of trees, too considerable for most persons to submit to, without the utmost reluctance.

When we consider, how much the arrangement of the grounds and trees about a place contribute to its embellishment and comfort, and, of consequence, its intrinsic worth; one cannot help wondering that a science which embraces such important objects, should be still so much enveloped in mystery. A bad design is often quite as expensive as a good one; and hence gentlemen could have no inducement to adopt the former in preference to the latter, if they had any criterion or rule, by which to judge of the merits of the one, and the defects of the other.

*Argument
in favour
of the art*

That this art may be traced to certain and fixed principles, there can be no doubt. If the same means never fail to excite pleasurable sensations in the mind of intelligence, it appears that such principles rest upon a basis much deeper founded than the fashion of the moment,

*lights in
century.
scenery.* The truth seems to be, that, for near a century, taste in ornamental gardening has been constantly verging towards nature and simplicity. The best scenes in uncultivated nature are clearly our best models when working upon a large scale: and, even upon a small one, we have no business to completely overlook them. These scenes may be simple; as where the gratification arises from the contemplation of one sort of object only, as the ground, water, trees, or prospect: or they may be compound, or such as arise from the combination of two or more of them;—generally artificial scenery proves of the latter description.

As it will not be disputed, but that the scenery alluded to is calculated to captivate alike the untutored and the cultivated mind, it follows, I think, of course, that we have here, what may be called, *the basis of a taste founded on nature.* It

will not, however, be sufficient to discover, that such scenery pleases in the gross; as in that state it can rarely be the subject of close imitation; and, therefore, it will be necessary to distinguish correctly, how far each distinct cause contributes to the general effect.

*Quits
circum
garden*

It cannot be disputed, but that an intimate knowledge of the means, by which the best effects are produced in natural scenery, is necessary to combine them in what is purely artificial. In fact, where the most of art is exerted, there nature will ultimately appear most of all predominant.

I do not here mean those combined exertions of art and labour, which frequently go the length of altering, what may be called, *the genius of the spot*, at a prodigious *expence*; but that art which can as it were seize upon existing circum-

stances, and, by slight additions, or cur-
 tailments, made at a small expence, con-
 vert them into what will, at once, har-
 monize with, and improve, *the natural
 features of the place.* Certainly a pro-
 pensity to more of alteration than is ab-
 solutely necessary, is no proof of either
 taste or skill, but the reverse. A taste for
 expence is one that ought to be sincere-
 ly deprecated; whether it exists in the
 proprietor or the designer; as it serves to
 deter persons, of moderate fortunes, from
 engaging in improvements that may be
 absolutely necessary.

Still the greatest of all discouragements
 to improvements is, the ignorance of the
 bulk of those who undertake to conduct
 them.—Undoubtedly, there are many ex-
 ceptions to this remark: we see the men
 in their works; but, by that rule, which
 all must allow to be an unerring one, we
 may safely pronounce it to be applicable

to a great majority of the profession.—*Suits a*
 The truth is, they grope their way in the *manu*
 dark; and hence, if they miss it, it is what *garden*
 might reasonably be expected: all we can
 look for from them as original, is a some-
 thing, which nature and propriety must
 equally disown; or a clumsy imitation of
 some PLACE they have seen.—Perhaps, as
 matters are circumstanced, it may be ren-
 dering an essential service to gentlemen,
 to furnish them with a *rule*, by which they
 may, in some degree, *measure* the “capa-
 bilities” of such persons as may be introdu-
 ced to them in the above capacity.—The
 method might be something like the fol-
 lowing:

After ample time has been allowed for
 observation, the person should be requested
 to explain the reasons for every distinct
 projected alteration, and how far each was
 to contribute to the general effect. He
 should, likewise, be desired to state the

name means to be made use of in producing
the garden effects speedily, by planting, and how they
may might be made lasting wherever desirable; as there is nothing in the above but what every practitioner either has, or, at least, ought to have, clear ideas of.

I am confident, that there is not a man in the profession, who deserves employment, that would not go through the ordeal with ease to himself, and in a manner that would convince every one, that he had, at least, studied cause and effect, so far as applicable to his profession. He would easily be able to make the distinction, between what might be called the great and what the inferior natural features of the place; and also show, in some considerable degree, how far each might and ought to be worked upon to advantage; and, in doing so, he would constantly keep in mind what was practicable in itself, and consistent with the general circumstances

of the place.—But easy as all this would be to the man of science, to the mere copyist and dashing adventurer it would, indeed, be a task, in the performance of which, their deficiencies would be plainly manifest. The difference between the reports of such persons, and that before mentioned, would sufficiently mark their different attainments; the former would dwell principally upon matters peculiarly applicable to the place, the other on what would be as applicable to any other: the former would tell us, how the work was to be done, and what species of trees to be planted, *and where*; the latter would content themselves with talking about such matters generally.

Having said thus much, on the uses of trees, as applicable to the immediate neighbourhood of a mansion; and, likewise, hinted at some common circumstances of mismanagement, I may now advert

use to to their value, as shelters and ornaments
agents generally; more especially to lands at once
plant bleak and bare, of which the country ex-
tracts hibits many very extensive tracts.

agricul
re. Some people seem greatly alarmed, least the business of planting should be so far extended as to intrench upon agriculture; the danger however, I conceive, lies entirely on the other side; for, though an old planter, I have never known much land devoted to planting that was of considerable value for corn or grass, except so far as taking a part to improve the rest, by shelter; a species of planting which, very unfortunately for the country in general, and its agricultural interests in particular, has been but little practised; perhaps scarcely thought of till within the last forty years; and which, to the present moment, is not practised to one hundred part the extent it ought to be.

If any one, inclined to doubt of the *Stanmer* truth of the above strong assertion, has an opportunity of visiting Stanmer, near Brighton, in Suffex, the seat of Earl Chicester; or Sledmere, in the east-riding *Sledmere* of Yorkfhire, the feat of Sir M. M. Sikes, I am perfuaded he will find reason to think with me, that inftead of detriminting, planting may be made to materially *promote* the interefts of agriculture. Every fituation that is elevated and bare is, in confequence, lefs or more barren; the Woulds and Downs, which certainly include no inconfiderable proportion of the culturable lands of the country, come very generally under this defcription. It is admitted, that they are productive in their prefent ftate; but certainly that produce would be abundantly increafed, were they properly fheltered by planting.

At the two places juft mentioned, the bufinefs of fhelter has been worked upon

W. & M. C. by planting to an extent, and with a degree of judgment, of which I have seen no parallel elsewhere:—indeed, with me, it is a question, whether the immediate descendants, or the country in general, are most obliged to these truly noble minded persons, the late Earl Chichester and Sir Christopher Sikes, who projected and executed these equally splendid and invaluable improvements? The former will, I understand, in consequence, have a pillar erected to his memory by his noble successor. I have not heard that any thing of the sort is intended in regard to the latter; but so much is certain, he has well deserved such a tribute of respect.

Of the value of these plantations, as shelters, as ornaments, and as producing timber, I do not pretend to speak; further than that it must be prodigiously great; nor is it possible to estimate their worth, in the way of example; he must indeed be

a cold-blooded mortal, who can contemplate such united utility and magnificence, without feeling "how low, how little" are most of the earthly pursuits, which so generally engross men of rank, in comparison of the elevated, I had almost said, the sublime science of planting.

The manner of planting general screens may be much the same as in the neighbourhood of the mansion, only rejecting the dearer species of plants. As here regard must be had as well to the future as the present, a moderate quantity of the following articles should be introduced as principals, wherever the soil proves suitable, viz. oak, beech, sycamore, and the English elm, the last being grafted. The ash should never be admitted into any other than broad screens, it being a bad shelter, and a worse neighbour.

As enough has been advanced, to explain what is necessary to the formation of the most perfect screens, I need here only refer the reader back to the subject, recommending him, at the same time, to attend particularly to what has been advanced, in the former part of the work, on the properties of the larch, spruce, and Scotch firs; as, by the proper use of these, most situations may not only be completely sheltered, but the screens rendered highly productive in timber produce.

It may be of importance to observe here, that screens, planted for the purpose of sheltering lands of inferior value, should by no means be narrow ones; for though it may be possible to preserve them complete shelters, it can only be done by such continued attention as can scarcely be expected in large concerns: nor is it possible that either the principal trees or underwood should thrive so well as in broad

ones. But the best reason for breadth re-
 mains to be noticed:—Such lands may ge-
 nerally be as profitably employed this way
 as in any other, frequently more so: be-
 sides the fencing of the two sides of a screen,
 whether it be twenty or a hundred yards
 broad, will be precisely the same. Of
 course, narrow breadths must be the worst
 kind of policy.

*Screen
cultivated
lands.*

The value of broad ones, as covers for
 game, is too obvious to need comment.—
 With most gentlemen, the protection of
 game is a matter of much importance.—
 Broad belts, partially cut down, from time
 to time, so as to produce a constant supply
 of underwood, are peculiarly calculated to
 encourage the breed. In short, the same
 means that will shelter the land, will also
 shelter the trees and game: and, with all
 these pecuniary advantages, they are be-
 yond comparison the most ornamental. A
 narrow belt, on the summit of a hill, com-

*screen for
libated
uds.* proposed of trees with naked stems only, has none of the properties of a shelter, but the reverse: it is indeed but little ornamental, and less useful.—The proper situation for such screens will be, in some degree, obvious. Generally they will be most effective on the summits of hills. In most places, it is known from what quarter the wind blows most violently; generally from the west:—the rule, however, admits of many exceptions; and, therefore, this point should be clearly ascertained, in the first instance; when the direction of the planting will follow of course.

Consistent with what has been advanced on planting steep, it will be found desirable, that the line of the screen to windward, should be as near the summit of the steep as may be found convenient; as, by that means, much of the current of the wind will be thrown rather over, than in among the trees; and hence they will

thrive better than if the line was lower in the ascent.

*Screen
cultiva
lands.*

When, as sometimes happens, the current of the wind takes the direction of a valley, it is peculiarly prejudicial. In such a case, the line of the screen must be across the valley, from the summit of one hill to that of the other: and, if such valley continues to ascend for a considerable length, a second screen may be necessary. It is not said that such things rank high as ornaments; but they may frequently prove extremely useful.

Where it is necessary for a road to cross the screen, it should either be turned about half a point from the direction of the current, or be made to bend so far that the wind, driving in a straight direction, will lose its force among the trees. It is almost unnecessary to add, that such roads should be no wider than what is ab-

*the, or
divided
into*
 solutely necessary; for, otherwise, they would not only hurt the general effect, but also occasion a degree of exposure. In narrow ones, by a little attention, the trees may be made to arch over at any given height; so that a matter of convenience may be made productive of variety.

In closing this subject, I may observe, that not only elevated situations require shelter, but any bare one may be greatly benefited by it. Any one, who has clear ideas of agricultural affairs, must know that it is highly valuable; but none who have not experienced it, can justly estimate its extent. The best proof, that I can advance, of its worth, is the opinion of the noble possessor of Stanmer, before mentioned. This attentive observer has himself assured me, that, in consequence of the shelters, he considers many of his fields of three times the value they otherwise would be: while others, not so fa-

vourably situated, appear evidently to be benefited in proportion to the shelter. Neither is there much danger of mistake in this respect; as the estate is large, and affords numerous situations *still exposed*, the natural circumstances of which correspond exactly with such as are sheltered; and, therefore, the rent each would let for, clearly ascertains the value of the shelters.

I have been the more particular on this head, because it appears this part of the subject is more imperfectly understood than most others. Indeed, from a pretty extensive knowledge of what is doing in the country, in the business of planting, there seems to be abundantly more need of *directions* than *incitements*: and the better a person understands the subject generally, and that of screens in particular, so much clearer will be his views of the general utility of the pursuit.

It is certainly a matter highly consolatory, to find so considerable a number of opulent persons, in different parts of the united kingdom, exerting themselves to provide a supply of timber for our increasing wants; and more particularly so, to find the prejudices, in regard to fir timber of home produce, very much upon the decline. If it is true, that we can grow such timber, proper for every purpose to which the foreign has usually been applied, it is surely matter of national disgrace *not to know it*; at least, the circumstances of the present moment imperiously demand, that the question should be determined, *yea or nay*.—In the present publication, as well as in the “FOREST PRUNER,” it has been a leading object with the author, to assist the reader in forming just ideas on this subject; and perhaps the samples, presented with this treatise, may, in some degree, tend to the same good purpose. Indeed I suspect,

that if many of those who are most active *Samph* in depreciating British produce, were called upon to examine these samples, without knowing them to be such; they would find themselves in the situation of the woodman, mentioned in page 62. But thus it must always happen, so long as men are content to take their opinions upon trust.

The practice of confiding in commonly received opinions, without examining either their truth or tendency, is what the author has never adopted; because he is fully aware, it tends to the exclusion of every idea of improvement; he believes it is to a conduct directly the reverse, that he is indebted for whatever success has attended him, either as a professional man or as an author; and hence, upon the present occasion, he has strictly persevered in it. He can, at least, say with confidence, that he has done his duty, in using

his best endeavours to elucidate the principles, improve the practice, reduce the expence, and increase the value of general planting.

I have just been favoured with the QUERIES of the Commissioners of Woods and Forests, (dated the 21st of Dec. inst.) "*relative to the Cultivation, Management, &c. of Navy Timber,*" inclosed in the following Note.

*Sheffield-Place,
Dec. 24, 1807.*

Lord Sheffield is requested, by Lord Glenbervie, to forward the inclosed to the persons best acquainted with the management and growth of timber trees, and therefore sends it to Mr. Pontey.

As his Lordship has adopted the Author's System, of managing his Oak Timber, *probably the finest in the Kingdom*, the above Note will

be sufficient to exhibit his opinion of the FOREST PRUNER; and, therefore, the Author has only to express his sincere satisfaction, that Government *now* sees the necessity of some measures to encourage the Growth and Improvement of Oak Timber. It is, indeed, the more pleasing, because the necessity for such measures has not only been pointed out by himself, but, *enforced* by arguments, that he presumes to be unanswerable, in the above work, (published in 1805,) p. 262—270.—The book is of itself a satisfactory ANSWER to many of the Queries alluded to.

POPLARS.

Mr. Liddell, Agent to Sir Thomas Pilkington, of Chivett, near Wakefield, has just favoured me with the following particulars, which I consider of much importance; as, while they demonstrate the quickness of growth, they also prove the peculiar propriety of using means, to ascertain the *useful application* of such articles.

A Black Italian Poplar, planted in Mr. Liddell's Garden, at New-Miller-Dam, near Wakefield, in the spring of 1799, and then only six feet high, is now thirty-eight; the Trunk being twenty, and

the Top eighteen feet. The average Girt of the former being twenty-four Inches. This tree loft about seven feet, from its top, in the fummer of 1802.

Another Poplar, of the fame fpecies, planted in the fame Garden, in March, 1801, had about ten feet cut off its head, after two years' growth, at eight feet and a quarter high, to prevent its damaging fome shrubs; after which, it produced three branches, which now form as many diftinct heads, at the above height; the leaf of which is twenty feet long. The Girt of the Trunk is twenty-four inches.—The *fituation* of this Garden is rather elevated, the foil LIGHT and DRY.

Another Poplar (of the common white fpecies, or what is called in fome places, the White Willow,) growing on the banks of the river Calder, near Wakefield Mills, planted fourteen years ago, being then about the fize of a common walking cane, is now of the following dimeufions.

The Height fifty-feven feet.

Average Circumference, to eight feet high, fixty-four inches.

Ditto ditto from eight to twenty ditto, forty-eight ditto.

From the trunk, at eight feet high, it has fent out an arm or branch, which is twenty-four inches in circumference and about thirty-five feet long; the whole containing not lefs than THIRTY CUBIC FEET OF TIMBER.

Though all the above may be confidered as aftonifhing inflances of quick growth, the laft gives the cleareft refult; as having come to an age and fize in which trees, of this defcription, may be faid to feed in trunk, rather than expend their ftrength in top.—A feale of progreffive increafe would certainly ftate the produce of the laft year at not lefs than fix or feven feet of timber.—The hiftory of this tree is as fingular as its increafe is *aftonifhing*:—It was found floating in the river!

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ADVERTISEMENT.

THE Author gives Directions and Designs in every Department of Ornamental Gardening; and, likewise, Instructions for the Management of Timber Trees generally, as well as the Objects of the present Treatise, in every Part of Great-Britain.

As his present Engagements occasion his visiting the Neighbourhood of London twice, annually, Gentlemen in that Quarter, and the Vicinity of the Road, may avail themselves of his Assistance, without being charged with the Expence of the Journey.

 *Letters addressed to Huddersfield, or to No. 36. St. James's Street, London, will be duly attended to.*

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SIR,

*Society of Arts, &c Adelphi.
London, Oct. 30th, 1806.*

The Society for the Encouragement of Arts, Manufactures, and Commerce, have directed me to return you their thanks, for the present of your valuable and useful publication, called the FOREST PRUNER.

I have read it with great pleasure, and think it will be productive of very considerable advantages to all persons, who follow your instructions.

Your treatise is carefully deposited in the Society's Library, and has met with much attention. I am,

Sir,

Your obedient servant,

CHARLES TAYLOR, Sec.

*Mr. William Pontey,
Huddersfield, Yorkshire.*

Extract from the Preface to the 24th Vol. of the Transactions of the Society of Arts, &c page 8, published in Feb. 1807.

“The mischief and damage arising to plantations in general, from a bad system of pruning, or neglect, induced the late public-spirited Duke of Bedford to direct a series of experiments to be made, at his expence, by W. Pontey, of Huddersfield, on his extensive plantations in the neighbourhood of Woburn. Mr. Pontey has shewn great industry and judgment in his selection of specimens, and in the clear detail relative to pruning Forest Trees, which he has communicated in a publication, entitled the Forest Pruner, presented by him to the Society.”

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20 to 40^s per hundred. Above ten
years growth they are called in Kent
"se stuff" for making sheep-gales
and staves for withstanding.

The most hard Willows are the
most profitable plants for hop-poles.
I have the Black Poplar.

Mr Coche now pays 10^s per thousand
for his withstanding to plant.

