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A FEW EXTRACTS
FROM NOTICES RECEIVED IN RELATION TO
THE ART OF TAMING AND EDUCATING HORSES,
BY D. MAGNER.

These notices were entirely unsolicited. They are the free, untrammelled expression of papers of the highest acknowledged authority and power, and of recognized merit and reputation; and of readers, who, on paying for and studying the book, felt impressed to send their meed of praise. Of the many extracts from readers' letters, those given here are but a moiety of the thousands on file at the office of the publishers.

No other book yet published on the subject on which this book treats has met with so universal an approval for the original and high character of its instruction on the education, management, and care of horses.

New York, Sept. 20, 1884.

Mr. MAGNER,—

I have been so very busy that I have not had time to read your book all through, and for that reason I have not given you my opinion of it before. I can now conscientiously say that it is by far the best work of the kind that, so far as I know, has ever been issued from the press. I cannot agree with all the opinions you print about the horse's foot, although you give a great deal of valuable information about horse-shoeing; but in educating, taming, and subduing the horse, your book is incomparably superior to all others. Every horseman in the land ought to have a copy of it.

Very truly yours,

ROBERT BONNER,
Proprietor New York Ledger.

Racine, Wis., Sept. 20, 1884.

D. MAGNER, ESQ.,—

In answer to yours of the 19th inst., will say that I have found your book very interesting and instructive. What a world of trouble, also of life and limb, it would save the millions that handle and drive horses, if they understood your common-sense theory of handling and breaking horses, and would practice it. It ought to be studied and understood by every man that raises or handles horses. I will be pleased to see you at my place at any time, but will not be able to show you Jay-Eye-See or Phallas until they return from their trotting circuit, which may be late in the fall.

I am yours truly,

J. I. CASE,

Owner of the famous trotting horse, "Jay-Eye-See," etc.

[From "Dunton's Spirit of the Turf," Chicago, Ill.]

The work contains 900 excellent engravings. These cuts have been obtained at an enormous expense, and give the reader a perfect idea of the Author's process. These alone are worth more than ten dollars to any man who owns more than one horse, to say nothing whatever of the elaborate explanation which accompanies each engraving. We had come to believe that we understood most of the errors that had crept into the horse family; but after a glance through Mr. Magner's book, we can readily understand that we know nothing whatever about these vices, or the best modes of correcting them. And as we conclude there must be thousands like ourself in this respect, we hope no one will fail to secure a copy. We regard this as a valuable, common-sense publication, worth double the price asked for it.

I will simply say that, to my mind, Prof. Magner's book is the grandest work of our time on the horse.

JAMES HAMILL, D. V. S.,

Prof. of Pathological Shoeing, in N. Y. Vet. Col., 416 East 14th St., N. Y.

I have carefully perused your book, "Art of Taming and Educating the Horse," and take pleasure in saying it contains the most useful information to the owner of the horse that it has ever been my privilege to examine in any single volume or work. I prize it as a valuable acquisition to my library, and cheerfully recommend it to any owner of a horse.

Yours truly,

D. G. SUTHERLAND, V. S.,

President of Michigan State Vet. Association, East Saginaw, Mich.

Your excellent book on Taming and Educating Horses is received. Permit me to thank you very kindly for remembering me. I sincerely hope you will be amply repaid for the immense amount of careful study and labor required to produce such a work. I predict for it a place in the library of every horseman in the country.

WILLIAMSON BRYDAN, V. S.,

Pres. Mass. State Vet. Ass'n, Boston, Mass.

I take as much pleasure in criticising your book on "Taming and Educating Horses," with a view to its recommendation, as I do in reading it. It is written in a plain, fascinating style. The subject is ably and *Exhaustively Handled*, and the illustrations are so numerous and demonstrative that the object of the work is accomplished in a singularly successful manner. There is no animal more intelligent than the horse, none so useful, none requiring more patient, intelligent common sense in training and handling, to obtain the most pleasing, affectionate obedience, and there are very few really well-trained horses. The chief reason of this is the ignorance of their human masters. Most all farmers break and train their own colts, and would be glad to do it well if they knew how. Your book will teach them and all horsemen how to do it quickly, effectually, and humanely. *The part on Shoeing is very complete, and is not second in importance to any other.* The part on diseases and their treatment is plain, and will be very useful to those not within reach of a competent veterinary surgeon. I *HEARTILY COMMEND THE WORK* to the careful attention of all lovers of man's most noble friend and servant, the horse.

A. H. BAKER, V. S.,
Principal Chicago Vet. College.

It is a prodigy of painstaking labor, beauty of page, and splendor of illustration. No man who has the handling and training of horses can afford to be without this book. *It is a MARVEL OF BOOK-MAKING that such a volume can be sold AT THE PRICE you are placing it.*

JOEL SWARTZ, D. D.,
Pastor of St. James Church, Gettysburg, Pa.

Disclaiming the qualifications needful for a proper criticism of a treatise of this order, I have, nevertheless, formed an opinion after an examination of the volume. It impresses me as a work of very great utility, and one which no person who is engaged in rearing or is much occupied in handling horses, can well afford to do without. Whatever serves to make men better acquainted with the nature, the habits, and requirements of these beautiful creatures, and conduces to modes of treatment of them more wise and patient and gentle, may be rightly regarded as a public benefaction. The practice of constant care and kindness toward the creatures under our dominion, is a constant discipline of virtue. This book appears to me to have the proper drift, and to be worthy of high praise.

HON. B. F. GRAVES,
Ex-Sup. Judge, State of Mich., Battle Creek, Mich.

In answer to your inquiry asking for my opinion of your book, would say that I have read it carefully, and consider it the *most COMPLETE and VALUABLE* book of reference for the use of stable keepers and horse owners generally that has ever been published.

B. C. Mc BETH, V. S.,
Sec. State Veterinary Ass'n, Battle Creek, Mich.

I would not be without Prof. Wagner's book, "The Art of Taming and Educating Horses," for \$50. *The instruction on SHOEING is the BEST I EVER SAW.*

HARRY SULLIVAN,
Sec. Mich. State Ass'n Master Horseshoers, Battle Creek, Mich.

You ask me for an opinion of the horse book by Prof. Magner that I bought of your agent. I don't usually recommend books, but I will this one; for it is the best horse book I ever saw, and I can give it my full indorsement. *It should be in the hands of Every man that Owns a Horse.* You need not be afraid to sell this book, for every one will be satisfied with it, and can recommend it to their neighbors; they will get the worth of their money two or three times over. Several parties have seen my book, and they would like one for themselves; but I did not have your address, or I should have sent them to your place. I will see them in a day or two, and tell them where they can get them, as I have your address now. I hope you will have a large sale of this book, for *no Farmer or Horse Owner ought to be without it.*

THOMAS EVERS,

Prop'r Union Stock Yards Sale Stables, Chicago, Ill.

I have carefully read and examined Mr. Magner's work on Taming and Educating Horses, and must say that I am most agreeably and emphatically surprised. His methods of taming and educating the horse are immeasurably superior to any that have heretofore been published; while the department of anatomy and medicine alone would make the book invaluable to any horse owner.

GEO. W. CURTIS,

Prof. Agr. & Hort., Agricultural & Mechanical College, College Station, Tex.

I have received a copy of your valuable work, "The Art of Taming and Educating Horses," and a more interesting and instructive work never before reached my hands. I have subdued some of the most vicious and dangerous horses ever known, in from twenty minutes to one hour and ten minutes, by the application of your method.

B. C. PLATT, V. S.,

Reno, Nev.

It gives me pleasure to have the opportunity to express my admiration of your work. The chapter on Diseases of the Foot and Lameness is especially instructive, and should be in the hands of every intelligent horseshoer.

CHAS. A. MEYER, D. V. S.,

Editor of "Veterinary Gazette," etc., New York City.

I regard your book on the horse as the best that exists on the subject of which it treats. Every farmer and horse owner should have it.

PAUL PAQUIN, V. S.,

Mo. State Vet. Insp., Pres. Mo. Ass'n Vet. Science, etc., in State Agr. College, Columbia, Mo.

I have carefully examined your book on the Structure and Diseases of the Horse, with their Remedies; also, Practical Rules for the Management of the Horse. It is just the work that is needed, being, in my opinion, the *BEST WORK I have seen PUBLISHED in America.*

C. LOFTUS MARTIN,

Vet. Sur. of Fifty-two Years' Practical Experience, Janesville, Wis.

I take pleasure in having the opportunity of recommending your valuable horse book, as I certainly think it a splendid work. I bought one of your agent, and I have made a thorough examination of the department I am interested in, namely, "Shoeing Department," and will say that every horseshoer and young man learning the business ought to have the work, and if they will study the contents, it will be of great benefit to them. The information is from the best authority, and gives us all much valuable instruction, and will be a great help to us. I think this department alone is worth the price asked for the book. I hope you will meet with a large sale, as the book ought to be in the hands of every horse owner.

THOS. LEGGETT,

Foreman Dept. West Div. City Railway, Chicago, Ill.

For six months or more, my horse was very lame because of a contracted foot. During that time I daily treated his foot in a variety of ways, but was unable to afford him any relief. It is now about two weeks since I began to try Prof. Magner's treatment for contracted feet, as set forth in his valuable work on the horse, and it affords me great pleasure to say that my horse is free from lameness from that cause. I had frequently expressed a willingness to pay any person \$25 to do for my horse what I have done with a very trifling expense, by using knowledge derived from Prof. Magner's work on the horse.

H. H. BLANCHARD,

Attorney at Law, Janesville, Wis.

Having purchased one of the books on Taming and Educating Horses, by Prof. Magner, I will say it is a fine book, and every farmer and horse owner ought to have a copy. I have had it only a short time, and have tried the system on balky horses, and it was a perfect success. It would take a long while to itemize all the good qualities in the different departments of this book. I have handled horses for over fifty years, and can sincerely recommend this work as one of high merit.

ROBT. HEARTT,

Foreman S. Halsted Street Car Stables, Chicago, Ill.

After carefully perusing Prof. Magner's great work on the "Taming and Educating of the Horse," I have no hesitation in pronouncing it the *most thorough, complete, and valuable work of the kind that has ever come under my observation*; and I cheerfully recommend it to every practical, as well as amateur, horseman and breeder. I have a valuable collection of works upon the horse, but I prize the work of Prof. Magner more than any one of them. No lover of the horse should be without a copy, as it is filled with valuable information.

H. D. McKINNEY,

Vice-Pres. Hayden Brass Co., and owner of the Celebrated "Mambrino" Stallion, Janesville, Wis.

Having bought the horse book by Prof. Magner, I wish to say that it is the *BEST BOOK of the kind I have EVER SEEN*, and cheerfully recommend it to all horsemen.

ROBERT ATKINS,

Supt. Horse Dept. North Chicago City Railway.

I have carefully examined the copy of your work on the "Art of Taming and Educating Horses," purchased by me, and have no hesitancy in pronouncing the same a very valuable work, and one that will fill a want long felt by horsemen. It is replete with suggestions and information that should be possessed by every owner of a horse. I bespeak for the same a liberal circulation upon its merits. The information therein contained upon the horse's foot and the art of shoeing is, in itself, worth more than the price charged for the book.

HENRY BROWN,
Owner of the Well-known Trotting Stallion, "Bay Middleton," Battle Creek, Mich.

Having carefully perused a copy of Prof. Magner's exhaustive work on the horse, we can only express our unlimited satisfaction with the contents. The shoeing department is treated in a way that clearly demonstrates that the author was perfectly competent to write this section of the work. His methods of training and educating vicious horses are also worthy the earnest attention of all horsemen; and for general completeness of the subjects treated, we can strongly recommend the whole work.

BROWN & COOPER,
Veterinary Surgeons, Janesville, Wis.

I certainly think "The Art of Taming and Educating Horses" is a splendid work. I have made a thorough examination of the department I am interested in, viz., "Shoeing," and will say that every blacksmith, or young man learning the business, ought to have the work. The book should, in fact, be studied by all having anything to do with horses.

R. DELBRIDGE,
Maynard, Ohio.

I am generally very much averse to indorsing patent arrangements and specialties of any kind, but your book is so intelligently and scientifically written that I feel *honored rather than honoring* in giving an indorsement. The whole work is of a superior character, the cuts good and not monstrosities. The art of rightly educating the young horse has been sadly neglected in the past, the general opinion being that he was a brute, and required nothing more than superior brute force. If you start right, there is every probability of going right; and by a continual intelligent system of education, such as yours is, the animal is taught to reason, and become a useful and intelligent servant, though spirited. Breeders of horses will not only study their own but the public interest in reading and adopting your plan of educating our best friends. The physiognomic plates accompanying the work are, in my estimation, invaluable to the young veterinarian, as well as young breeders. By means of such plates they can learn to tell at a glance the animal's disposition. I shall take pleasure in recommending it to all who may ask my personal opinion.

R. J. WITHERS, V. S.,
Pres. of Chicago Vet. College.

While in the East some time ago, I enjoyed an opportunity of examining your book, "The Art of Taming and Educating Horses," and believe it to be the best book of the kind ever published.

I. P. ADAMS,
Lohman, Mo.

I have looked for and read all the works I could get treating on horses' feet, but have not seen anything before so complete and instructive as "The Art of Taming and Educating Horses." I shall deem it a great pleasure to express to my friends my views of its great merits in the educating, training, and shoeing of the horse.

J. P. DUDLEY,
San Jose, Cal.

We have examined the book by Prof. Magner on Taming and Educating Horses, and which treats generally of their diseases, and consider it to be in every respect a first-class book, clearly and concisely written, and of great value to all interested in horses. The plates and illustrations are much superior to anything of the kind we have ever seen.

GALBRAITH BROS.,
Breeders and Importers Clydesdale Horses, Janesville, Wis.

I prize "The Art of Taming and Educating Horses" above all other books.

G. S. HUTCHINSON,
Parma, Mich.

I have received your book, and am much pleased with it. Would not be without it for Fifty Dollars.

GEO. KUHNLL,
Charles City, Iowa.

"The Art of Taming and Educating Horses" received. It is the finest work on the subject I ever saw, and would not be without it for anything in the world. It is worth more than four times its price to me, or to any other man who owns horses.

O. D. SPRAGUE, Att'y at Law,
Gowanda, N. Y.

I have bought one of your large books, "The Art of Taming and Educating Horses," and think it one of the most valuable works of the kind I ever read. Have derived a great deal of good information on shoeing bad horses.

W. D. BAKER,
Portland, Ind.

About two weeks since, I received from a brother in Connecticut a copy of your valuable work "Taming and Educating Horses," and a more interesting and instructive book never before reached my hand. Believing that it will do your heart good, I will state that I have subdued some of the most vicious and dangerous horses ever known in this section of the country, in twenty minutes to one hour and ten minutes by the application of your methods. The Second Method is in every instance A, No. 1; but the Third does beat the very d——l, I do believe. Perhaps I may seem to you a little over-enthusiastic, but I have just put the finishing touches on the worst brute of a beast that man ever attempted to lay hands on, and all of the efforts made to accomplish the result were of the neatest and easiest and safest kind, which makes one smile to see how powerful he is, especially when he has Magner at hand.

B. C. PLATT,
Reno, Nev.

Since receiving the book, "Art of Taming and Educating Horses," I have made ONE HUNDRED AND FIFTY DOLLARS in breaking one horse.

W. W. GRAHAM,
Chippewa Falls, Wis.

The following letter of inquiry explains itself, with the result of treatment as given in letter following this one: —

FORT HUACHUCA, ARIZONA, MARCH 8, 1889.

Mr. Magner: I have a heavy boned California horse, that breaks every halter put on him. I have to TIE HIM up with a CHAIN. I cannot take such a horse into the field; for he will stampede the whole herd by breaking loose and running. This same horse is a VICIOUS STRIKER, and has already knocked down and walked all over one of my sergeants. He is of no use to the government, and I want to get everything in shape, and either break or kill him.

Yours truly, A. E. Wood,
Capt. 4th Cavalry.

After having subjected the horse to treatment as laid down in "The Art of Taming and Educating Horses," Capt. Wood writes, under date of March 24, as follows: —

Your system of breaking halter-pullers works like a charm. That wild California horse surged back about ten seconds, and then he came forward with a rush, and I could not get men enough around him to force him back the second time. From the stall I took him out to the picket line, and tied him to a post. He set back about three seconds, when he sprang forward astride of the picket line, and when freed from the picket line, we could not induce him to pull back again. Any halter can hold him now. He was so easily managed that I concluded that I had misjudged his disposition, so I tried the Second Method on him the next morning, to break him to the saddle. Immediately after giving him this Method, I put on the Second Form War Bridle, and after a few side surges, he was saddled and a man mounted, dismounted, and in fact he was broken to shoe, to ride, to stand still, and behave himself generally, in about twenty minutes.

I fully indorse what Mr. Bonner and other well-known leading gentlemen say about your book, as being far the best I have ever seen on the subjects treated. It is a book that should be possessed by every horse owner who regards his own interest.

CHANDLER J. WELLS,
Ex-Mayor of Buffalo, Ex-Pres. of Buffalo Driving Park Association.

After studying your work, "The Art of Taming and Educating Horses," I must say that it is the best work of the kind I ever saw.

H. MC INTYRE,
Calumet, Mich.

The book received, and gives perfect satisfaction. I think it worth much more than the price paid for it.

GEO. CHRISTOPHER,
Wyoming, N. Y.

I was a member of your class at Burr Oak and Sturgis, Mich., in the fall of 1871, and bought one of the books you then published. Since that time I have been continually among horses, and have put into practice many of the principles taught by you, and have been very successful in handling all that I have undertaken, so far, — quite a number that were not the best disposition by any means. One year ago a circular came to hand announcing your new book. I at once addressed you regarding it. Some six weeks ago a copy of said work was received by Mr. Dunham. At his house one evening, I called his attention to it, and he said: "It seems from appearance to be a very exhaustive work on the handling of vicious horses and treatment of diseases, and it must be a valuable work for horse owners." I look upon it as the *greatest work on the horse that has ever been published*. It seems to give in detail about all there is to be known of handling all dispositions found in the colt, and also the hardened old reprobates that are sure, at some time or another, to find their way into the stables of nearly every man who uses horses. I also state that the illustrations used in your book to demonstrate your theory are applied precisely as you taught them before your classes, and the directions are so plainly written that any person can apply them with all confidence; and it is worth five times the price asked.

A. F. MCKEE,
Business Manager for M. W. Dunham, the great Importer of Percheon Horses,
Wayne, Du Page County, Ill.

I have one of your old books, and see that you are about publishing a much larger and better work. Would like to learn the price so I can send for one. I would not be without the book I have for \$100; but if I can get a better one, I want it, that is, of your publishing; for I am sure it must be the best book on the treatment and care of horses yet made.

After receiving this book, Mr. Webster says: —

The more I read and study the work, the more I am impressed with its real merit. The book should be in the library of every person who owns and loves a horse. *To a Breeder and Dealer it is of INFINITE VALUE.*

C. E. WEBSTER,
Gaylord, Mich.

I have carefully examined the work by Prof. Magner on the general management of the horse, how to treat him in health and disease, and unhesitatingly pronounce it the best book on the subject I have ever seen. A book so elaborately gotten up is, in my opinion, of paramount value to every horseman. I consider the book a valuable production. It should be possessed by every horseman in the land.

WM. HORNE, M. D., V. S.,
Author of "Diseases of the Horse," etc., Janesville, Wis.

It is a great book. It is worth more than all other books published on the horse. No horse owners, especially livery keepers, can afford to be without it at any price. I would not take one hundred dollars for my book, if I could not get another.

S. I. ABBEY,
Prop. Sanitarium Livery, Battle Creek, Mich.

This is the most complete work on the management of horses ever issued in this country. Mr. Wagner is a noted trainer, who has subjected the most ungovernable animals, and whose practice has been aided by extensive study. In the preface Mr. W. H. H. Murray says: "I doubt if there be on the globe his equal in knowledge as to the best method of training horses." This knowledge is imparted to the public in the volume before us. The explanations are all so plain that unlettered men can understand them, and the illustrations show exactly the positions explained. There is nothing in the management of a horse, of whatever age or disposition, in health or sickness, that this treatise does not cover. It will be considered by every owner of a horse almost indispensable, after he has become familiar with it. [From the *Rutland Daily Herald*.]

A short time ago I bought one of your books on "The Art of Taming and Educating Horses," and can most cheerfully recommend it to every one interested in horses, and would advise them to get a copy. I have tried the system on halter-pullers and a horse that would not drive single, and it was a perfect success. We had one halter-puller that was the worst I ever saw; I applied this system, and have broken him thoroughly of the habit. I have examined the book carefully, and can indorse it as a whole. I find the Shoeing and Medical Departments very fine, and alone well worth the price of the book. I believe that any one who buys this book will obtain such information as every farmer and horse owner ought to know, and it will be a good investment.

G. B. REYNOLDS,
Foreman Van Buren Street Car Stables, Chicago, Ill.

Having examined Prof. Wagner's new work on the horse, and knowing the author well, I can give my unqualified approval of all that is stated above, and myself subscribe for the work.

M. V. WAGNER,
Mayor of Marshall, Mich.

I have examined your late work on the Taming, Education, and Treatment of Horses, and consider it of such value that horsemen or farmers cannot afford to be without it, when they come to know its worth. I consider it a valuable addition to my library.

S. BRENTON, D. V. S.,
Treas. Mich. State Vet. Ass'n, Jackson, Mich.

It is a much larger and finer book than I thought for the price, and I regard it as a very valuable work. I have used part of your system for many years, and have been very successful.

JACOB ALBRIGHT,
Maple Shade Farm, Etna, Thompsons Co., N. Y.

My uncle, Lawrence M. Duncan, gave Fifty Dollars to learn Wagner's system of training and educating horses, and has used it so successfully that he gained the reputation of being the best man in Contra Costa County, Cal., to handle a wild or vicious horse or stallion. No animal could withstand him, and his treatment was never abusive, but the contrary.

HENRY L. VAN WINKLE,
San Francisco, Cal.

I desire to express my very high opinion of your invaluable work on the horse. It is the finest and most complete book I have seen on the subject, and I am sure that every owner of a horse will find it a profitable investment,—in fact, indispensable for reference.

HON. CHAS. AUSTIN,
Senator from Eighth Dist., Mich., Battle Creek, Mich.

I wish to state that the book grows in my appreciation all the time, and I would not take \$25 for it if I could not get another. My father did not open it with great interest, but when he began to read, he could hardly stop. I have spent several evenings till near or quite midnight reading it.

CHAS. WILLIAMS,
Breeder of Jersey Cattle, Pensaukin Farm, Fellowship, N. J.

Your book received. I have taken the time to examine it carefully (hence this delay), and permit me to say I think it is a work that *no owner of horses can afford to be without*. I predict a fortune for you in the work. I prize the volume very highly. I have shown it to several, and I think as a result you will get several orders from here.

J. O. DUCKER, M. D.,
Eureka Springs, Ark.

No horseman can well afford to be without the book. From the standpoint of a physician, the impression formed as to its value is decidedly favorable.

F. H. ROOF, M. D.,
Rhinebeck, N. Y.

I am much pleased with my book. It is the best work on the horse I ever saw. I have handled horses and colts since a boy, and with my experience and your instruction I can tell very well what method is best for each case. I would like to tell you of two cases. I handled a kicking colt, four years old, by your method, in the stable, and in twelve minutes made her so gentle that, with a little handling out-of-doors, she was hitched up and driven in the public street. This I did without the use of brecching. She had been given up by one man before she came into my hands. Another case : A bay mare, twelve years old, could not be shod without ox-slings or other confinement. After being handled by me twice, she was shod at the shop without trouble.

EZRA T. WEBBER,
North Vassalboro, Kennebec County, Me.

I believe that every man who owns a horse should have your book. I would not take five times the price of it, if I could not get another copy. It is undoubtedly the best book of its kind extant.

J. N. TILDEN, A. M., M. D.,
Peekskill, N. Y.

If I could not get another copy of Prof. Magner's book, "Art of Taming and Educating Horses," etc., \$50 would not buy the copy I have. It is the best book on the horse that I ever saw.

STEPHEN BOWERMASTER,
Bowersville, Ohio.

By knowledge derived from your book, I broke my five-year-old colt of *Halter-pulling in Twenty Minutes*. He had cost me \$50 for bridles since I owned him. I would not take \$100 for my book, if I could not get another copy.

FRANK B. ROOT,
859 Grand St., New Haven, Conn.

I am highly pleased with the "Art of Taming and Educating Horses." Value it very highly, in fact, consider it *worth a horse* to me. Have a brother who is succeeding admirably conquering and breaking "bad" horses by its instruction.

JASPER ANGEL,
North Webster, Ind.

It is the FINEST and MOST VALUABLE HORSE BOOK we have ever seen, and we feel convinced that it must be accepted as a bonanza by livery keepers. Money would not buy the copy we have if we could not obtain another.

BEAVER & WILLIAMS,
Liverymen, Battle Creek, Mich.

I am highly pleased with your new work. I have been handling horses since my boyhood; and for the last seven years I have followed the system taught in your old book entitled, "New System of Training and Educating Horses." But since receiving your new book, I feel as though I had just been initiated into the true principles of the system. I take this opportunity of thanking you for laying before the public and inaugurating a *Truly New Era* in the management of our most noble animal. No matter how much a man may pride himself on his success in the business of horse training, he will find something in this book entirely new to him; and if the treatment prescribed is strictly followed, the result can but be successful, if handled with anything like ordinary care and caution. I have trained a two-year-old colt, with a disposition by no means good, to drive without bridle or reins, and he is very handy at that. I had previously tried to do this on several different horses, but never before succeeded. I must give the credit of my success to the instruction given in your new book. I hope you will be able to give exhibitions very soon, as promised in your book. I would like to be one of the audience, no matter where held.

J. CARMODY,
Bellona, Yates Co., Ohio.

We think your new book is the best work of the kind ever issued. We heartily wish you all the success its merits demand. You have certainly covered the ground completely, and leave nothing more to be said on this important subject.

BURK & McFETRIDGE,
Printers and Publishers, 306 Chestnut St., Philadelphia, Pa.

I hail your new book with glad tidings. Having been a member of your class at two different times, I need no better proof of the merits of your book than your name upon its title-page.

BEN WADE,
Woolwich, Me.

I have made more than *Five Times the Cost* of your book since I have had it. I have cured a *Quarter-Crack* in each of the fore feet of a horse which I had tried for *four years* to cure, but failed. Also cured one which another horseshoer tried in vain to cure.

JOHN A. MC DONALD,
Taunton, Mass.

I think it by far the most complete and thorough work on the horse ever published.

J. W. ROBINSON,
Livery Proprietor, Portland, Me.

I think it the most valuable work of the kind ever published. I think the training and educating part is all that could be desired, and the other parts are good. The description and treatment of the horse's foot is worth many times the cost of the book. I would not sell my book for ONE HUNDRED DOLLARS, if I could not obtain another.

E. L. CRAFT,
Center Point, Iowa.

I think your late work on the horse the most complete work ever published. It is full of information that every horse owner ought to know. It certainly has my hearty indorsement.

DR. L. B. WOOD, V. S.,
Newburgh, N. Y.

Your plan in relation to breaking horses certainly should have brought you the biggest kind of a medal. Mrs. Hill, who, by the way, takes a hand in the breaking of our horses, in fact adopted your plan in breaking her pet horse, and from a broncho green from the range, has a horse that will come into the house, eat bread from her mouth, open the windows, in fact do lots of things that kind and patient treatment will encourage a horse to do.

EDWIN C. HILL,
Ranch Owner and Breeder, White Sulphur Springs, Montana.

Your book has paid for itself many times to me in handling bad horses.

EZRA T. WEBBER,
North Vassalboro, Me.

After reading and reviewing Mr. Magner's book on "Taming and Educating the Horse," together with his "Standard Horse and Stock Book," I feel it a privilege as well as a favor to recommend them to the people. The book on "Taming and Educating the Horse" is the best I ever read, full of principles of mercy to the noble animal, the horse. They are both simple and complete. Prof. Magner's "Horse and Stock Book" is one of value to the farmer because it is so carefully written in detail, and it is practical and founded upon common sense, easily understood by the non-professional. In my opinion the above work is second to none, and is worthy of a place in any library. I shall always detail time enough to recommend it to those inquiring for a full and complete work on the lower animals.

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State Veterinary Surgeon of Iowa, and Veterinary Editor of the Iowa *Homestead*.

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Defreestville, N. Y.

EXECUTIVE OFFICE, STATE OF IOWA.

I have examined with much care the "Standard Horse and Stock Book," and desire to acknowledge my high appreciation of its merits as a great work, not only for the benefit of owners of that class of property, but for the cause of humanity. It will be invaluable for those interested in horses and cattle, and I wish every person in *Iowa* who *owns either* could have the book at hand for consultation.

WM. LARRABEE,

Governor of State of Iowa.

I have examined and read with much pleasure and satisfaction Prof. D. Wagner's book on "Taming and Educating the Horse," together with his "Stock Book." As a whole, I consider it a work of great value to every owner of man's most noble animal, the horse. It is especially of great interest to the farmer; the subjects treated upon are easily understood, the art of educating and taming the horse is practical and humane, and in my opinion the wide circulation of Prof. Wagner's work would be a benefit to the community, as I believe the information it contains is well calculated to prevent cruelty and lessen the suffering of that noble animal, the horse. It is a pleasure to me to recommend it to the people.

J. A. CAMPBELL, D. V. S.,

Veterinary Editor Iowa *Homestead*.

A short time ago I bought one of your books on the "Art of Taming and Educating Horses," and can most cheerfully recommend it to every one interested in horses, and would advise them to get a copy. I find the Shoeing and Medical Departments very fine, and alone well worth the price of the book. I believe that any one who buys this book will obtain such information as every farmer and horse owner ought to know, and in my opinion it will be a good investment, as the work is of a reliable character.

GEO. J. HOWELL, V. S.,

Des Moines, Iowa.

I am glad of the opportunity to indorse Prof. Wagner's books "The Art of Taming and Educating the Horse" and "The Standard Horse and Stock Book." I am an old pupil of Prof. Wagner; I attended two of his schools. I consider Prof. Wagner the greatest living horse tamer. I have personal knowledge of a large number of his remarkable successes in the subjection of vicious horses. I have both of the above books, and I find that some of the examples given were from those to which I was an eye-witness. The book, "The Art of Taming Horses," contains nothing in its claims for training and managing horses that from my own experience under him as his pupil I cannot emphatically indorse as being strictly true.

WM. CAMPBELL.

Though constitutionally opposed to personally indorsing books or patents, yet "The Standard Horse and Stock Book" is a work of such rare usefulness that it is entitled to an exception. I hesitate not to give it my full and hearty indorsement. It is not a mass of unconsidered trifles, huddled together to make a cheap subscription book, but is a work of true merit, every item being carefully prepared, and before publication, expertly examined, criticised, and corrected by twelve practical veterinary surgeons. It will be a fraud on no one, but is especially useful to owners and raisers of horses, cattle, hogs, sheep, poultry, etc. No such work, embodying so much reliable and valuable information, and so elaborately embellished, has heretofore been published by any one. It is not expected that so large and valuable a work can be prepared and sold at a diminutive price. Prof. D. Wagner has spent the most of a valuable life in studying and managing horses, and on this subject this work is inestimable to stock owners and raisers of all classes. As such, I heartily commend it.

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Agricultural Editor Iowa *State Register*.

Some time ago I was fortunate enough to become possessor of your book, and I trust you will permit me to state that, in my opinion, it is the most thoroughly honest and efficient work I have ever read.

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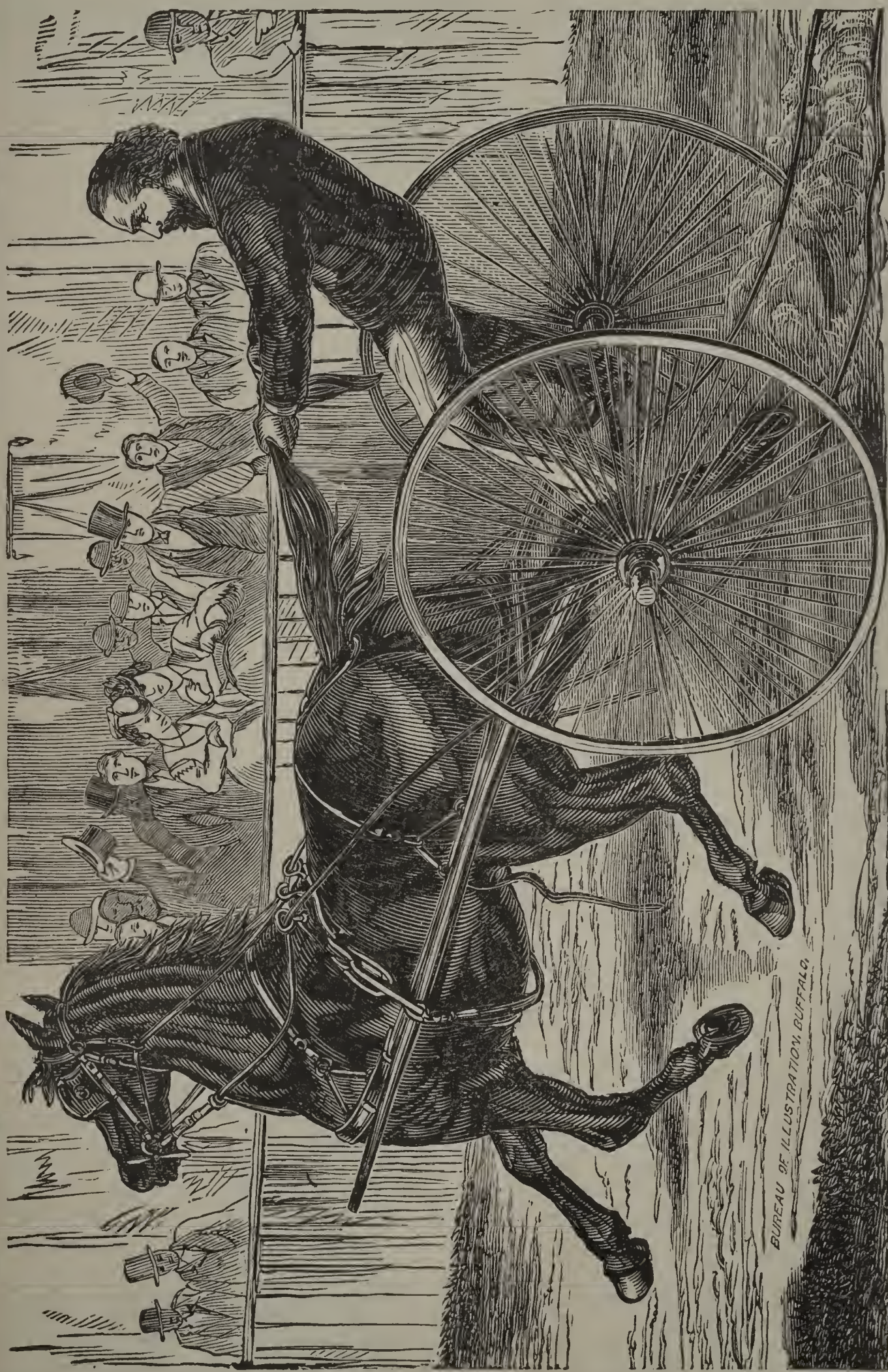
Through the kindness of James Hamill, V. S., my attention has been called to your work on subjects relating to the management of horses and to veterinary surgery. I take occasion to write to you that I consider it the most practical work, and one of the very best published, upon veterinary diseases, and I can heartily recommend it to the careful consideration of my friends.

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A COMPLETE BOOK OF REFERENCE

ON

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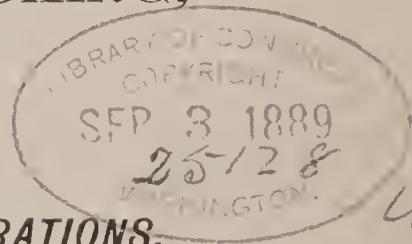
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1889.

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Five hundred leading veterinary surgeons in Great Britain have signed a paper condemning the overhead check-rein as painful to horses and productive of disease. It distorts the windpipe, and is liable to cause paralysis of the muscles of the face, apoplexy, coma, and inflammation of the brain, all these resulting in shortening the life of the horse. The British Parliament passed a law forbidding the use of the check-rein.

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INTRODUCTION.

AT an early age I was, in a chance way, led into the study of the principles of subduing and controlling vicious horses. In 1859 and 60, I was betrayed into teaching what I had learned by such experiments in this study, and in this way was finally induced to make it a permanent calling, in which I continued for nearly twenty years. I had at first, of course, but a very imperfect and limited knowledge of the subject, there being no principles or methods of instruction known, nor authorities to consult, of even the crudest character, before my time. In order, therefore, to combat successfully the difficulties which I met, I was forced to strike into a new path of study that finally led into the discovery of new and original principles and methods of subjection. By these methods I was not only led to revolutionize all previous ideas and methods on the subject, but to exhibit such results in controlling vicious horses easily, safely, and quickly as to be entirely beyond what it was possible to do by any other known methods of treatment, thus awarding me the success in this field of effort which I was so fortunate as to obtain.

With the aid of this knowledge, I was often able, in from a few minutes' to an hour's time, to perform the apparently astonishing feats of effectually subduing and making gentle vicious colts and horses that had resisted months or years of the most skillful and persevering efforts, and were regarded prac-

tically worthless. These feats were performed daily before my classes in illustrating my instruction.

In the early winter of 1878-79, I became so seriously broken down in health in consequence of the long-continued strain to which I had been subject, that I was compelled to leave the road. I concluded now to give to the public the full benefit of my experience, which up to this time I had taught to my classes under *oath* of *inviolable secrecy*. This knowledge I expected to embody in a work of from two to three hundred pages ; but with the effort to make it as complete and thorough as possible, the work grew upon my hands until it comprised over one thousand large octavo pages, with nearly one thousand illustrations. This book, when published, I was pleased to find was accepted by the best authorities, not only as the first on the subject treated, but as the finest and most complete work on the horse that had yet been published. Though the sale of this book had been entirely beyond my anticipation, there was a general desire on the part of farmers and stock owners to have added information on the *care* and *management* of *stock*. To do this in a way to make it entirely reliable, I employed the best veterinary talent to prepare the requisite matter. To make the necessary room for this, required the rewriting and abridgment of the *Horse Book*, bringing it down to nearly half its original size, and necessarily excluding much matter of interest to horse owners, — matter that had an important bearing on the secrets of subjection. In order to make it what I wished, I found it necessary to extend it to the large size of over *1100 pages*, illustrated by *1700 engravings and plates*. Wherever presented, this book has been accepted with the most flattering favor by the farming community.

Finding, however, that a great many farmers could not afford to buy so large and expensive a work, and wishing to bring the knowledge it contained in its most practical form

within the reach of this class, I was induced to abridge this book as much as possible, giving the most *important facts*, so as to make it available to them at the *lowest possible price*. And I think it must be admitted that I have made the most valuable book for the price that has yet been published.

In this work I have included additional features of special interest to the farmer's family. I would call particular attention to the instructions on cookery, embodying a great many valuable secrets known only to and practiced by the best of cooks, together with the fullest instructions for invalid cookery. Very valuable instruction is also given in regard to the treatment of special dangerous but common diseases.

*Battle Creek, Mich.,
Aug. 1, 1889.*

D. MAGNER.

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CHAPTER I.

PRELIMINARY REMARKS: ABUSE OF HORSES.

BEFORE taking up regular details, I wish to call your attention to some important points. *First*: That the horse, when treated intelligently, is really very easily managed, and that, too, by treatment that any one, however dull, should be able



FIG. 1. — An intelligent, courageous, yet extremely sensitive nature.

to use, if only patient and careful. But if at all spirited and intelligent, and treated ignorantly or wrongly, he can be made one of the most difficult and dangerous of brutes to control.

The better to illustrate the points I wish to impress, I will refer here to the statement of a neighbor, Mr. J. B. Sperry,

who related to me the following from his recent experience. Now bear in mind, Mr. Sperry is not a horseman, but a business man, a produce dealer.

He had a mustang which he wished to have shod, but the horse would strike and kick so desperately that no man could

take up his foot except at the risk of his own life; he was utterly unmanageable, and blacksmiths could do nothing with him. Mr. Sperry himself took him in hand, and in less than twenty minutes made him so gentle that he would stand on the floor and allow any foot to be taken up, and was shod without the least difficulty.

In conversation with the same gentleman, some time afterward, he gave me the following facts in relation to the management of a very bad balker he had recently obtained: This horse had been owned by several parties in the neighborhood, all good horsemen, one of them a



FIG. 2. — An intelligent, docile character.

livery-man; but in defiance of all that could be done, the horse could not be made to go or to pull, and had been whipped and pounded enough to kill an ordinary horse. The man of whom Mr. Sperry got him, had abused the horse shamefully, repeatedly knocking him insensible, in fact nearly killing him. Mr. Sperry got the horse for a mere nothing, and said that

NOTE. — In my large work there are seventy portraits of horses referred to in the text of that work, from which the portraits here given are selected.

the animal was so cut up from the pounding and abuse that he had to let him rest a month, so as to have the cuts and bruises heal, and enable him to recover from the effects of the abuse. He then carefully instructed his teamster how to manage the horse, and put him to work; and with the exception of the first day, when he balked once a little, he worked right in without making the least trouble, and now he will pull a ton anywhere. To use his exact language, "He is one of the best working horses in the city, and I would not take \$150 for him."

On asking him particulars of what he had done, he said: "I first took your book and read it carefully, and then directed the driver what to do, following exactly the course advised by you for simple treatment."

In reply, I related to Mr. Sperry the following incidents, coming recently to my notice, which are still more striking:—

A lady from Boise City, Id., Mrs. Thomas Johnson, who was at the Sanitarium in this place three years ago, upon going home obtained a



FIG. 4. — A vicious, treacherous nature.



FIG. 3. — Portrait of a docile family horse.

copy of my book. She returned here recently, and stated to

me that they had a half-breed mustang which was so vicious they could do nothing with him, and was practically worthless ; that she studied the book carefully, then went out with her husband to the yard, and, with the book on her lap, directed him what to do with the horse, and that in a short time he made the mustang entirely gentle ; that he has been driven in



FIG. 5. —Sketch from life of the most vicious mustang pony the writer ever saw.

harness and worked right along, remaining perfectly safe and gentle ever since. She stated further that a neighbor of theirs owned a horse, also a mustang, which was so vicious that he could not be broken, and they had intended to shoot him. This woman took the book, and in like manner went out into the yard and directed her husband in the treatment to be used ; and he in a

short time made the horse entirely manageable. They have used him since then for their family driving, and he continues just as safe and gentle as any horse in the country.

I could give a great many cases of this character did space permit, but will refer simply to some representative cases in my own experience, — cases supposed to be so vicious as to be entirely worthless, yet, when treated properly, submitting readily, and proving perfectly gentle and manageable afterwards.

First : A horse in New York, referred to in my large work as the Wilkins horse. This horse was recognized as the worst in that city, and, as a final resort, had been taken to a pretentious horse-tamer, who had orders to break him or kill him.

The man worked upon the horse for a week, and tried to kill him rather than admit his defeat; but the horse, being a tough,



FIG. 6. — Nervous, excitable horse.

plucky fellow, fought through it, and the man had to send him home, with the statement that the horse had no brains and could not be broken. More than a month afterward, when I saw this horse, he was scarred from head to foot, and that he was not killed by the severity of the

treatment to which he had been subjected, was owing to his remarkable vitality; yet in forty minutes, by the simplest treatment, I had no difficulty in making him entirely manageable,* and with a few slight repetitions of treatment, I afterward exhibited him in the presence of Mr. Bergh and other leading humanitarians, as a model of docility.

In Cleveland, O., was the famous Malone horse, which had resisted for years every effort of the best horsemen, and was



FIG. 7. — A noted vicious horse.

* This horse, as a special test, was subjected by the writer to treatment before Mr. Bonner, under a forfeiture of \$1000 if he was not made perfectly manageable and gentle within forty minutes, which was done. See reports of special committees and other experiments in New York City, in my large work.

finally pronounced hopelessly unmanageable, as no such kicking run-away horse was ever before known in that country. As a test, and with treatment easy for any one to use, I controlled him perfectly within forty minutes, making him so gentle that, with a little additional treatment, I drove him next day on the square without bridle, reins, or breeching, proving him to be one of the most gentle and safe carriage horses in the city.

In Lancaster, N. H., a fine blooded young stallion, owned by Mr. Stevens, to secure the best possible treatment was sent by him to a horse-breaker forty miles distant, who was recognized as the best in



FIG. 8. — Vicious.



FIG. 9. — Treacherous.

that country. This man, after working upon the horse for six weeks and being twice arrested for cruelty to him, sent him home as utterly unmanageable.* The owner positively asserted that such a horse could not be broken. Upon examination I assured him that there would be no trouble at all in making the horse gentle, that the trouble was the result entirely of improper treatment. So incredulous was he, that I was obliged to pledge \$500 as a guarantee that the horse would not be injured, and in addition \$25 to him for

* About six weeks before I went to Lancaster, this horse-trainer came twenty miles to attend one of my lectures. He at that time asked me if I intended to go to Lancaster; that if I did, I would find there the worst horse I ever had handled, etc. From his representations I was anxious to see and experiment upon the horse, and immediately wrote my agent to be sure to put in Lancaster.

his time if I did not hitch up and drive the horse gentle within fifteen minutes. Upon trial, as I anticipated, it proved one of the simplest cases. The whole trouble was caused by his being made insane with fear and excitement; all I did was to overcome this, when he submitted readily.

A young horse in Portland, Me., the famous Jet stallion, was regarded hopelessly vicious. He had nearly killed one



FIG. 11. — Strong-willed, intelligent character.



FIG. 10.—“Wild Pete.” A very peculiar and interesting case.

man, and seriously injured several others, and the owner, Rev. Mr. Hillman, refrained from shooting him only on the promise of my going there to treat him; and the horse was kept shut up for ten months, until I was able to visit that city for the purpose. Though the best horsemen in that country regarded it as only the merest fool-hardiness to undertake to break such a horse, yet, as I had assured them, I experienced no real difficulty in making him en-

tirely gentle and manageable when first tried, requiring but twenty-five minutes to bring him under complete control; and

with slight repetition he was handled and driven afterwards entirely manageable.*

A case in Mansfield, O., was a mare owned by McVay and Allison, purchased when three years old by them, with others, of L. L. Dorsey, of Kentucky. When purchased, she was so vicious a kicker that she was obtained by the parties mentioned at a greatly reduced price. Being fine blooded, the

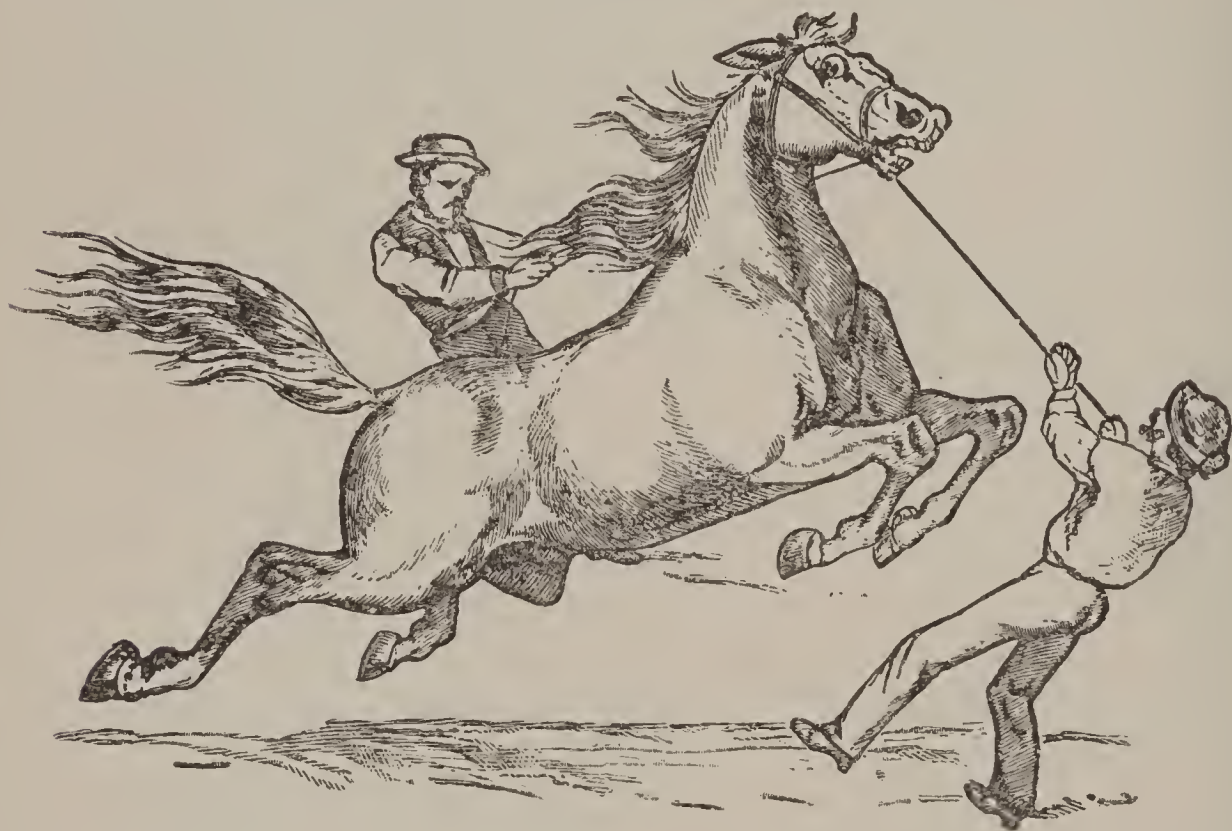


FIG. 12.—The Arnd Horse referred to in text as led out of stable to be subdued.

most persistent efforts had been made by the best horsemen from that time until she was seven years old, to break her, but she had finally to be given up as incorrigibly vicious. She could not be driven, was regarded too vicious to breed from, and was considered practically worthless. She had been worked upon and abused enough to kill any ordinary horse, all only making her worse. This mare was treated as a special test † on a for-

* In my large work I give very full and interesting particulars of forty of the best representative cases of vicious horses, giving age, disposition, character of resistance, with full details of treatment used.

† A number of jockeys planned to break me down and turn my efforts into ridicule by springing this mare upon me. The owners told their manager to take her in; that she was good for nothing, and even if she were killed, they would regard it no loss. No one supposed it possible to break such a mare, and it really could not have been done except by the treatment used upon her, which I gave only to my classes as an inviolate secret, under oath.

feiture of \$500 if not driven gentle without breeching in forty minutes, and she was controlled just within that time, the one lesson, in fact, breaking her perfectly, and she was afterwards used as a family driving horse of the very finest and most gentle character.*

Even if we had no special methods of subjection or treatment, with a proper understanding of the horse's nature, and



FIG. 13.—The Fred Arnd Horse as seen by the writer four years after being subdued.

the simplest means of control, there should be no trouble in making at least eight-tenths of what would be regarded as very bad horses entirely gentle and obedient; certainly all ordinary habits of resistance and viciousness could be prevented. To show what can be done in this way, I refer to some special cases.

I was once present when a team of four horses was harnessed for the first time to a band wagon. With the first note of the band, the horses were so frightened that they very nearly got away, though the band stopped instantly. I saw a

* Six weeks afterward, Mr. McVay stated to the writer at Newark, that she was the most valuable and promising horse in Richland County; that one day while driving her rapidly before a sleigh, accompanied by his children, the breeching broke, letting the sleigh against her heels; that he expected of course she would kick and run away, but at command she stopped quietly, not showing the least fear or offering to kick.

terrible accident was inevitable if the experiment was repeated, and to avert it I directed the men to get out and go back about fifteen rods. In the meantime I took the most excitable horse by the bridle, and directed the others to be treated in like manner. They were greatly excited; the one I held fairly shook with fear. After a few minutes I directed the band to commence upon one or two instruments, the others afterward



FIG. 14. — The noted Wilkins Horse of New York.

to start in gradually. This slight commencement was repeated several times before the horses would bear it. I then directed the men to play gradually louder until up to the full force of all the instruments and drums; this point made, while playing they came

forward very slowly, got in, and commenced again in the lightest possible manner, gradually increasing the sound until they played with full force. I now requested the band to keep quiet while the team was driven a short distance, then as before to commence lightly, gradually playing louder until the horses were indifferent to the sound. The result was that in less than twenty minutes the band paraded the street playing as they pleased, the horses perfectly indifferent, in fact appearing to enjoy the music.

During my early experience, long before I took the road, I often traded horses, and not infrequently got very bad ones. I really knew nothing about horses, but I liked the novelty of change and of trying to manage those of different habits. Among these was a small pony mare nine years old, a confirmed balker of the worst character, though this I did not know until I had traded for her. I got her on my own terms,

with the understanding that nothing should be said about her character. I learned afterward that she had been traded around among the jockeys of that country for years, and that she was considered so unmanageable in harness as to be practically worthless. On hitching her up, she would not go. I took her to the side of a hill, facing down, and hitched her to the wagon, but could not make her move. As an experiment I struck her sharply with the whip, when she instantly threw herself down. I saw at once that I had the worst possible case, and was thrown upon my ingenuity in determining what to do. Being bound to succeed, and wishing

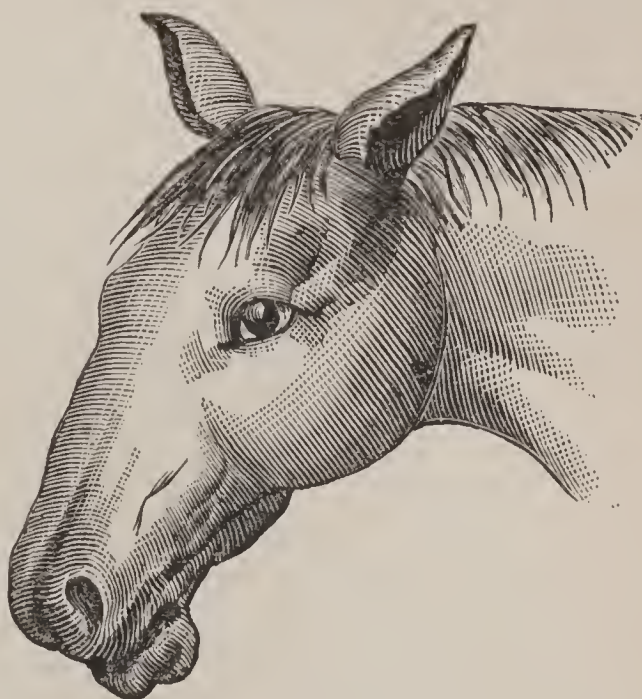


FIG. 15. — A Barnyard Lunkhead.



FIG. 16. — Coarse, low-bred horse.

to take no chances, I was instinctively led to take the following course:—

I unhitched her, then went into an orchard close by, and filled my pockets with apples. I now led her to a back road, entirely beyond observation, and commenced by standing at her shoulder, and with the whip touching her sharply over the hip, at the same time saying “Get up!” Of course she started promptly, and after going a few feet, I called “Whoa!” at the same time

pulling upon the reins to stop her, and giving her a piece of apple. This I repeated, but each time going a little

farther back until able to get directly behind her, with hold of the reins, and to make her start and stop at command, being particular always to reward her with apples. This point thoroughly established, I pulled the wagon to a slightly descending piece of the road and hitched her in, when I commenced again in the same gradual manner, the only difference being that she was attached to the wagon. Then I repeated until I was able to get on the wagon step and start her, then to get in,



FIG. 17. — The famous Malone Horse.

but each time letting her go a little farther, until I was able finally to get in and sit on the seat. Each time, of course, I was careful to get out and reward her, being somewhat sparing of my apples so as to keep her hungry for more. Then I gradually repeated, until within about an hour I was able to start and stop her, even going up a rise of ground. I then took her out, and treated her as well as I could, getting, as it were, well acquainted with her. Next day I repeated this treatment in part, until I finally let her go from ten to fifteen rods at a time. The result was that within two days I could drive her into a mud hole or anywhere else, and she would start and stop at command, and even pull heavily. I kept her about a month ;

she never troubled me in the time, and I never had a more pleasant and willing driver in my life.

I could illustrate the value of simple good management in a great many ways did space permit; but all these points will be found fully explained in connection with regular treatment, especially with the very full instructions and details of my regular methods of subjection given in my large work, which there should be no difficulty in using successfully: but few of the

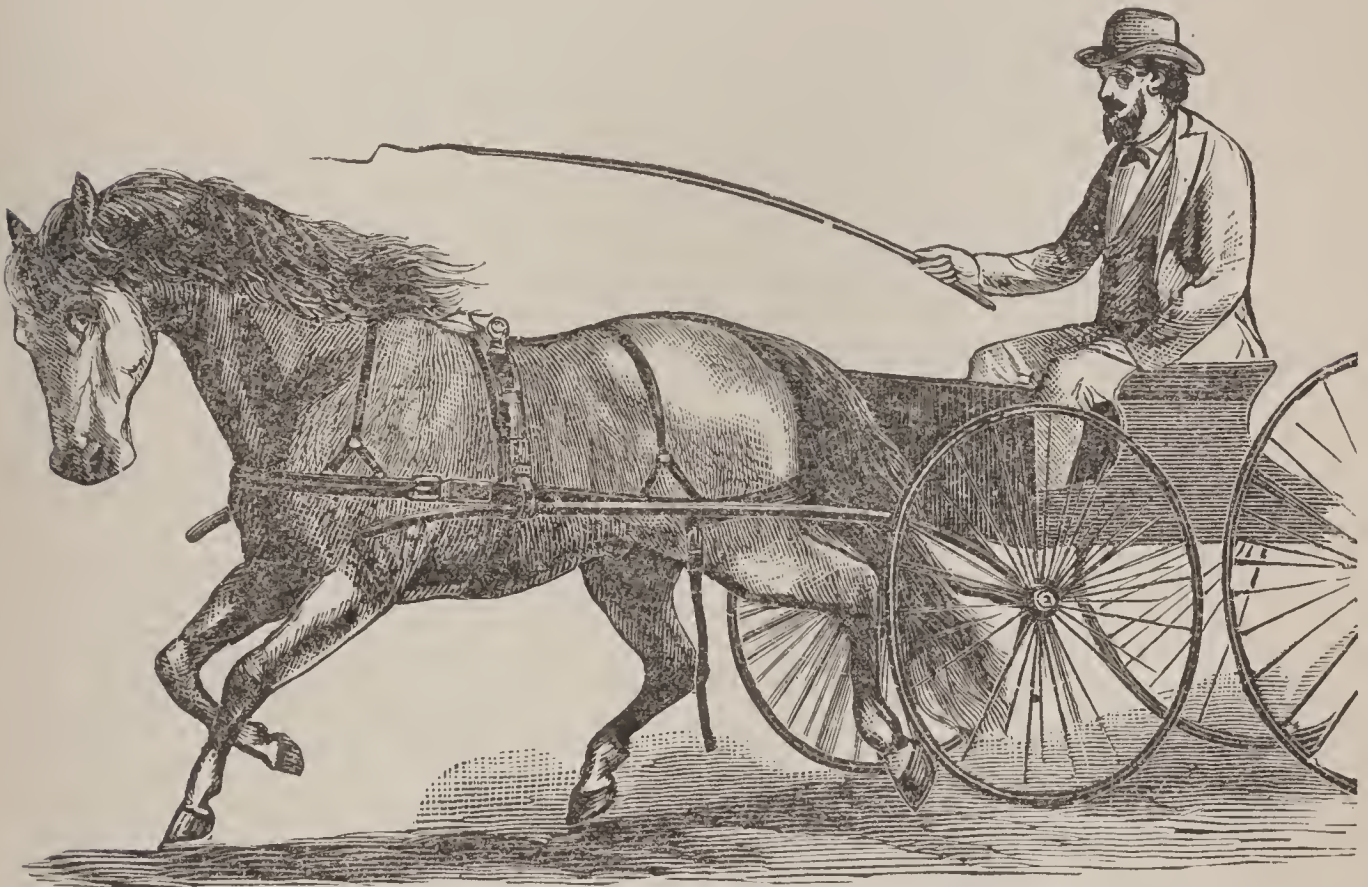


FIG. 18.—The Malone Horse next day after treatment, on the square without bridle, reins, or breeching.

most vicious horses should be found at all difficult to manage. I could refer to many instances of the most vicious character which were controlled readily by ordinary men of no previous practical experience, by the instructions only obtained from my book; and though encroaching largely upon my limited space, I include one or two representative cases out of many coming recently to my notice.

Capt. A. E. Wood, of the 4th Cavalry, Fort Huachuca, Arizona, writes under date of March 8, 1889: "I have a heavy boned, strong California horse, which breaks every halter put on him; I have to tie him up with a chain. He

has already knocked down and walked all over one of my sergeants, and I want to either break or kill him." After using upon him the most simple treatment, taken from my book, Capt. Wood again writes the following, which was received at the time of writing this article: "That wild California horse surged back about ten seconds, and then he came forward with



FIG. 19. — Jet stallion in one of his vicious acts.

a rush, and I could not get men enough around him to force him back the second time. From the stall I took him out to the picket line, and tied him to a post. He set back about three seconds, when he sprang forward astride of the picket line; when freed from the line, we could not induce him to pull back again. Any halter will hold him now. He was so easily managed that I concluded I had misjudged his character, so I tried him with the Second Method next morning to break him to the saddle. Immediately after this, he was saddled and

a man mounted and dismounted; in fact, he was broken to shoe, to ride, to stand, and to behave himself generally, in about twenty minutes."

B. C. Platt, V. S., of Reno, Nev., also writes: "About two weeks since, I received, from a brother in Conn., a copy of your valuable work, and a more interesting and instructive book never before reached my hand. I have subdued some of the most vicious and dangerous horses ever known in this section of the country in from twenty minutes to one hour and



FIG. 20. — The noted vicious horse Jet, Portland, Me.

ten minutes, by the application of your methods. The Second is in every instance A No. 1, but the Third does beat the very d——l I do believe.

"Perhaps I may seem to you a little over-enthusiastic, but I have just put the finishing touches on the worst brute of a beast that man ever attempted to lay hands on, and all the efforts made to accomplish the result were of the neatest and easiest and safest kind, which makes one smile to know how powerful he is, especially when he has Magner at hand."

Did space permit, I could refer to an almost countless number of cases, showing the ease with which horses supposed to be entirely unmanageable and practically worthless were made perfectly gentle, and that, in most cases, by very simple treatment; also that without the advantage of special methods of treatment, which I give, and which were originated and introduced by me as my secrets, these results in extreme cases would have been entirely impossible. Whatever my own suc-

cess in the control of vicious horses, — and it is no egotism to say such results as I have been able to demonstrate were never equaled in ancient or modern times, — the real success of my efforts was owing not so much to my ability as to the natural susceptibility of horses to control when treated at all reasonably and properly. I certainly had none of the advantages of unusual strength or personality ; for I was of less than average size, and naturally sensitive and retiring, — points greatly



FIG. 21. — Vicious stallion in a rage.

against me ; but I was perhaps more than ordinarily observant, with great natural perseverance.

But however remarkable the results I have been able to produce may seem, they have been no more than any ordinary man with the benefit of my experience and the instructions given should be able to produce, even on horses of very bad character. It is a matter simply of correct principles of treatment and applying them properly.

There is a singular adaptation of the different classes of domestic animals in the different parts of the world to the wants of the people where we find them. The Esquimeaux has the dog ; the Laplander, the reindeer ; the Peruvian, to climb the Andes, the llama ; and to travel on the desert, the Arabs have

the camel, etc., etc. In like manner we have a wonderful adaptation in horses for special uses ; those of a large, coarse, heavy character being adapted for the cart and plow ; while the lithe, active thorough-bred, having the conformation of the greyhound, is fitted for quick, active, and prolonged exertion. From these extremes we have countless modifications in size, disposition, and intelligence. Now, if possible, there is still more marked difference shown mentally than there is physically. One

is perhaps naturally gentle and fearless ; another sensitive, impulsive, but innocent ; while another is wild, aggressive, vicious, and dangerous.



FIG. 22. — A very courageous, intelligent character.



FIG. 23. — Sensitive, intelligent character.

If we were to study even the head, we will see the most marked difference in features. If, for example, the eye is large, brown in color, set well out in the head, forehead broad and full, short from eyes to ears, ears short and pointed, set well apart, the head high between the ears, and nostrils large, we have the best type of intelligence and docility, the model family horse. The opposite extreme, — small, round eye, set well back in the head, eyelids heavy, long from eyes to ears, forehead narrow, ears long and

flabby and rather flat between them, nose rounding, nostrils small, gives us the best type of the naturally sullen, treacherous character.

Next, a large but clear eye, full forehead, medium length between eyes and ears, ears rather long and pointed, hair short, rather light-boned, rangy and active, indicates the naturally nervous, sensitive horse, one learning quickly, easily excited, not bearing abuse, but whose only impulse is to get away,— the horse that will not bear the whip, and is a prompt driver. If now we find considerable white in such an eye, the bones a little large, deep chest, strong digestion, with the hair a little longer and coarser, not inclined to put on flesh, we have a horse that is on the surface sensitive and intelligent, but, roused and excited, will show great reserve powers of pluck and resistance.

Bodily structure generally must always be considered in connection with special parts, for which there is not space to enlarge upon. Something of these extremes and modifications of character are shown by figures. No. 2 is a good representation of the naturally gentle, intelligent horse ; No. 4 of the naturally sullen, treacherous nature ; No. 6 of the excitable, sensitive nature ; No. 15 of the barnyard lunkhead, that has no intelligence or action ; with others representing special types of character. In my large work there are nearly seventy special portraits representing a great variety of horses referred to in the text.

The extent of disturbance to the nervous system is a point to be considered carefully. These conditions are brought very forcibly to notice in practice, as no two horses, though of the same general character, submit alike to treatment. This knowledge, which is of great advantage because it enables determining with more accuracy what to do and how to apply treatment, can only be learned by practical experience ; still, with the careful instructions given, it is not essential in the management of all ordinary cases.

CHAPTER II.

PRINCIPLES OF TREATMENT.

IN the control and education of horses, we have three natural difficulties to overcome. *First*: The horse is much stronger than man, and just so far as he learns in any way that he can resist his control, to that degree will he be encouraged to become unmanageable and vicious. *Second*: His methods of reasoning being limited to seeing, hearing, and feeling, to prevent his becoming excited or frightened at objects and sounds with which he is brought in contact, he must be convinced of their innocent character by his own way of reasoning. *Third*: He cannot understand the meaning of language or words of command, excepting so far as he is taught by associating them with actions; consequently he cannot know what he is required to do, unless shown and taught in a way he can comprehend.

Taking these conditions in order, we see, for example, that if a horse learns to pull away, break his halter, resist the blacksmith in shoeing, or run away, etc., he will be encouraged to do so afterward, until the habit becomes fixed. On the contrary, we see that when a colt is first haltered, no matter how hard he may resist, when once forced to submit he will not only follow readily without restraint, but will continue to do so afterward; also when the feet are taken up and handled until the operation is submitted to, there will not only be submission for the time, but, if done properly, all inclination to resist afterward will be overcome.

First. The principle is the same in relation to other habits, or in overcoming viciousness. No matter how wild or vicious the horse may be, if so controlled that resistance becomes impossible, and his fear is overcome by kind treatment, there will not

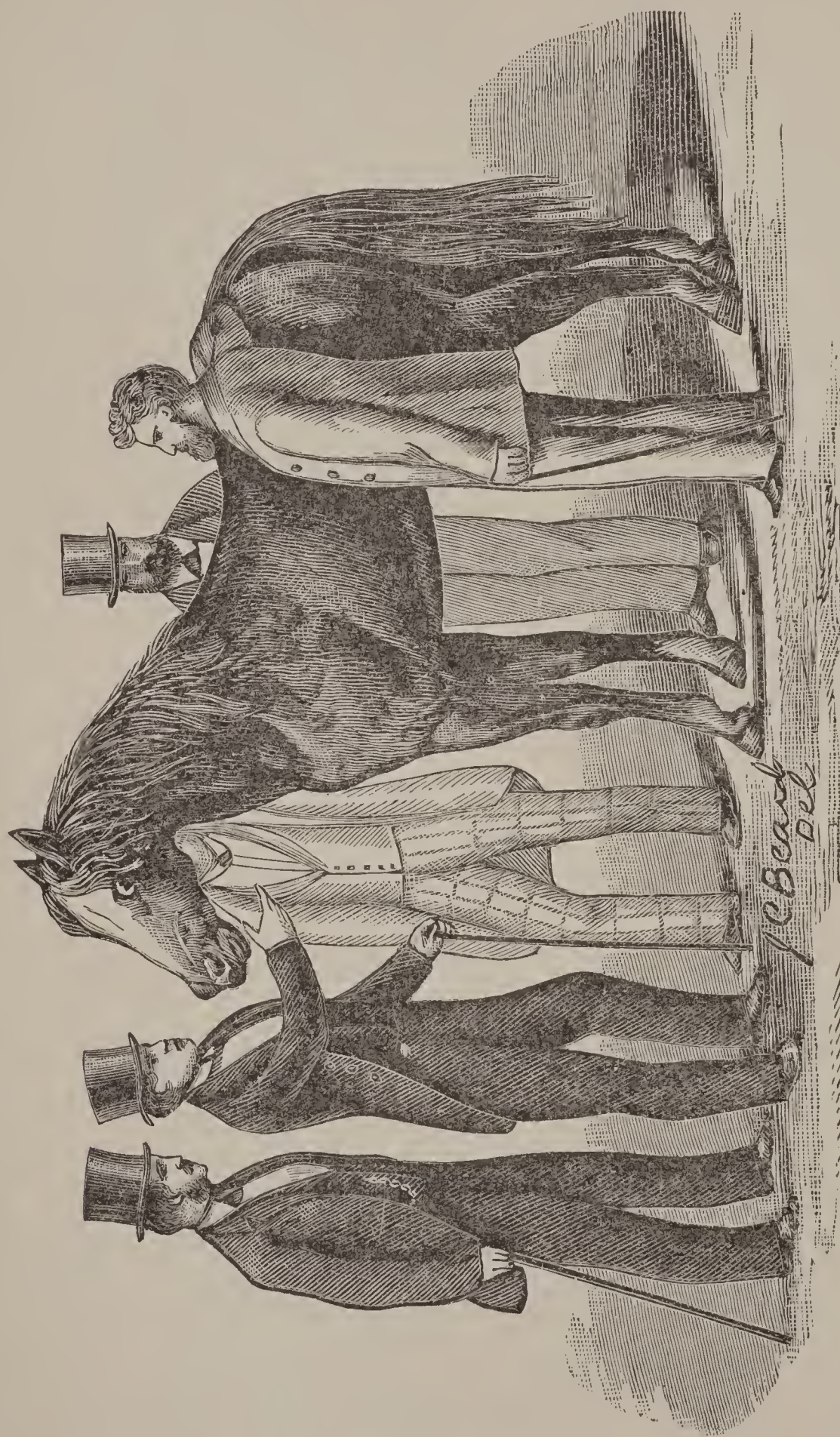


FIG. 24. — The famous Wilkins Horse in New York City, as exhibited weeks after treatment before Henry Bergh and other leading gentlemen.

only be entire submission without the use of power or restraint, but he will remain so afterward if not abused or excited.

Second. We see that when an object or cause of unusual sound is brought suddenly or unexpectedly to his notice or in contact with his body, it is liable to excite the most intense fear or resistance, and of which he will ever afterward be afraid; whereas if brought slowly and gently to his notice, letting him smell and feel of it, it can soon be brought over or around him without causing the least fear, or attracting his attention. It does not matter whether it is in driving to carriage, letting the cross-piece come across the quarters, raising an umbrella behind, or the noise of a steam-engine, etc., the effect is the same.

Third. In relation to teaching the meaning of sounds or words of command. If a man were to repeat the word "whoa" to a horse, he might do it indefinitely without being able to teach him its meaning. But if the horse is moved moderately, and immediately after the command he is pulled upon sufficiently hard to make him stop, he will, after a few repetitions, learn to stop at command, to avoid being pulled upon. Or in teaching to back, if, after the command is given, the reins are pulled upon sufficiently to force him back, he will, after a few repetitions, soon learn to back freely when the word is given, to avoid the hurt of being pulled upon. To explain more fully, I include the details of teaching a few tricks:—

If it is desired to teach a horse to make a bow, first prick him lightly on the back with a pin, and repeat until in his effort to avoid the annoyance he drops his head; then instantly stop the pricking and caress him. Repeat the pricking until the head is again dropped; then caress him, and give him something of which he is fond. Continue to alternate in this way with the pricking and caressing until at the instant a motion is made toward the back he will drop his head.

To teach to kick up, simply prick him on the rump until there is an inclination to kick up, when, as before, stop and caress him. So repeat until the least motion toward the rump will induce him to kick up.

In teaching any kind or number of tricks the principle is the same, the difference being that instead of a pin, other means suitable to the requirements of the case must be used.

Now, to teach these tricks by word, it will be necessary to repeat the command and associate the act with it; that is, "Make a bow," "Kick," etc., in connection with the signal of whatever trick is being taught, until there is obedience. It is an important point to avoid confusing the horse, and therefore but one trick should be taught at a time, and that slowly and carefully repeated until thoroughly understood. Then another trick is to be taken up, and so on. At each progressive step review the previous tricks, until any trick demanded will be promptly performed. The duller the horse, the less can be attempted, and the more time must be given; while the more intelligent the horse, the more can be done and taught. To have prompt obedience to the command, the exact signal and word given in teaching the trick must be repeated, even the tone or pitch of the voice, otherwise the horse can not know what is wanted of him, and he will become confused, and consequently unable to obey.

The principle is the same in teaching a horse to do anything in or out of harness, the difference being that such means as will give more power of control must be used. Now the principle is the same in either overcoming or preventing viciousness or bad habits of any character, the only difference being that instead of teaching a trick, we now combat the habit or viciousness already formed, simply repeating until there is entire docility.

Now as the horse is really superior to man physically, and we cannot control him directly when seriously vicious or unmanageable, we have to study how most safely and effectively to impress him so as to make him entirely obedient to our control.

No matter how vicious the horse may be, it is a very easy matter to make him gentle for a short time. This can be done in a variety of ways, such, for example, as lowering vitality by such means as bleeding, want of sleep, violent exercise, producing intense pain, want of water and food, etc.; but when there is recovery, or the strength is regained, the character will gravitate back to what it was before. Horses can be controlled easily by medicine, but not in the way people suppose, and its

effect is not permanent. The use of scents, for which a good deal has been claimed, is not at all practically effective. This is very easily proved. During my early experience I was greatly misled by this sort of pretension, but I found it the merest trickery, simply calculated to deceive. [I give very full particulars in regard to scents and medicine in my large work.]

The true key of success is in addressing and impressing the brain directly. It is evident to you that a horse can be easily spoiled, and excited to the most intense resistance, and this by the impression of a moment or two, even without being touched physically. This is in a chance way, though in the wrong direction, the art of impressing the brain. Now if we know how, and do it properly, we can impress the brain in the opposite direction of making the horse fearless, obedient, and good, with almost the success that we can spoil him.

By referring to what I say on the use of the War Bridle, and especially in Colt Training and teaching the colt to lead, it will be noted that no matter how hard the horse may resist at first, that once made to submit, there will be, when well done, no inclination to resist in that respect afterwards. So in controlling a horse's foot, for example; once successful in taking it up and holding it until all resistance ceases, there will be no inclination to resist handling it afterward. Now the principle is the same in overcoming general physical resistance. The horse may exhibit the most extremely violent resistance; but if we are able to control it, and establish the impression of submission effectively with kind treatment, there will be no inclination to repeat such resistance afterward. This is the true law of subjection and government, and is the principle by which I have accomplished my best results.

I could give a great many ways of controlling horses, and many of them very good; but as they would only serve to confuse, I give only what I have found to be the most practical and effective methods of treatment used by me. They will be seen to differ greatly in principle, each being specially adapted to different characteristics of resistance and temperament. But as shown by the results of my experiments in the easy control and subjection of horses that all others had failed upon, they are by far the most simple and effective yet discovered.

THE WAR BRIDLE.

FIRST FORM.

When skillfully used, the War Bridle enables one to produce the most wonderful results, and is all that is needed to make all ordinary colts gentle to control. It is especially valuable on account of the ease with which it can be used, and its entire safety. If a horse is restless, and will not submit to have the

harness put on, resists being bridled, cleaned, or curried, is restless in shoeing, or is a little nervous when ordinary objects of fear are brought around him, etc., this will be found to give almost immediate control; while as a means of teaching ordinary, unbroken colts to follow, etc., it is the most practical and effective means known.

HOW TO USE IT.

It is very important to have the cord made of the very best quality of hemp, and size about right. The point is to have the cord as small as possible, yet sufficiently strong to give assurance of its not breaking un-

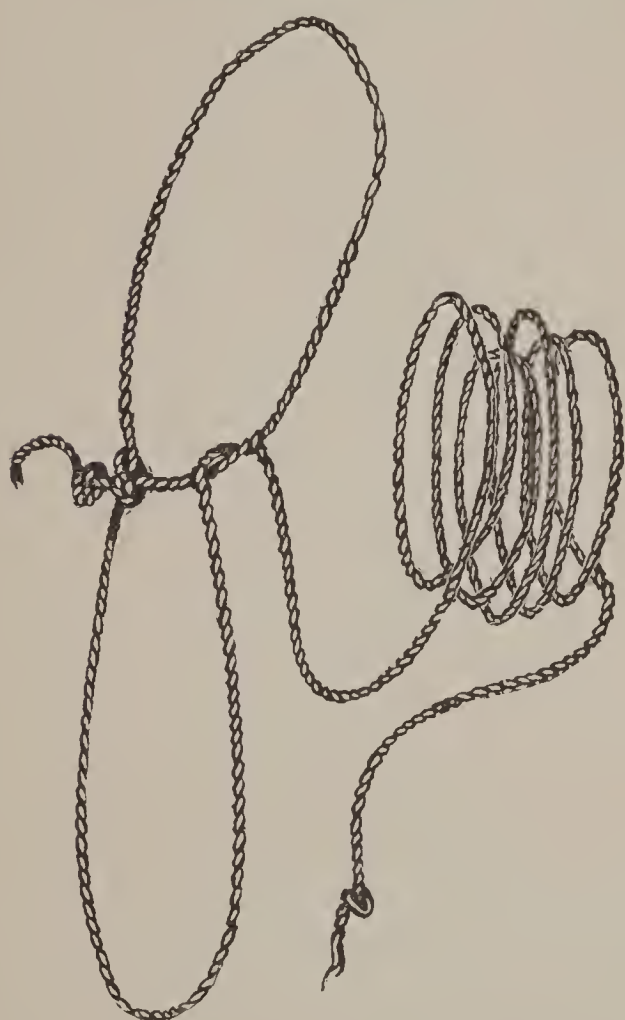


FIG. 25. — First Form of War Bridle.

der the most severe strain to which it can be subjected. I have found the most satisfactory to be that made of the best quality of long-fiber Missouri hemp, wound very hard, yet in such a way as to be flexible. I used the same cord for the Third Method of Subjection. The size should be from five-sixteenths to three-eighths of an inch in diameter, and in length from fifteen to twenty-two feet. The average length used by me was from eighteen to twenty feet.

For the simplest form of War Bridle, take such a piece of cord, tie each end in a hard knot, and make another knot or



FIG. 26. — First Form of War Bridle.

loop about twenty inches from one end; bring this end around the horse's neck, and pass it through the loose knot or loop, regulating the size of the loop to that of the neck. Next catch the end hanging down, and pass between the cord and neck, forming a loop with the free end on the near side. Pass over the lower jaw the loop this forms, as shown in Fig. 26. This we will term the First Form, and, it will be noticed, gives considerable pulley power sideways and back upon the mouth. The method of using it is as follows:—



FIG. 27. — Smallest size of cord used—five-sixteenths of an inch in diameter.



FIG. 28. — Largest size of cord used—three-eighths of an inch in diameter.

Stand opposite the shoulder, about four or five feet away from the head. To prevent chafing, have a light leather

glove on the right hand, with the cord wound once round it loosely, while it is simply grasped by the left a little in ad-

vance of the right. Give a sharp, quick pull or jerk, when instantly give slack, using more or less force, according to the amount of resistance to be overcome. This will be found to give great power, being sufficient, unless the horse is very heavy and slow, to pull him around easily, when by repeating a few times he will come around freely without being pulled upon. Now, go to the opposite side, and repeat the pulling until he will come around promptly in the same manner. The force of the pull must necessarily be regulated to the resistance of the



FIG. 29. — Second Form of War Bridle.

horse, a quick nervous horse usually requiring but two or three light pulls to make him follow freely; while a dull, stubborn, or slow horse may require to be pulled upon with a good deal of force, and this perhaps repeated a number of times to produce the same effect.

After doing this by stepping sideways and ahead, the horse will promptly follow; then gradually enlarge your circle, until you



FIG. 30. — Second Form of War Bridle as it should be adjusted.

can go straight ahead, and he will follow freely. But should he be a little slow, or not follow as desired, simply repeat the pulling a few times as before, when he will follow readily though the cord be thrown over the back, and will do so afterwards with a halter.

It will be noticed that this form only gives power sideways. If you were to go in front and pull straight ahead, it would only throw the head up and back, in fact making the horse resist. When it is desired to bring the horse straight ahead, simply change to the Second Form, as shown, when



FIG. 31. — Double draw-hitch.

by pulling a few times sideways and ahead, he will come ahead as freely as before sideways.

SECOND FORM OF WAR BRIDLE.

Make a single loose knot or loop about a foot from the end. Put the end knot through this knot or loop, and draw sufficiently tight to prevent its slipping out. The loop thus formed should be only large enough to go over the lower jaw, because the larger the loop the less power will be obtained. Next pass the cord from the off side over the head where the halter rests, and down through this loop back of the jaw, until the slack is taken up, as shown in Fig. 30. Now, step a little sideways and ahead; give a sharp pull as before, when you will find that you will be able to pull the horse right to you; but if you do not the first time, you can at farthest after a few repetitions. A quick, nervous horse may jump right to you on the first pull, and will follow in the most prompt manner afterward; while one of a slow, sullen nature may resist quite hard for a while, but will always yield in a short time.

Putting this part over the head about half-way back on the neck, drawing down tightly with the hand, or tying moder-

ately tight will be found all that will be required in the control of all ordinary cases bad to bridle, to handle top of head, harness, etc. If tied down, it should not be kept so at longest more than a minute or two. See Bad to Shoe, Harness, etc.

THE DOUBLE DRAW-HITCH FORM.

This is the result of a great deal of experimenting, and was taught by me for years as a very important secret. This was my secret for controlling headstrong, unmanageable stallions so easily that I could in a few minutes, as a feat, call a stallion away from a mare or horse by word of command only. It can be changed or modified in two or three ways, as may be necessary, and is a very practical and valuable means of control, giving very much more power than either of the other forms of War Bridle.

First, put on a cord as for First Form of War Bridle; but instead of bringing the cord down through the loop, bring it from below up; then pass it over the head and back through the mouth, thence through the loop that this forms on the near side. (See Fig. 31.) If desired, this can be modified so as to give still greater power by bringing the cord across under the upper lip, instead of through the mouth, or by making another loop over the head in the same manner, and by bringing it under the upper lip.

By experimenting a little with this, it will be found to increase the power wonderfully. A horse so stubborn and sullen that he can hardly be moved or seem to be influenced by the First Form, can, by an ordinary pull or jerk with this, be lifted almost bodily out of his tracks, giving all the power necessary for making such a horse follow in a few minutes. Where a horse is restless, or somewhat unmanageable, such as resisting the feet being taken up, having a blanket thrown over him, the head handled, etc., he can sometimes be made to submit readily by bringing the cord, after the First Form is adjusted, forward under the upper lip and right around over the head and through the mouth, and holding moderately tight. But it should not be held so for more than a minute. Should it be resisted very much, it should be abandoned and other treatment used.

There is quite a secret in using the War Bridle. It lies, first, in getting the right position and distance from a horse ; second, in the method of pulling, which is the point here to be explained. Wind the cord once around the right hand, not very tight, while it is passed through the left a little in advance of the right. And now for the secret : It is giving a sharp, quick jerk with both hands, like the cracking of a whip ; not a long, heavy, dead pull, mind, but a quick little jerk, as it were, and instantly slack. You will, of course, place one foot a little forward of the other to give purchase ; the rest must be done by the force of the arms only. I have frequently been able to illustrate this by jerking heavy horses around freely by pulling upon the cord even lightly but quickly with my naked hands, without the least injuring them ; while strong, heavy men, though pulling quite hard in a slow, indifferent way, could scarcely move them, and, at that, bruised their hands quite seriously.

I may say that in hundreds and hundreds of cases, men who had joined my classes, and to whom had been shown and explained the application of every point in this method, and to whom its effect had been illustrated, would often catch the points only so imperfectly that they would follow me many miles to attend another class, and have them again explained to them.

The simplicity of this form of control makes it very difficult to comprehend its great value unless its effect can be shown upon a great variety of horses ; neither is it too much to say that it requires considerable practical skill to bring out its full power.

FOOT-STRAP.

This, for a simple means of control, because so easily used and practical, is very valuable. It is, however, properly considered, but a palliative measure of treatment.

Once having a horse I could not control safely while driving, it occurred to me to attach a strap to the forefoot and carry it back to the wagon, by which means I could at any moment, while moving, disable the horse by holding the foot helpless. Upon trial, the effect upon the horse was beyond my expecta-

tion. The sudden pulling of the foot from under him had a much better effect in disconcerting him and preventing resistance than could possibly be done by tying up the foot and holding so while driving, as was done before. A horse can travel but a short distance upon three legs, and if a bad kicker, he is liable to balance on the opposite leg and kick as badly as before; whereas, suddenly taking and holding the foot helpless while moving not only prevents this, but freedom can be given again when desired.

I found the foot-strap particularly valuable in the management of colts and in controlling runaway kickers. I used one strap and sometimes two. In the management of reckless, runaway kickers, I held the second strap in reserve, so that if there was a disposition to resist the control of one foot, and lunge ahead, I disabled the opposite one. Would state here that if necessary to do this, it must be done before the horse gets under much headway; for should he be permitted to go very rapidly, pulling the opposite foot from under him so suddenly would be likely to throw him over on his head and do serious harm. I experimented a great deal with this, but found this simple method of taking up one or both feet separately as desired, the best. A single cord or strap can be attached to both feet, giving pulley power from the belly-band; but this is objectionable mainly on account of the danger there is of cutting and bruising the knees when the horse is thrown upon them while moving upon hard or stony ground, thus disabling the horse more seriously than is necessary.

The foot-strap can be used to excellent advantage when the horse is first driven in harness, in which case it will be necessary to have an assistant. It can be used to decided advantage in driving a doubtful colt, as it restrains from kicking as well as running away. The way I managed such horses was this: When I first let him move forward quietly, I suddenly pulled the foot from under him, calling "Whoa!" This I repeated until he would stop instantly. If disposed to lunge recklessly, and try to get away, then I disabled him wholly. I simply used the second strap as a measure of precaution.

Buckle a soft strap around the foot, to which attach a cord or driving rein, and carry back over the belly-band to the

wagon. The belly-band should be strong, and not buckled very tight, so as to give entire freedom for the cord or strap to slide over it. We usually used a soft rein webbing, but any piece of light cord or driving rein will answer. A particular point I would call attention to in the use of the foot-strap, is to select a sandy piece of road, free from stone, or a heavily sodded piece of ground, so that if the horse is forced upon the knees, there will be no danger of bruising or cutting them. You should be very careful about this point.

Soon after learning the use of the foot-strap, when in Jefferson Co., New York, in 1861, I was required to drive a very bad runaway, kicking colt.

Depending upon the foot-strap for his control, he was hitched to a rough lumber wagon with a loose box, in a narrow back lane with a crooked rail-fence on both sides. As soon as given freedom to start, the colt sprang ahead recklessly, when of course I pulled the foot from under him and held it; but being a reckless fellow, he

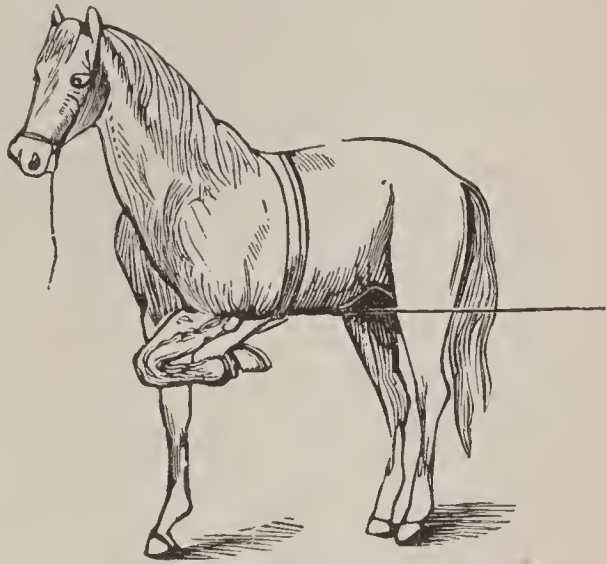


FIG. 32. — Foot-strap.

rushed on furiously on three legs. The bottom boards of the box, which were loose, slid forward against his hind parts; this, with the wagon barely missing the ends of the rails during a rush of about forty rods, made it about as exciting a little incident as I had during my early experience. When we stopped, the boards were right up against his quarters, and he in the fence corner. It occurred to me instantly to use a strap also on the opposite foot. This I tried, which soon enabled me to drive him with entire success. The owner afterward wishing to experiment himself, took the colt on the main road and started him down hill, and when going quite fast, imprudently pulled both feet at the same time from under him. The consequence was that the colt was thrown violently forward on his head, skinning and lacerating the head badly, as well as bruising the knees, in fact very nearly killing him. In repeating the incident to me, the man laughed,

saying that he had a sure thing on him now, and that I was not to blame at all, as he did not follow the instructions, etc.

With the aid of this alone, if used carefully, there should be no difficulty experienced in breaking any colt to drive safely in harness.

FIRST METHOD OF SUBJECTION.

So far as we disable any part of the horse's body, we produce to that degree a sense of helplessness in him. To make a horse stand gentle to be shod, it was a great secret, years ago,

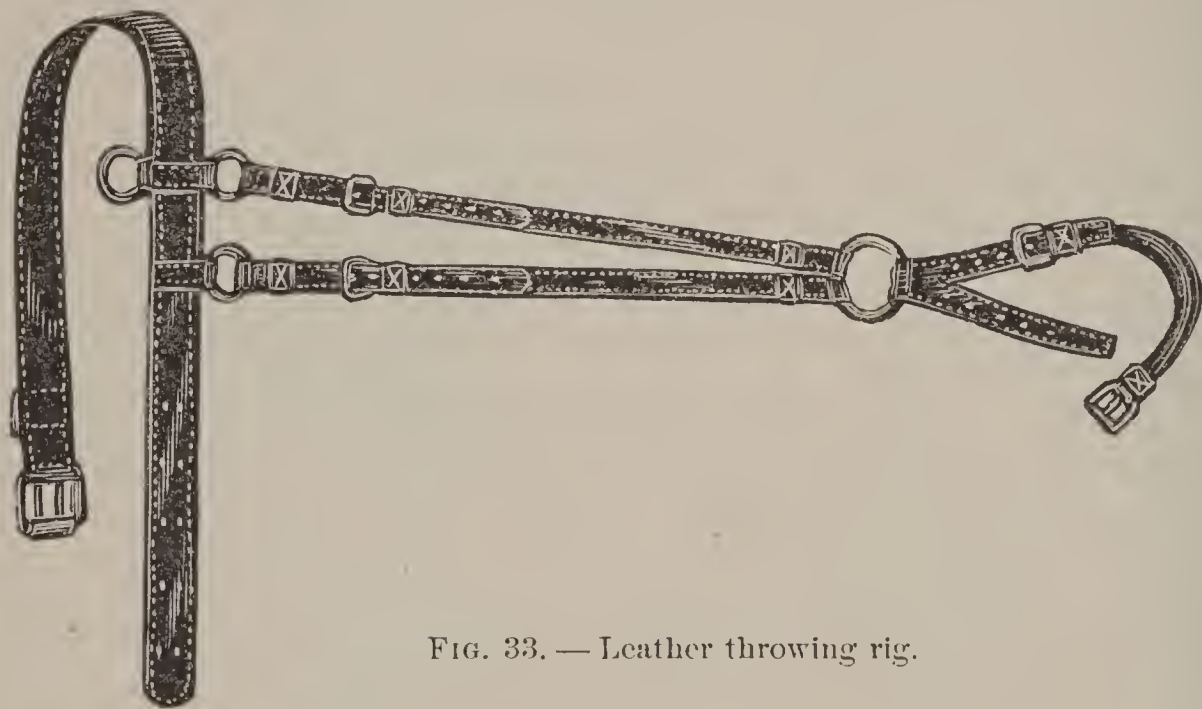


FIG. 33. — Leather throwing rig.

to tie down one or both ears ; of preventing a horse's kicking in harness, to tie the tail down to the cross-piece of shafts, so that it could not be raised ; also of disabling one or both fore-legs. This was the great secret, and practically all that was known about the art of taming horses before my time. Now if we can disable the whole body, or directly overmatch the power of the horse to resist, we create in him a strong sense of his helplessness and a corresponding impression of our mastery. While the various methods of subjection here given carry this principle out in different ways, that which we call here the "First" is based more directly upon this principle, and will be found very effective when used properly, and the age, resistance, and temperament of the horse are adapted to it. There are a great many ways, heretofore practiced by

others and myself, of laying a horse down ; but this is by far the most effective, and has been the outgrowth of a great deal of practical experimenting by me.

I give two rigs, one of leather and one of rope. The leather rig works well, but is expensive, costing from eight to fifteen dollars. The rope rig works equally well, and can be made of any old rope in a few minutes, at a merely nominal cost. During the later years of my experimenting, I used the rope rig exclusively.

For the leather rig the surcingle should be made of two thicknesses of good harness leather, about three inches wide,



FIG. 34. — Simple rope rig.

and about eight or ten inches longer than the size of the body. The buckle should have two tongues, and be made of good wrought iron. When this rig is on, and drawn tightly from the back over the backbone, a double strap, the length of the back, with a strong crupper, should be attached. Four or five inches on the off side should be fastened, at the front edge of this surcingle, a strong two-inch ring. On the opposite edge should be attached another strap, extending to a ring upon the back strap at the hip. A little pad should be attached to the part coming across the back, to prevent bruising or chafing it.

For the rope rig, procure a three-fourths inch rope, eighteen or twenty feet in length. One that has been used enough to render it pliable is best. Make a simple loop about three inches long at one end, and double the rope about four feet

from the loop. Pass over this double part a three-inch ring made of three-eighths rod. Measure the distance from the tail



FIG. 35. — Foot tied up.

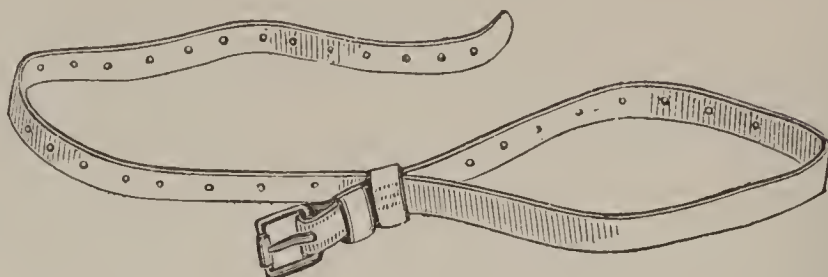


FIG. 36. — Foot-strap.

to where the saddle of the harness comes, to which bring the ring, and make a simple knot of both ropes around it, regulat-



FIG. 37. — The rig as arranged for throwing.

ing it to the length of the back as it is tightened. Next, put the double part under the tail, twist two or three times, and bring the part with the ring to its place about eight inches to the right of the back, with the loop toward the near side. While holding it in position, reach under the body, catch the

opposite end of the rope, bring it through the loop, and draw down to the size of the body. Now, while holding it in place by pressing down firmly upon it, make a simple knot in the rope, which forms a button, and keeps it from slipping out. It is also necessary to protect the back and tail by winding the part of the rope coming under the tail, and putting two or three thicknesses of cloth or blanket between it and the back.

Next put on a strong strap halter with the nose part coming well down upon the nose, and draw it up rather close back of

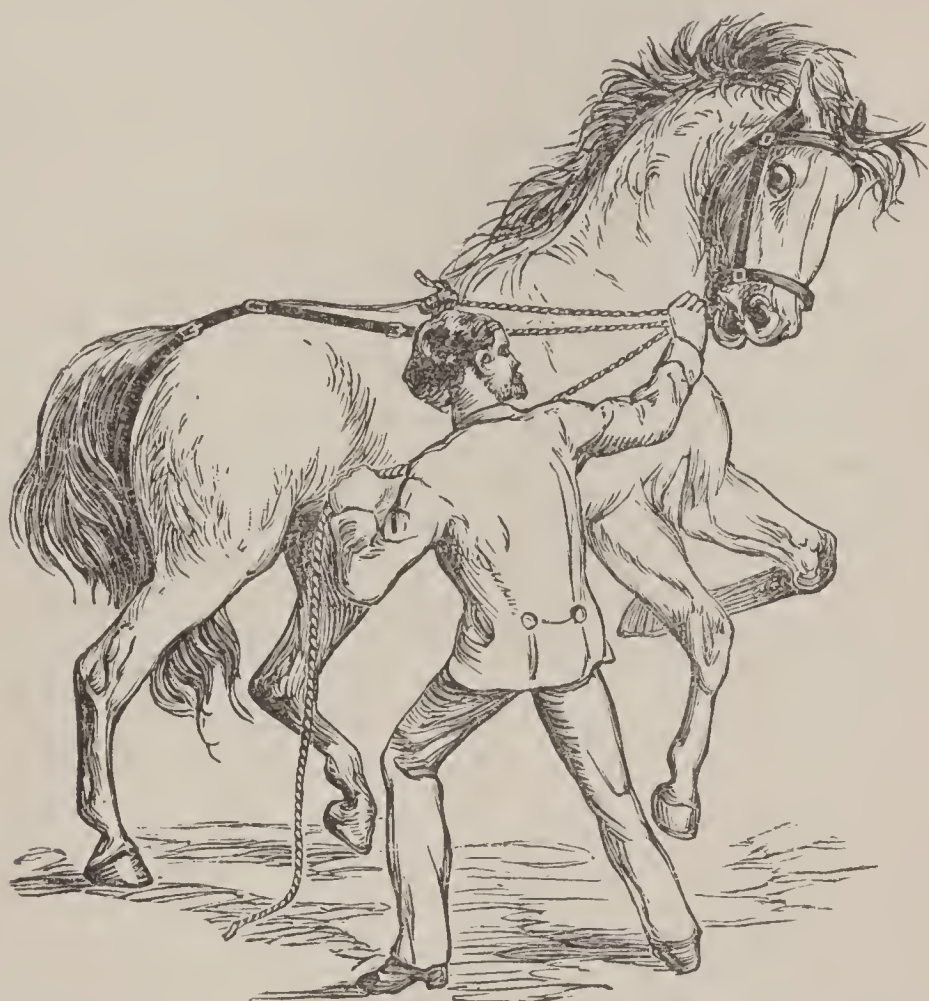


FIG. 38. — Turning a stubborn horse around before throwing.

the jaw; then take a piece of strong cord, made of the very best quality of hemp (that used for the largest-sized War Bridle is best), about twenty feet in length, tie a hard knot in each end, and fasten one end around the rope or surcingle just above the ring. Pass the other end from above down over the strap of the halter back of the jaw, thence back and down through the ring referred to, until the slack is taken up. Now tie up the near forefoot by passing an ordinary hame-strap

around the foot, thence over the belly-band, and buckle short, as shown in Fig. 35.

It is very important, and adds greatly to the effectiveness and safety of the treatment, to have good, soft ground. The best is that which is free from stone, with thick, soft sod; as an orchard or meadow, a ploughed field, or a place liberally covered with straw or manure. Stand almost in front of the horse at the right, and with a firm hold of the cord about seven or eight feet from the shoulder, as shown in Fig. 37, pull gently but firmly. This will draw the head back to the side, throwing the body out of balance, and the horse is forced to fall over with a rolling motion on his side. If during the first trial he

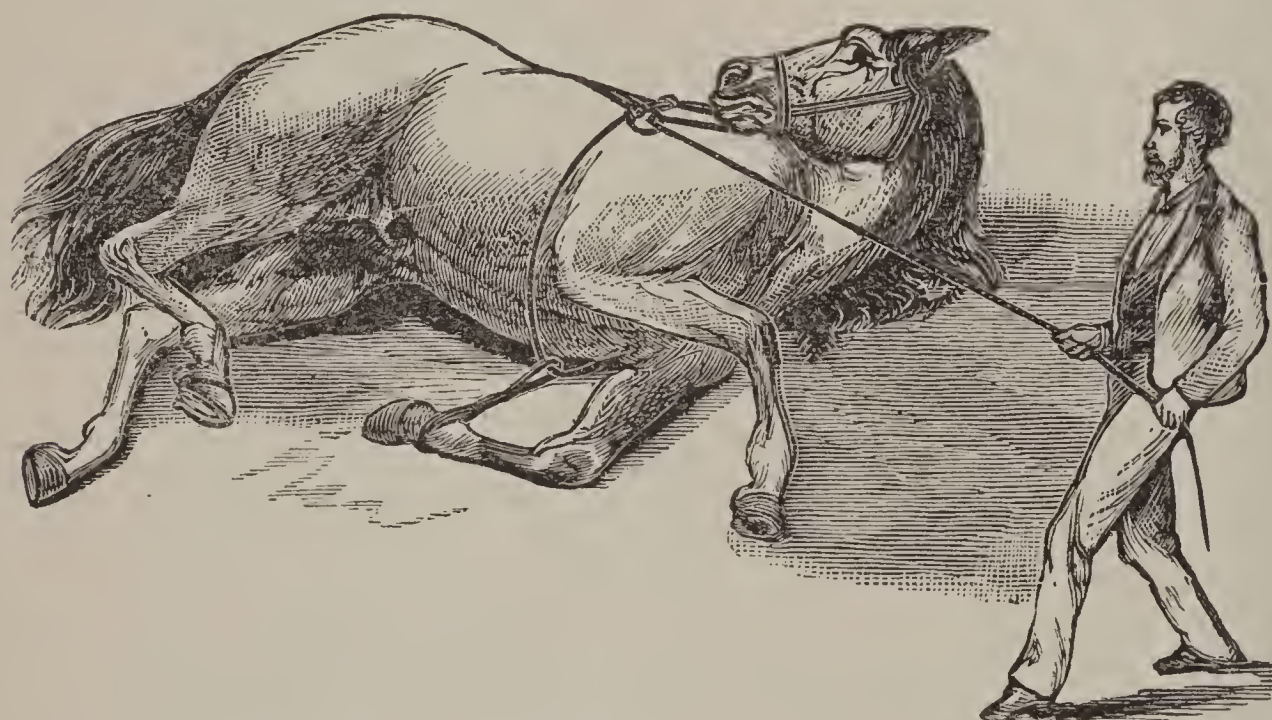


FIG. 39. — Position of horse when thrown over on his side.

is disposed to resist much, as some horses are liable to do, take a firm hold of the cord and run around in a circle once or twice, pulling him around after you, as shown in Fig. 38; when he is hopping steadily, stop, pull quickly, and he will fall over on his side easily. There is a great sleight in doing this well; but if the points given are carefully observed, any ordinary man or boy should experience no trouble in being able to throw the strongest and most stubborn horses easily and safely, and as fast as made to get up.

As soon as the cord is given slack, the horse will usually jump up; when, by again pulling, he can be thrown, which can

be repeated as often as he will get up. Now stand behind him, keeping firm hold of the cord with the left hand (see Fig. 40), and strike the belly with the hand or touch lightly with the whip, which will incite him to get up; on the instant of his trying to do so, pull quickly upon the cord, which will roll him back helplessly upon his side, and so repeat until he will not try to get up.



FIG. 40. — Rolling the horse back when struggling to rise.

If the horse is specially sensitive upon the belly, quarters, or feet, touch these parts with a pole while he is down, until he will submit to it, then with the hand, until there is no inclination to resistance, and he is entirely submissive; after which he should be allowed to get up, when the handling or touching is to be again thoroughly repeated. But should the case resist very hard, and you do not care to repeat the throwing, after getting him down, simply roll him back as before explained, until he gives up, and the effect will be just as good as if the throwing had been repeated — an important point.

This method of treatment will be found to have excellent effect upon a certain class of young horses. I have often been able to make horses of the most reckless character, in a general way entirely gentle by it in from six to eight or ten minutes.

If the impression produced by the throwing or rolling back is not sufficient to break up the horse's confidence and prevent a repetition of the habit, whatever it is, the treatment must be

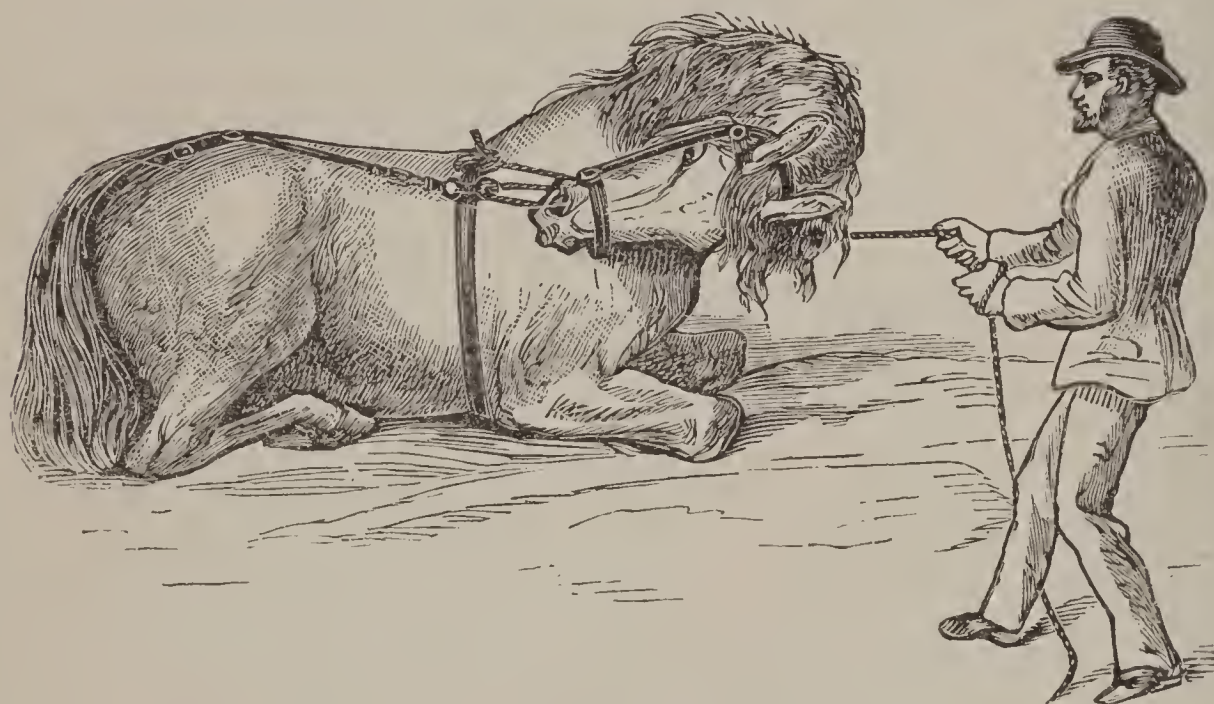


FIG. 41. — Type of sullen character.

regarded as not sufficient for the case. For example, if the horse is a kicker, and persists in kicking after the treatment, it must at once be abandoned or supplemented by other treatment, until there is success; but if the habit is given up after he has been thrown several times, and he submits unconditionally, it would be all, in a general way, that is needed.

If when pulled upon, the horse drops, or lies down submissively, refusing to get up, as shown in Fig. 41, it will do no good, and should not be tried further. It should not be used upon nervous, irritable, unbroken colts, and especially not on those showing a wild, sulky, or mustang nature, as they are liable, as soon as the leg is tied up, to become frightened by the restraint upon it, and lunge around recklessly or drop down sullenly. For this class of cases, always use the Second Method, which is exactly adapted to them.

Under no circumstances should mustangs be subjected to this treatment. First, it will be found very difficult, in fact very dangerous, to attempt putting such a rig on a mustang, as he cannot be approached or touched without his kicking or



FIG. 42. — The horse subdued.

striking violently; and even if put on, it does not enable producing nearly the good effect of the Second Method, which can be easily used, and enables the easy control of such.

SECOND METHOD OF SUBJECTION.

I once had a singularly dangerous horse brought me to experiment upon before a class. When hitched to a buggy, this horse had become frightened, kicked, and ran away, tearing the buggy to pieces. He was so desperately afraid of shafts that with the aid of several men I could not put him in shafts, or even bring him near them. After working upon him for two hours, aided by members of the class, and resorting to every

means of control known to me at the time, my efforts were a complete failure, leaving me almost completely exhausted and chagrined at the result. At this point I happened to think that turning around quickly made me dizzy and helpless. But I was so exhausted that I could not possibly turn so strong and desperate a horse around enough to do the least good. I now remembered having once seen a dog in play catch his tail in

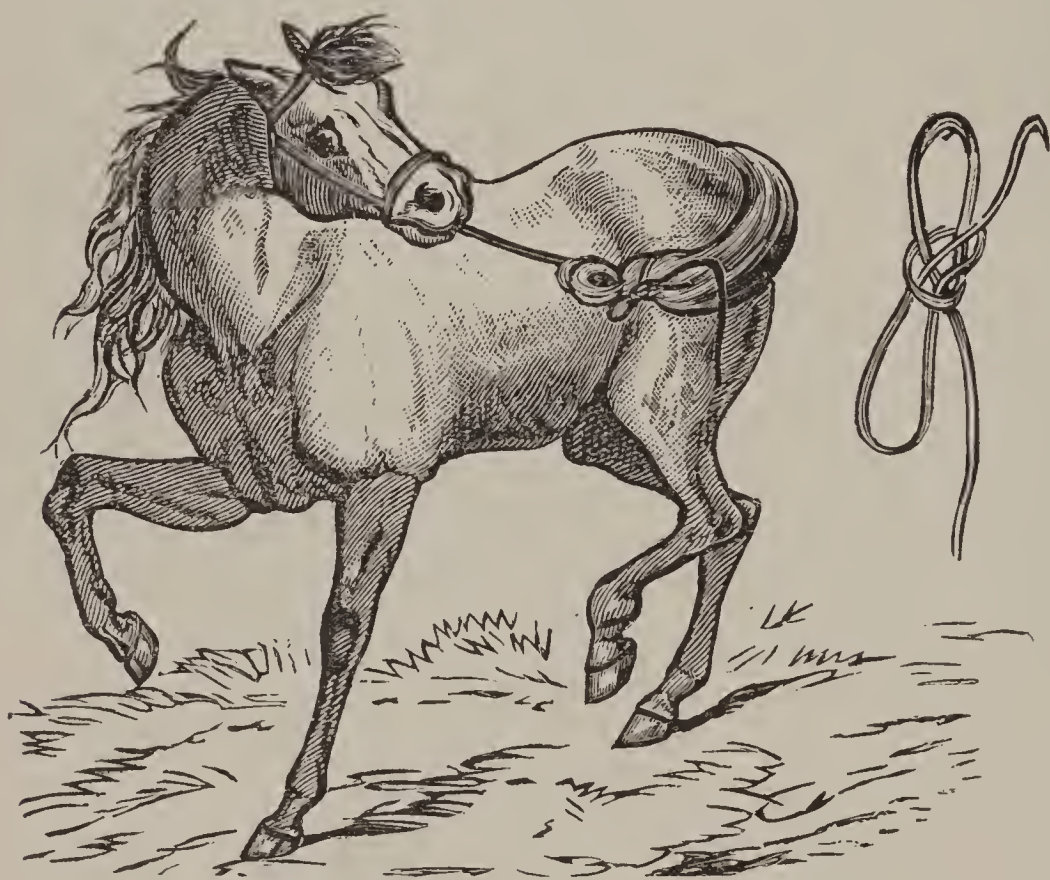


FIG. 43. —Method of tying halter to tail.

his mouth and run around, when it occurred to me that possibly by tying the horse's head to his tail he would turn himself around. I made the experiment, and to my surprise and delight he went around freely, and in a short time became so dizzy that he fell over helpless. But soon recovering, he jumped up and went around again, with the same result. This he repeated three times. I never witnessed a more desperate struggle to resist restraint. As before explained, he was extremely nervous and afraid of being touched; as he went round, I brought a pole against his quarters, and in a few minutes he became entirely submissive to it.

I could not have been made more happy if I had been given a kingdom. It certainly was the best illustration I ever had

of the value of thought. Here was a horse I had worked upon, with the aid of several men, over two hours, until completely exhausted, with the result of only making him so heated and excited as to be desperate and utterly unmanageable. Yet with scarcely an effort, or exciting the horse in the least, I was now able in a few minutes, unaided, to control this desperate brute with the ease I could a plaything. I had, in fact, made



FIG. 44. — Method of holding strap while going around with a doubtful case.

the most important discovery that had yet been made in the art of taming horses.

This method is wonderfully effective in the subjection of colts and vicious horses of a certain class of temperament, and in breaking single balkers. When combined with other treatment, it makes easy and simple the control of horses that it would be both difficult and dangerous to try to subdue without. For example, a wild, dangerous colt, mustang, or vicious mule, which in many cases it would be exceedingly difficult and perilous to try to confine with straps or other rigging, with the aid of a simple halter can in this way be brought under control in a few minutes. Or, if in any case this is not sufficient to give the success desired, it will always give the required advantage

to subject safely to other methods of treatment. This we will call the Second Method of Subjection.

The conditions to be observed in its application are, —

1. The selection of a soddy place in a field or yard free from stones, stumps, or sharp fence corners. The place should not be too soft, such as a deeply ploughed field, barn-yard manure, or deep straw. Heavy sod with considerable grass is the best.

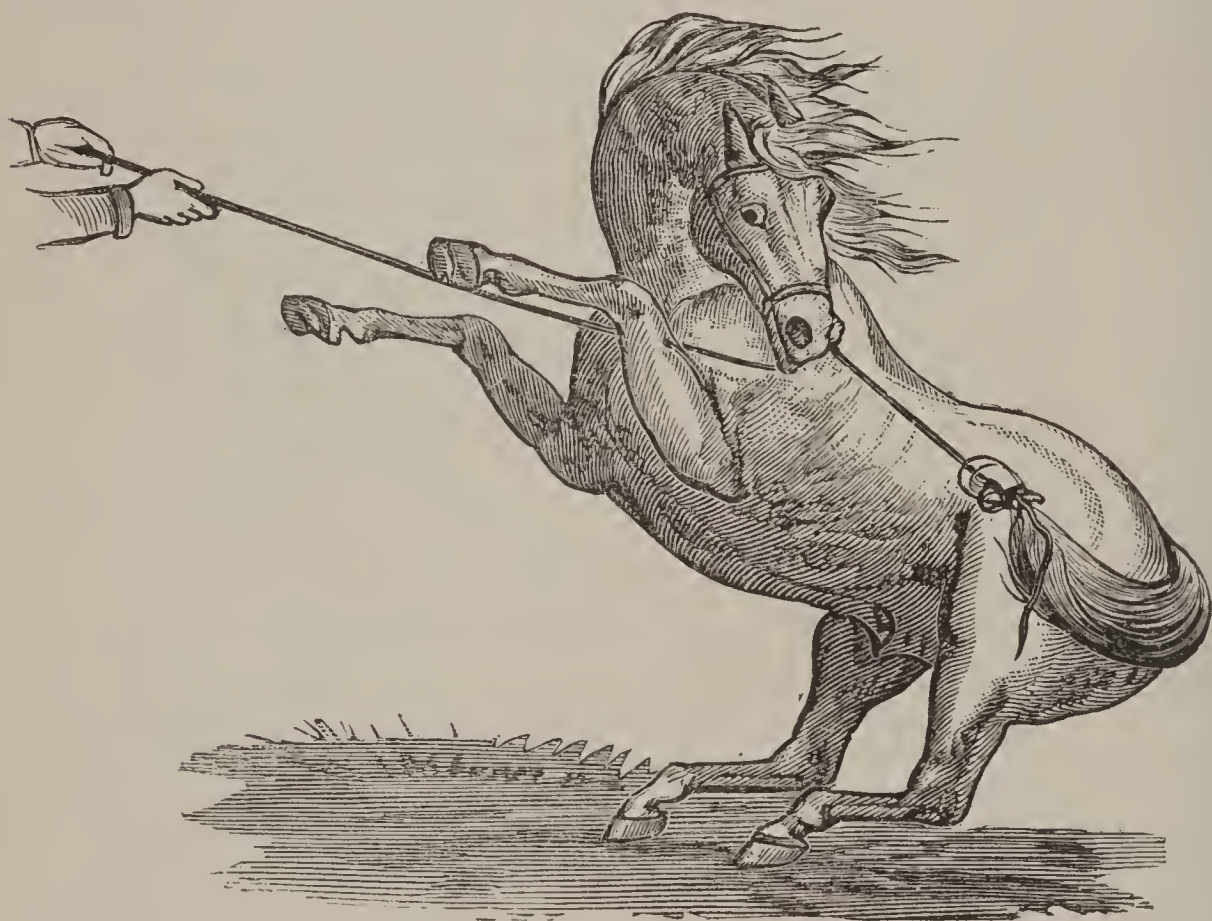


FIG. 45. — A vicious colt as he will usually strike when the pole is brought near his nose while turning.

2. If there are sharp shoes on the feet, they should be removed before subjecting to this treatment; to neglect this would endanger calking or cutting the feet badly.

3. A strap halter should always be used. After catching the tail, take the strap of the halter between the teeth, so as to give freedom to use both hands, and tie the hair of the tail into a knot. Divide the hair above the knot, pass the strap through, and tie into a half-hitch knot. The strap should be drawn short enough to compel the horse to turn fast enough to divert his attention and make him helpless, but not so short as to cause him to fall. The more nervous and excitable the subject,

the longer the strap must be left at first; and the more sullen or cold-blooded the horse, the shorter it may be drawn. If at all doubtful as to the length, when the strap is run through the tail, before tying, double it in the hand, and go around with him a few times, as in Fig. 44, so that the necessary length can be ascertained; then quickly tie into a half-hitch knot, and let go. If tied the right length, the horse will keep moving in a circle

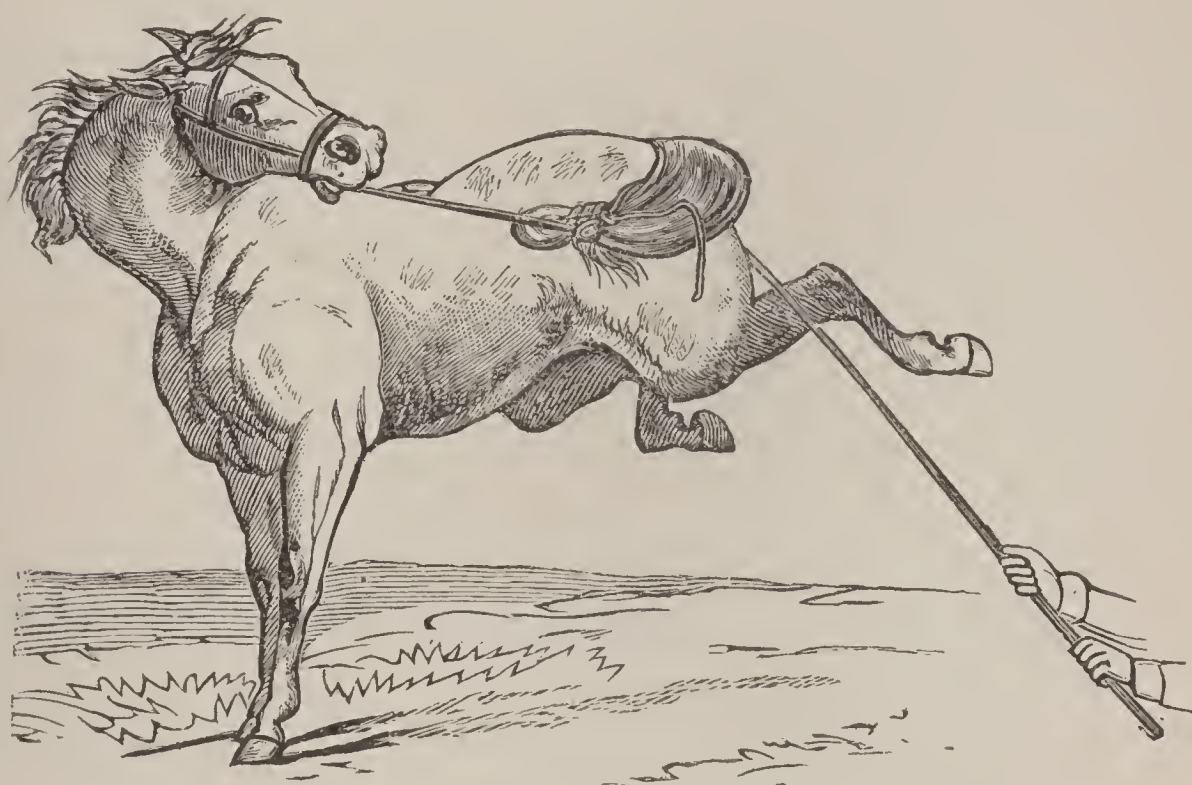


FIG. 46. — As the sulky, vicious colt will usually kick when touched with pole while turning.

as described; but if too short, or forced up to the point of falling, pull quickly upon the end of the strap, which will pull it loose, and tie again the required length.

Sulky or cold-blooded colts, if tied very short at first, are liable to throw the head against the nose-piece of the halter, and if pushed, are likely to rear up and fall over backward. This can be easily prevented by holding the strap, as before explained, and going around with him a few times, until he is slightly dizzy; then tie quickly, and let go. Motion towards the head while passing, and so continue until he moves steadily.

Now, take a pole or rake-handle eight or ten feet long, and bring it gently against the legs or parts of the horse most sensitive, until there is complete submission to it. This he will

usually at first resist by kicking violently; simply continue until all inclination to resist is overcome, and when untied he can be poled in any manner, or the feet can be taken up and handled without his showing the least resistance. Sometimes a young horse or colt will start all right, but when tested, will not go sufficiently fast to enable his control. Touch the nose of such a case lightly with a light buggy whip, and repeat until he is forced to the point desired to compel submission.

I soon learned by experience that by turning one way only, the impression upon the brain, after a certain point, diminished

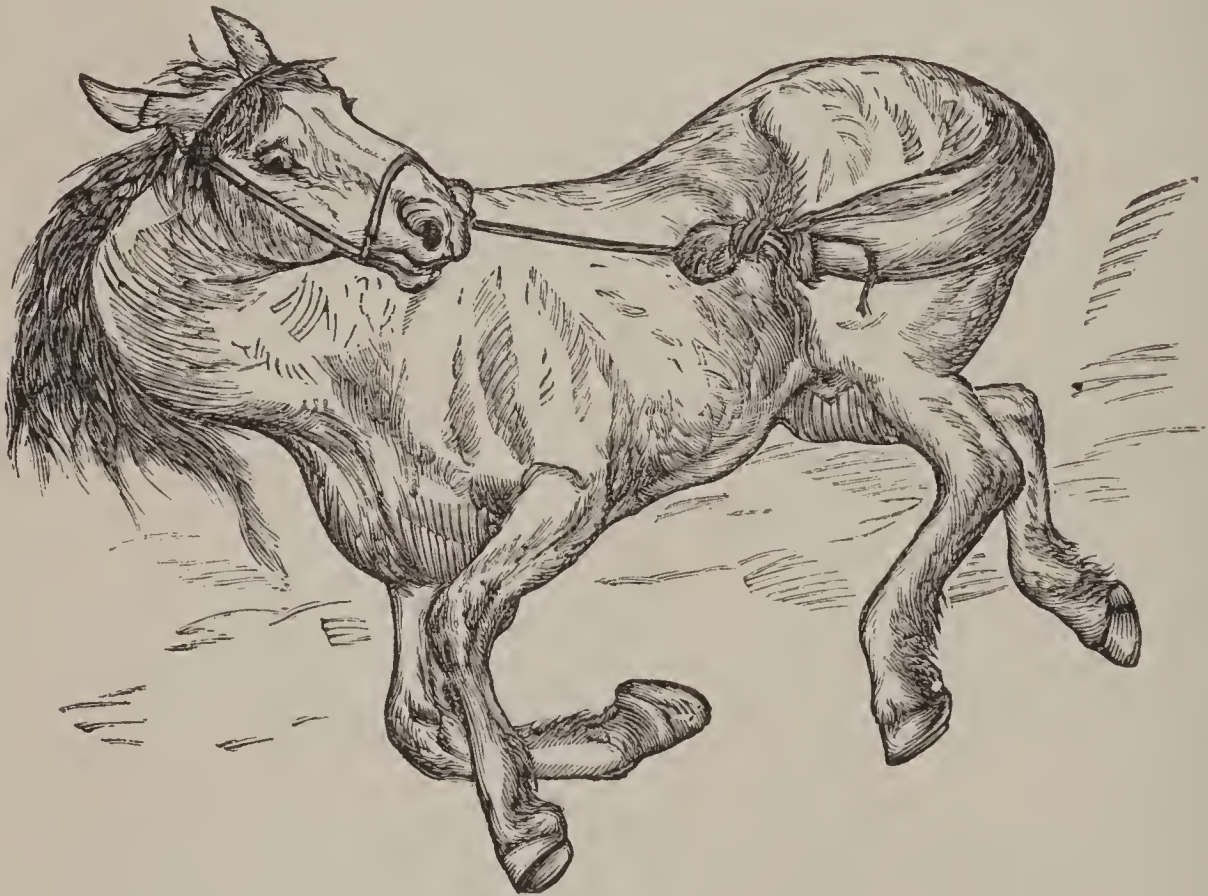


FIG. 47. — Position in which the horse falls, confused and helpless, when turned too quickly.

in proportion to the continuance of the turning. To remedy this, I was induced to reverse the action, by tying in the opposite direction, which not only greatly increased the effect, but enabled me to repeat the treatment with success. In bad cases, the horse should be turned one way up to the point of falling, then quickly reverse, at the same time poling, as before explained. It is necessary under such circumstances to watch carefully, so as to be able, at the instant there is an indication of falling, to prevent it by pulling the strap loose.

After the horse has submitted, he should be thoroughly poled all over, the feet handled, etc., until there is entire indifference to it; then untie and repeat handling.

This method of subjection is the simplest, most humane, and most effective, all things considered, that has yet been discovered. It not only diverts the horse's brain from acting in resistance, but matches his strength so perfectly against itself that without producing the least pain or injury he can be made almost entirely helpless. It will effect the subjection

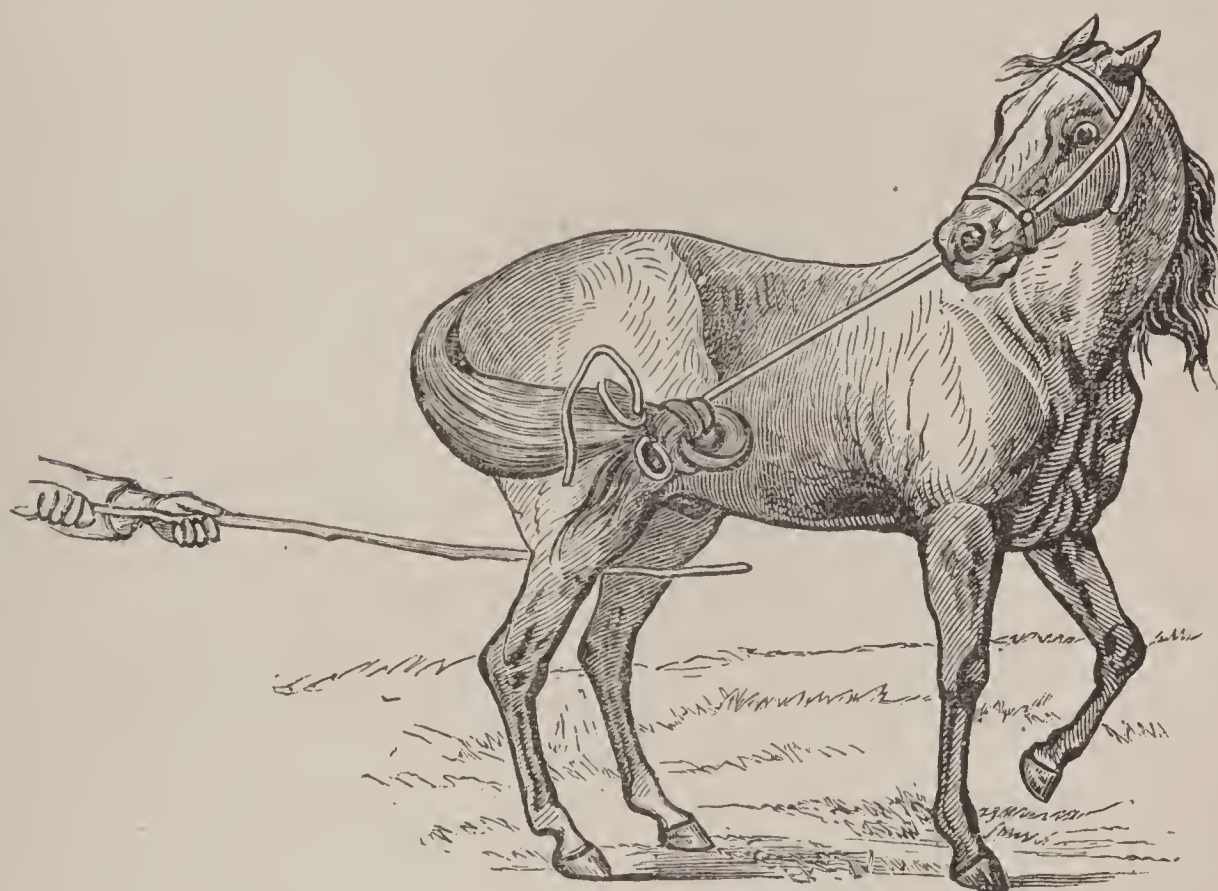


FIG. 48. — The first indication of submission — submitting to be poled.

and docility of the worst colts in from five to fifteen minutes, so that they can be ridden, have the feet handled, or allow anything to come against the quarters, etc. It gives, in connection with the War Bridle, the true key for breaking single balkers. It is singularly well adapted for supplementing the other methods and effecting the control of vicious horses that have partially or wholly resisted them. It is the safest and best method of treatment for cases extremely averse to being ridden, bridled, or having the head handled; also those which have the habit of striking. It is specially adapted for the sub-

jection of mustangs, and will enable one with very little difficulty to break any mustang. It will not work well upon kicking, switching mares, and colts of a slow, cold-blooded, sulky nature. There may also occasionally be found horses of a quick, nervous, and decidedly vicious character, that will at first seem to resist it or fall down too quickly. Upon such the Third Method should be used for a short time, after which this method will be found effective.

Though compelled almost daily to subject all kinds of horses to this treatment in small, unsuitable places, with a

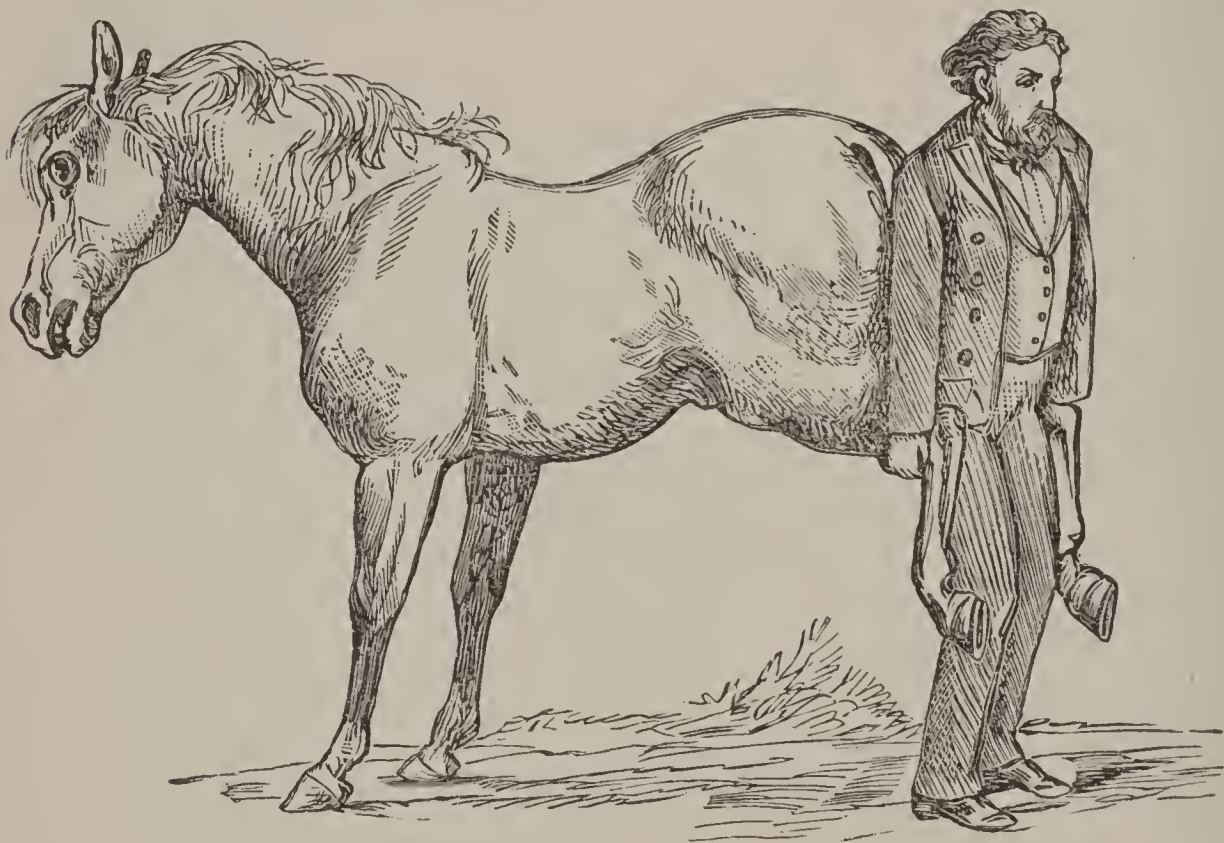


FIG. 49. — A test frequently given by the author before his class in proving the docility of vicious horses subjugated by treatment before them.

crowd around me, in my own experience I have never had a colt hurt by falling in this way ; he will usually fall over onto his side, but sometimes he rolls over so that the head will come under the shoulder, which looks dangerous. I would repeat that while I have never had an accident resulting from such falling, and so far as I know never injured a horse seriously in making experiments, I can see how easy it would be to have a serious accident in handling a sensitive, determined colt, by letting him fall recklessly, and especially in the management

of large, rangy horses of a well-bred character. With these last named you must be very particular ; in fact, I do not advise you to use this treatment upon such. In the management of such cases, depend mainly upon the Third Method and War Bridle. A great deal will depend upon how expert you may be in using any treatment. By going slowly at first, and following up cautiously, there can seldom be an accident.

THIRD METHOD OF SUBJECTION.

By hitting a horse at a certain point back of the ear, it is easy to knock him down ; or if a horse were to throw himself over backward and strike this part on a hub or stone, he is very

liable to be instantly killed. At the front part of the atlas bone, or the first of the cervical vertebræ, where it articulates into the occipital bone, or back of the head, there is about an inch of the spinal cord not covered with bone. If a sharp instrument were driven down at this point sufficiently to penetrate it, it would cause instant death. Now by



FIG. 50. — Method of applying the cord to put on pressure.

bringing gentle but firm pressure upon this part, if properly done, we have one of the most powerful and valuable methods of subjection known. It is especially adapted for the subjection of courageous, determined, kicking horses, that will not bear excitement. It is, however, a method of treatment that is of so arbitrary a nature that it must be used with great care and judgment. Not enough pressure, applying it carelessly or improperly, would cause its failure ; while too much or too long-

continued pressure would be a cause of abuse as well as dangerous to life.

It is, however, when used properly and upon cases for which it is adapted, not only perfectly safe, but enables one to gain the easy control of horses which it would be very difficult to subdue with other treatment.

METHOD OF APPLYING PRESSURE.

Take a firmly wound, smooth hemp cord, about five-sixteenths of an inch in diameter, that has been well stretched, and is

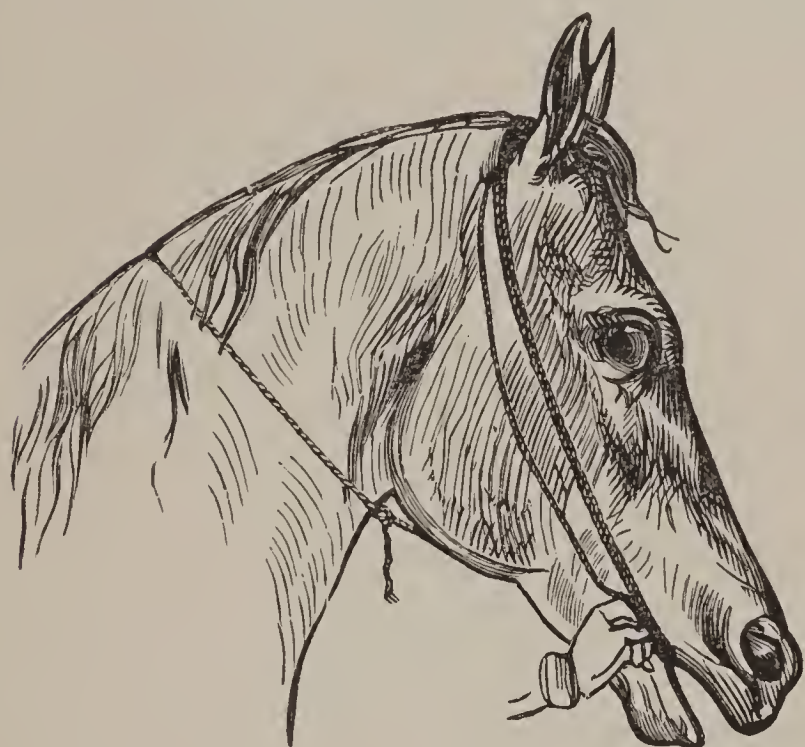


FIG. 51. — Holding cord when through the mouth.

about eighteen feet long; the small size used for War Bridle is best.* Tie a hard knot at one end and a loose tie or knot about eighteen or twenty inches from this end, bring around the neck, and slip the end knot through the loose tie as for the First Form of War Bridle. Stand a little in front, and at the left

of the head; bring the cord through the mouth, and pass it over the head where the halter rests, pulling down gently; thence through the mouth again, and hold with the left hand, as shown by Fig. 51, while with the right it is again passed over the head and pulled down as before. And so repeat to the end of the cord, winding for the first three or four times rather loosely; then gradually, with each repetition, pull a little tighter. Always use care to bring it over the tongue so as not to tangle or bruise it.

* Finding it difficult to get a cord of the proper size, strength, and smoothness, I have it manufactured especially for this purpose, and supply it to subscribers at closest rates.

Now take another cord and tie to the first one, so that when pulled down, the knot will come on either side of the head, but not at the top or in the mouth. Draw this cord as tightly as thought necessary for the case, and continue to wind until three cords are used, according to the degree of resistance to be controlled. Fasten carefully by bringing the end under the other coils, and tie it so that it will not slip or get loose.

The principle is, the greater the strength and resistance of the horse, the more cord must be used, the tighter it must be drawn, and the longer it must be left on. The average time it should be kept on is from six to ten minutes, if put on ordinarily tight. In no



FIG. 52. — Pulling the head of a vicious horse around to avoid his forefeet should he strike, and observing that the cord comes right in the mouth.

case of even extreme resistance should it be left on longer than from twenty to twenty-five minutes. Unless in a small place, where there is not room to run around much, attach a strap or cord to two or three of those around the head, and hold by it, or tie to a hitching post.

The success of the treatment will depend upon what is done after the cord is applied, as it will practically do no good to put on pressure if nothing more is done. This is a point I wish to impress particularly upon you. The efforts must now be directed immediately, and persisted in industriously, to combat and overcome the resistance, whatever it is, until there is submission. For example, if a kicker, the moment pressure is put on take a small pole or rake-stale and bring against the legs and quarters,

as shown in Figs. 55-58. If the case is very vicious, this will usually be resisted hard, by the horse's kicking violently. Simply continue poling gently until there is entire submission to it. Sometimes a horse will submit in five minutes; if he does, simply uncoil the cord to the last three or four winds, and hold so while the pole is again applied to the quarters. If there



FIG. 53. — Looking at the opposite side to see that the cord comes right, and determine the amount of pressure necessary.

is no resistance, unwind and turn the last cord into the First Form of War Bridle, and while holding it, test again carefully.

This is about the course required with the average sensitive horses that have learned to kick. If, however, the case is of

a very plucky, determined character, that resists violently, and if, after a reasonable effort, there is no indication of submitting, the best course will be to draw the cord a little tighter. In some extreme cases one or two extra cords may be added, and repeat the poling. If the cord is put on properly, and the poling applied gently and persistently, it is rare that it will not be submitted to in from five to eight minutes.

When there is submission, the most prominent signs will be submitting to the pole, the ears dropping a little, the eyes softened in expression, with a slight indication of panting. There is also, in some cases, profuse sweating, which is always a favorable indication. One of the nice points of success is to force submission quickly, and as soon as made, remove pressure but continue the poling after giving entire freedom. The result will usually be very remarkable, a horse that has perhaps been one of the most determined and violent of fighters becoming as docile and gentle in appearance as if he had always been so.

While being subjected to this treatment, the central point of observation should be the eye. So long as there is fire in it, and the ears are thrown back, no matter whether the horse kicks or not, it is an evidence that he is fighting hard, and the pressure must be kept on. On the contrary, when there is a general ceasing of resistance, the eye softened in expression as if going to sleep, breathing accelerated, perhaps panting a little, and especially if there is sweating, it is sure evidence of unconditional submission. If these indications are shown



FIG. 54.—As a vicious horse will usually kick when first touched with pole, after subjecting to pressure.

in even two or three minutes, the result will be just as effective as if pressure had been kept on longer. The cord must be taken off at once.

The treatment should now be carried out for driving in harness, as directed for Kicking, under that head.

If bad to shoe, — for which it is very effective, — while the pressure is on, attach a rope or strap to the foot, and pull backward and forward as in Fig. 108½, until the toe rests upon the ground, and there is submission. The cord should then be im-

mediately taken off the head, as before explained, and turned into the War Bridle, when the leg is to be repeatedly tested.

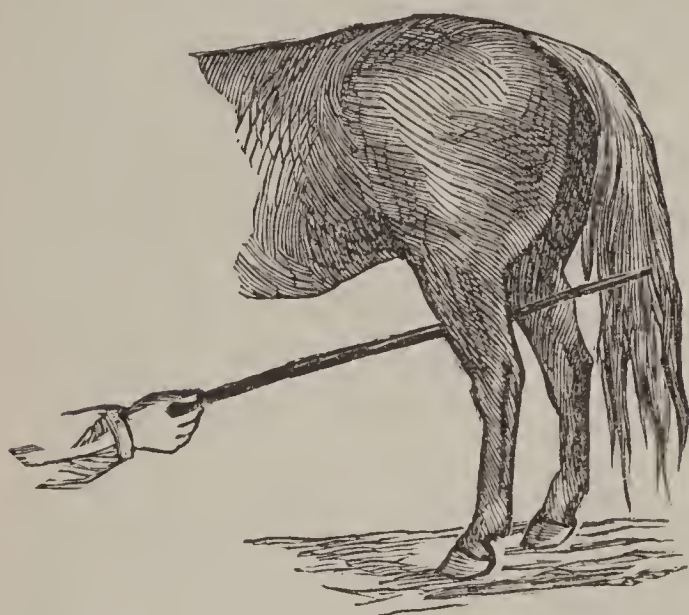


FIG. 55. — Touching the horse's quarters with pole while the cord is on.

Nearly all good subjects for this treatment will resist hard at first, but when they give up, will be found entirely manageable; while those that do not resist when touched while the pressure is on, are, as a rule, not good subjects for it.

The success with which some vicious kickers can be controlled by this treatment is often remarkable.

It works extremely well

upon mules, seldom requiring more than ten minutes to subdue those of a very bad character.

Cases upon which it will not work well, and for which it should not be used, are young, unbroken colts, sullen or cold-blooded horses of any character, and, once in a while, a class of high-strung, sensitive horses of great courage and endurance, that become excited, strike, and resist hard. Such cases are, however, very rare. It is not adapted for balkers, and must not be used



FIG. 56. — Manner in which some horses kick when touched with pole.

on them. The reason this method should not be used upon colts is that they are liable to resist any attempt to put on the cord, but the most serious objection is that they bite and chew upon it to a degree that will cut or bruise the cheeks;

hence it must not be used upon them. Besides, colts can be controlled very easily by the Second Method.

There will occasionally be found an old horse that will bite upon the cord like a colt. In all such cases the treatment must at once be abandoned, and other treatment used.

I have been very reluctant to give this method of treatment, fearing its misuse. It is always advisable, before applying this treatment, to look the horse over carefully. Then if not sure of the character, test a little to be able to determine it.



FIG. 57. — Manner in which a vicious horse will kick when touched with pole.

If a nervous, excitable fellow, that has perhaps been greatly frightened, the Second Method may first be used. Should it fail or not produce satisfactory results, then this method can be tried. To make its application plainer, first bring the cord through the mouth once, and pull down rather tightly. Should this be submitted to, it is safe to proceed. But if the horse strikes violently, or resists, showing a disposition to bite upon the cord, especially after two or three coils have been used, it would better be abandoned and other treatment used.

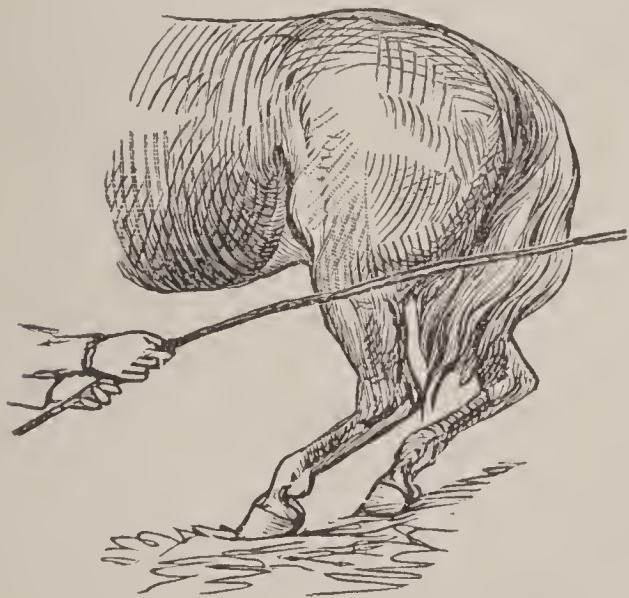


FIG. 58. — Submitting to the pole after being subdued.

Whatever is attempted by this method must be done at the first trial. But if the horse will bear it, this trial can be carried to a considerable extreme of pressure, and be continued for some time, though it should not exceed twenty-five minutes, except in very extreme cases.

THE BREAKING BIT: CONTROL OF THE MOUTH.

During my early experience, among the most serious difficulties I encountered was controlling the mouth with success in harness. The War Bridle was my main reliance in making a horse stand and back, but the results were not as satisfactory as I could wish.

Incidentally I found, in combating a horse that resisted the bit, that after making my point he did not try to resist afterward. This clue I followed up carefully. I remembered that, no matter how stubborn a colt or horse, if, when teaching him to lead by the War Bridle, he once yielded, he would afterward follow without requiring to be pulled upon. It occurred to me that the result must be the same in controlling the mouth with a bit. I experimented with different forms of bits, especially those that were severe or harsh upon the mouth. At times I would be very successful; but should I happen to have a very determined horse, I was liable to bruise and cut the mouth badly. This forced me to use other modifications, and it was only after long experimenting that I settled upon the Breaking Bit as here given as the best form for doing this; and simple as it may appear with the points of using it, this is one of the most important and valuable methods of treatment introduced by me. With a horse this difficulty is in part met by biting; all very good as far as it goes, and in the right direction, unless it is carried too far, or done too recklessly, as by checking a green colt at first too high or short, he is liable to become mad and throw himself, and thereby is very liable to be seriously injured or killed. This method of training, it must be remembered, is simply dead pressure upon the mouth, and often teaches the habit of lugging or resisting the bit; hence the habit of pulling on one rein, refusing to back, throwing the head down upon the breast, etc. As soon as the horse learns that he can resist the restraint of the bit, or pull against it, he needs only to become a little excited to resist even the most severe pulling upon it; whereas the object is to teach the mouth to submit to flexible restraint, that is, that when the bit is pulled upon beyond a certain point, it will be submitted to

freely, and that no matter how intensely excited, there will be no inclination to resist or pull away. This we can do in the most practical manner with the Breaking Bit.

It took me a long time to learn, first, to lengthen the bars to get lever power; and second, that instead of having the bars twisted and rough, I could produce better results by having a smooth, polished, round bar. I found it was lever power that did the work; and this was an important secret. Next how to use it, which is no less important. I would say in this connection that it was with this bit I performed all my greatest feats of driving kicking, runaway horses so quickly and with such success. Without it I would have been practically unable to control such horses in harness. This is a breaking bit, not a

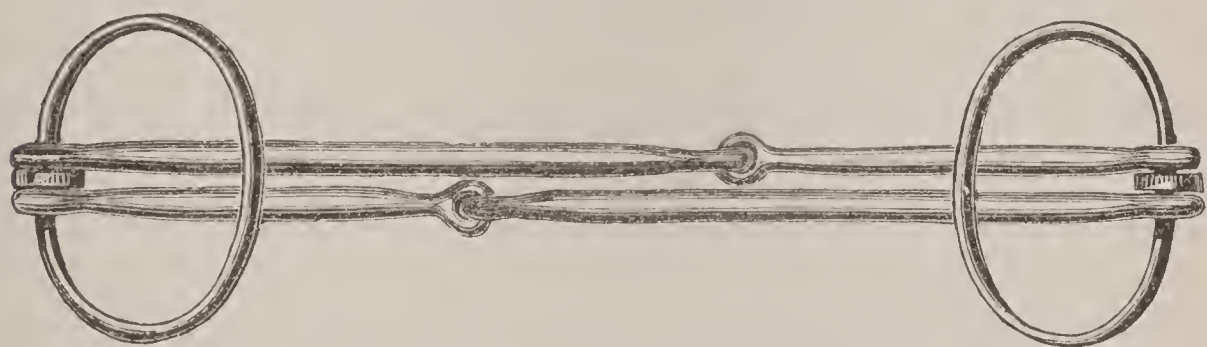


FIG. 59. — "W," or breaking bit. Half size.

driving bit; that is, it enables training the mouth so that the horse can be controlled afterwards with an ordinary smooth bit.

One point I wish to call your special attention to in connection with this method of training the mouth. If the horse, when pulled upon, *throws the head* up so as to bring the pull of the bit back on the cheek instead of the jaw, this method will not work well, and other measures must be resorted to. These cases, however, are very rare; they are usually high-headed, spirited, energetic fellows. The Patent Bridle, described in my large work, would be specific for those cases. I would add that we do not manufacture them, but those purchasing copies of any of my books are given the right to make and use them.

The length of the bit should be regulated to the size of the mouth, so that when pulled upon, the bars will come at right angles with the jaw on each side. The average length is eight and three-fourth inches from center to center of ring-holes when

put together. This makes the length of the short bars three and three-eighths, and the long bars five and three-eighths inches from center to center of holes. It may be made much shorter, but it would proportionately lessen the lever power of the bars upon the jaw, which is the key of its success. The bars should be made of round cast-steel rod, about five-sixteenths of an inch in diameter, filed and polished perfectly smooth, so as to leave no rough corners or surface anywhere. A round, stiff piece of leather may be stitched inside the rings; while this may be dispensed with, it is desirable to have it on.

A great variety of bits are made on this principle, but they are defective in being too short and rough. This bit will not bruise or cut the mouth in the least. The point of its use is that when put into the mouth, the reins are to be brought back through the shaft lugs so as to bring a straight, even pull upon the mouth backward, and prevent the horse from turning around. A specially important point is that the hand parts of the reins are large and soft, so as to give good hold upon them. Now stand behind, just beyond the reach of the heels, with a rein twisted once around each hand, and after moving the horse moderately, call "Whoa!" sharply, instantly following with a sharp, quick, raking pull. The variation of the pull in the arms should not be more than two or three inches, blended with the direct pulling, which should be with the energy of the strongest blow from the shoulder, the principle simply reversed. In this way, after the command of "Back!" or "Whoa!" is given, whichever it is, repeat at short intervals. In all ordinary cases, the submission will be quick and easy; but in plucky, bad cases, the resistance may be very determined. In fact, in exceptional cases it may be so great that it will seem impossible to make the horse yield; but this should not by any means be accepted as a reason for discouragement.

If the horse warms up much, and becomes sullenly indifferent to the pressure of the bit upon the mouth, by repeating the lesson it is rare that he will not be found to submit in a few minutes. At any rate, the lesson must be so thorough that there will be unconditional submission. In all my experience I never found more than half a dozen cases that did not submit in two or

three short lessons. Success will depend upon how it is done, the main point being to make the horse submit, if possible, before he warms up, persevering and repeating until there is success. But should the horse become so warmed up as to make it necessary to repeat the lesson, he must be allowed to stand long enough to become entirely cool. The better way would be to let him stand over night, or even longer. In most cases, when the lesson is repeated, he will be found to respond immediately, because the mouth has now become very sensitive ; but if not, the only thing to do is to go on as before, carefully, until successful.

If the case is known to be a very serious one, and resists with decided courage, move the horse at first very slowly, until the point is gained of making him stop and come back at a slight pull. In my own practice I moved the horse at first on a slow walk, and repeated making him stop, until he would do so without being pulled upon, then stop and come back, until he would respond to the pull of the bit with the elasticity of a spring. Then I moved him faster, and repeated until he could be moved to a sharp trot, and though not pulled upon, at command would stop instantly, no matter what the excitement. This I would repeat over and over until I could put the horse on a run and do it. This lesson was repeated after he had gotten over the excitement and was cool. In most cases, upon repeating or testing, the horse will be found entirely manageable ; but he may, when pushed up sharply, resist quite hard again. If so, the point must be fought out at once, and most thoroughly.

The next step is to put the horse before a wagon, and carry out the control to the point of direct resistance. The lesson in all cases was made without the breeching straps being buckled. The entire time needed to get the average of horses under good control would be from five to fifteen minutes.

Frequent reference will be made to this bit in different parts of the work, more especially in Colt Training, Running Away, and Runaway Kickers. We do not manufacture or keep these bits for sale, but most any ingenious blacksmith should be able to make one from the instructions here given, and at no greater cost than we could furnish them.

I include next a very practical method of controlling colts and unmanageable horses to drive in harness. The objection is the expense and trouble of making it.

THE BREAKING RIG.

To break a kicking, runaway horse or colt, all that is necessary is carefully to harness him in the rig so that he will not break loose, and let him go as he pleases. The more he struggles to free himself, or tries to kick and run, the quicker he will be broken, while the trainer can sit quietly behind, touch-



FIG. 60. — Simple form of Breaking Rig. Pat. July 6, 1880, by the author.

ing and poling the horse where sensitive until he becomes submissive and gentle. The rig should be constructed as follows: First, set an upright post firmly in the ground. Next, have two shaft-arms, about twenty feet in length, so fitted that one end of each will turn upon the post. At the outer end of both of these shaft-arms should be fitted a spindle, and a wheel from a lumber or farm wagon. Separate the ends of the arms at a distance of eleven or twelve feet, or so that the horse can travel between them without touching either. Next place two bars across from one shaft-arm to the other, the inner one about three feet eight inches from the hub of the wheel, the outer one

about two feet from the inside one at the horse's shoulders, and three feet at the quarters, so that an average-sized horse can travel easily between them. Have holes or mortises made through the shaft-arms, and the ends of the bars fitted to them. The inner one should be fastened permanently, but the outer one so fitted that it can be taken out and reversed, to allow driving the other way. It is best to have the holes or mortises duplicated, so that the bars can be adjusted to fit the size of the horse.

If the wheels are not high enough to support the frame arms, put an extra piece of scantling on the upper side, and make the mortises or holes high enough to bring the bars where the shafts would come in driving. The simplest way of fastening the horse in the rig is, after he is harnessed in place, to pass a strap under the body from one bar to the other, another over the body and shoulders, and a third over the hips.

No matter how vicious or headstrong a runaway horse may be, the faster and more determinedly he runs in this rig, the sooner he will from necessity become gentle. He has not the liberty to rear up, throw himself, or kick. If he undertakes to run, he will be carried round in a circle so rapidly that he would fall helpless from dizziness if not supported. If sensitive about having the head, neck, or hind parts touched, he can now be handled until he is submissive to it. If he is afraid of an umbrella or robe, these objects can be brought around him with safety as desired. If he is afraid of a carriage-top, open and shut an umbrella before his face, over, and behind him, until he is fearless of it. If afraid of having the rein caught under the tail, and inclined to run under such circumstances, he can now, with entire ease and safety, be made to submit to it.

I could give other methods of treatment used by me with good effect, but space will not admit, neither do I think it advisable to add descriptions of treatment that would not be found nearly so effective, and would serve only to confuse.

These methods of subjection and educating are proved to be the most effective, comprehensive, and humane that have ever been discovered. They give power to control the whole or any part of the body, so that with reasonable effort it becomes a very

easy and simple matter to perform the most astonishing feats of mastery over horses regarded as very vicious.

In the management especially of very critical cases, if you do not understand clearly what to do, do not undertake the work until you have a good idea of every point laid down in your instructions, and then go to work slowly and cautiously. It is no excuse to say that you fail because the horse is vicious and difficult to manage; this is simply the very strongest proof of incompetency, and also proves that the horse was in the first place spoiled by ignorant, bad treatment, which it is of course our object to remedy. You must at least be patient and careful.

It requires the most careful attention to little things, as inattention or carelessness under certain circumstances is liable to be the cause of serious injury or of killing the horse, or to result in exciting a degree of resistance requiring the most skillful work to overcome, and this in a hundred different ways. Then the judgment of knowing what to do and how to carry it out. The success of the physician is not so much in the knowledge of his remedies as in the nicety of perception and judgment with which he adjusts them to conditions of disease. Of course both conditions are necessary. The least intimation, in action or expression, of weakness or lack of confidence, is simply fatal in the management of horses of a spirited, aggressive character. The tone of voice, the expression of countenance, in fact every action, must imply confidence. It requires in the man the most absolute truthfulness and honesty with a horse, to have him understand without confusion or excitement, as well as establishing his confidence by kindness; and all these, we see, are requisites of the highest character.

CHAPTER III.

COLT TRAINING.

IN the management of colts, the main difficulties to be overcome are, first, excessive fear, and, second, such resistance as may be excited by it. Next, to guard against injury, which of course must on no condition be hazarded.

It is of course necessary to discriminate very carefully as to



FIG. 61. — Simple way of haltering a dangerous colt.

the age and character of the colt to be treated. If very young and not very sensitive, no special treatment will be necessary, the main point being to handle him quietly and carefully, when

he will soon become as gentle, fearless, and manageable as can be desired. If the colt is grown, say three or four years old, and has never been handled much, and especially if very wild and nervous, the case will still be very simple to manage, but will require more or less care and perhaps a little subjective treatment. There may occasionally be a colt so exceptionally wild and nervous as to require very careful treatment. The

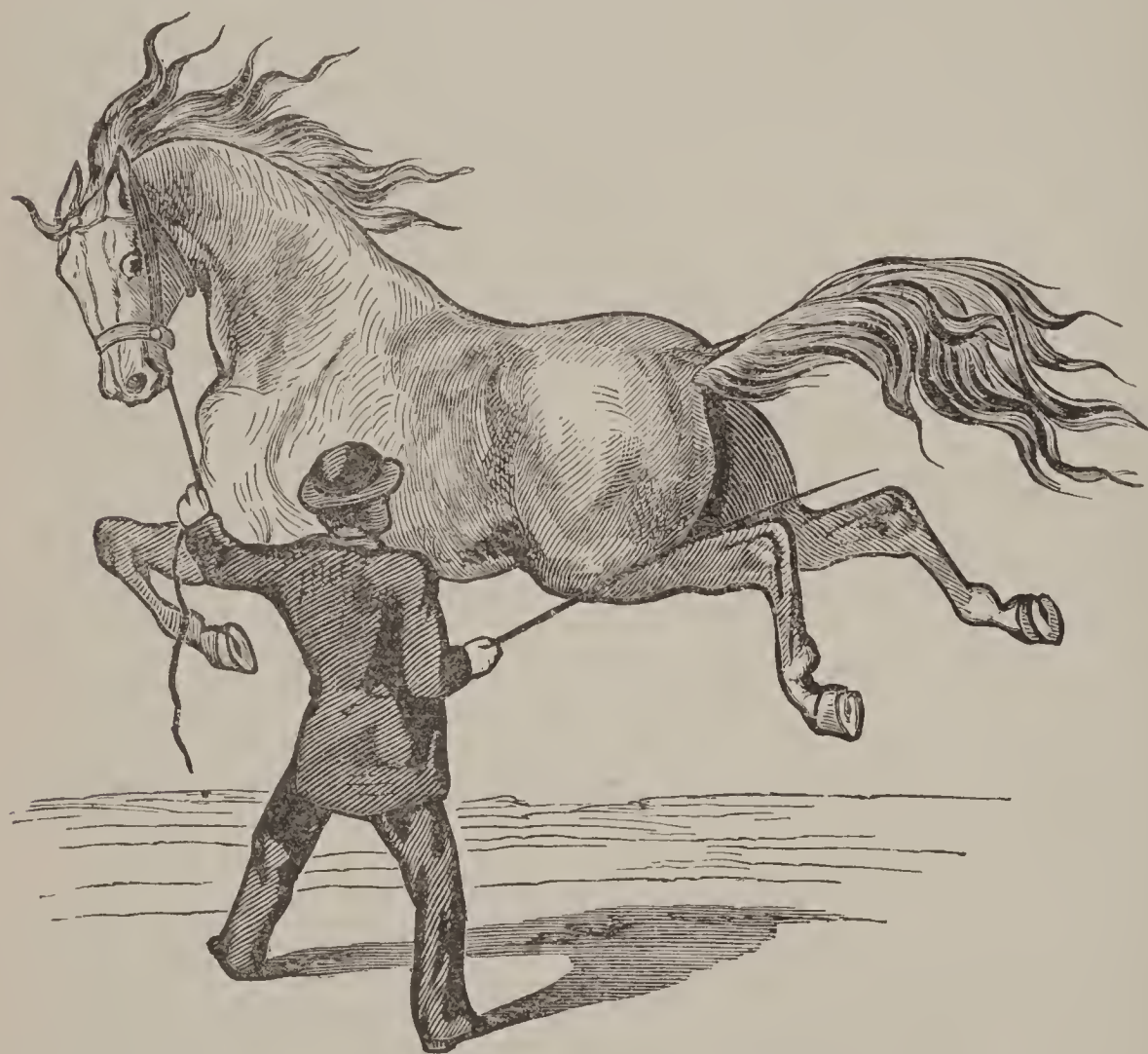


FIG. 62. — Testing a doubtful colt before subjecting to treatment.

greatest average of colts brought me to experiment upon were of this character, and more especially colts that, in the effort to break them, had resisted control and had become runaway kickers. Such colts are frequently so nervous and vicious as to become apparently very dangerous and difficult horses to break, as they really are by the treatment in general use. But if you will only go to work carefully and thoroughly, even the worst of these will not be found at all difficult to manage. If the colt is simply a little nervous, all you need to do is to put on a

well-fitting rope halter, tie the noose back of the jaw into a knot so that it will not slip, be careful that it fits well on the head, and that the nose-piece is large enough so as not to press upon the jaws. It is presumed that a colt is gentle enough to allow approaching and haltering him. Let your place of treatment be in an ordinary room, never where there are stalls, nor in a very large stable with open doors and places to encourage running into. Stand opposite the shoulder, and while grasping the halter firmly, make a quick, sudden pull toward you, at the

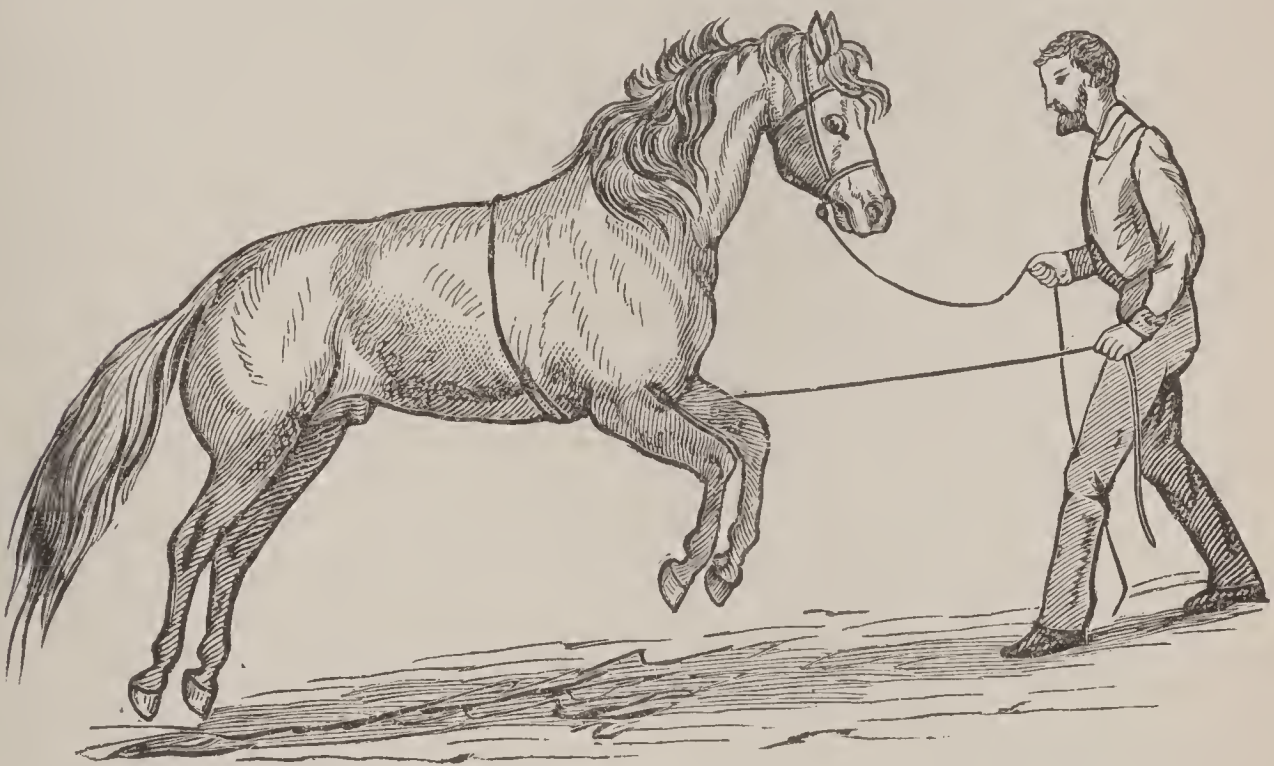


FIG. 63. — Simple method of making a sullen colt follow instantly.

same time saying, “Come here !” (See Fig. 64.) This will bring him off his feet around to you. Caress a little, and so repeat until he will come around promptly. Now repeat on the opposite side, until he will follow you either way freely. Do not be in a hurry ; have a little oats, or an apple, or something of which he is fond, and give him a little occasionally. When he will follow right and left promptly, gradually go straight ahead. Should there be resistance, simply pull a little more on a line with the body, and by repeating in this way a few times it is surprising how quickly a colt will learn to follow with a halter, and also do so ever afterwards.

It is surprising to see by what crude and bad means horse-breakers in general frequently try to train a colt to do things

which the most ordinary observation should show them to be very simple and easy of accomplishment, and none more so than this of teaching to lead. The usual method is to pull straight ahead, and by main strength try to make him follow. If the colt is of a nervous, impulsive character, when pulled



FIG. 64. — Right way of pulling with halter to teach the colt to lead.

upon hard in this way he is liable to rear up and throw himself over back, and thus this means is frequently the cause of killing the colt instantly or of seriously injuring him. If not this, he is liable to brace himself and stand sullen, as shown in Fig. 65; or at any rate be the cause of a great deal of needless cruelty and abuse to the colt and a great deal of hard, exciting work for the trainer. I have known men to work for hours in trying to break a colt to lead in this way, and then after almost killing him not accomplish it well. All such trouble can not only be easily avoided by the course of treatment given, but it can be

done infinitely easier and better, rarely requiring more than a few minutes, and with entire safety. Even should the colt be unusually heavy and strong, and we were limited to the use of a rope halter, we still have all the power needed if we only use it properly; simply tie up one of the fore legs, which will so weaken his resistance that he can be easily pulled around, and once made to do so, when given the foot loose, he will follow freely. But the War Bridle makes this entirely simple.

Then the method of training with the whip, details of which are given fully in my large work, is a very valuable method, and enables doing this very quickly and easily. With little

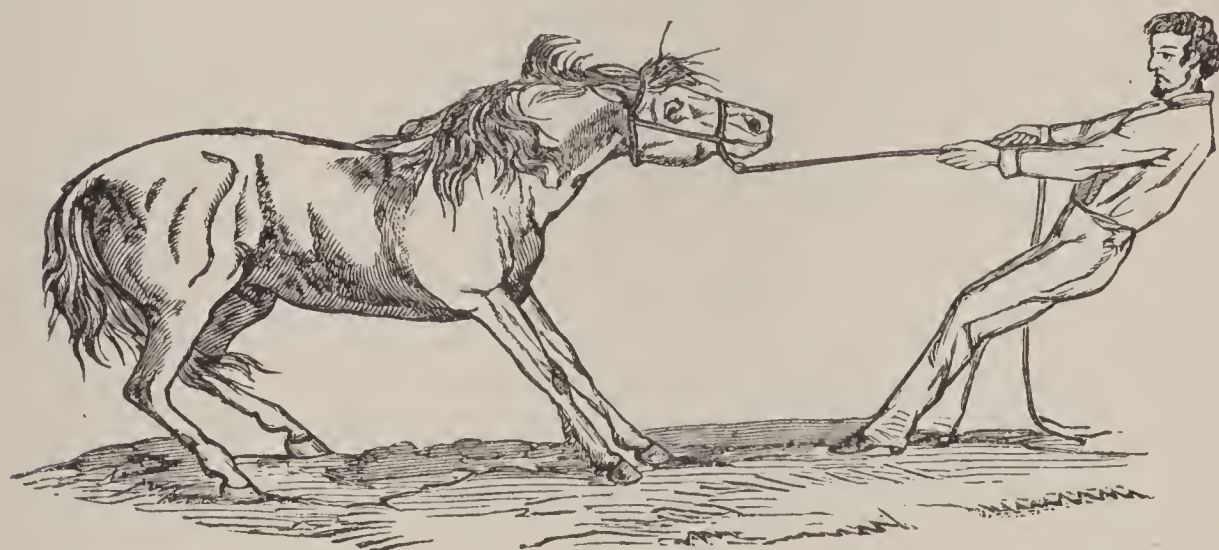


FIG. 65. — Wrong way of teaching colt to lead by halter.

more than a few light touches with an ordinary carriage whip, the most nervous and unmanageable colt can be made to follow with entire freedom in a few minutes. The effect, in fact, will seem to be almost incredible.

This was the principal secret of my success during my first campaign in Maine, in 1862--3, in performing the feat which I advertised to do daily, —namely, of making any wild colt within twenty minutes so gentle that I could take him into the street without anything on him, ride him, handle his feet, and make him follow me freely in any manner. I made the colt gentle usually by the Second Method, and taught him to follow with the whip, in all requiring seldom longer than ten minutes. I was always timed to do it within twenty minutes from the time I left the hotel.

If the colt is simply young and sensitive, and you wish only to make him follow in the easiest and simplest manner, put on a strap halter that fits nicely ; now take a small cord (War Bridle cord is best) of sufficient length so that when doubled you can make a noose around the body, bring the other end forward between the legs, as shown in Fig. 63 ; while holding by the halter loosely, and standing a little one side of the shoulder, give a sharp, quick pull, and he will spring forward instantly.

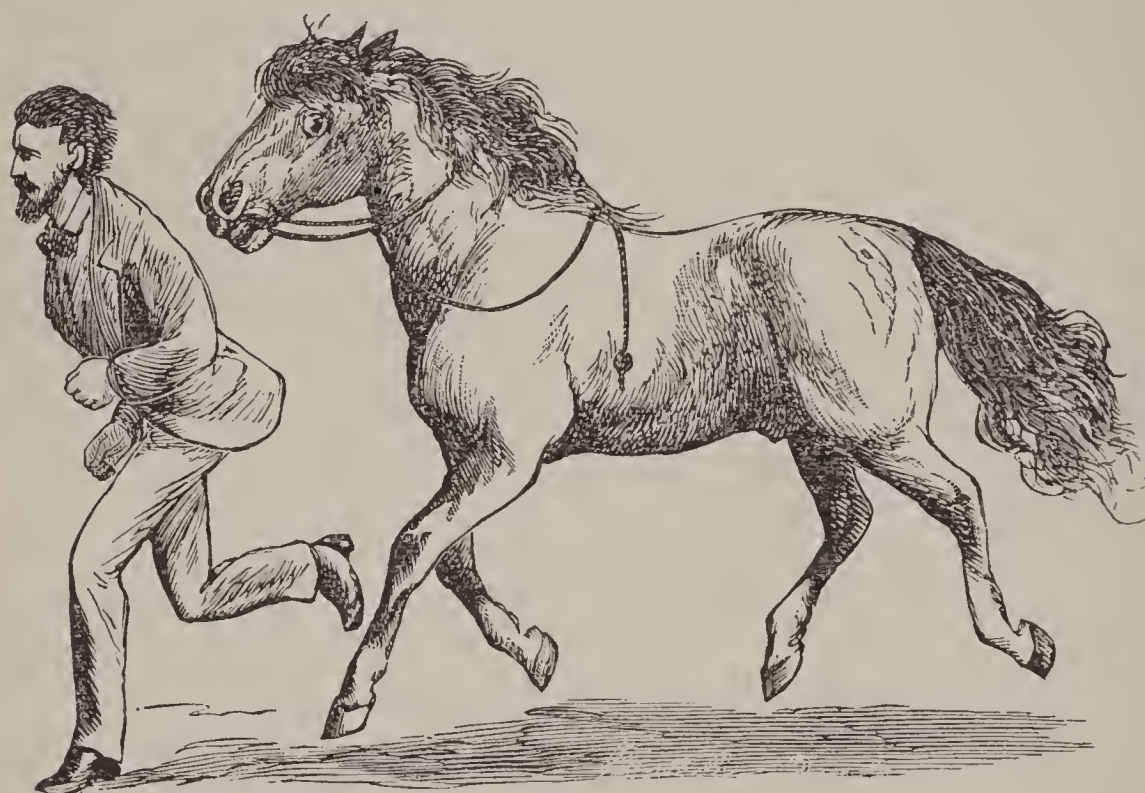


FIG. 66. — Colts as usually made to follow on a run by a few minutes' treatment before the class.

For this, caress, and so repeat, and in a few minutes he will follow round freely. It does not, however, give the idea of submitting to the restraint of the halter, but it will in most cases make a nervous or sullen colt, that will not bear excitement, come ahead and follow readily.

I once had a colt before a class that was so sullen that he would not submit or move to any restraint upon the head. Instinctively I was led to double the cord and bring it under the tail, forward over the back, and tie in front of the shoulders to keep in place, and pull forward in this way. It took him by such surprise that he sprang forward fully ten feet, and by repeating once or twice, he followed freely. I soon found the

cord liable to make the tail sore, and teach the habit of kicking. To prevent this, I was led to form a loop around the body, which worked equally well.

Next take a rake-stale, or any light, smooth pole six or eight feet long, and bring the end over the body and legs until there

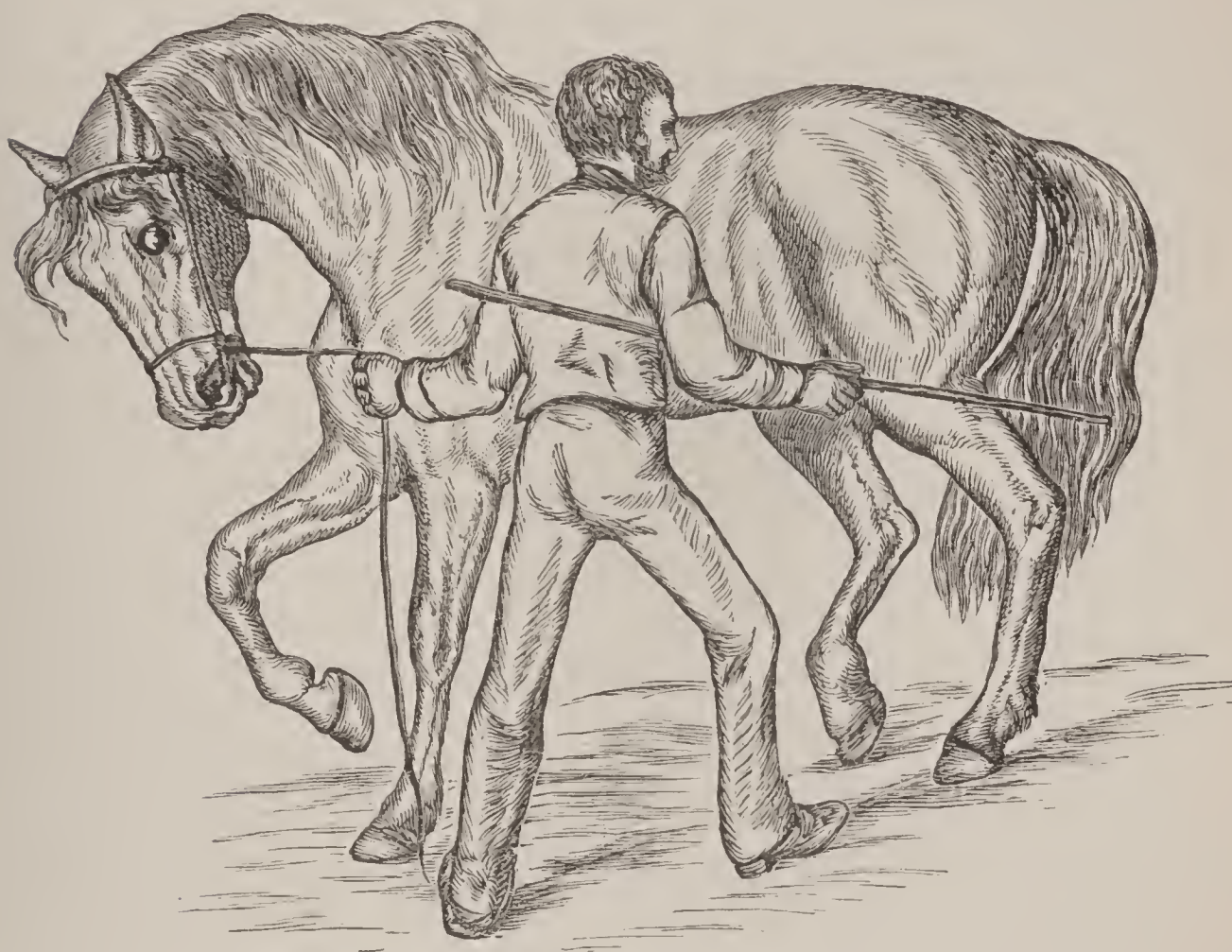


FIG. 67. — Bringing the pole against the quarters.

is no fear of it. This must be well done ; every part of the back, hip, legs, and belly must be freely touched. The more nervous, the more careful you must be ; but should he jump or resist a little, simply repeat more carefully. If, however, the colt should resist enough to be troublesome, take a short hold of the halter up near the head, and walk round quickly in a short circle, pulling him after you, and at the same time bring the end of a pole, as shown in Fig. 67, against the quarters until submitted to ; repeat on the opposite side. Next take up the feet, commencing with the fore feet ; then the hind feet. There is quite a knack in doing this ; the point is, while stand-

ing opposite the shoulder and facing the hind parts, with the left hand holding the halter resting against the shoulder, with the right to catch the foot gently, and at the instant of lifting it press from you strongly. This will throw the weight upon the opposite foot, when the near one can be taken up easily. This should be done at first very gently, gradually repeating until the foot can be held with both hands and pounded upon freely.

To take up the hind foot, lengthen the hold upon the halter until the hand rests gently upon the hip, pass the right smoothly



FIG. 68. — Taking up the colt's foot while tied — one of the tests in determining his submission.

down the leg to the fetlock, and grasp lightly ; at the instant of lifting, press from you with the left, as before, when the foot can be easily taken up. As before, do this gently, repeating until suffered to be handled and held upon the knees as if to be shod. A little apple, or anything of which he is fond, should be occasionally given, and he should be talked to kindly. The feet on the opposite side should be taken up in the same manner.

In mounting the colt and teaching to be ridden, there is a great sleight. The point is to face the back squarely, and with

a short hold of the halter or War Bridle, whichever used, catch the mane with the left hand, while the right rests lightly on the back. Make a spring upwards ; repeat this once or twice, and finally spring high enough to rest the arm upon the back a little below the elbow, holding in this position a little, and, if submitted to, moving around right and left. Gradually but carefully bring the leg over the back, at the same time touching the



FIG. 69. — One of the tests frequently given by the author in proving the effect of the treatment upon vicious colts when making experiments before his classes.

flanks and back with it until it can be thrown over, and you can sit upright. This submitted to well, get off, and now spring on again with the leg over the back, and push yourself back slowly but gently to the point of the hips ; let your halter or cord be held gently but firmly in the left hand, so that if there should be resistance, by pulling quickly the head will be pulled around towards you, and the hind parts thrown from you, while you glide off sideways out of danger. Simply repeat a little, and you can soon get on and slide back over the hips without the least resistance from the colt. I may say in this

connection that a few slight pulls with the War Bridle, right and left, will usually enable mounting a colt that has been quite nervous and resisted being mounted. But if the colt resists with energy, send him around until he becomes helpless and stands quietly. Then get to his off side, and spring upon his back as before explained. Should he resist, he will simply go around a few times, but he will soon submit. It was very

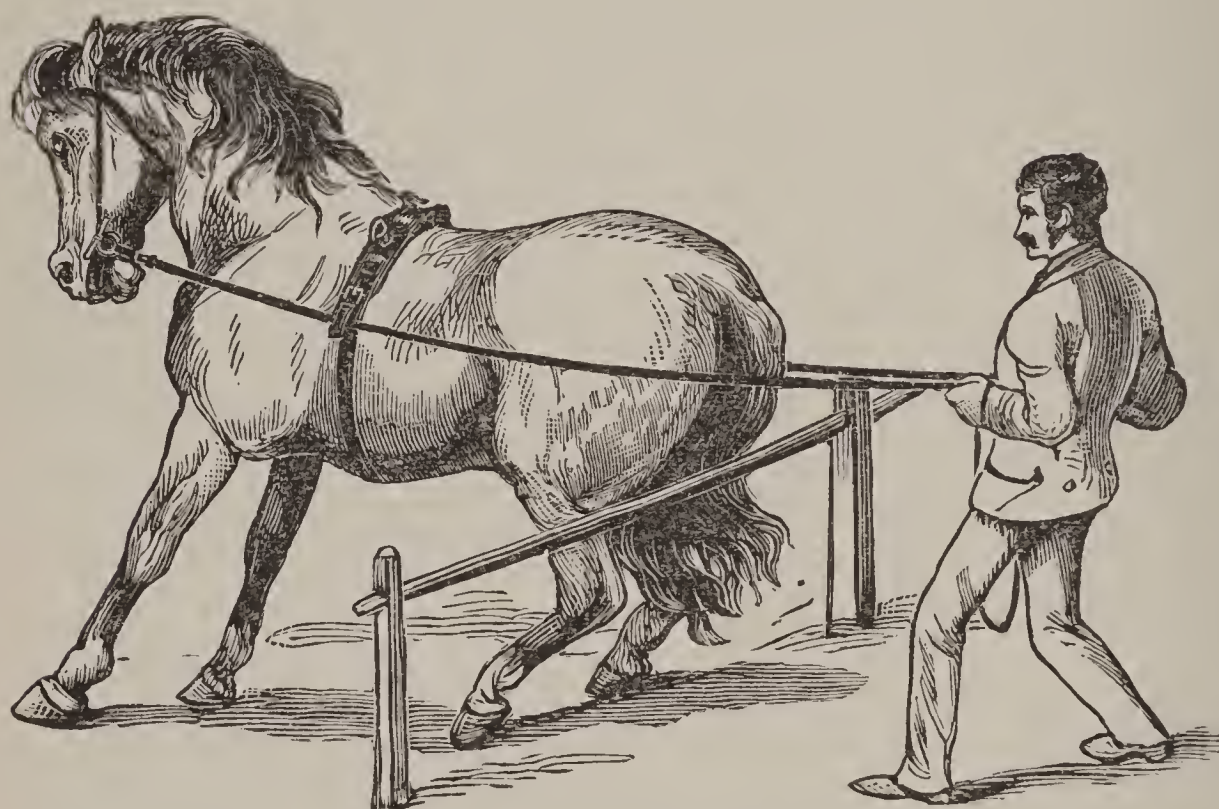


FIG. 70. — Method of backing the colt against rail or pole.

rare indeed to find a colt that we could not in a few minutes ride freely by this simple method of management.

If the colt is grown, and very wild and nervous, have prepared a small yard or a room that has no stalls, or sharp knots, corners, nails, or anything of the kind that he would be likely to run against and cause injury ; these points should be carefully looked to. If there is plank flooring, it should be covered with dirt, sawdust, or a little damp bedding, to prevent slipping. Get the colt in as quietly as you can ; do not run after him, swing the arms, halloo, or throw anything at him that would frighten or excite him. Simply get outside, and drive him in quietly ; if other colts are with him, get them out as easily as you can.

If he is so nervous that you cannot safely go near enough to put on the halter, have provided a well-made rope halter, with slipping noose ; next a pole, piece of edging, or something of the kind, eight or ten feet long. Drive a couple of nails about eight or ten inches apart near the end, hang the head part of the halter on these nails, with the nose part pulled well out, and with the end held in the hand ; with the pole, reach it out to the head gently, as shown in Fig. 61. While the colt is smelling of it, pass it over the nose, turn the stick around, and the halter will drop on the head back of the ears ; now by pulling upon it gently it will be found to be on the head securely.

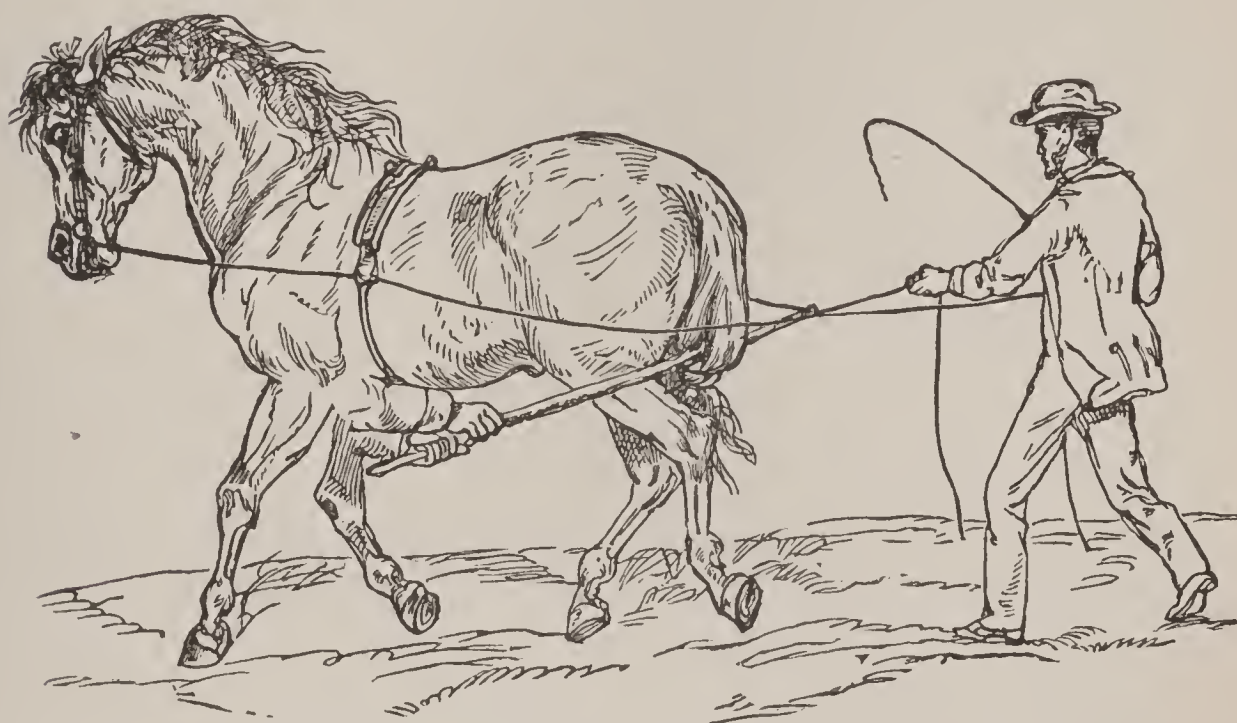


FIG. 71. — Bringing pole against quarters when first driven in harness.

In my practice, the course I usually pursued with very nervous, impulsive colts was to subject to Second Method, until all fear of being touched was overcome. If you are quick and active, get to the shoulder quietly, with a short hold of the halter with the left hand, and with the other catch the tail and run him around two or three times ; or tie the hair of the tail into a knot, and draw the halter strap through it sufficiently short to bring the body into a half circle, or nearly so. (See details, p. 57.) Hold with the right hand, while with the left you hold it well up near the head, and go around with him two or three times, or enough to throw him off his balance a little. Now tie

the cord into a half hitch, and motion slightly towards the head, and keep him moving until he becomes sufficiently gentle to be handled. Be careful not to tie short enough at first to make him go around so quickly that he will fall. Usually I sent such colts around both ways once or twice; then while moving, I brought a pole against the quarters until submissive to it. Bring the pole now over the back, against the quarters, under the belly, in fact, touch every part gently but persistently,

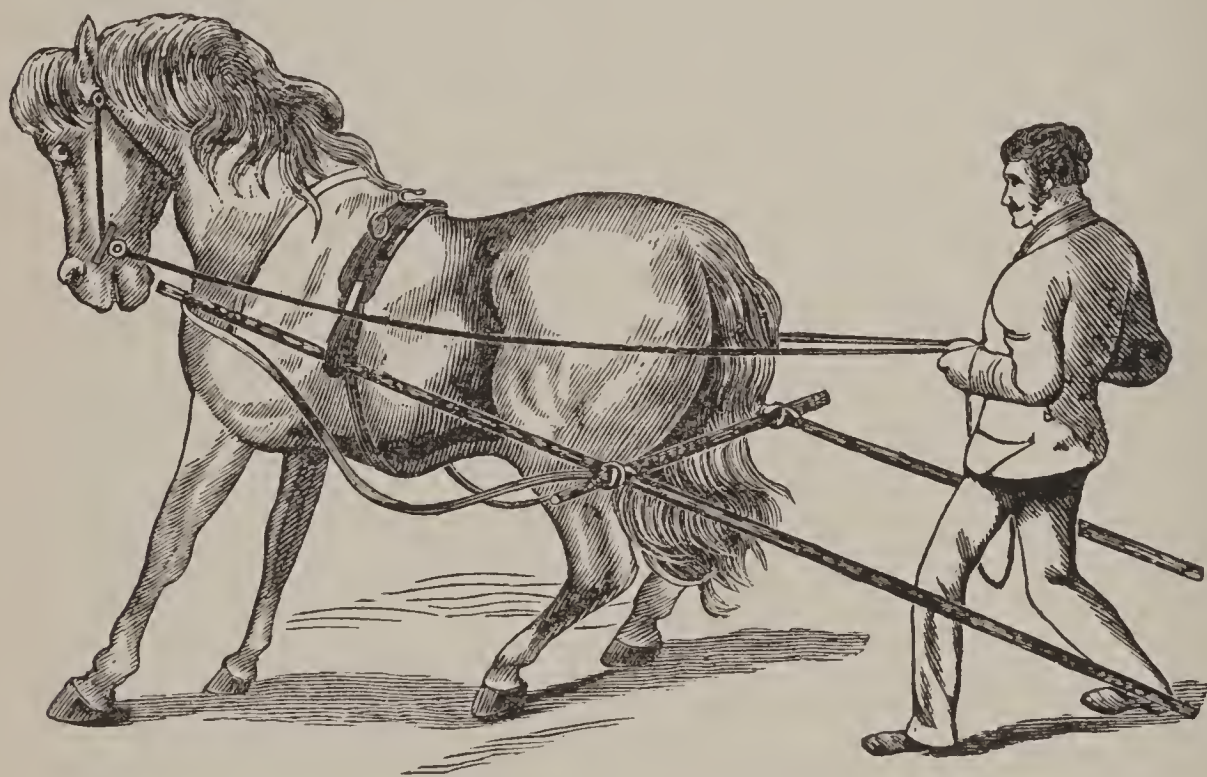


FIG. 72. — Testing the colt by driving in poles.

until there is not the least fear of it. Both sides and every part of the body must be rubbed and touched in this way. It is advisable, before untying, to take up the hind foot. Now untie and pole him all over again. If this is well done, all fear will seem to have disappeared; and no matter how nervous before, he will stand quietly, allowing himself to be handled and ridden, the feet taken up, etc. The change in the face will seem wonderful. It is only a very exceptional case that will require more than six or eight minutes to be made entirely gentle by this treatment.

If a strong, vigorous colt, the better way would be for you now to put on the War Bridle, First Form, as described under

that head, page 41, and a few minutes' treatment will teach him to follow readily.

The next step is to drive in harness. Put on the harness, with smooth snaffle bit, which should be so adjusted that it will not chafe or irritate, yet fit easily; tie up the tugs and breeching straps, and bring the reins back through the lugs or shaft bearers. I used no check or blinders upon colts or horses when subjecting them to treatment, always giving the head entire freedom, and able to see everything plainly. Now get behind, holding the reins low on each side of the hips, as shown by Fig. 71; touch lightly with the whip, and have him go ahead, or in long circles slowly. If he pulls upon the bit rather stubbornly, the Breaking Bit, if available, may be substituted; this will give all the power desired, but you must be careful not to abuse this power by crowding too much with it. At this stage have an assistant bring a pole against the quarters and flanks, until submitted to, as shown by Fig. 71; then back the colt sharply against a rail or pole so arranged that it will come against the quarters where the breeching or cross-pieces of shafts come, as shown by Fig. 70. If there is resistance, it must be carefully overcome before proceeding farther. This is a point that must not be neglected. But if the previous work has been well done, there will rarely be any trouble in making this point easily; but should there be, tie up the reins, put a halter over the bridle, and subject again for a few moments to the War Bridle or Second Method, until entirely submissive.

The foot-strap on one or both fore feet is very effective, and would be good treatment for these cases. The foot-strap was one of my strong points during my early experience; it is not, however, nearly so effective as the Second Method when properly applied, but being simple, safe, and easily used, may be tried to excellent advantage. This means of control will be found very good in giving security when hitching to wagon and driving the first time; but I found by practice that when once undertaken, the safest and best course was to make a colt so gentle and fearless there would be no resistance in harness that could not be easily restrained by control of the mouth with a

bit, which I could easily secure, if necessary, by a little training with the Breaking Bit.

It took me many years to learn these points of making the horse gentle and getting such control of the mouth as to be able to carry out the most absolute obedience when driving to wagon. I may add in this connection that if the colt is only two or three years old, he may, unless unusually intelligent, act very awkward and bad when there is an effort to drive him. In such a case you would better put on the bridle with snaffle bit, and leave on until accustomed to it; then put on an ordinary biting rig; but do not check short at first; let the head be comparatively free, and lead him behind while driving moderately to wagon. Be careful under such circumstances not to drive too far, so as to get the colt too tired; or you might let him run around awhile in an open yard, and repeat until accustomed to the bit; but in *no* case check up the head so as to be at all uncomfortable at first. Many colts are seriously injured, and not infrequently killed, by becoming frightened and maddened by the unusual restraint of a check, and throwing themselves over back.

If, on the contrary, the colt is three and a half to four or five years old, no matter how badly such a one may act at first, he will work in smoothly and quickly in driving. My best subjects were always colts of nearly or full maturity.

Continue your driving around, stopping and starting. If you use a whip, let it be a mere touch over the quarters to start him up; let him go straight ahead, any way he will. This point of starting and going ahead should be made the object of one lesson. You of course will now recognize the necessity of giving a signal for this, that of "Get up!" Instantly after this command, touch with the whip, and repeat at intervals until this is understood and is obeyed promptly. Next to stop; let it be done by calling sharply "Whoa!" and immediately stopping him by a sharp pull upon the reins; repeat this carefully until it is understood. It is surprising how quickly a colt of mature age will learn these points if you are only careful not to confuse or excite him. When he does well, stop and caress and talk to him; above all, give him something of which he is fond.

An important point is that you do not undertake to do too much at a time. Let the object be to teach him one thing at a time, and do that well before you proceed to the next. Remember, the more you try to push, the more you are liable to abuse and confuse the colt; and remember also that, unable to understand your meaning, the whole thing being new to him, you must at least give him reasonable time to be able to learn clearly what you want done. Imagine yourself in the colt's place, and you can better realize the necessity of exercising great patience and care. Go slowly, keep your temper, and you will soon be surprised and gratified to see how much you can do; and then, instead of being a cause of irritation and annoyance to you, you will feel in every way better and encouraged. This will be one of the most gratifying points to you, because appealing so strongly to your better nature that you will be better able to control your temper and exercise that care and judgment which is absolutely necessary in the performance of this duty above almost any other.

There is quite a sleight in teaching a horse to stop at command promptly and reliably. This is the one command that must be made sharp and obeyed quickly. Most people suppose that they must not speak sharply, for fear it would frighten a horse. The point is to make your colt feel that the sharper the command, the quicker he must stop. I commence, while walking very moderately, by calling "Whoa!" in a low tone; instantly afterwards I give a sharp little raking pull, — just enough to stop him, — then instantly slacken. Usually the colt will at first try to pull ahead; but simply repeat until he will stop. Now start him up again lightly, and after going some little distance repeat the command to stop; simply repeat until he will stop promptly and stand quietly as long as desired. Now commence making the commands sharper, and pushing him a little faster, until you can put him on a sharp trot or run, and by calling "Whoa!" quickly and sharply he will stop instantly without being pulled upon. This is a most important thing to do well, for the reason, that in driving, should the horse become frightened, or anything go wrong, requiring stopping quickly, there will naturally be an exciting, sharp command;

and the first impulse, under such circumstances, would be to spring ahead, whereas he must be taught to stop on the instant. This was one of my strong points in making a telling exhibition on the street. A colt perhaps that learned to kick and run away by something striking against the quarters, I would make stop at once by the wagon striking the quarters. Not only this, but I would put him on a run, perhaps throw the reins right out over his head, often allow myself to fall out of the wagon over backwards, as if by accident, and when the horse would get six or eight rods distant, gather myself up and yell "Whoa!" when he would stop instantly, with breeching loose and the wagon against the heels. Frequently I would take the sidewalk, and let the horse go along in the middle of the street, distant from me from six to ten rods, and show him under the most perfect control; for under such circumstances there would usually be such a rabble of boys and men yelling and making all the noise they could, as to be of itself sufficient to frighten any common horse. This was my secret also for performing the interesting feat, during one of my early campaigns in Western New York, soon after the war. I advertised that if the people would remain in the street, giving me twenty minutes from the time of leaving them, I would subdue the worst kicking, runaway colt they could produce, — one that had been spoiled. I would lead him out to the outskirts of the town, far enough to get out of sight, when I would overcome fear of being touched (which I would usually do in a few minutes); then quickly put on a harness with Breaking Bit, and teach him to stop at command; back him against a rail or something; then hitch him to my buggy, with breeching straps loose; now test him a little, and when found all right, remove the Breaking Bit, and put his own driving bit in the bridle. I would turn my own horse loose into town, and drive in at a rapid gait; and on the instant of getting in the midst of the crowd, with the horse perhaps on a sharp trot or run, I would throw the reins right over his head, and yell "Whoa!" and though the wagon was running against his heels, the horse would stop instantly.

The point of doing this in so short a time, and in most cases within view, would appear most startling to them, as I intended

it should. They would usually shake their heads and laugh, and regard it as something wonderful ; but as stated before, it only shows how easily the great average of horses can be managed when treated at all reasonably well.

Now the main secret was, first, overcoming fear of contact with the quarters, which in most cases I found very easy to do ; second, getting perfect control of the mouth, which I could usually do with a Breaking Bit in a few minutes ; and teaching to stop ; for “Whoa” under those circumstances was almost a startling yell, which the horse was taught to obey instantly. A point that I never told or explained to any one, and which was most mysterious, was that I always called for colts that had learned to kick and run away ; because such were mostly always of mature age, and would learn more quickly and submit to control with more certainty than an immature colt. This feat I performed daily without a single break or failure for nearly three months, in Western New York.

After the colt will go ahead, stop, start, and rein right and left nicely, the next step is to teach him to back. To do this, stand behind and say “Back !” and immediately give a little sharp, raking pull ; this repeat until he will back as desired. You must be very careful, in doing this, not to crowd so hard that there is danger of cutting or bruising the mouth, and particularly that you do not force him to the point of backing too freely ; let it be just enough so that he will, when pulled upon slightly by the bit, move back a step or two. If you are using an ordinary snaffle bit, and there is much resistance to it, it will be better to substitute the Breaking Bit, as it enables doing this a great deal easier. Should the colt become warmed up, and resist the effort to make him back, you should stop at once ; and when cool and over the excitement, repeat the lesson, when he will soon back freely. The reason I would caution you to be very careful not to force too far this point of backing, is that when the colt gets over the excitement, the mouth is likely to be so sensitive that should he be pulled upon sharply, and especially if exposed to imaginary or real excitement in front of him, he is liable to run back and upset the wagon, — an inclination that must at all hazards be guarded against.

If you wish to be particularly careful and thorough, now hitch to poles, as shown in Fig. 72. Get two straight, stiff poles, something like hop poles, ten or twelve feet long, with small ends forward, and lay on a small piece about six feet from forward end, 2 feet and 10 inches to 3 feet wide where the cross-piece comes, and tie on with two pieces of rope or straps. Hitch him into these as you would to shafts; simply attach the tugs by tying them in the pieces of strap or cord to the cross-piece. Driving around in these will accustom him while mov-

ing to being touched on the flanks, and if backed, the quarters come directly against the cross-piece.

It is needless to say that these progressive lessons, or steps, should be short, and that you should take particular pains when he does well to give him a little apple, and talk to and caress him. You should particularly make it a point to repeat exactly the same commands and



FIG. 73: — Natural docility.

in about the same tone of voice as first given, so that he can clearly understand them.

The next step is to drive to wagon. If a driving-cart is available, it would be a great deal better. These are now so common, and so admirably made, as well as so very cheap, that it would be most desirable to have one.* A colt can be guided and controlled very much easier in a cart than in a wagon, particularly in turning around. If, however, you must drive to

* A very superior variety of carts is made by Chas. T. Allen, of this city, Battle Creek, Mich., and at very moderate prices. The illustration here given is furnished by him.

wagon, I would advise the following course : Place him in front carefully, then rattle the wagon ; raise the shafts, and let them drop upon the ground two or three times ; then raise the shafts, and pull them forward against the quarters several times, at first gently, and repeat until they can be pulled forward strongly against him.

I should have mentioned, during the lesson in Driving to Harness, that the tail should be handled carefully and thoroughly, and the reins brought repeatedly under it, until there is no fear of them. You should be careful, too, not to be harsh in doing this. If hugged tightly, raise the tail for a few times gently, until no notice will be taken of it. Many a fine colt is spoiled by neglecting even this little precaution before driving to wagon. For more careful instructions on fear, see article on Fear, farther on.



FIG. 74. — Sullen treachery.

Another point : Be very particular that the harness is fitted nicely and yet loosely ; there must be no pressure anywhere. See that the belly-band is not too tight, so as to hurt or irritate, that the crupper or back strap is not too short, and particularly that the bridle is nicely adjusted to the head, that its throatlatch is not too short or buckled too tightly. Notice these little things carefully. You know how annoying a new coat may be when first put on, especially if it does not fit well ; and in the same way a harness, when put on the colt, even though nicely adjusted, must annoy considerably, so you can judge how it would irritate if badly fitted or drawn too tightly.

After submitting to the contact of shafts, etc., take him by the head gently with one hand ; with the other hold the shafts in place, and move him forward a little, and while doing so, pull the shafts against the quarters several times quite strongly. This submitted to, now run the shafts through the lugs, and attach the tugs and breeching straps in place.

Always hitch the colt at first where the road is wide and level, or in an open field. At the beginning let him go along on a walk, any way he will ; after moving a short distance, get out, talk to him, rattle the wagon, give him a few apples if you can, and repeat running the cross-pieces against the quarters. Remember you must on no account be over-confident, or try to

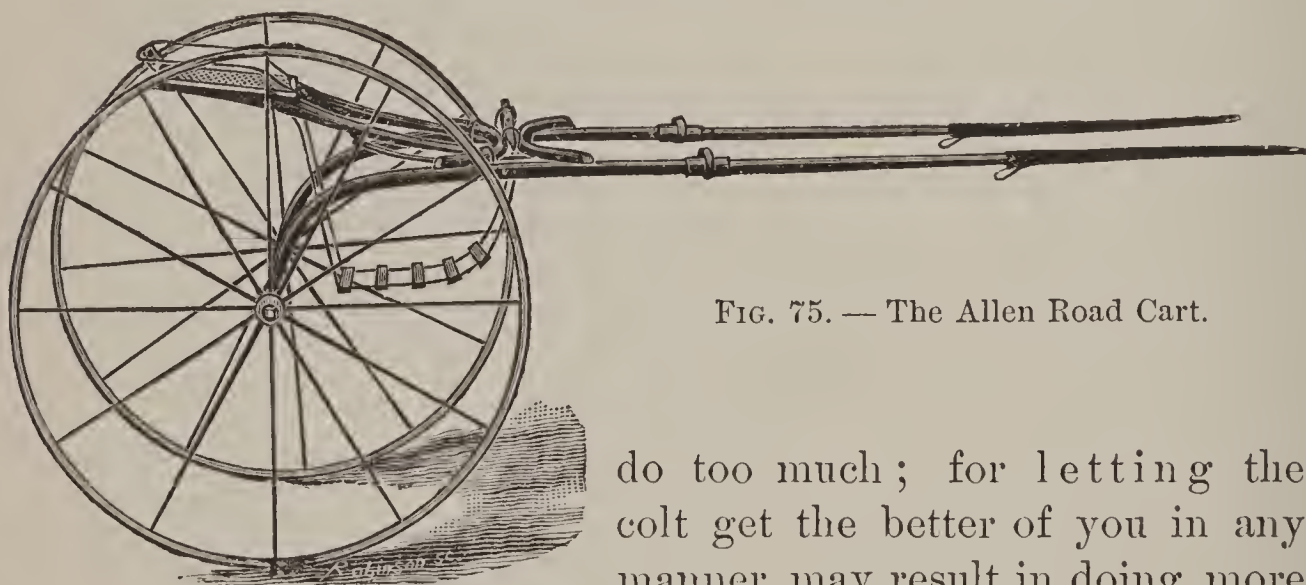


FIG. 75. — The Allen Road Cart.

do too much ; for letting the colt get the better of you in any manner may result in doing more harm in a few minutes than undoing all you have accomplished. It does not explain the matter, that the colt became so frightened as to resist you ; it simply proves that you were not careful and thorough enough. This is one of the points on which you cannot take any chances that can be avoided. But presuming the colt to be entirely safe, and every step made properly as directed, now let him move along up to a sharp walk, then out to a moderate trot, but on no account drive to the point of weariness or exhaustion. Let the lesson be short, and let the colt feel by your actions and manner that you are his best friend ; and to do this you must frequently rub his head, talk to him kindly, and give him apples, and he will soon work in so smoothly and nicely that in docility he will act the part of an old, gentle family horse.

I will add here, as an important point, that if the colt steps well, and it is desired to cultivate a fast trotting gait, there is more necessity for going slowly. First, let him out on a smooth, moderately descending road, holding up often, and speaking to him kindly. Gradually he can be let out faster and a little farther, but not to the point of breaking, nor so far at any time as to cause fatigue.

For a few times at each repetition of being hitched up, before attaching the harness pull the shafts forward against the quarters, moving forward a few steps, and then pull the wagon strongly against him while moving, thus the better to establish entire fearlessness of anything coming against him. At first start off in the same moderate manner, gradually increasing the gait. Another point in your preliminary training: In teaching to stop, let the point be thoroughly made, so that the colt will not start until called upon to do so. Now when hitched to carriage, a very little additional treatment will make him stand and wait as long as may be desired while getting in or out, — a very important thing in the carriage horse. If it is intended to hitch to top carriage, lead him around first with an umbrella held over his head, bring it over the back, etc. Next lead him around the carriage with the top down, and let him smell of it; then partly raise the top, and do the same; finally raise it in position, and let him examine it carefully; then stand him in front, and pull the buggy up behind him as if to hitch him in. In making this step, you should be very careful that the colt thoroughly understands it before attaching the tugs. I would repeat again that I used no blinders on colts. By all means let this training be done without blinders; and if a check is put on, it should be a very loose one, only sufficient to prevent throwing the head down too much. Now put down the top, and attach the tugs and breeching; get in and start off moderately. If you are alone, it is best to keep talking to the colt; this gives him great confidence. Now gently pull up the top in place, then throw it back. Repeat this a number of times while going slowly, until there is no notice taken of it. Then repeat the same while moving on a sharp trot.

Sometimes a colt will learn, while driving, to lug upon the

bit, or perhaps throw the head down upon the breast. It is a very nice point to be able to overcome this tendency at the start. Training the mouth implies submitting freely as required to flexible restraint. Now biting, however well it may be done, is only a partial step toward doing this, as it only holds the head to a fixed position of restraint. Not infrequently, when the head is checked high, and held there long enough to weary the muscles of the neck, as is common in biting, there is liability to rest the head for relief upon the bit, and thereby the habit of lugging may be learned. The annoying habit also of pulling on one rein, holding the head down when pulled upon, or refusing to stand, back, or rein freely, or refusing to rein but one way when excited or maddened, are habits that are often the consequence of this practice of biting. There has been practically no remedy for these difficulties; yet they are in most cases easily prevented or easily overcome by the simple method of training the mouth with the Breaking Bit. The point is this: While moving slowly, give a little raking jerk, when the pull is too hard, — just enough to break the pull; slack instantly, and so repeat. The same for throwing the head down and lugging, which will bring it up and back. Simply repeat until the mouth submits freely to moderate restraint, and the head is held up in position when pulled upon gently. Sometimes the colt will fight this quite hard for a time, but by a little repetition he will soon learn to submit to it unconditionally. He is simply taught that he will be hurt and punished if he pulls or throws the head down; that he will have entire freedom so long as he keeps the head up high and does not lug.

HITCHING THE COLT.

There are two points you must be very careful to observe in doing this. First, you should have on a smooth, well-fitting, five-ring halter. Be careful that it does not rub, or is so stiff as to hurt the head. These little things you should look to carefully. Second, you must have a cord so long, elastic, and strong that it cannot be broken, — elastic, so it will adjust itself to the back nicely, and play freely through

the ring in front. Nothing like a coarse, stiff rope is at all admissible. Use the best quality ; large size War Bridle is the best if you can get it. Anything like ordinary clothes-line or common cord on sale cannot be depended upon at all. Double this cord ; make a loop of one end, and bring around the body well back of the shoulders ; bring forward between the legs, and pass up through the ring or hole in the manger, and tie into the ring in the halter back of the jaw, as shown in Fig. 109. Let the cord be sufficiently long to enable him to step around freely, as if hitched by an ordinary halter. You must be particular, too, about another point. Hitch in a stall that is rather wide, and be careful that the ring or hold in the manger is no higher than the breast, higher or lower is objectionable. Be careful that, if a ring, it has no sharp edges that would cut the cord, and that this ring is so securely fastened it cannot be pulled out. If a hole in the manger, let it be large enough, and let the corners be whittled out, so that the cord will play through it freely. I am opposed to frightening a colt at first in any manner if it can be avoided, so at this stage would do nothing to make him pull. Let him stand quietly. When he goes back, as he may in a short time, he may make a little effort to get free ; but the moment he starts back, the noose part instantly tightens around him, and hurts his back a little. The first impulse will be to spring forward to avoid this. He may make a sharp pull or two, but it will end in his springing up to the manger and looking back a little frightened. Should he, in surging back, break the cord, or in any way get loose, he will very soon learn to pull with great determination. Preventing this by having everything sufficiently strong and secure, as stated, is a very necessary precaution ; then by this method he will not pull hard enough to become strained, and will soon learn to stand quietly under any excitement. If you wish to be very thorough, send him back a little after a while, then throw objects in front of him, to impress him as strongly as you can with his inability to pull loose. After hitching in this way for a few times, he can be hitched with entire safety by the head. You should always be careful to have a good, strong hitching-strap. Many horses

innocently learn to break their halter by being hitched with weak, poor straps that a little chance surge, such as may be induced by the horse being forced back a little by some trifling cause of excitement, may break; and once feeling the strap break, the habit is very quickly acquired. It is very important that a horse should stand anywhere under any excitement, hitched by an ordinary halter-strap. If you would be very thorough, hitch the colt in the open street, as before explained, and now test him hard.



FIG. 76. — A vicious man-eater subdued by author.

CHAPTER IV.

FEAR.

IF possible, you should never allow the colt to become seriously frightened at anything. Few know that a very severe shock of fear is liable seriously to unsettle the nervous system, or even destroy life directly. I could cite a good many cases if

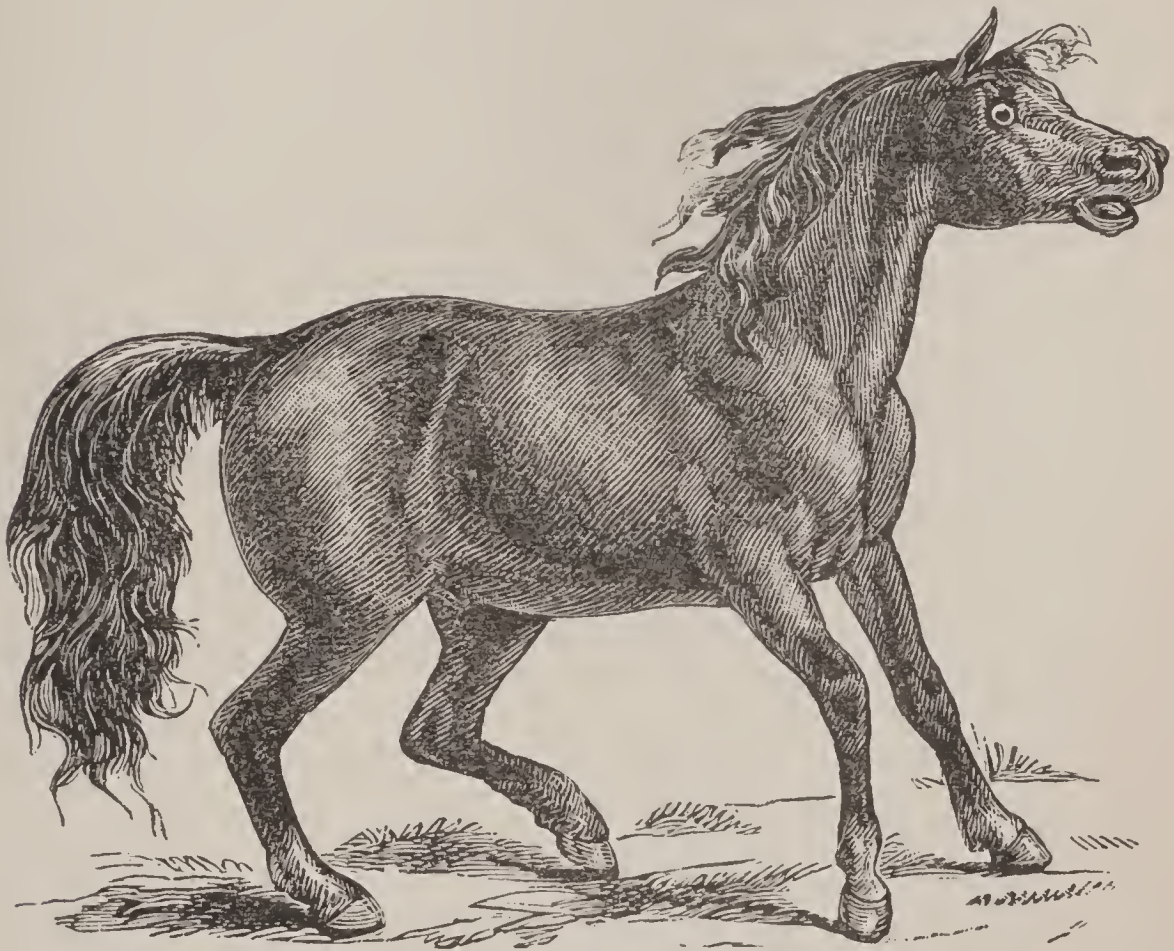


FIG. 77. — The colt excited by fear.

necessary. As an illustration, I include here a few cases coming under my observation within the limits of a few days. “In Rochester, N. Y., the other day, a horse was so frightened at an engine letting off steam that it trembled and fell dead from fright.” “At White Plains, N. Y., a horse was so frightened by a locomotive whistle that he dropped dead.”

The fear of an umbrella, a buffalo robe, white paper, the contact of an object with the body, fear of a top, unusual sounds, etc., etc., are shown to be frequently so intense as to be little short of insanity, and this too often by even a momentary impression. On the other hand, when properly treated, it is really surprising to see how quickly the most nervous colt can be made indifferent to even the most exciting causes of fear. While the great average of cases of fear are usually very simple and easy to manage, some of the most dangerous and

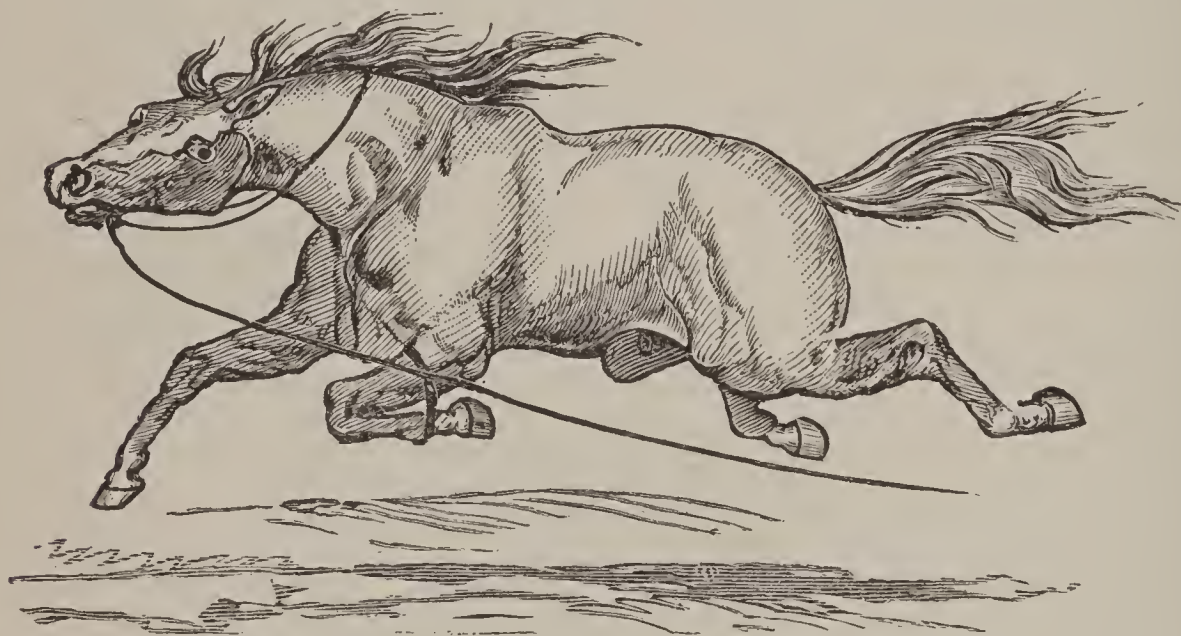


FIG. 78. — "Wild Pete," a representative case in large work.

difficult cases I ever found to treat were those exhibiting excessive fear.

Let us presume to make a few experiments, showing the serious effects that may follow even a very little carelessness or want of proper treatment. First, a colt is perhaps of a quiet, good character, or by the usual course of working before a plow, or driving double with a gentle horse for a while, is quieted down sufficiently to enable, with great care, hitching before a buggy. The usual plan in doing this is to guard against touching or exciting him in any way. If he moves off all right, it is taken as an evidence of his being a gentle, intelligent colt; but if he should become frightened, kick, and get away, it is accepted as proof of his being of so dangerous a character that there is no help for it.

Now in the first place it is seen that the very conditions of giving assurance of making the colt safe and gentle by accustoming him to being touched around the quarters and body generally, and by training the mouth until there is perfect control of it with an ordinary bit, which we can now do very easily by the treatment given, is entirely wanting. The consequence is that if even a dangling strap by chance touches the flanks ; if a rein is caught under the tail ; or if, in turning, the shaft touches the quarter, and particularly if the breeching strap should get loose or break ; or if by any carelessness the cross-piece or whiffletree is permitted to touch or strike the quarters, or any other little cause of derangement, the result will be such intense fear that the first impulse is to spring, kick, and try to get away. Contact of the legs with the shafts or wagon, together with the noise following, adds to



FIG. 79. — The noted "Wild Pete" excited by fear.
From forty special cases referred to.

this fear ; there is no adequate control of the mouth, and the consequence is a thoroughly frightened, kicking, runaway colt, with the common result of smashing things to pieces, the horse perhaps seriously injured, and with the throwing out, and possibly serious or fatal injury, of the driver or others in the wagon, and all this in consequence of neglecting or disregarding the commonest necessary principles of treatment. On page 27 is given the result of a very interesting experiment, which should be carefully read in connection with instructions here given.

In training to harness, we should aim first to overcome all fear of the hind parts being touched, next to get the most per-

fect control of the mouth, as explained under the head of Colt Training, full details of which are given under that head. In a word, to teach the colt in the most simple and direct manner just what he is wanted to do and in a way to compel his sure and quick obedience. Dependent upon the control of the mouth in driving, it is necessary to have the most perfect control with the reins, and this, too, with a very slight exercise of strength.



FIG. 80. — Letting the colt feel and smell of an umbrella.

A point, the importance of which I found it very difficult to make my scholars understand, I will try to make clear to you by presuming to make a simple experiment. The first sensitive colt you have, accustom one quarter and side to be touched and handled until there is no fear exhibited. You would naturally suppose that the colt would understand that touching the opposite quarters would not be a cause of fear. But upon trial you will find he will likely show as much fear of being touched upon this part as if he had not seen the

pole, or had not been previously touched by it. In relation to fear of white paper, contact with wagon, etc., see page 102, also in *Colt Training*, page 83, which will be found sufficiently explicit, showing the necessity of understanding the conditions and principles of treatment which, properly carried out, will make the colt fearless and gentle in harness.

As noted in instructions on *Colt Training*, you are not to presume, because the colt does one thing nicely, or is fearless of it in a certain position, that he is to be equally so in another,



FIG. 81. — Bringing umbrella over the head.

or under other circumstances. In his training, have him understand fully by his own way of reasoning what you want him to do and the innocent character of objects brought to his notice.

If in driving to wagon, an object such as a stone, stump, or anything else unusual excites much fear, and especially if the horse is sensitive, stop him instantly, speak encouragingly in a low, confiding tone of voice, at the same time keeping

careful hold of the reins, but not pulling back any, as a very little pulling may induce him to run back and attempt to turn around, a very dangerous trick that must be guarded against. After looking at the object for a short time, he will usually quiet down, when move him forward a little, and so repeat until it can be passed. If he is particularly sensitive, and there is much danger of his jumping around at once, get out and lead him forward quietly and up to the object if you can, until he can be moved by without excitement.

If afraid of a robe, while holding the horse by the halter (War Bridle would be better), stand on the off side of the

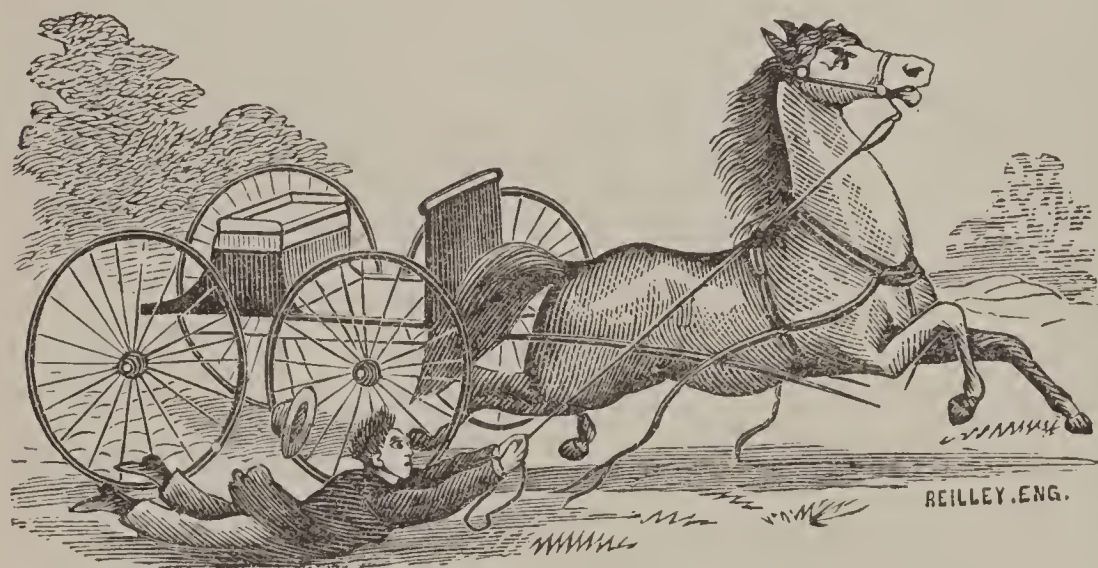


FIG. S2. — Runaway accident caused by fear.

head, and gently bring the robe up to the nose until he can smell of it. If this is borne, bring it against the head and neck and over the body generally. Usually a horse once frightened at a robe will show great repugnance to it, and may resist its contact very hard; if so, by far the best course will be to subject him to Second Method. Now bring the robe to him as he will bear, until compelled to submit to it, when rub it all over him carefully. For a few times the robe should be brought to his notice gently, until accustomed to it. During my early experience I depended mainly upon the War Bridle for control in doing this; but in all serious cases the Second Method will enable by far the best results.

FEAR OF UMBRELLA AND PARASOL.

While held by the head by the halter or War Bridle, bring the umbrella or parasol, while closed, gently to the nose, then pass back over the head and neck. Then open a little and repeat, and so continue; at each repetition open a little more, until it is fully spread, and can be passed over the head and body generally. Be careful to go around behind and on off side, gradually swinging it in the air until there is no fear of it.

SOUND OF A GUN.

Commence by snapping caps at some distance from him, gradually going nearer until it can be done over the body,



FIG. 83. — Greatly excited by fear.

neck, and head; then put in small charges of powder and repeat, and so continue until a full charge can be fired over or near the body, as desired.

RAILROAD CARS.

If in harness, commence by driving around at some distance (it would be best to have before a cart, if available); now drive slowly nearer, and so continue until the cars can be approached quite closely. Be careful not to allow the whistle to

be blown too near, or any unusual sound that would startle him too suddenly. In a word, grow him into confidence in relation to such objects. Of course, much will depend upon being able to control the motions of trains or engines, or on opportunity to drive around where they are. It is a very serious thing to allow the horse to become much frightened at cars. If the nervous system is not really shaken seriously, subject him to a sharp course of treatment, and then commence back again as if managing a colt, which will enable doing a great deal.

We sometimes performed very interesting feats in the control of horses greatly afraid of cars and engines. If very vicious and dangerous, we subjected first to such treatment as would enable driving with safety in harness without kicking; then, if possible, while steam was thrown off largely, we rushed him under it so as to be apparently in the midst of the excitement. It is a singular fact that a nervous horse will show very much less fear in the midst of a crowded, noisy, city street than he would in the country. The effect is the same in rushing him into the midst of the steam; being apparently in the midst of the excitement, he will seem to do nothing, and will give right up. This on no condition should be done while hitched to a buggy, but should be done by driving in harness, as shown in Colt Training. Once up there, the treatment will be simple. Simply repeat by driving around.

CHAPTER V.

BALKING.

THIS is a habit that is always the result of bad management, and for which there can be no valid excuse. Neither will it be found difficult, with care, to manage the worst cases by the treatment here given.

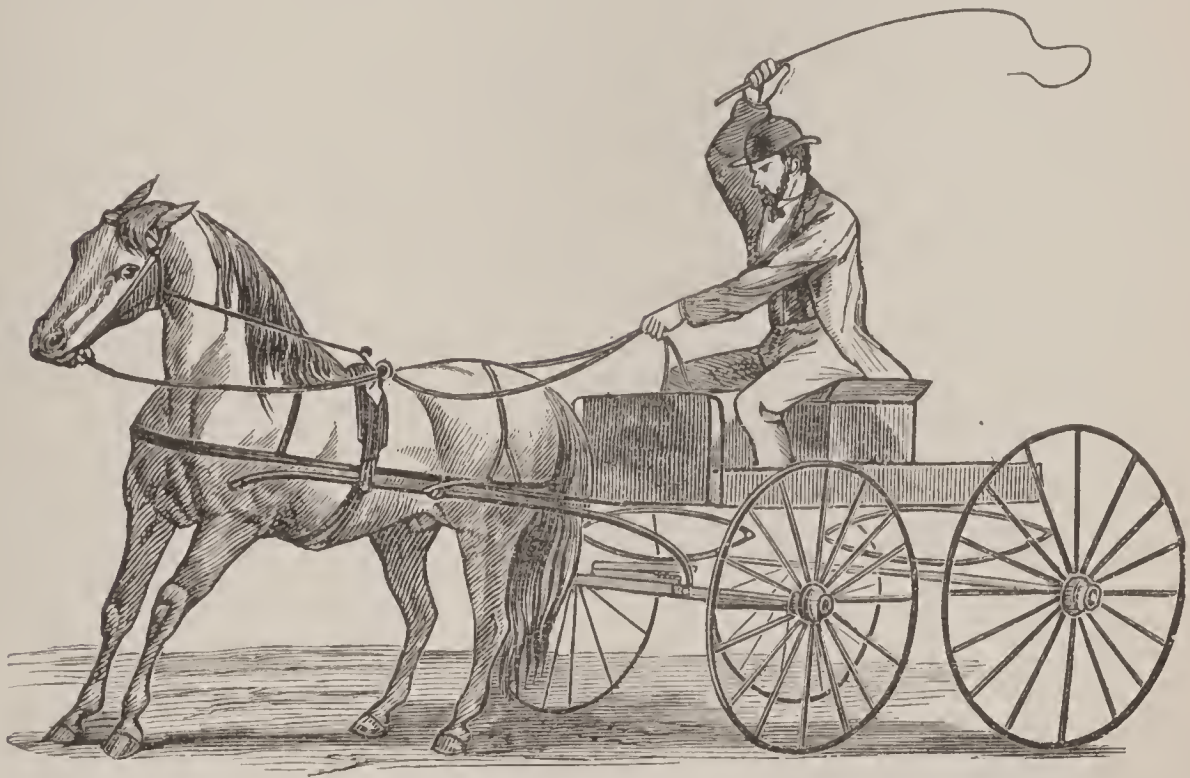


FIG. 84. — As the horse will sometimes stand, regardless of the most severe whipping.

In teaching a colt to drive, let him go at first slowly and almost as he pleases. There should be sufficient room so as not to require short turns, as pulling short around before learning to rein is liable to irritate and make him balk. If there appears any inclination to stop, or if he refuses to go, sit quietly in the wagon, fix the harness, or do anything to take up time until he gets over his fret; or get out and move him a little to the right or left, speaking to him kindly, and it is

rare that he will not move off without knowing that he has balked. If he has an irritable disposition, and appears unwilling to stand, particular care should be taken to teach him thoroughly the lesson of stopping and starting, as described under that head in *Colt Training*, page 91. If the habit is only partially learned, and especially if the colt is of a warm-blooded nature, it is by all means advisable to win him out of it if you can by good management.

Sometimes very simple treatment will enable starting a balky horse, as kicking the leg lightly below the knee until he lifts his foot; passing a string over one of his ears, and tying it down; letting the horse inhale a little ammonia or red pepper. These are very common tricks, and will sometimes disconcert a horse sufficiently to cause him to start.

You can sometimes start quite a stubborn balker by stroking his nose, pulling his ears, etc. Grasping both nostrils with the hand to prevent his breathing until he struggles for freedom, and turning him a little sideways at the instant of letting go, will frequently start quite a bad horse. Tying the tail to the cross-piece has been quite a secret in making a balker start. It has the effect of disconcerting and annoying so much that there is an effort to get away from it. Blindfolding is one of the simplest and best methods of starting a balker. After being blindfolded, he should be allowed to stand a few minutes, then move him right and left a few times, say encouragingly, "Get up," and the horse will usually pull steadily against the collar and move off all right. Tying up the fore leg, and compelling him to stand on three legs until tired, will usually be very effectual, and a few repetitions will generally break up the habit. This method works best on nervous, impulsive horses.

A mare in the habit of balking, although occasionally driving well for weeks at a time, one day got into one of her balking tantrums. Her owner, becoming angry, determined to kill her. Taking a gun from the hands of a sportsman who happened to be standing near, he fired the charge of shot into her body. It did not kill her, and on recovering, she was put to work as usual. It was found afterward that whenever she

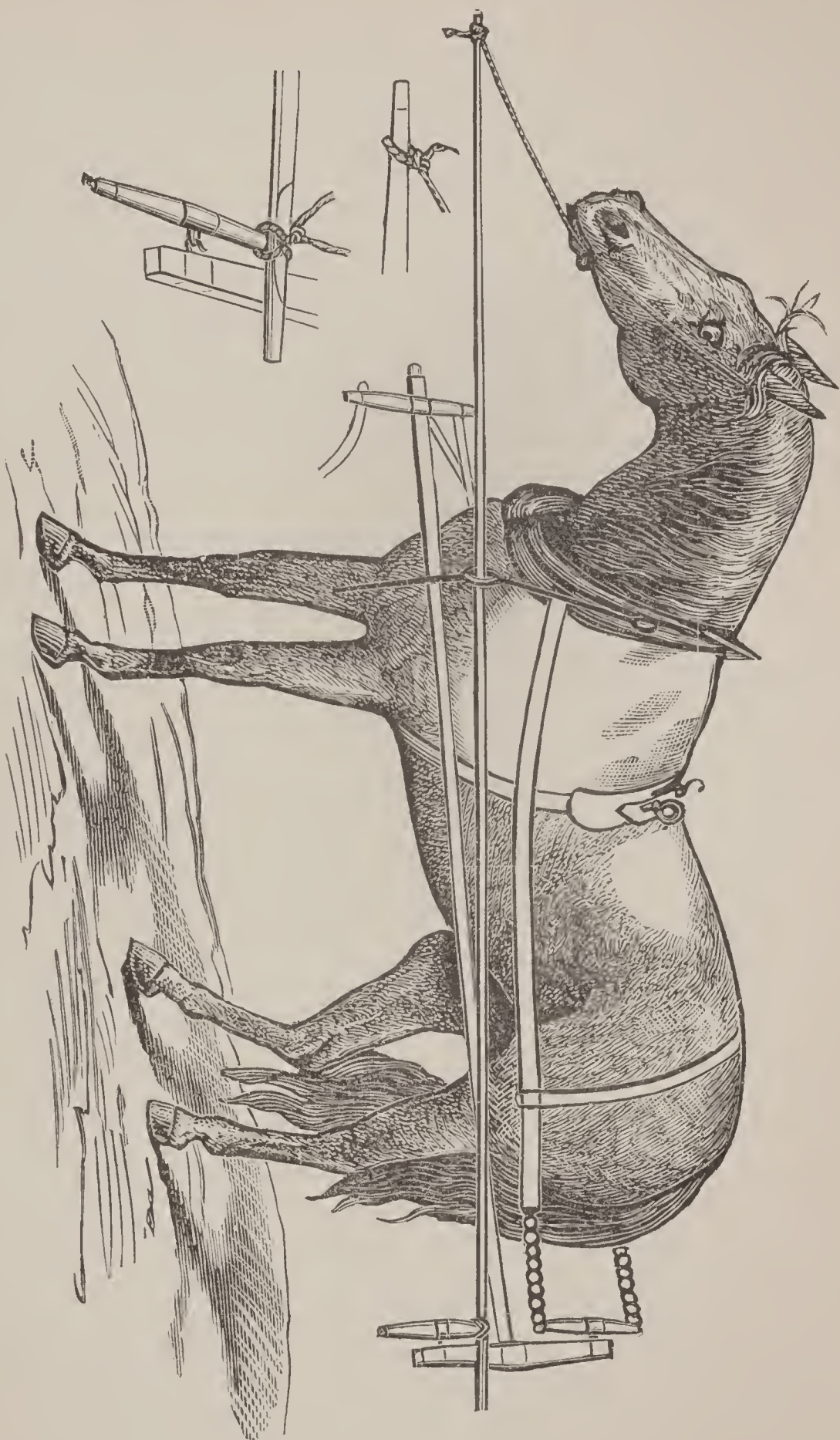


FIG. 85. — Arrangement for breaking a balky in double harness.

balked, simply pointing a stick at her was sufficient to make her start at once.

A horse employed in drawing limestone to a kiln from a quarry close by, was in the habit of balking. One day he refused to pull, and, in defiance of the strength of several men, who caught and held the wheels to prevent the accident, backed over the precipice, falling about thirty feet. The cart was broken to pieces, but the horse escaped with slight injury. He was put to work as usual, but was never known to balk afterward.

STARVING.

A farmer who was once a member of my class made the following statement in relation to his managing a balker: He had a mare that would sometimes work well for a week, and then, perhaps at a critical time, would stand stubbornly, resisting all effort to move her. One day while drawing in oats, she balked. After working with her a long while, he resolved that she should go or starve. He drove a stake down in the ground, and tied her to it; then putting a sheaf of oats a few rods distant, he went off. This was at ten o'clock in the morning. About five o'clock he returned and tried to start her, but she would not go. He tied her again to the post, and let her stand until morning. Then he unhitched her, took the reins, and tried to start her, but she would not pull. During the afternoon he tried her again, when she went. Upon reaching the sheaf of oats, he let her eat it. He now drove her home, unharnessed and fed her, then put her to work. She worked all right for a few days, and then balked again. This time he let her stand forty-eight hours, and then fed her, when upon trial she went all right, and he kept her at work. She never balked afterward. These facts were given me by the man himself.

Another man of much genius in the management of horses, who was also a member of one of my classes, told me that he always succeeded with balkers by the following treatment: When a horse balked, he unhitched and put him in the stall, and stationed a man behind him with a whip. Every minute or two the man tapped the horse on the quarters with the

whip, just enough to annoy him. This was kept up for twenty-four hours, the regular feed and water being given. If he refused to go upon being tried, he was put back, and the same treatment kept up to *prevent* his *going* to *sleep*, until he would go as desired. It was rare that a horse would not work in all right after one or two treatments of this sort. Innumerable instances of breaking very bad horses in this way have been brought to my notice by horsemen who have been members of my classes. Turn to page 27, where will be explained the simple treatment used by the author with decided success. Read also what is said on page 19 by an amateur in breaking a very bad balker. After the horse got well enough to work, the man bought a half bushel of apples, and directed the driver as to the management, following exactly the course given by the writer, commencing on page 26.

SIMPLE TREATMENT.

If the horse is nervous and impulsive, and will balk if not allowed to start, I would advise the following course : —

If you have a Breaking Bit, and you are good in practical management, first teach him to stop and start, as explained on page 90, and do this well. When hitched to wagon, go to the head and stroke it, then go back to the wheel ready to set him back sharply should he move. When desired to start, take him by the head, and, after going a few steps, call “Whoa!” If he does not stop promptly, pull back sharply upon the reins until he will do so. Reward for standing; punish for moving. Having once learned to stand and wait, get on the step and make a noise; this submitted to, get in quietly and sit down.

Now commence cracking the whip, yelling, etc. Should he move, punish by pulling back sharply, and saying “Whoa!” Then repeat cracking the whip, etc., until he will stand quietly. When he will stand while in wagon, get out and caress him, walk around carelessly, crack the whip, etc. The instant he starts, call “Whoa!” and pull him back again. Repeat this until he will stand under any excitement, and the impression becomes fixed.

Horses of this character are sometimes very sensitive, and require nice management, because they are so easily taught to balk.

If you are not very practical, and wish to use the simplest treatment, turn the carriage to face a barn or high fence, and quietly hitch the horse in; then go to his head, caress, talk to him, and give him some apple. Be in no hurry, but hold his attention in this way several minutes. When you want him to move, walk ahead a little and say, "Get up!" or "Come!" After going a few steps, stop and repeat the rewarding.

There will be less inclination to rush ahead when a barn or high fence is in front, and you are standing directly before him. In addition to this, his attention is attracted by the apples. In this way repeat until the obstruction is reached, when it will be easy to turn or back short around. Gradually get back opposite his head and shoulders, with each repetition going farther back till the wheel is reached, when mount the step and get into the wagon. Repeat this until the horse is obedient to wait for the driver to get in, stopping and starting as desired. Now drive farther, and take some one in with you as if to take a journey. First, drive where the horse is least likely to resist, but finally in front of the house, or other place, where there has been most trouble. The hitching and unhitching should be repeated, and his attention held as before with apples, etc., in the meantime talking, walking around, and rattling the wagon. A little care should be used, especially after idle spells, to hold the attention by giving apples, etc., or have some one stand at his head and talk to him, but not to take up the reins until ready to start. If in a barn, keep the door shut until ready to move. A great deal will depend upon the tact and good management used. It is rare that horses of this character will not submit readily to a little good management.

REGULAR TREATMENT.

When the habit is thoroughly fixed, and it is desired to use regular treatment, the course I usually pursued with most success was, first to provide a good strap halter, a War Bridle, and

some good apples ; then to hitch the horse where in the habit of balking, or drive him until he balked. Now be ready for him. Take him out at once, tie up the reins and harness carefully ; put on a halter over the bridle, and subject him to the Second Method of Subjection. Now in this case you must be provided with a good bow whip, and if he does not move promptly, give him a few sharp cuts across the tip of the nose, enough fairly to startle him. Very soon he will be thrown off his balance so much as to be completely disconcerted and break up his confidence. This treatment makes a powerful impression on him in two ways : First, by convincing him that there is power to make him move, which is the important point to be established, as he does not know the difference between going sideways and straight ahead ; second, by throwing the mind so completely off its balance that he is diverted from the purpose of resistance.

Put on the War Bridle under the bridle (the Double Draw-Hitch Form first is best), and lift him out of his tracks right and left a few times until he will follow instantly. Be careful to have on leather gloves, to prevent the cord from chafing or breaking the skin on the hands. When he follows promptly, change to Second Form. Now pull upon him sideways and ahead ; as he yields, pull on a line with the body, until he will come ahead promptly. Now tie up the cord loosely in the terret, take down the reins, run them through the lugs, and get behind and say “Get up !” At the same time touch the quarters with a whip sharply, and drive him around a little, stopping and starting him. When he does this well, attach him quietly to the wagon. Start him very gently, making him start and stop at command promptly. Should he resist, take down the War Bridle, and give him a few sharp pulls. Usually this will be all that will be necessary, very much depending upon the character of the horse and how the treatment is applied. These cases must now be treated very carefully, holding your point, if you can, by good management. You cannot well overdo the matter of giving apples and diverting the attention by kind treatment of this character, especially if the horse is at all impulsive.

But if he balks again, take down the cord, stand in front of him, a little to the right or left, and give a sharp jerk, repeating until he will go at command. Should this be resisted, which in a bad case is probable, repeat the previous treatment, which, in some cases, may be supplemented by the other methods of subjection. Test the horse hard before putting him at regular work. Patient good management, as before explained, is indispensable. We found many horses which could be neither ridden nor driven, and were practically unmanageable; yet we never found a case we could not break readily by this treatment, and with care it gives ample power to break any balky horse without difficulty. I would, however, advise trying thoroughly the simple good management as explained on pages 26-29; certainly if it is used carefully, in connection with the coercive treatment described, there should be no serious trouble in managing any case.

It is a notable fact that a rough, abusive owner will have the reflex of such treatment exhibited by an irritable, treacherous character in his horses and domestic animals generally; while the opposite treatment, kindness and patience, will be shown by confidence, docility, and good character, and in no respect is this manifested more plainly than in preventing and overcoming balking.

To adapt treatment to each peculiarity of character and resistance, would involve more extended details than there is space to give, so that it must be understood that with the general instructions on Subjection, and the details given here, together with reasonable ingenuity, there should be no trouble in successfully adapting the treatment to all ordinary cases.

I will mention some illustrative cases:—

A man who had once been in my school, told me years afterward, upon meeting him, that he had a horse that balked in plowing, and he could do nothing with him, he got a rail and adjusted it as well as he could.* The first time he started

* He did not train the horse at all as directed, and under the circumstances could not apply the treatment properly; it was consequently a matter of chance that the experiment was a success.

the gentle horse, he jerked the balker out of his tracks. The second time he started him, the balker went right ahead when he put the plow down to the beam. The horse never troubled him afterwards.

When in Mass., an Irishman wished to join the class if I would break his horse of balking. I explained to him that I could not do this before the class, but promised that he should be instructed so that he would be able to do it himself at home, and, if not successful, I would return his money the next day at a neighboring town, which was nearest his home. Next morning, as I expected, he came forward delighted, stating that in ten minutes he got his horse to working perfectly, etc.

Another instance in Me.: A poor man stated that his team was worthless to him because one of his horses balked; but he reported next day that with a few minutes' effort he got the horse to working all right. I could refer to a great many instances of this character, which are explained quite fully in my large work.

CHAPTER VI.

KICKING.

IT is not to be supposed that a horse is naturally vicious and bad because he kicks. If the colt is treated as directed, page 83, there will be but little danger of his learning to kick or resist control in harness. However, when once learned, it



FIG. 86. — Effect of bad treatment.

is a very serious habit, and one that must be treated carefully and thoroughly to be successful in overcoming. It will be noticed how carefully I call attention to the necessity of overcoming every semblance of fear and resistance to being touched around the quarters, in the training of colts, to make them safe. In like manner, in combating this habit it is not sufficient that the horse should drive all right when free from excitement. He must be made to submit unconditionally to any and every cause of aggravation that before excited his resistance, in order to give assurance of his good character and safety afterwards.

Before driving a new or strange horse after purchasing, you should test him very thoroughly to know exactly what he will bear; and if not found safe, make him so, which you can easily do by a little effort.

The greatest average of horses brought me to experiment upon before classes were kickers, — frequently kickers of so nervous and violently dangerous a character that they could not be even put in shafts without their kicking and resisting control in the most desperate manner.

If any one had a particularly bad or unmanageable colt, or a young horse that had been spoiled in the effort to break him,



FIG. 87. — Horse driving gentle.

and could not be broken, I was almost sure to get him; and many of these cases were frequently such reckless, dangerous kickers that it would seem as if no human power could control them. Yet they were usually our most interesting and easiest subjects. I always made it a point to hitch up and drive such horses, and make them submit to the most severe trials, driving without breeching, etc., without their attempting to kick or try to get away.

The most important point I learned in the management of these cases was, when very vicious, to throw aside all palliative treatment and take them in hand by a quick, aggressive course of subjective treatment. As to the best treatment to be used upon all ordinary vicious kickers, that must depend upon

the temperament and the character of the kicker. If a young horse that was very nervous, the kicking excited mainly by fear, I usually overcame general resistance and fear by subjecting to Second Method, sometimes alternated with First Method, and if the case was suitable, the Third Method, and forced him to submit to the contact of the pole, as described for Colt Training. This point I followed up until in a general way entirely gentle and submissive. I then carried control to the mouth

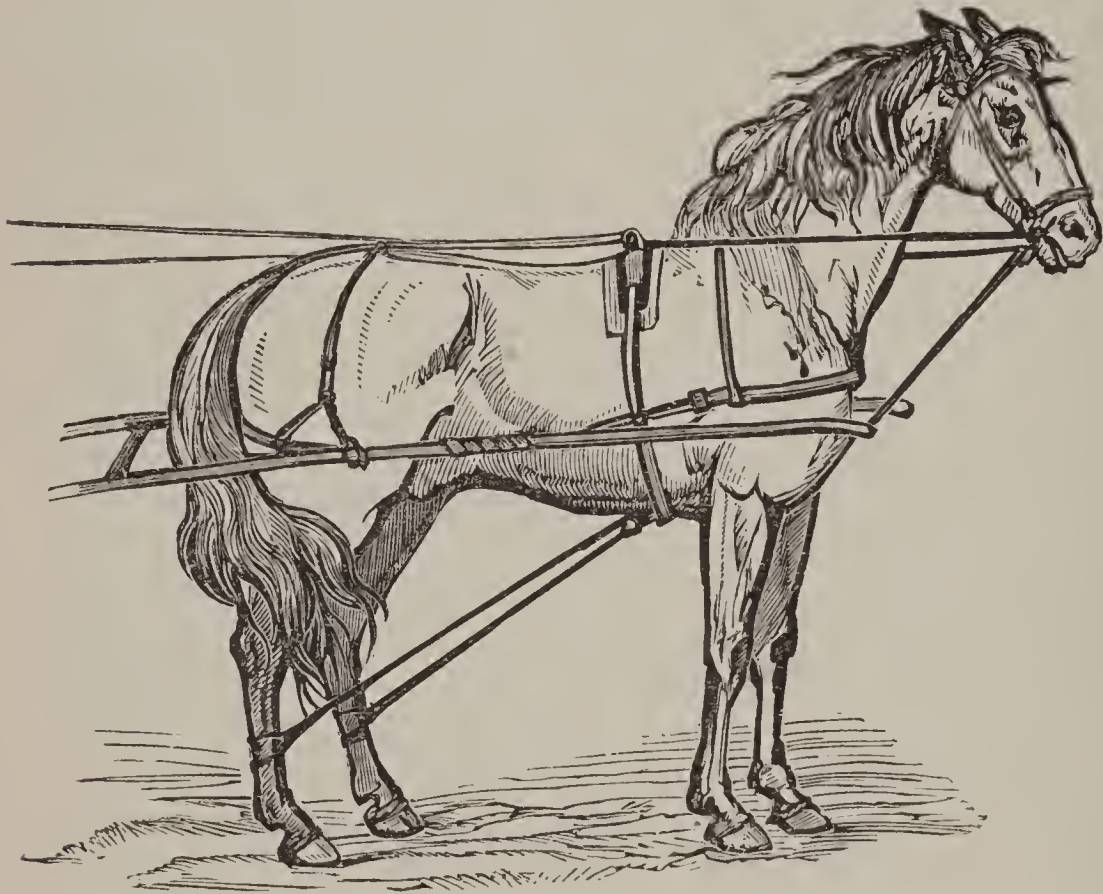


FIG. 88. — Kicking-strap as arranged for use.

with the Breaking Bit, treating about as directed for colts, driving him around, and submitting to be touched around the quarters, backing against a pole, etc. This point must be accomplished thoroughly so as to be submitted to freely, then hitch to cart, — or poles would be better, until reconciled to drive to shafts.

If a very reckless case, five or six or seven years old, and one that seemed to kick as much from habit as from sensibility, and possessing great courage and endurance — if I had a good place, I usually submitted the horse to a sharp lesson by throwing repeatedly and rapidly by First Method. I did not expect,

however, to be able to make my point by this treatment, but do what I could with it, and then I subjected to the Second Method. If I did not have a good place, I used Second and Third Methods ; then, as before, I held and carried out control with the Breaking Bit until successful. If I found the case would not bear excitement, I usually submitted to the Third Method. Sometimes six or eight or ten minutes' treatment with this would be sufficient to control a very bad case. But I preferred, if I could, to use a combination of treatment, as I made a more rapid and effective impression. Only very exceptional cases required more than from ten to fifteen or twenty minutes to bring them under perfect control.

During my early experience I used a great deal of rigging, such as kicking-straps, high checking, and other means of disabling a horse in harness. But during my later years on the road, I practically discarded all this sort of treatment for the direct coercive treatment described. When I overcame resistance by this treatment, I laid the foundation of my work so thoroughly that the rest was usually easy.

A great deal depends upon how the treatment is applied. A man may use either or all the methods, supposing he has done all that it is possible to do, and fail to subdue the horse ; yet I could use the same treatment immediately afterward, and succeed without difficulty, the only difference being in the proper application of the treatment. This I frequently proved over and over.

The point accomplished of making the horse gentle in one position to be handled and poled, it must be carried to driving in harness, which is the real point to be attained ; for however gentle the horse may be at this stage, he may still resist with great recklessness when driven to wagon. In many cases he may, if thoroughly subdued, be safely put to a wagon and driven ; but if at all doubtful, this should not be attempted until there is assurance of making this point safely ; for in the event of kicking successfully, a great point will be lost.

No matter how well the horse drives to poles, it is no assurance that he will be reliable before a wagon. The increased noise and rattle of the wagon will be an additional cause of ex-

citement, to which he must be accustomed. Before hitching, repeat the touching around the quarters and flanks with a pole. If he has been much frightened at the wagon, let him feel and smell of it; at the same time rattle it until he is accustomed to the noise, and encourage him by giving apples, etc.; then put him in shafts. Pull the wagon forward, at first lightly against the quarters, gradually repeating until it can be brought against the parts quite hard. Now by starting him a little and pulling the wagon behind in this way, it can be ascertained what he will bear.

Attach him to the wagon without buckling the breeching-straps, get in, let him go slowly a few steps, then pull him

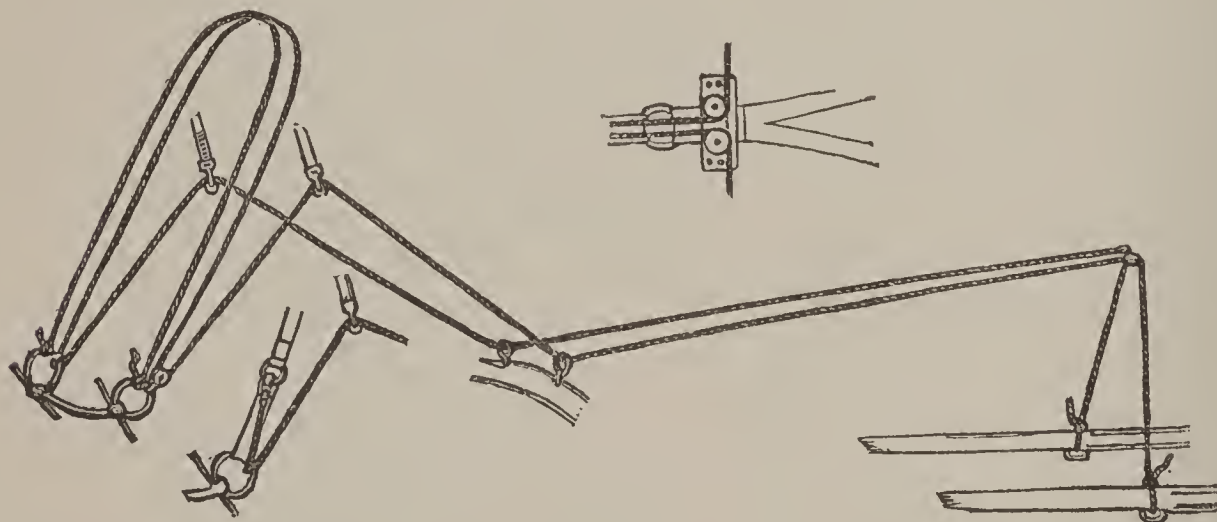


FIG. 89. — Simple method of forcing the head up, and preventing kicking by the elevation of the hips.

back sharply, saying, “Whoa!” which will bring the wagon as before against the quarters. Repeat, driving him faster and faster, until he can be put at a moderate trot, and then increase to a run. In this way he becomes thoroughly reconciled to the noise and excitement of a wagon, as well as the contact with the shafts. Of course, when it is desired to drive in the regular manner, the breeching-straps must be buckled.

A very important point, and one that should not be neglected, is that when the horse behaves well, he should be encouraged by giving apples, talking to kindly, etc. A great deal also depends upon the temperament of the man. Some men, whatever their experience with horses, seem to be as

poison to them, being not only thoughtless and impulsive, but not capable of using good sense. If the case is bad, read instructions very carefully before taking it in hand.

RUNAWAY KICKERS.

The treatment for runaway kickers is practically the same as for horses of the previous habits, the difference being simply

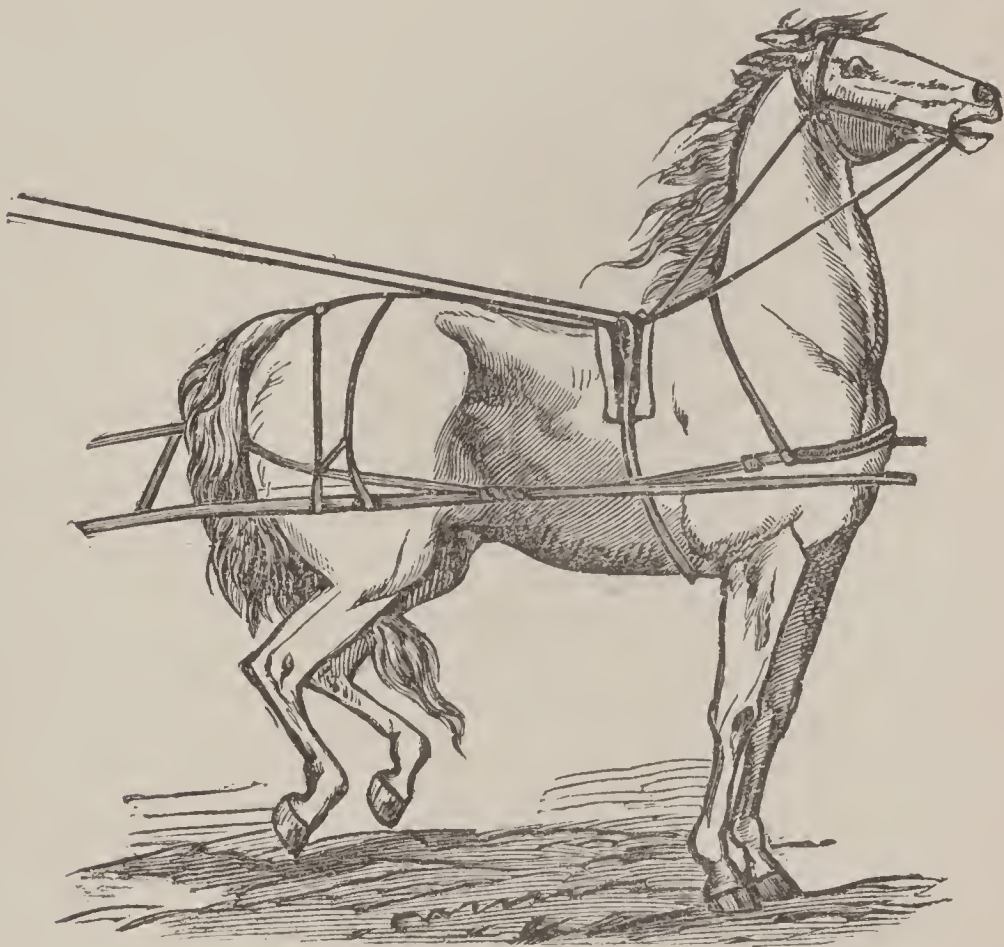


FIG. 90. — The horse as disabled when there is an effort to kick.

in training the mouth, which must be made sufficiently thorough to compel unconditional submission to the restraint of the bit. (For details, see *Running Away*.)

CONFIRMED KICKERS.

Confirmed kickers are usually exceptionally bad cases, and may be classed under three heads, as follows: Nervous, excitable kickers, sulky kickers, and switching kickers. Some of the very worst horses of this kind I have ever broken, and which caused me the most trouble, were cases which, at first, did not seem very bad, but grew worse as they warmed up. Some will

show the most wonderful pluck, striving to kick in defiance of all that can be done, and requiring not only the most careful but the most thorough course of treatment, to be broken. While others, though kicking with extreme viciousness, and showing a great deal of excitement, may become entirely gentle by a short lesson of subjective treatment. So that the act of kicking must not alone influence the treatment so much as the peculiarity of disposition.

If the horse is large-boned, with strong, dense texture of body, gray or sorrel, not inclined to put on flesh, eyes large, rather dark, showing much white, and with a sort of sullen ex-

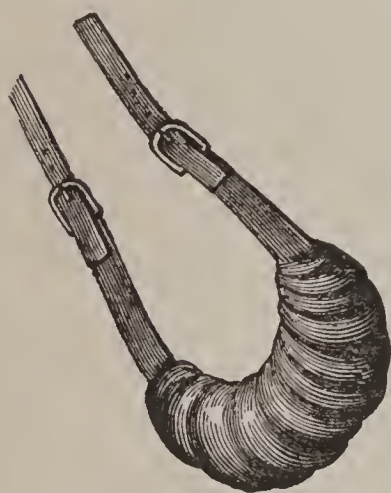


FIG. 91. — Crupper wound
to prevent catching
the rein.

pression, no matter what the character of the kicking, he will generally prove a hard fighter. Horses of this character usually will not bear any mistakes or fooling with. They must be taken in hand with great care and thoroughness. Sometimes a very nervous, excitable horse will not bear the Second Method, becoming warmed up too quickly. In such a case, the First and Third Methods must be depended upon. Usually the Third will be all that is required. If so, the pressure should be all that the horse will bear; and when suc-

cessful, there will be entire submission, the eye softened in expression, and the whole system, as it were, relaxed, the horse showing no fear of having the pole brought against the quarters.

In a general way I would advise again treatment about as follows: If there is not entire docility after using the Third Method, use the First to the extent the case will bear. Much depends upon how this is done, and how the horse submits. If he is rangy, quick, and active, it may be necessary to be particularly careful to avoid hard, stony ground. Select a ploughed field free from stones, or where the sod is very soft. Throw the horse quickly, and as often as he will get up. Now see what the result will be by poling and handling around the quarters; but few horses will resist it. If there is any inclination to kick after-

ward, the next alternative should be the Second Method. But I repeat: As much depends upon the way this is done as upon the treatment itself. The point is to throw the horse off his



FIG. 92. — Tail-strap.

balance with sufficient force and often enough to bear being poled at pleasure around the quarters and flanks, — a task not at all difficult. If the horse has a good mouth, the after treatment will be simple and easy. The most difficult horses of this character to break are those with mouths so tender that they will not go against the bit, or will submit to it too easily. Presuming there is a good, stiff mouth (for nearly all these cases are of this character), put on the harness with Patent Bridle or Breaking Bit, and make the after treatment as before explained, being careful to be thorough, taking no

chances that can be avoided, until able to drive to wagon perfectly docile.

SWITCHING KICKERS.

When a horse is greatly excited and irritated by fear or abuse, his nervous system is liable to become so sensitive that he will squeal and switch. This is more common to mares, which are more impressible than horses; consequently, when badly spoiled, they are more difficult to break. In this form it becomes involuntary resistance, or a species of insanity, and in extreme cases very difficult to overcome. The point is, if possible, to make a sufficiently strong, counteracting impression to overcome this. Very much will depend upon how much the nervous system has been shaken, and the peculiarity of disposition. Some of the worst kickers I have ever handled were colts which had been greatly

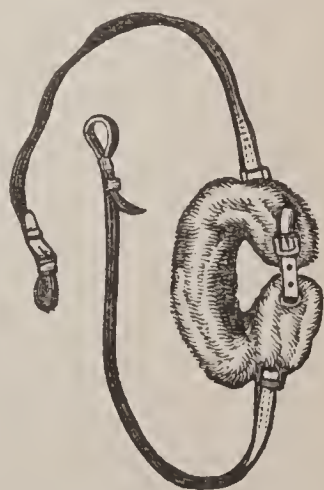


FIG. 93. — Tail-strap detached.

frightened and abused in breaking. The course I pursue with such is about as follows : —

If the case is one that will bear impressing sufficiently to overcome the kicking, I subject to regular treatment as advised for ordinary cases, directing my attention particularly to accustoming the quarters to being touched. Failing in this, I use direct means of restraint, such as the kicking-straps or over-draw checks. The kicking will now punish so severely that there will soon be fear to repeat it. The straps should be used



FIG. 94. — As a bad case of this character will usually resist before treatment.

in driving for some little time after the inclination to kick is overcome.

I include illustrations of different methods of disabling or punishing for kicking in harness, which are sufficiently plain to make details of discipline unnecessary. I would only add the precaution that you must be careful about connecting the hind feet with the head directly, as a reckless horse may injure himself seriously, if not kill himself, by the sudden and violent shock upon the spinal cord at the juncture of the vertebræ with the head.

If he is simply irritable, and hugs the rein, the easiest way to prevent it is to wind an ordinary crupper with cloth, or cover

nicely with chamois skin or soft leather, until one and a half to two inches in diameter, as may be necessary. See Fig. 91. This being larger than the rein below makes it impossible for the horse to hug the rein with sufficient strength to hold it.

When the tail becomes very sensitive from the continued chafing of the parts, its action becomes involuntary. In such cases it must be confined, to make the horse safe. This can



FIG. 95. — As the horse will stand quietly to be harnessed after treatment.

be easily done by buckling a small strap around it under the hair about two-thirds down the dock, from which, on each side, extend a small strap to the hip-straps, and fasten short enough to prevent the tail from switching around and catching the reins, as shown by Fig. 92.

It is impossible for me to give the full details I could wish in the limited space at my disposal here. In my large work I devote nearly forty pages to the details of this instruction, including details of the management of a large number of representative cases, which will be found very important.

KICKING WHILE HARNESSING, ETC.

While there may occasionally be cases of this character that are very bad, and require very vigorous, coercive measures, the great average of them will submit to very simple treatment. Simply put on the War Bridle, and after giving a few sharp pulls, just enough to disconcert the horse a little, bring the harness up, and while holding the cord taut with the left hand, with the right put on the harness gently. If there is resistance, simply drop it, and punish with the cord sharply. A few sharp pulls in this way will usually make the average of these cases stand up quietly to be harnessed and handled. It is also the simplest treatment for controlling a horse bad to bridle or handle about the head. In extreme cases the Second Method may be resorted to.

If the ordinary form of War Bridle is not sufficiently effective, use the Double Draw-hitch Form. Very few horses of this character will resist this more than a few moments. Do not under any consideration draw the cord tight and make fast, and keep so tied longer than half a minute. Many ignorant people who have learned the use of this, are liable to abuse horses greatly by trying to do too much with it, that is, punish severely with it, and then tie down tightly and let it remain so for some time. This should never be done. As I have brought this into use, and know every point of using it, I would repeat that if tied down at all, it should be only momentary; then untie, and while pulled down rather close, tremble upon the cord a little with the hand to hold the horse's attention. The result will usually be better than if tied down rigidly, and there will be no bruising or cutting of the lips, as would be sure to follow if kept tied very long, a thing that must be avoided.

CHAPTER VII.

RUNNING AWAY, WILL NOT BACK, BAD TO SHOE,

RUNNING AWAY.

THE important point in breaking runaway horses is first to remove the cause of the trouble, whatever it is. If the horse becomes frightened at the wagon, kicks, and resists control, the important point is to overcome the cause of this sensibility, which has been fully explained under the head of Kicking and Colt Training. If frightened at a top or anything else, overcome such fear; but the main thing to be done is to get the mouth so manageable that the horse can be held under any excitement with the control of an ordinary bit. If this cannot be done, then such form of bit must be used as will give power to do so.

During my later experience especially, on the road, I frequently had horses brought to me that would seem to resist any treatment that could be brought upon the mouth. In my large work, I refer to a number of interesting cases that even with the Breaking Bit on would pull by the reins, on a walk, from four to six men; pulling, in fact, with the same courage that horses would against the collar. Of course it would be entirely impossible for any man, or even for two or three men, to hold such horses when excited while driving, and especially if moving rapidly. The first thing I did with such cases was to put them through a general course of subjective treatment until gentle, then train the mouth with the Breaking Bit until entirely manageable to it.

There is a great sleight in using this bit to advantage in the management of such cases. It is first giving a sharp, quick, raking pull, like the crack of a whip, that will lift and bring the horse back, and this repeated at slow intervals until the

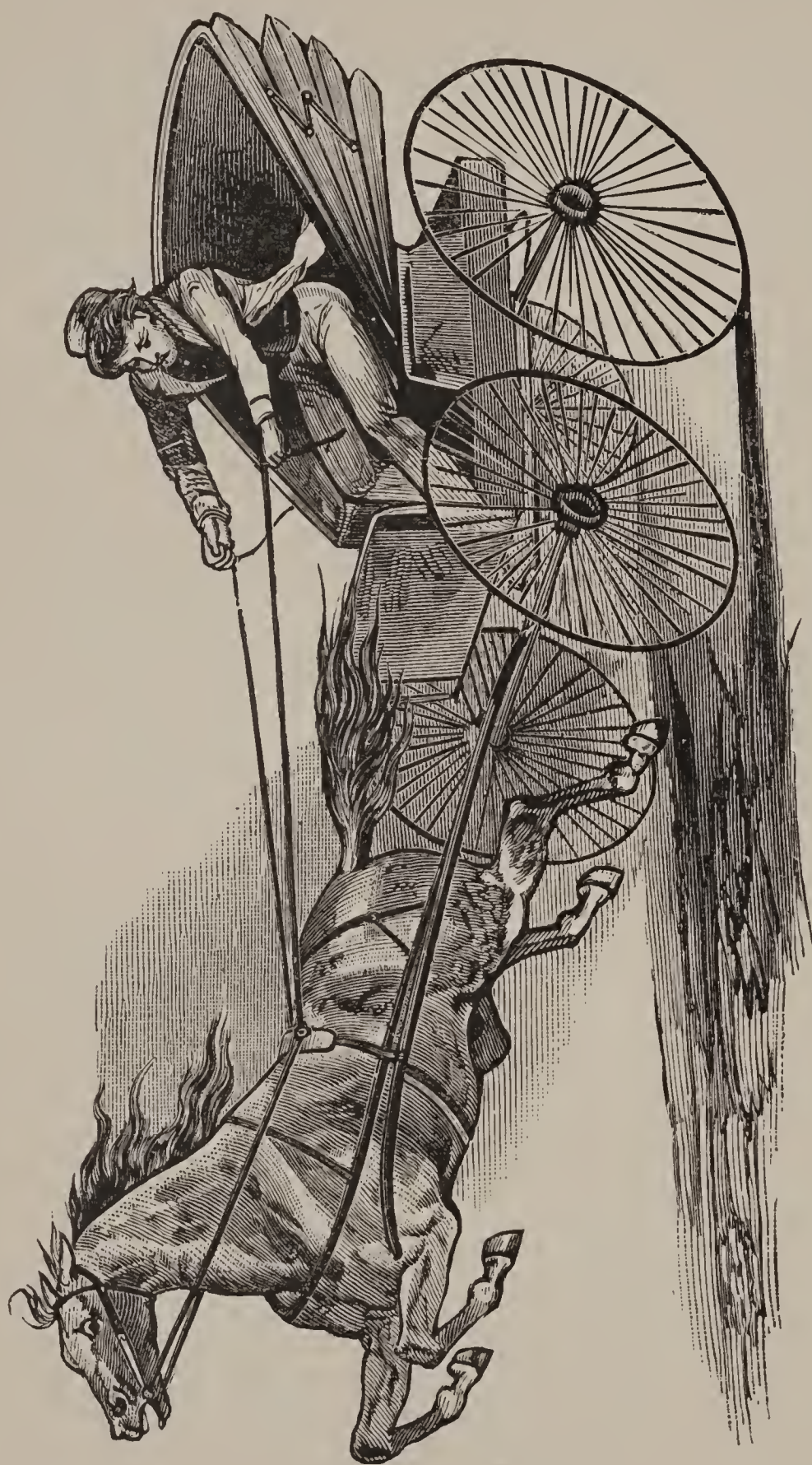


Fig. 96. — A lunge as he usually starts.

horse submits to it unconditionally. There must be no half-way work in doing this. It is a point that must be made thoroughly; and if it cannot be done in one lesson, then repeat the lesson until the horse can be stopped and held under any excitement by the slightest pull upon the reins. In experimenting upon such cases, I found it necessary to be very positive, putting the horse, if necessary, on a run under the whip, yet stopping him instantly by the slightest pull upon the

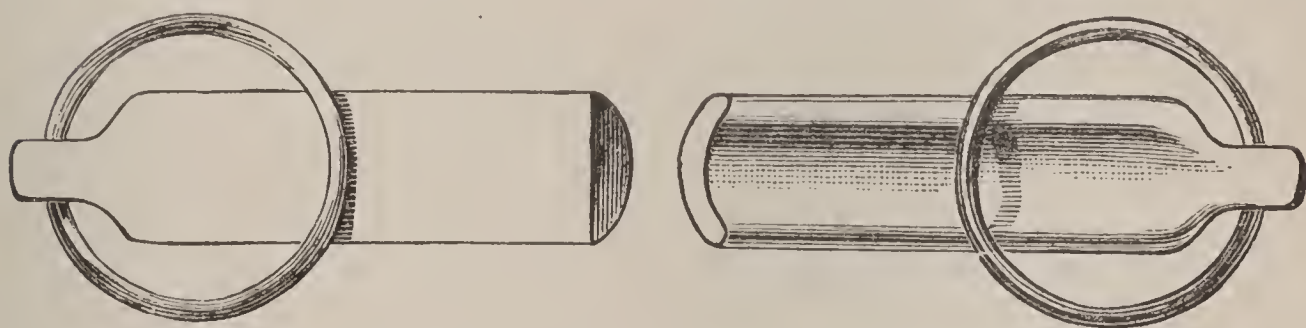


FIG. 97. — Slightly rounded, or flat, when not desired to be severe.

Concave with edges rounded, when more severity is required.

mouth, proving him perfectly manageable. In some exceptional cases the horse may resist so hard at first that it will seem impossible to make this point; yet it can be done in every case. In my large work, I cite a great many cases that were

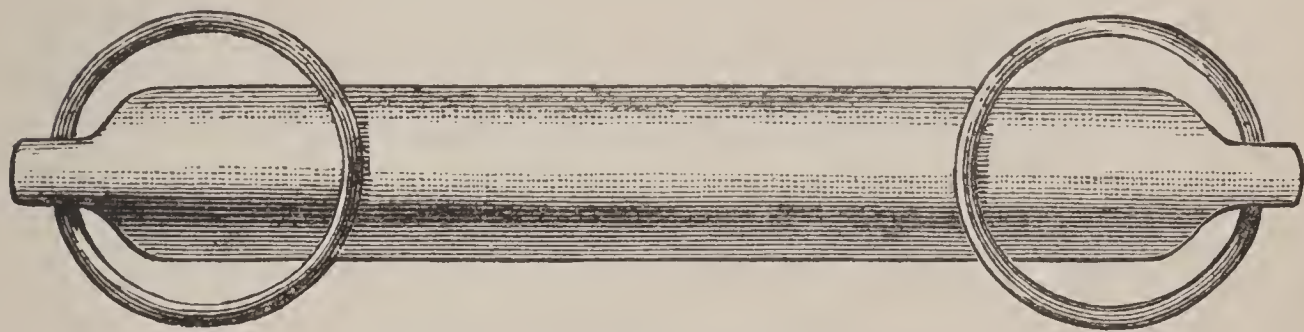


FIG. 98. — Rounded side of the bar.

entirely unmanageable, yet were controlled easily by this simple treatment.

Various forms of restraint can be brought upon the head in connection with the reins, that are very effective in the control of a headstrong horse. One of the simplest is placing a small cord, about the size of that used for War Bridle, across on top of the head, under the head-piece of bridle. Pass each end

down through the rings of the bit, and attach to the ends ordinary rings. Into these, buckle the reins. This will give great purchase upon the mouth. This can be improved upon by extending the cords up through the lugs on each side of the bridle, and then back as reins. Now when pulled upon, the head is thrown up and back very strongly. This may be



FIG. 99. — Improved four-ring bit. Patent applied for.

increased in power still further by attaching an extra loop that will come over the upper jaw under the lip, and connect with the bit on each side, as shown in Fig. 101. But few horses can resist a slight pull upon this.

The Patent Bridle, described on page 99 of my large book, is the most powerful means that has yet been intro-

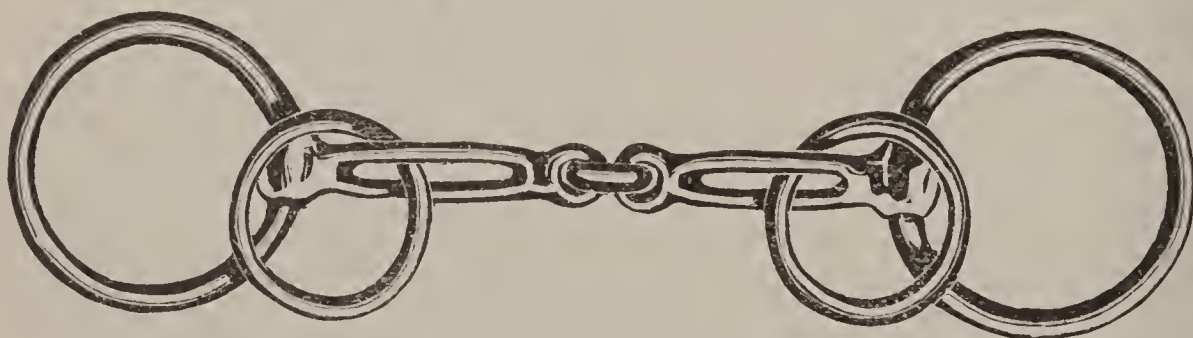


FIG. 100. — Improved four-ring bit.

duced of controlling a horse by the head. It not only gives all the power possible upon the mouth, but in proportion to the restraint or pulling, by bringing direct pressure upon the spinal cord it becomes a powerful means of direct subjection. But few horses will have the courage to pull strongly against it for any length of time, or to repeat the resistance.

I include several forms of bits that work in some cases very nicely. The four-ring bit usually works very satisfactorily on

headstrong, lugging, or pulling horses. The simplest form of this bit is made thus: Take a snaffle bit, slide two rings over the mouth-piece, and connect them by a strap passing closely over the nose but nicely fitted to it; now when the reins, which are attached to the outside rings, are pulled upon, the center of the bit is forced upward against the roof of the mouth in such a way that the horse will rarely pull hard against it. This is a very valuable method of managing headstrong luggers. The form of bit represented by illustrations would be best. The effectiveness of this bit will greatly depend upon its being properly adjusted. The point is to have the strap over the nose short enough to give the requisite purchase upon the roof of the mouth. Though it may appear severe, it is really a very mild, easy bit upon the mouth. It works well upon side reiners, especially those that, as they warm up, have more inclination to lug or pull. I have known many horses that would pull so hard as to draw the wagon by the reins, but that would drive entirely easy by this bit.

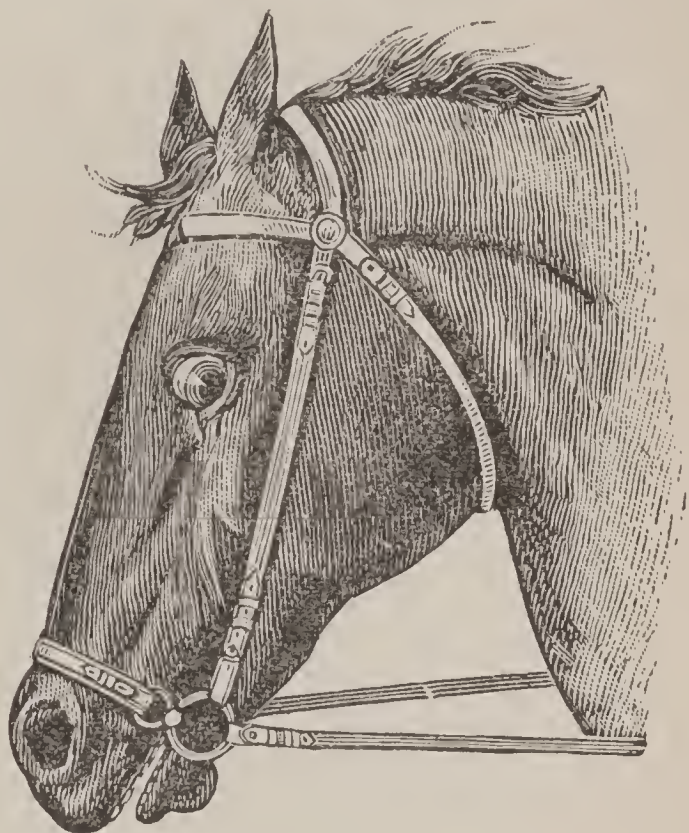


FIG. 101. — Four-ring bit arranged for use.

WILL NOT BACK.

This is a habit that always follows imperfectly or badly trained mouth. If treated as directed under the head of Colt Training, there will be no trouble. We sometimes found horses which had so thoroughly learned this habit that they would stand and brace themselves so firmly that several men even could not pull them back. At first I managed this habit en-

tirely with the War Bridle, by simply pulling sideways and well back. This compelled the horse to step around, and in doing so forced him back a little, and I so repeated until he would go back freely. Another method I used with success was to put on a foot-strap, and then bring it from behind forward over the surcingle, or belt attached around the body. I now took the horse by the head, and with the leg pulled up, I pressed back gently, and while doing so, I let the foot down, which brought it to the ground some distance back of the other, making him move back a little. This I repeated until he learned to step back as desired; but when I learned to train the mouth, and perfected the Breaking Bit as given, I abandoned all this palliative treatment, because now by training the mouth directly I not only overcame the habit, but made the horse manageable directly by the bit, which had to be used in his control. In addition, by this means I could do it a great deal easier and better. I simply got behind as directed before in Harness, and after calling "Back!" gave a sharp but strong, raking pull and slacked instantly, and then repeated slowly, until the horse would move back. An ordinary case can be lifted off the ground and brought back, but some horses may at first resist quite hard for some time. If a very stubborn fellow, and he becomes warmed up, better put him aside and let him stand until he becomes cool; then repeat the lesson, and you will find he will soon go back freely. Be careful not to go too far by making the mouth too tender. Back freely in harness, then put him to wagon, when he will do so afterwards with an ordinary bit.

BAD TO SHOE.

As the main object in the management of most of these cases is to make them submit to being shod with the least trouble, I will first give the simplest treatment for doing this.

If the horse is very sensitive and excitable, but naturally gentle if given his own way, a great deal, of course, depends upon the management of the shoer. When the shoer is in position, catch the horse's ear with one hand, squeezing or twisting it a little; with the other, stroke the nose, or grasp the muzzle, and hold firmly but gently, at the same time talk-

ing to the horse kindly. If there is resistance to this, try blindfolding by tying a blanket, or something convenient, over the eyes, at the same time rubbing the nose, etc. If these expedients fail, put on the War Bridle, Simple or Double Draw-hitch Form, and give a few sharp pulls right and left. Then step back to the hips, pull the head around a little, keeping the cord taut, and take up the foot, punishing instantly for any resistance. Or, stand at the head, and keep the cord drawn rather tight to hold the attention of the horse, while an assistant takes up the foot. If the horse is very stubborn, bring the

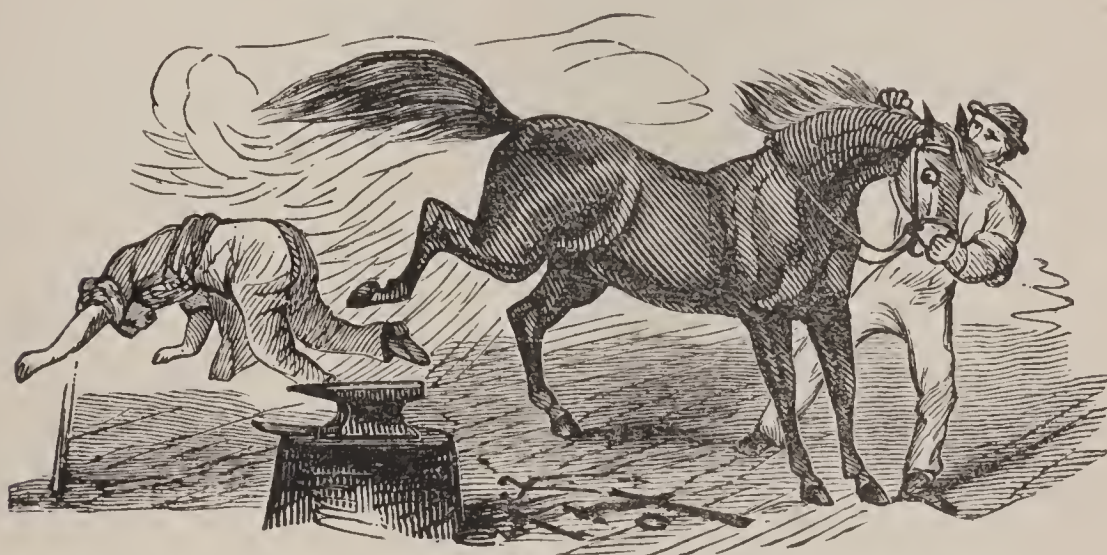


FIG. 102. — As a vicious horse will sometimes act while being shod.

second turn of the cord over the upper jaw, under the lip. A slight pressure will disconcert sufficiently to make the horse submit. Or the cord, Second Form, can be put on, with the loop brought over the upper jaw, and pulled sufficiently taut to force submission. In either case, gradually let up as the horse submits. In no case should the cord be held tight more than half a minute at a time.

The four-ring bit properly used will sometimes work extremely well in making the horse submit to be shod. Figs. 99–101 explain method of applying sufficiently. But usually a sharp lesson with the War Bridle, then taking up the foot gently, will be all that is necessary for the management of all ordinary cases.

TREATMENT FOR VERY VICIOUS CASES.

Very much depends upon the disposition of the horse and the treatment pursued. In most cases the following will be



FIG. 103. — Simplest method of making a nervous horse stand to be shod.

found easy and effectual: Subject to the Third Method, using more or less pressure according to the case. While the cord is on, attach a strap or rein to the hind foot, and pull back as previously explained. At first there will usually be great resistance, the horse kicking with great spitefulness, or pulling the foot forward energetically. But however much he may resist at first, it must not be ac-

cepted as a cause for discouragement. Simply keep pulling the foot back at short intervals until there is no resistance. When given freedom, the foot will be rested upon the toe; then pull forward and back, as before explained. In some cases it may be necessary to tie forward by bringing the strap over the neck, back between the legs, and making fast to hold the foot firmly until all resistance is overcome. Treat the opposite foot in the same manner.



FIG. 104. — Blindfolding a nervous horse to be shod.

Occasionally an old horse will resist quite hard, but with the treatment given, there should be no difficulty in managing

any case with success. We found no case on the road which we could not manage in fifteen or twenty minutes. I may mention that mules which resisted having the feet handled, submitted to treatment very readily; either the Second or Third Methods enabled the control of a mule very quickly. I could refer to a great many incidents proving this, but will relate but one. When in Cleveland, after being located there for a couple of weeks making a great stir, the question was asked one evening if I could control mules as well as horses. I said, "Yes; they are usually my best subjects." Immediately a man said, "Bring in the mule." I found there



FIG. 105. — Simple method of using the cord for the control of horses bad to shoe, harness, etc.

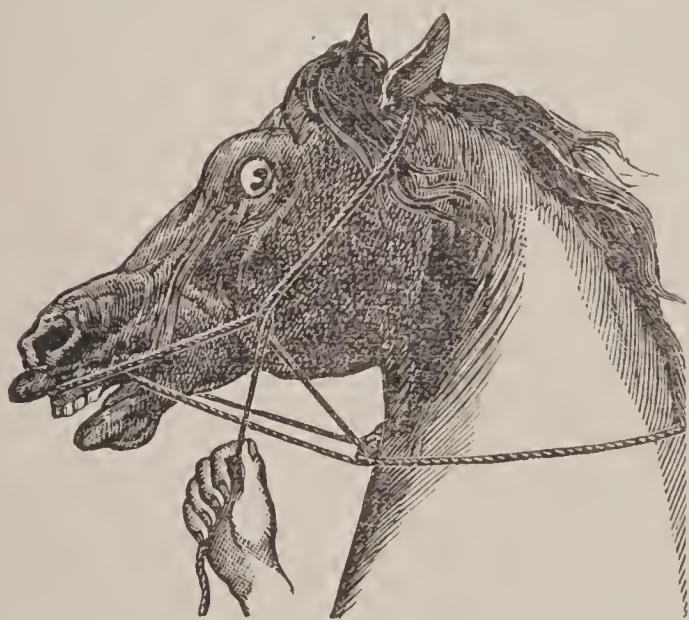


FIG. 106. — Method of putting on the cord when the horse proves very stubborn.

was a noted kicking mule from over on the West Side, one that could scarcely be touched around the quarters, as he would kick so badly, and could only be shod by putting him in stocks. It certainly seemed that they had me cornered. I simply subjected him for a few moments sharply to the Second Method, and in five minutes could take

up the feet as I pleased, the mule standing perfectly gentle. The people were so astonished at the result that they fairly shook the place with applause.

At another time in Central New York, a mule that was a desperate kicker was brought some distance to test me. While lecturing to the class, boys outside annoyed this mule by poking at it with a piece of sharp stick to such a degree as to cut its flanks, making the mule kick very badly ; yet upon trial, a

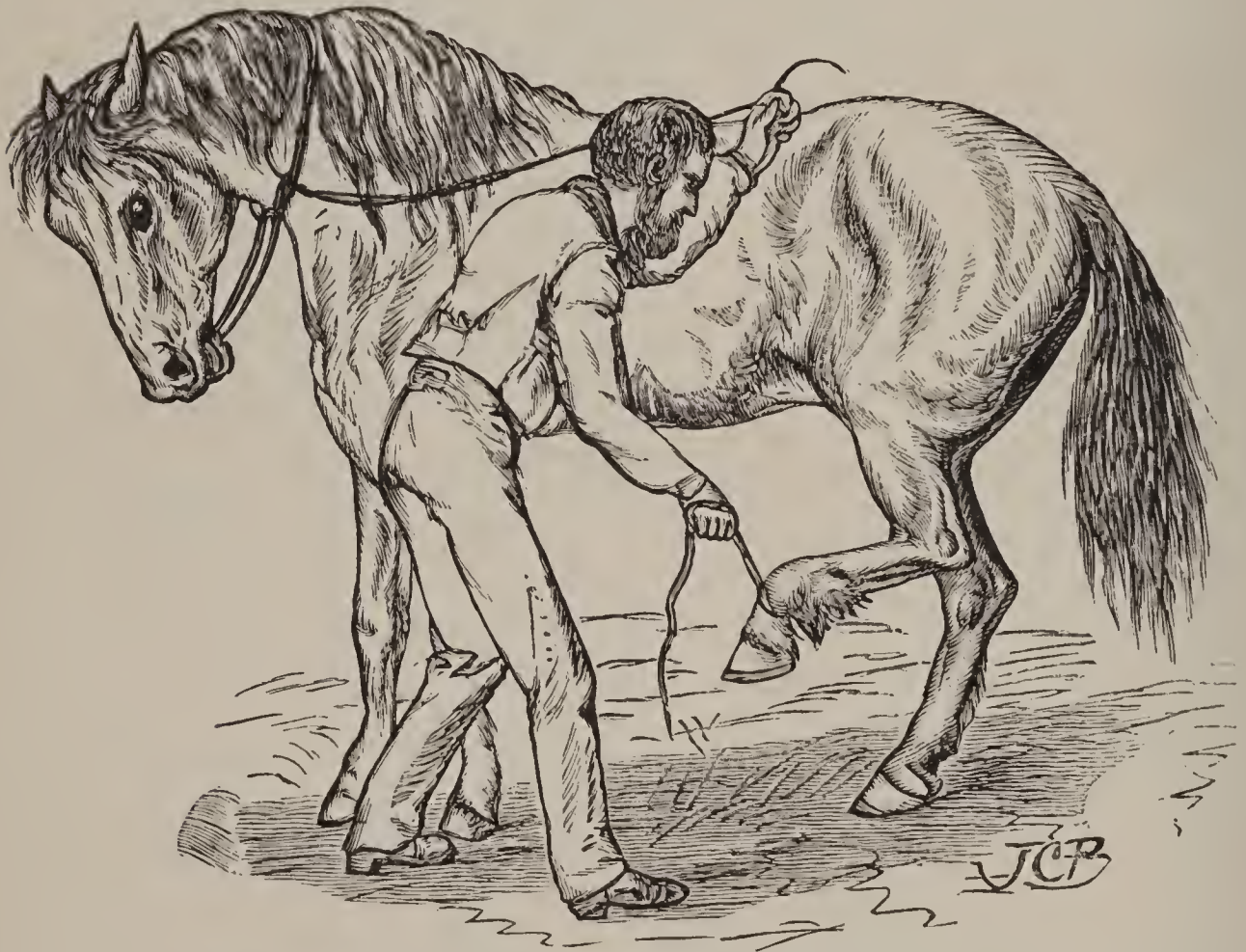


FIG. 107. — Pulling the foot forward.

few moments' treatment was sufficient to make him stand up perfectly gentle. We even hitched him up, and drove him without breeching, a thing that was regarded as very wonderful, and always done in eight or ten minutes.

LEANING OVER.

There are occasionally horses that will allow the foot to be taken up, but will lie down or lean over upon the blacksmith while it is held. Usually a sharp lesson with the War Bridle, repeating it for each recurrence, will soon so disconcert that he will stand without leaning. If this is resisted, subject to Second Method. While the head is tied around, take up the foot, and test until he will stand squarely. If there is any inclination to

lean over after given freedom, punish with the cord, which should be sufficient.

I may add in this connection that no matter how bad a *cow* may *kick*, a sharp lesson with the War Bridle for a few minutes will make her stand gentle; there is no exception to this. When in dairy countries, we had a great many cows



FIG. 108. — The colt as he stands after treatment.

known to be desperate kickers, but we found none we could not control in a few minutes by the War Bridle. A man who had been in my class in Herkimer County had a very bad kicking heifer. He tried the War Bridle upon her, and broke her, and reported the fact to me. I mentioned it to others who had tried it, and whose reports were favorable; and I finally put it on my bill as a feat, and had a great many interesting incidents connected with managing kicking cows. I will mention one.

At a point south of Jamestown, N. Y., a man had a very noted kicking cow. He joined the class on the condition that

his cow could be made gentle to milk without kicking. He felt sure this could not be done, and a great many others in the neighborhood came in on the strength of this condition, confident that the cow would not be controlled. She was certainly a very bad kicker; but less than five minutes' treatment made her stand quietly to be handled as we wished. While talking to the class, without any warning she suddenly made a lunge, went right through the wall of the tent, and went on a run up through town, the cord hanging to her head. The dogs in the neighborhood took after her, and the whole thing appeared so ridiculous that it convulsed everybody with laughter. I lost a fine War Bridle by it; but as the man declared himself perfectly satisfied, I told him he might keep it in remembrance of the visit.

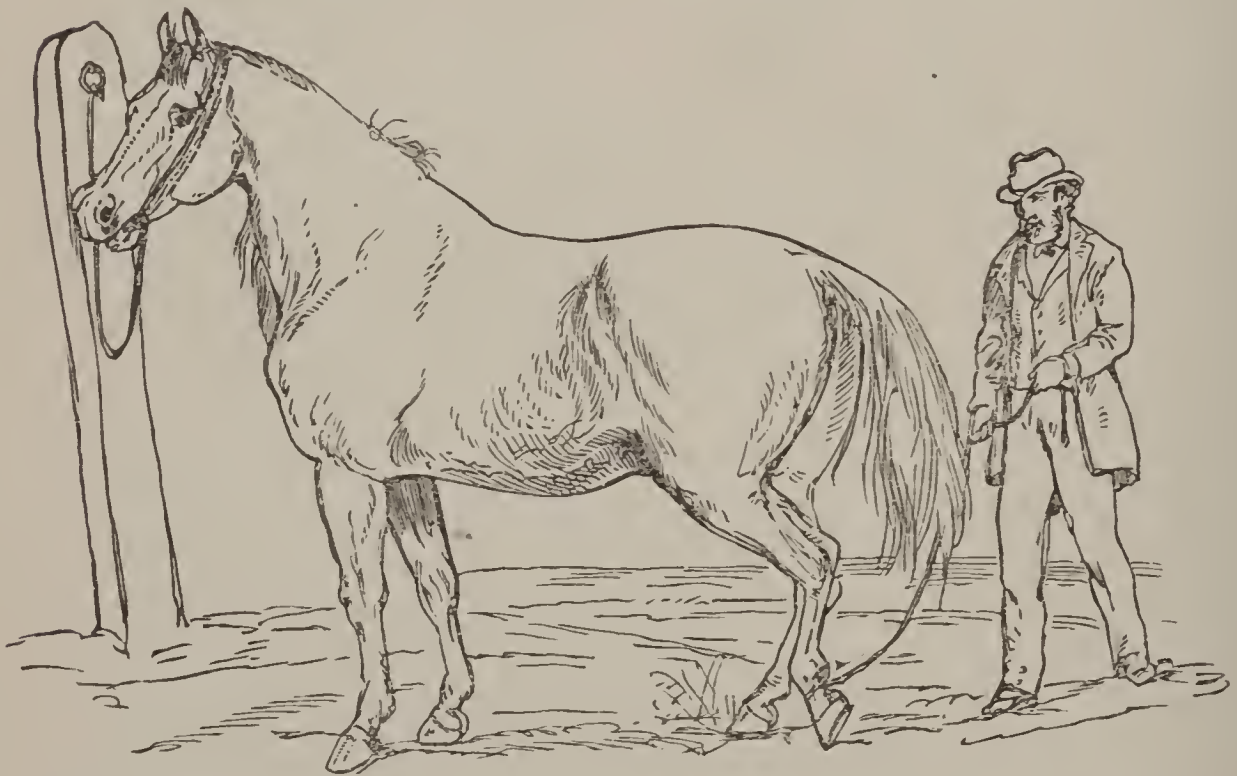


FIG. 108½. — As the foot will be rested upon the ground after submitting.
(See "Third Method of Subjection," page 67.)

CHAPTER VIII.

HALTER-PULLING.

TWO important requisites are necessary to break a bad halter-puller : First, a cord so strong that it cannot be broken ; second, an ordinary bow whip of the best character, — one that will stand the most severe use without breaking. I used a bow

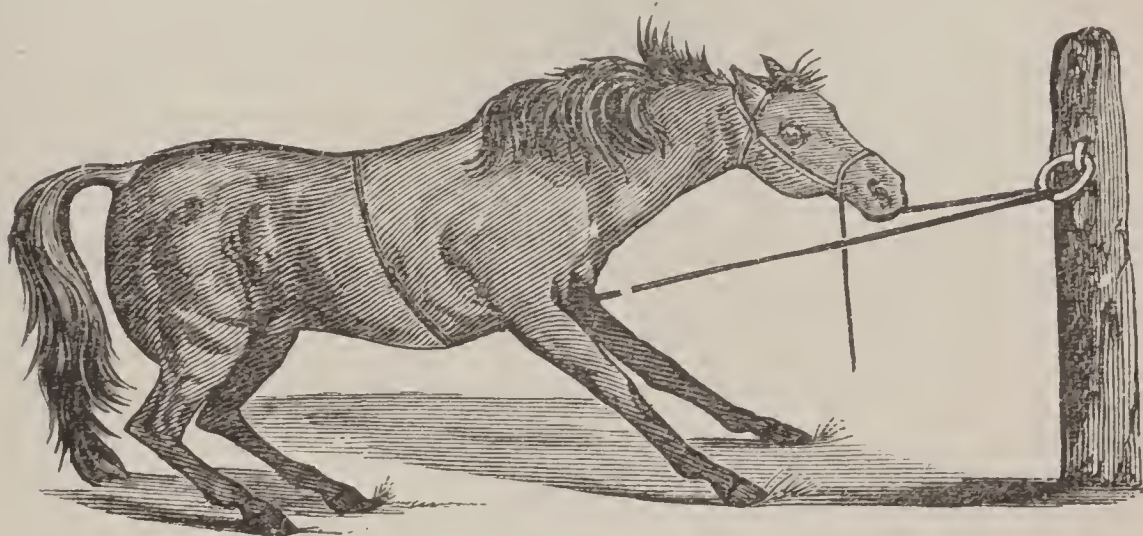


FIG. 109. — The halter-puller trying to pull loose.

whip, buckskin tip, made for my special use. Now hitch the horse as directed for hitching the colt, in *Colt Training*, but where he is in the habit of pulling the hardest. If in his stall, let it be a wide one, where you can get in and stand near him safely while he is pulling. The moment secured, before he has time to go back, send him back for all you are worth. The moment he pulls, send the whip into the tip of his nose just so long as he pulls. Usually he will jump ahead after pulling hard for a few seconds. Now scare him, not whipping or hurting, until he goes back, when, as before, hurt him as intensely as you can. If afraid of a buffalo-robe, blanket, or anything of the kind, now test him with it.

The point in the management of this habit is to make the horse bear all the excitement you can without his resisting, because he is usually made to pull by being frightened or excited in some way ; but made to submit to such a strain, the habit can usually be overcome easily. The direct result will be that the more he is frightened and excited the more he is afraid to go back. He will stand up to the manger, look back, and act frightened. This point made, let him stand quietly. As stated

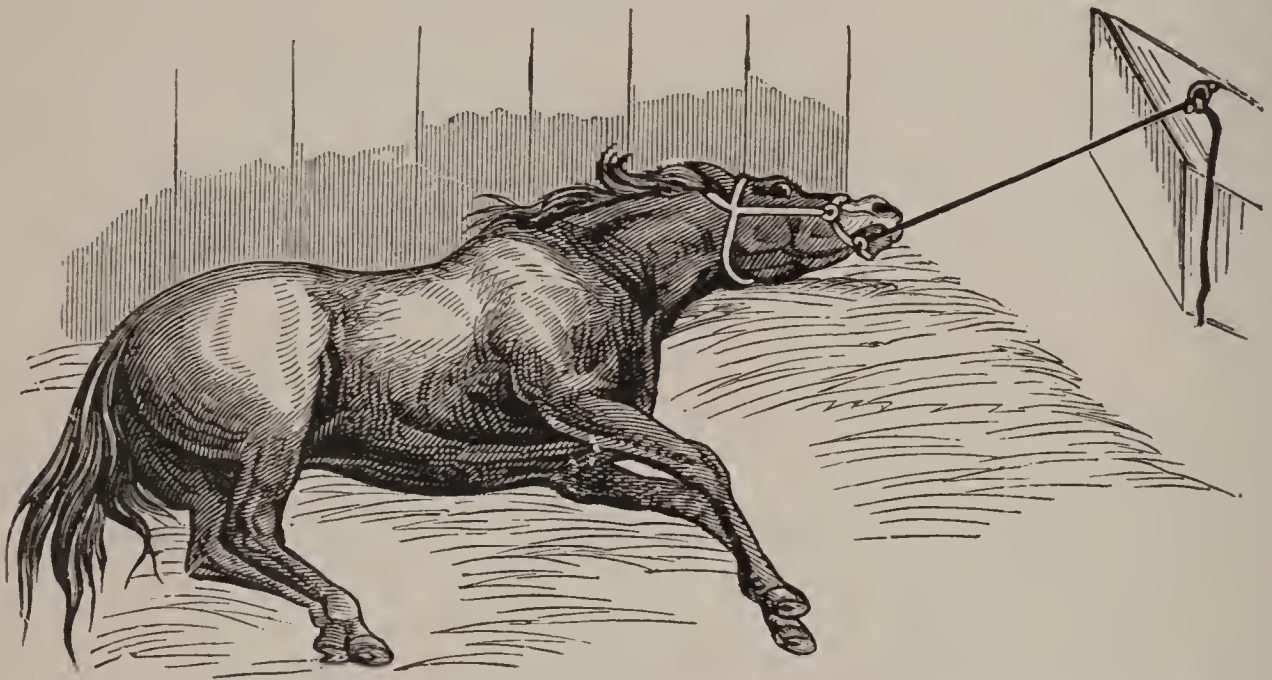


FIG. 110. — As a horse of sullen temper is liable to throw himself when pulling.

in Hitching the Colt (page 99, which should be read in connection with instructions here), every precaution must be taken so that nothing will break, or he can pull loose. To let him break loose would be fatal to success, and cannot be hazarded. I generally used a double thickness of the best quality of War Bridle cord. If the horse was very heavy, and pulled badly, I usually used four War Bridle cords, — that is, the cord doubled twice over ; but as a general thing a double cord will do. But you would better be on the safe side by having the cord strong enough.

After the horse is hitched, now for a few times be particular that you treat him in the same manner in the street where he is in the habit of pulling. If the horse pulls in the street, he cannot be broken in the stall ; and if he pulls in the stall, he cannot be broken by treatment anywhere else. It must be where he

is in the habit of resisting. When all inclination to pull is overcome, which can only be determined by testing the horse, you can now hitch by the head. It took me a good many years to learn these points in breaking halter-pullers, and I certainly have been very successful. Every point in overcoming this habit has been brought into use by myself. I give very full and interesting particulars, not only in explaining how I learned different points, but the effects of the treatment upon the worst cases which could be produced. This is one of

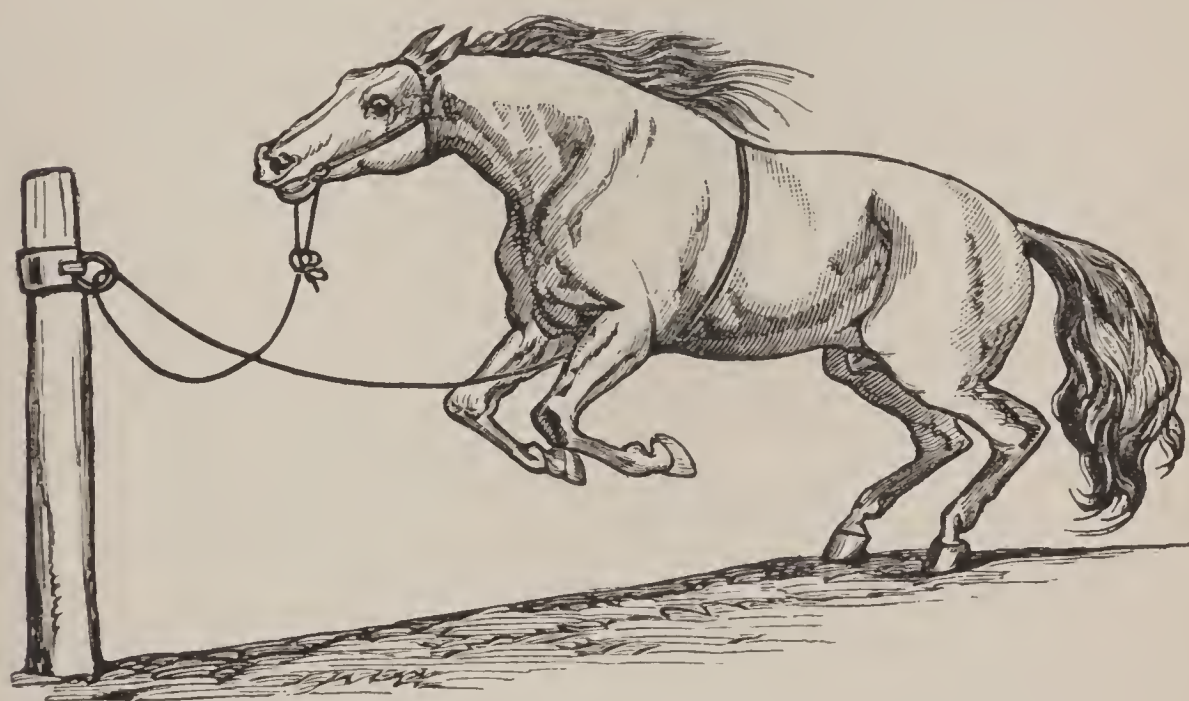


FIG. 111. — As a horse will rear and jump ahead after pulling.

the important minor discoveries I made, and was the result of long practice. See page 29 for a very interesting statement of a case which could only be held by hitching with a chain, yet was effectually broken of the habit in a few minutes, and is a fair representation of what can be done in the management of the worst cases. I could refer to hundreds of cases of like character, showing the same results.

When I was on the road, I challenged the production of any halter-puller which I could not in two minutes make stand under any excitement without attempting to pull, and I never found one I failed upon.

WILL NOT STAND.*

This is a very simple habit to manage if you only go at it properly. Put on the harness with Breaking Bit, run the reins back to the shaft-bearers and get behind, start him up a little, call "Whoa!" when instantly give a sharp, raking pull upon the reins, that will force him to stop. Repeat this until he will stop instantly. Now crack a whip, or make any excitement you please, which of course will cause him to start ahead, when



FIG. 112. — A test to which the halter-puller was usually submitted by the class after treatment.

instantly call "Whoa!" and throw him back again, and go on as before. In a short time he will learn to stand to avoid being hurt. Now move around a little, making a noise, cracking the whip over him and behind until he will not dare to move. This lesson should be made very thorough. As a feat, I was in the habit of taking the most sensitive horse of this character I could find, and making him stand in the open street under any excitement without starting. Now attach to wagon, and repeat the lesson. I usually attached something to the reins so they would extend well back of the buggy. I would now walk

*This article should follow article on "Running Away" before "Will not Back," but was transposed by mistake.

around, make a noise, crack a whip, etc.; when the horse started, I caught up the reins quickly and pulled him back, and so repeated until I could walk around some distance from him, making any noise I wished, without his attempting to move. Sometimes the habit of a horse in learning to start when hitched up, or not waiting for one to get in and out, is a very delicate one to manage, on account of the liability of making the horse balk if too stern with him.

To the management of this habit with other modifications, I devote considerable space in my large work. It is, however, a habit that with a little patience and care should always be managed without any serious difficulty. See also page 91 on the Management of Colts.

CHAPTER IX.

CHECKING AND BLINDERS.

I WOULD call your earnest attention to the needless cruelty to which horses are subjected on account of the restraint and injury of severe checking and of covering up the eyes with

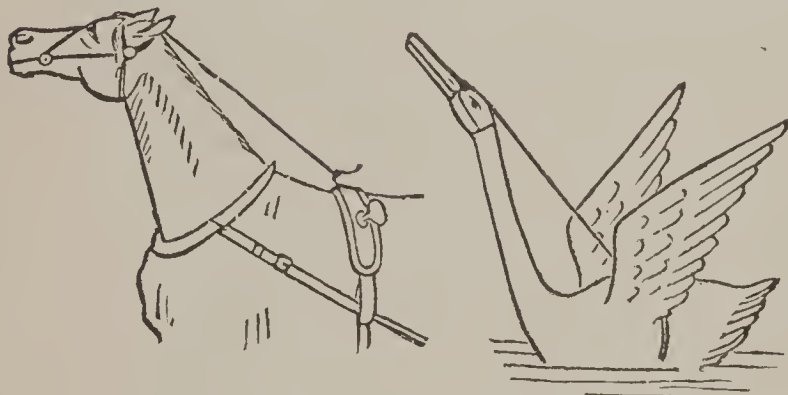


FIG. 113. — The horse with over-check.

blindern. To work to the best advantage, the greatest physical freedom is necessary; not only this, but the curves of the form are never so beautiful and expressive as when permitted to be natural.

In sitting, walking, or standing, every one knows how tiresome and annoying it is to maintain one position very long. A frequent change of position is equivalent to resting. A French officer, as a punishment, marched his soldiers all day without allowing the regulation freedom of changing the position of their arms, which so injured them that it was regarded sufficient cause for inflicting on him the penalty of death.

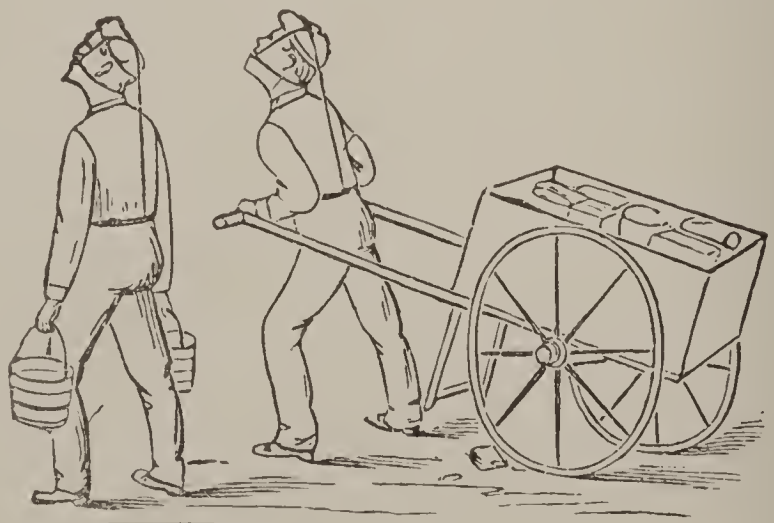


FIG. 114. — Let the drivers try it.

Now, in like manner, the custom of checking the head of horses high, as is now common throughout the country, is

really no less injurious than cruel, and every one, — certainly every one of ordinary, humane feelings, — should look carefully to this matter of guarding against such a common and thoughtless cause of irritation and abuse. Not only this, but the horse never looks so graceful and beautiful as when permitted to appear natural. No one pretends to use a check or blinders upon a riding horse, because it would destroy his gracefulness; and on the same principle the horse should be

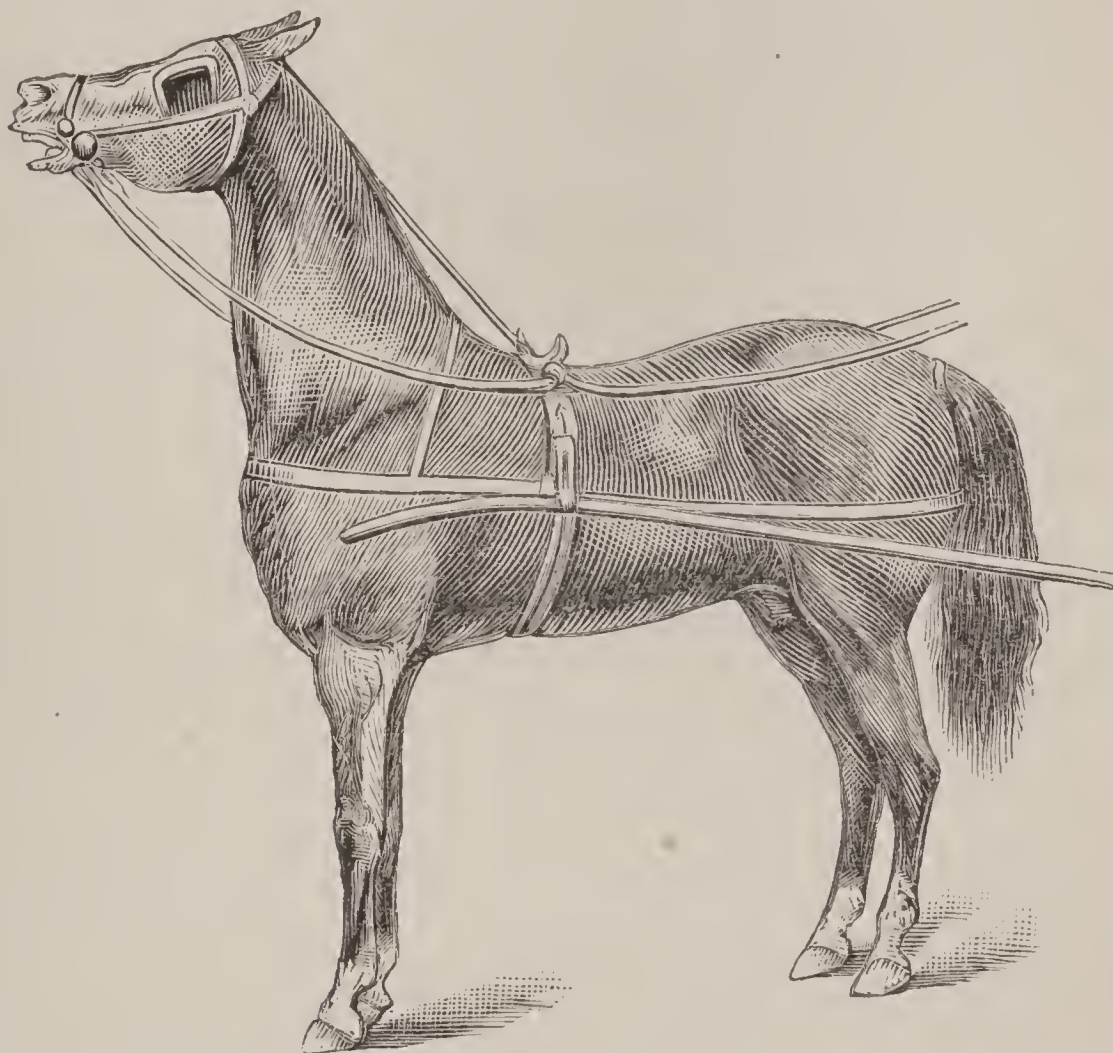


FIG. 115. — As driving horses are usually checked up.

given all the freedom possible of the head and eyes in driving and working in harness.

There is no serious objection to using a check if the head is given reasonable freedom, and especially none if used to prevent the head from being put down while hitched. But the custom of holding the head up much beyond the natural position, as now done by the arbitrary overdraw check, cannot with reason be regarded as anything less than hampering the horse's

freedom so seriously as to become a positive cause of abuse, as well as often of serious injury and disease.

Trotting trainers have learned that low-stepping horses can be made to carry themselves better by checking the head up when speeding. They have learned, also, that a headstrong, pulling horse will drive a great deal easier and better by checking high, and that by keeping the nose out in pushing at a

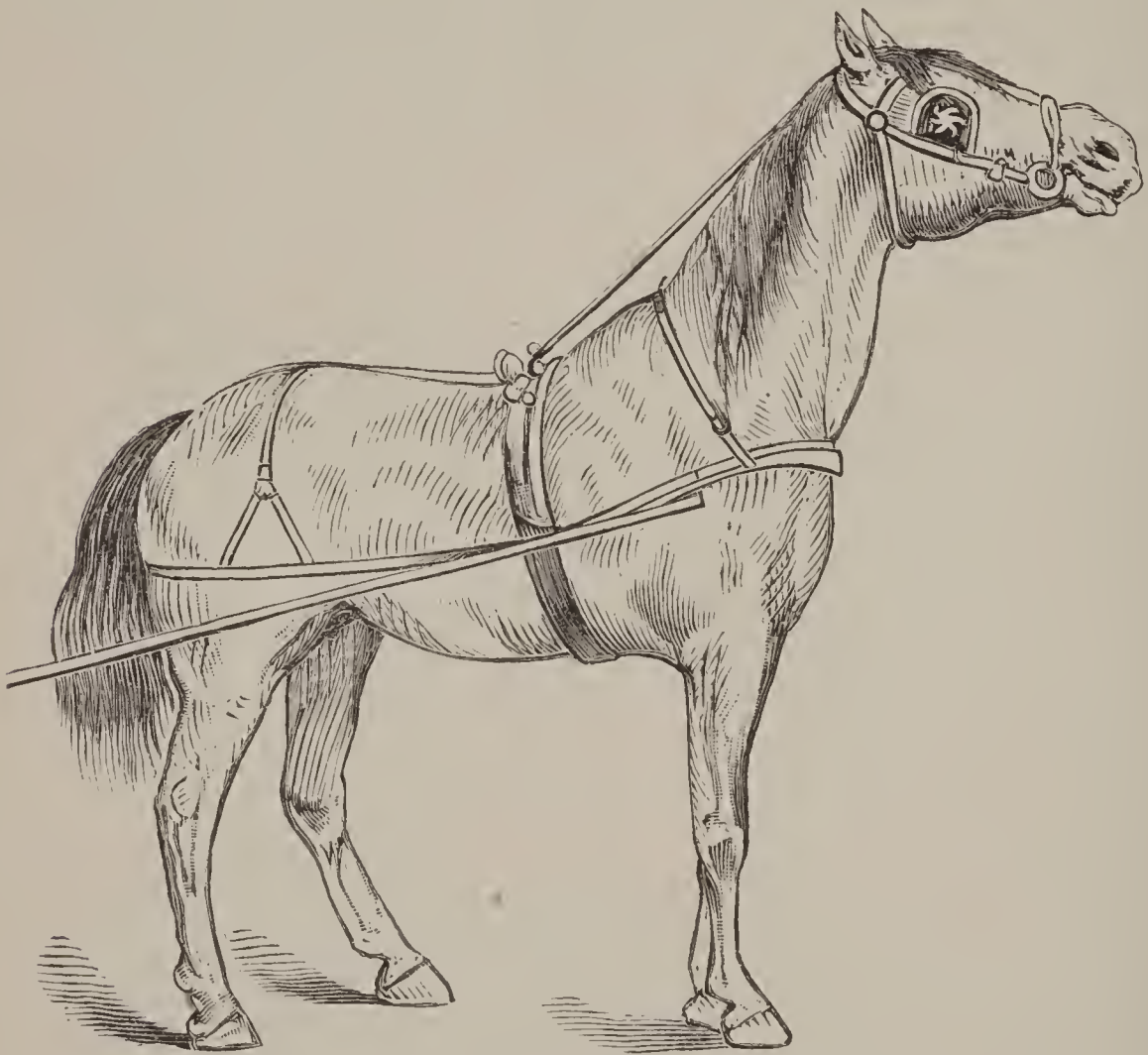


FIG. 116. — Head drawn up too high with overdraw check.

high rate of speed, the larynx is less contracted, thereby giving more freedom to breathe; consequently in striving to attain the greatest possible speed, the ingenuity of trainers has been directed for years to the use of such means as would keep the head up in the position required most arbitrarily. It is necessary to adjust nicely this condition of restraint to special cases; for often the raising or lowering of the head an inch or two will make a difference in the speed of the horse several seconds in a mile, certain horses requiring a certain elevation

to trot at their best, which can be learned only by the conformation of the horse and by experience in his training. So

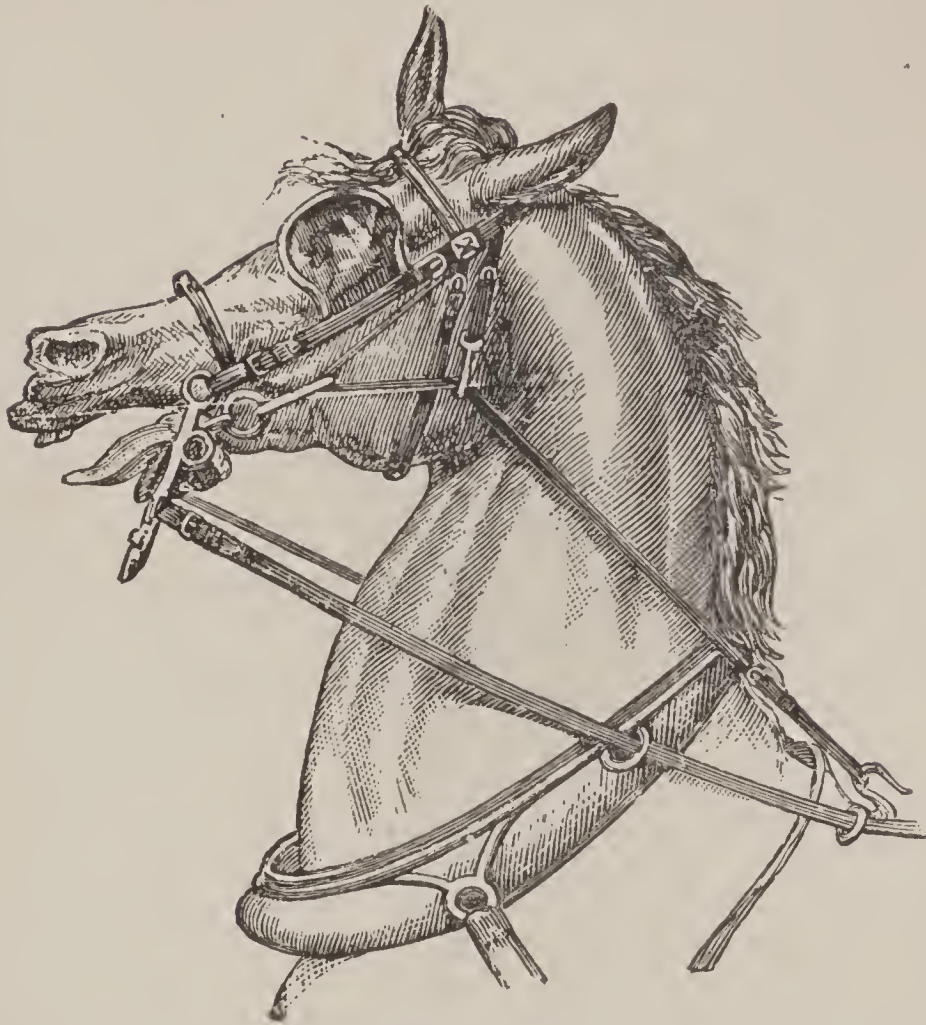


FIG. 117. — The extreme torture of the Bedouin or gag bearing-rein.

the check is found necessary, the same as are boots and other accessories, to force the greatest speed. It will be seen, also, that as soon as the trotting horse is speeded, or has made his race, he is immediately unchecked, and given the entire freedom of his head.

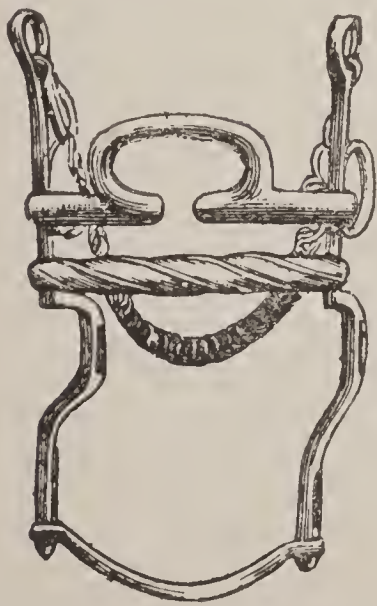


FIG. 118. — Form of bit in general use.

Then it has been learned that a headstrong, unreliable horse, liable to kick and run away, by checking the head high can often be made to drive quite pleasantly and safely. So it will be seen that while checking is proper and indispensable in the training of trotters, as well as in the driving of some headstrong horses of doubtful character, it is not only wholly

uncalled for, but practically cruel as now generally used upon ordinary carriage horses, roadsters, and work horses ; and that to work easily and comfortably requires the greatest freedom of the head from unnecessary restraint.

Of course, no matter how low-headed the horse naturally is, there is no real difficulty with the overdraw check as now used to pull the head up far above the position in which the

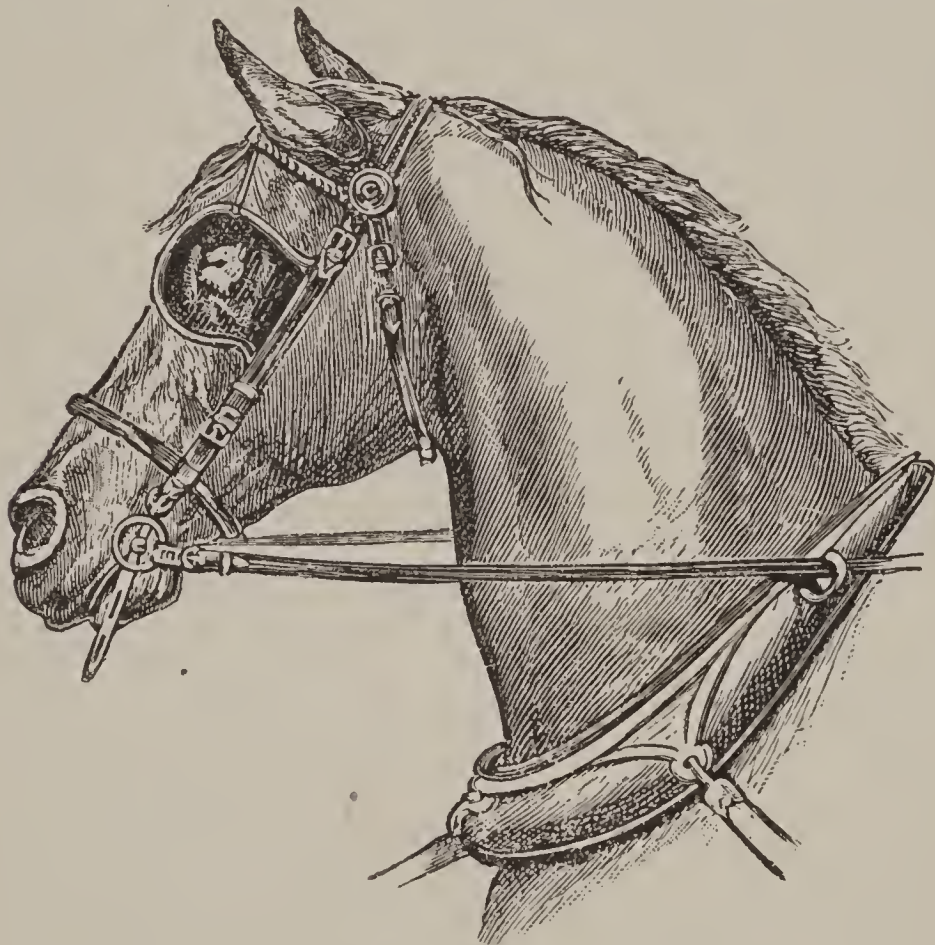


FIG. 119. — Comfort.

head is naturally carried, and hold it there. This has now become so common that it is a most serious cause of objection and abuse. Not only the most intelligent owners, but every country fellow and jockey, no matter how poor his horse may be, if even hardly able to go five or six miles an hour, will pull the head up in the most painful manner ; and the poor horse is perhaps compelled to drive in this way all day. As an illustration, only recently a couple of ignorant country boys drove up to the Sanitarium, at the front door of which I was standing at the time. The head of their horse, which was only a common, rough farm-horse, was checked

so high that it was painful to witness the struggles the poor animal made to free himself from the uncomfortable restraint. I said to the boys, "Why on earth do you keep your horse checked so high? He will go a great deal better, and be very much more comfortable, if you will give him the freedom of his head; and he will really look better if you take off the check entirely." They answered by referring to a particular man in their neighborhood who, they claimed, was a good horseman, and who checked his horse in this way; and they said they would rather follow his method of management, that it was good enough for them. This is only one instance of many I could refer to.



FIG. 120. — The horse trying to relieve himself from the torture of the overdraw check.



FIG. 121. — Throwing the head up to obtain relief from check.

With a view to making plain something of the great pain and discomfort to which driving horses are subjected in this way, I give illustrations showing the struggles of a horse driven to a top carriage by a couple of young ladies. The horse, evidently a family pet, was naturally low-headed and moderate in his action; but the head was pulled up so high as to make it painful to witness his struggles to give himself freedom; and this is only a fair representation of what may be seen daily in every city, village, and neighborhood throughout the country.

It is a matter of common occurrence, which any one may observe, to see horses, after being driven in many miles from the country, hitched to a post with the head checked high, and allowed to stand there all day. We can hardly conceive of the pain and discomfort to which a horse is subjected by being tied

and hampered in this way for so long. This should be carefully guarded against. If hitched to a post, and allowed to



FIG. 122. — Gentle family horse ; showing torture of high checking.

stand for any time, the check should be let down, or the head given comparative freedom.*

Fig. 115 is a very good illustration of how the head is usually pulled up. The head of this horse is drawn very high, and it is easy to see how uncomfortable he is in consequence of being so hampered ; yet a horse which has less action, and carries the head naturally low, but is checked so that the head seems no higher than it is car-

ried ordinarily, may really suffer more than the one with the head very much higher, but with a better conformation. It is the conformation that in a great measure determines the amount of cruelty and discomfort.

While the check is less objectionable for light driving, it is nothing less than positive cruelty to put such restraint upon the head of the draft horse, because in addition to the great discomfort it causes, it seriously impairs his strength. If a man has a load of



FIG. 123. — Seeking relief from pain of check.

* With people who drive in from the country, it is also a matter of common occurrence to hitch a horse, while warm and sweaty, in some cold, bleak place, and allow him to stand there until chilled, while the owner is, perhaps, in some drinking saloon or somewhere else having a good time. Many a horse is ruined and lost by this exposure. After getting home, he is liable to have a chill, running into an attack of pneumonia or laminitis, which leads to the loss or serious injury of the horse. This, you see, is very poor economy. By all means take good care of your horse when driving him.

anything to pull, he wishes to get his head as far forward as possible to pull with ease ; but the horse is denied this ; his head is reined back tightly, thereby making it much harder for him to pull the load. This is particularly hard upon the horse when the roads are heavy, and he is compelled to make great exertion.

A high English authority, Prof. McBride, says : “ I most heartily concur in what has been said about the bad effects of



FIG. 124. — Check-rein on work horses.

the foolish custom of using the check-rein. It is a very common cause of roaring in the horse.” This statement is indorsed by all leading veterinarians, seven hundred in England alone, and is concurred in by leading veterinary surgeons in this country.*

*It was admitted by the same authorities that not only roaring, but apoplexy, migrains, or inflammation, and softening of the brain, are frequently induced by this cause.

The most serious exhibition of this cruelty, which can be witnessed in large cities, is the high checking of fancy carriage teams. Fig. 117 is a good illustration of the common method of checking such teams. The form of bit, too, used on them, a representation of which is given in Fig. 118, is entirely uncalled for, and unnecessary in harshness and severity for the control of such well-trained, gentle teams.



FIG. 125. — Showing the discomfort and torture of high checking.

A few years ago it was the custom for coachmen, without the knowledge of their employés, to use round leather bit guards, barbed with short spikes, and placed inside the ring of the bit, so that when the reins were tightened, the nails sunk into the sides of the mouth, and made the horse show a fashionable degree of mettle. This Mr. Bergh finally broke up. He exhibited to me hundreds of such burrs taken from the bridles

of coach teams. Fig. 134, showing length of the spikes, was drawn from a specimen given me by the New York Humane Society.

BLINDERS.

But if high checking and severe bits are senseless and cruel, the method of covering the eyes with blinders, as now usually done, is, if anything, worse; for the custom is to make the blinder bend forward, cup shape, so as actually to cover up the whole eye. A nobleman in England had a favorite horse which had a defective eye, and to cover this



FIG. 126. — Showing position of eyes.



FIG. 127. — Fashion. The eyes completely covered.

up he had blinders put on the bridle; they became a good place for the insignia of rank, and hence blinders, formerly called winkers, became fashionable and common. I have seen in New York, during a short stroll, scores of teams with the eyes actually covered so much as to make it next to impossible for them to see anything before them. Figs. 127, 128, which are taken from life, are fair illustrations of this form of blinder. I give also good illustrations of the old farmers' horses, with blinders either pressed up close, or flapping right and left against their eyes.

Any one examining closely is liable to find the clinch of the ornament usually put on the outside of the blinder, raised and perhaps sticking into the eye. In

pointing out this cause of harm lately, I found a piece of wire connected with the ornament of the blind, which had become



FIG. 128. — Eyes completely covered.

raised and pressed into the eye almost a quarter of an inch, so as to cause serious injury. The blinders had been pressed close up to the side of the head and against the eye to such a degree as to attract my notice.

It is not an unusual thing to find the outer lids of the eye so rubbed and excoriated from this cause as to be seriously injured. I have found

the eyes of many horses seriously injured from this cause.

I would ask you to notice these little things carefully in fitting and adjusting the bridle to your horse's head, so as to avoid such causes of annoyance and injury. Upon putting on a new or closely fitting bridle, it is rare that the blinders will not be found to press too closely and harshly against the eyes, and they are liable to be particularly injurious if the eyes are large and prominent.

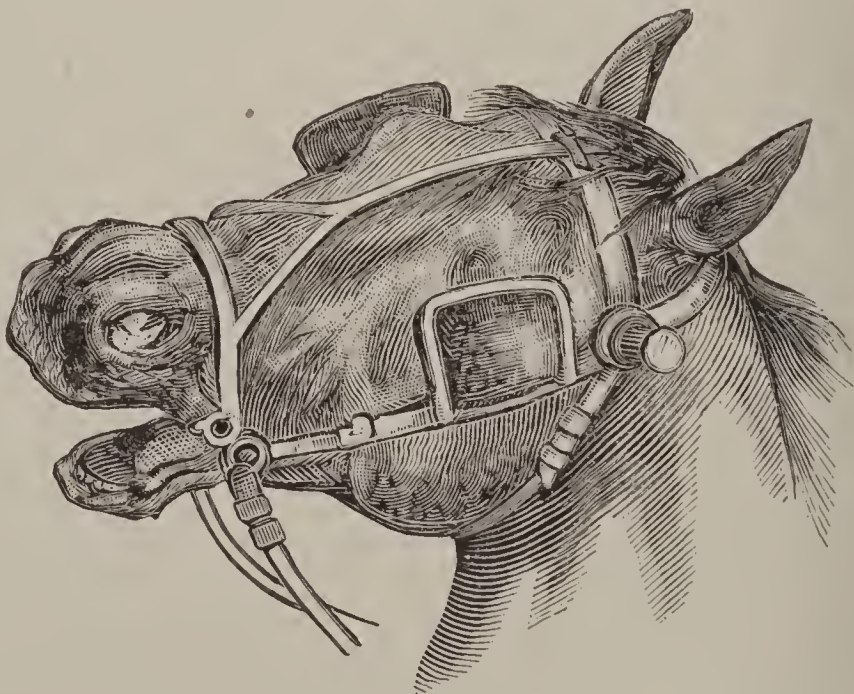


FIG. 129. — Fashion in the country.

It is thought that many doubtful horses will drive better by covering up the eyes with blinders. If not fitted closely, — and

they rarely are as used in the country, — the horse is able to see back over them, in which case he is liable to become frightened, especially at the top, or umbrella, or anything objectionable, and run away.

A horse may have been driven perhaps months or years with success to a top carriage. Unexpectedly one of the blinders becomes misplaced or loose; or the bridle becomes changed for one the blinders of which cover the eyes but imperfectly; or, perhaps, in changing harnesses, the bridle proved too short, and in letting out the check-pieces, the blinders

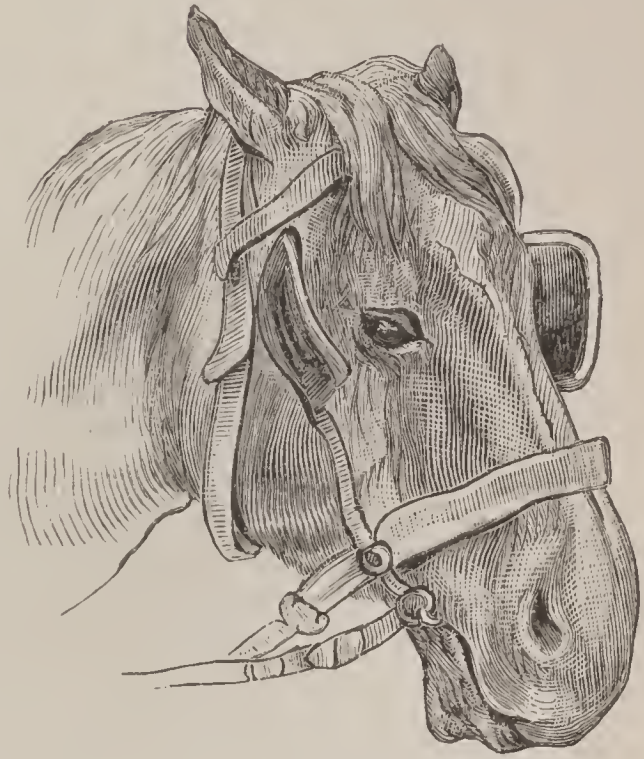


FIG. 130. — Old farm-horse with blinds.

were brought too low for the eyes; in any event, the horse is, in a chance way, as he throws up his head, enabled to see the



FIG. 131. — Corners of blinders dangling against the eyes.

top, becomes frightened, and the consequence is a most dangerous runaway, kicking scrape. These accidents are of almost daily occurrence in every neighborhood. Here, at the mere chance of a blind's getting out of place, you are at the mercy of a dangerous horse. Yet all this trouble could be prevented by a few minutes' proper treatment. In all my experiments before classes

upon the most nervous, unmanageable horses that could be produced, I always made it a point, no matter how afraid they were of a top or anything else, to drive them without blinders so that they could see behind them plainly. To have a horse

fearless and most safely manageable, he should have the fullest freedom to see everything behind him.

A horse is naturally suspicious and afraid of anything he does not plainly see, or does not comprehend the nature of ; and hence he must either be prevented from seeing objects at all, or be permitted to see them plainly.

Any one can understand that if compelled to look through a small slit or narrow space, it not only in the first place in-



FIG. 132. — Blinders striking against the eyes.

creases the difficulty of seeing, especially while moving, making it very trying on the eyes, but it makes it clearly impossible to see things as plainly as if the eyes had entire freedom. This is just the effect blinders have upon the horse's eyes. In another part of this work (*Colt Training and Fear*), the instructions will be found very explicit on these points.

If blinders are used at all, let them be of a form not to press upon the eyes or obstruct the vision in front. It is a great deal better, if the horse has a good head, and especially if reasonably spirited, to have no blinders at all. There is no part of the body so expressive or beautiful as the eyes. Not only

this, but they are made for a wise purpose, and the horse should have the benefit of using them. Do not interfere with the eyes ; and as you would not be hampered and obstructed in your freedom, do not tie up the head. These matters of high checking and blinders are usually made particularly uncomfortable and cruel when left to the guidance and management of an ignorant driver or groom ; and very few of even intelligent farm help ever give much thought to such matters. The master and mistress should look to these points, and insist upon their observance. How would you like to be compelled to

work even for a short time with your head tied back as shown in Fig. 114? How soon you would enter an emphatic protest, and explain the seriousness of the annoyance. Remember the horse cannot do this; that if hitched up wrong and hampered, no matter to what degree of discomfort, he cannot protest.

It is only a foolish law of fashion that has brought into use this custom of high checking and covering up the eyes of driving horses; for no one pretends that high checking serves any purpose excepting that of show, in holding the head up higher than nature intended; and so in relation to covering up the eyes with blinders. All this is of a piece with the custom of cropping horses ears, practiced in England many years ago, and in this country of cutting off and nicking horses' tails. But these things are so common that with few exceptions even the wise and good of our own country, — who are at heart disposed to condemn anything in the way of cruelty or abuse, — sanction these things in the use of their horses.



FIG. 133. — Excited by pain of the burrs.



FIG. 134. — Side view of burr, three-fourths size.

CHAPTER X.

MISCELLANEOUS HABITS.

CRIBBING.

A HORSE will not crib on anything that is lower than the knees ; consequently a practical way to prevent the habit is to tear away the manger, and feed the horse from the floor or from a basket.

Saturate with kerosene oil the manger, neck-yoke, and strap, if inclined to bite them. Rubbing the parts bitten upon with strong fly-blister, may next be tried ; or get cayenne or red pepper pods, boil down to a strong decoction, and



FIG. 135. — Horse in the act of cribbing.

wash thoroughly with the solution the parts the horse may be inclined to bite upon. To be repeated at least once a week, for a month or more. The object is to make the lips and mouth so sore as to prevent the inclination to bite. Cribbing can be stopped by buckling a wide, flexible strap moderately tight around the neck. It should be from three to three and one-half inches wide.

I noticed once that a horse, when cribbing at a post, contracted the larynx and muscles of the neck forcibly during the act. It occurred to me to put such an adjustment upon the throat-latch as would cause sharp pain when there was an effort to crib. I went to a harness-shop, procured some six-ounce tacks, drove them through a strip of leather about half an inch apart, and filed the points sharp and of equal length. I laid this bit of strap on the inside of the throat-latch, so as to bring

the points of the tacks under the larynx, and kept it in place by winding each end and the center with a piece of waxed-end. I now buckled the throat-latch long enough so that it would not touch the neck when eating or swallowing, yet so close as to bring the points of the tacks sharply against the throat at the least attempt to crib, and stood by to notice the effect. The first time the horse tried to crib, he was hurt so keenly that he

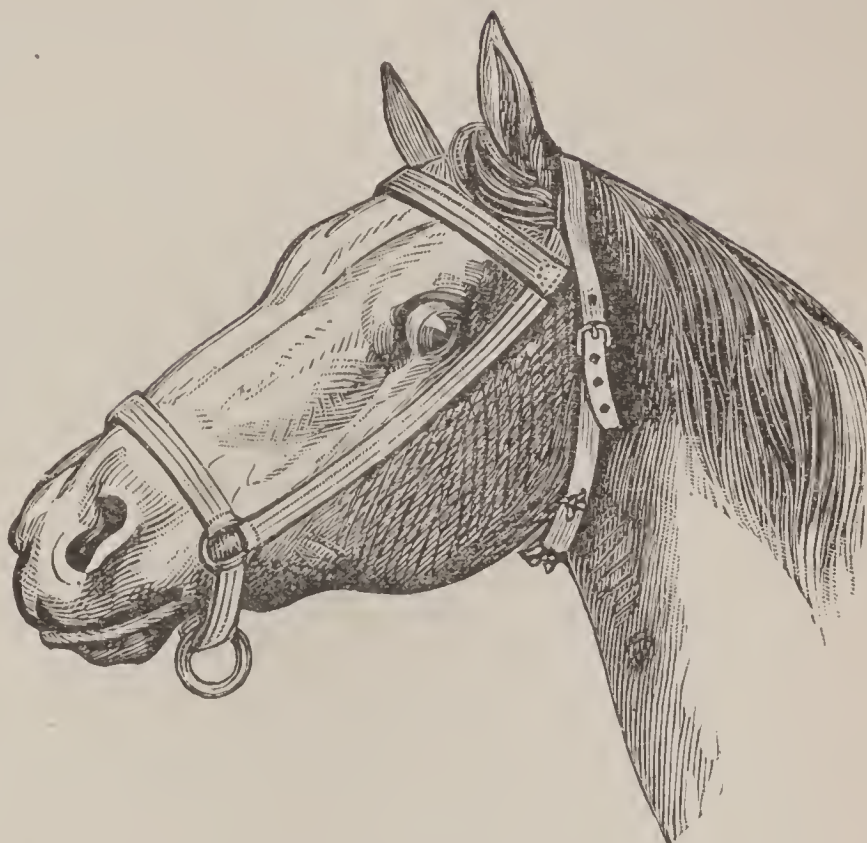


FIG. 136. — The halter adjusted for cribbing.

jumped almost from the ground. In a short time he tried it again, with the same result; the third time he only gave a little nip, and then stood quietly for some time. I have broken several horses of the habit by this means, and think if the adjustment is made right, and continued long enough, it will be found effectual. A

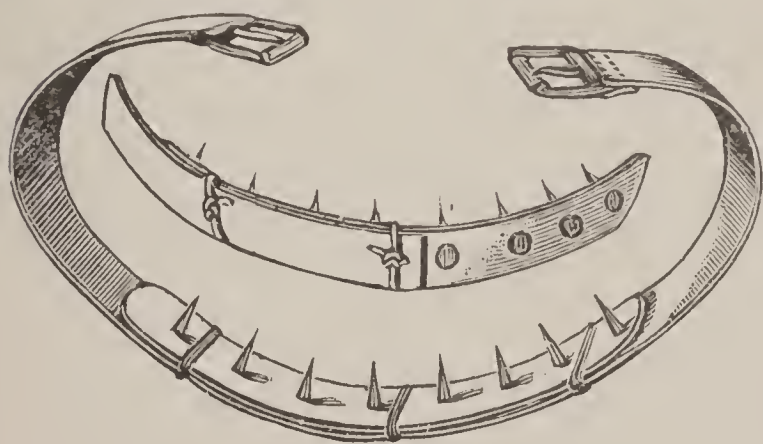


FIG. 137. — Throat-strap with tacks.

boy reported to me that he had broken five horses of this habit; but he became careless, and failed on the sixth. There is, once in a while, an old horse that may resist this treatment. In this case, put on a muzzle.

WIND-SUCKING.

Sometimes a horse sucks wind without the habit of cribbing. I include a cut of a form of bit to prevent this, for which much

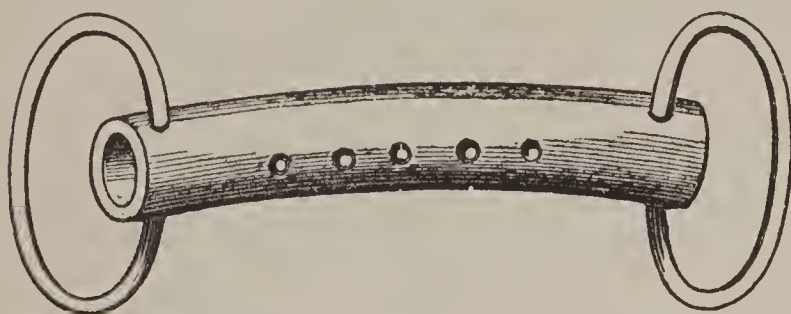


FIG. 138. — Bit made of gas-pipe to prevent cribbing and wind-sucking.

is claimed. A practical horseman of experience gave me the point. He claimed that it would work perfectly in preventing the inclination to crib and suck wind.

Procure a piece of gas-pipe about seven inches long. Drill a hole across each end, through which put in rings, as seen in cut; next, drill four or five holes, as shown in cut. The theory is that the gas in the stomach cannot escape through the mouth on account of its being closed, and that instinctively the horse will bite something to open the mouth and throw off the gas. With this bit in the mouth, the air passes through the small holes in the center, and out through the ends. (See Fig. 138.)

The gentleman referred to positively assured me that in several cases known to him it worked with perfect success.

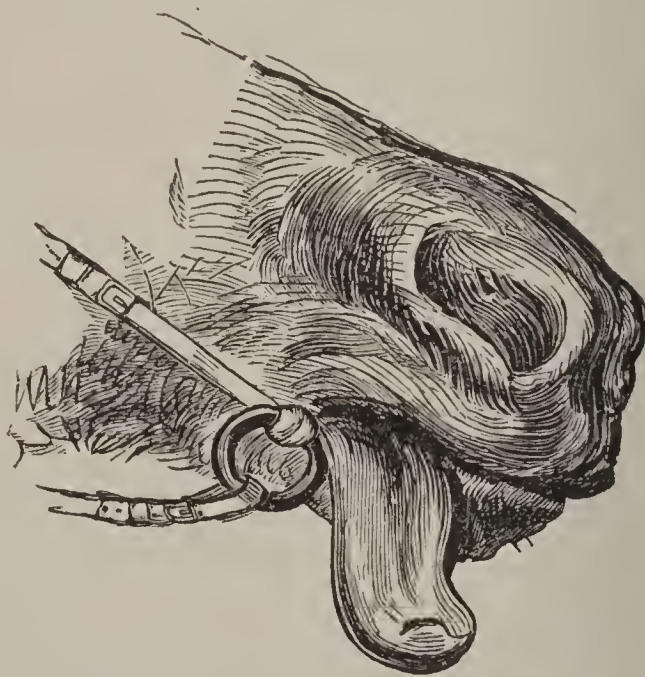


FIG 139. — Manner of putting tongue out.

PUTTING THE TONGUE OUT OF THE MOUTH.

If the tongue is put over the bit, the simplest way of preventing this habit is to have the smith make a mouth-piece, as represented in Fig. 140, which is seen to be bent up, and comes so high in the mouth that the horse cannot get the tongue over;

this works well, and is not inconvenient to drive with. It should be bent up from at least two and three-fourths to three inches, come well out to the cheek-pieces, and be filed smooth to prevent cutting or chafing the mouth. The tongue is sometimes, but not often, put out under the bit. For such cases, the following treatment will work well: —

Get three medium-sized bullets, and hammer them out to about an inch and a half in length. Drill a small hole through the end of each. Tie one to the center of the bit by a little piece of wire through the joint. Attach the others to the bit about an inch from the center (one on each side), so as to play loosely.

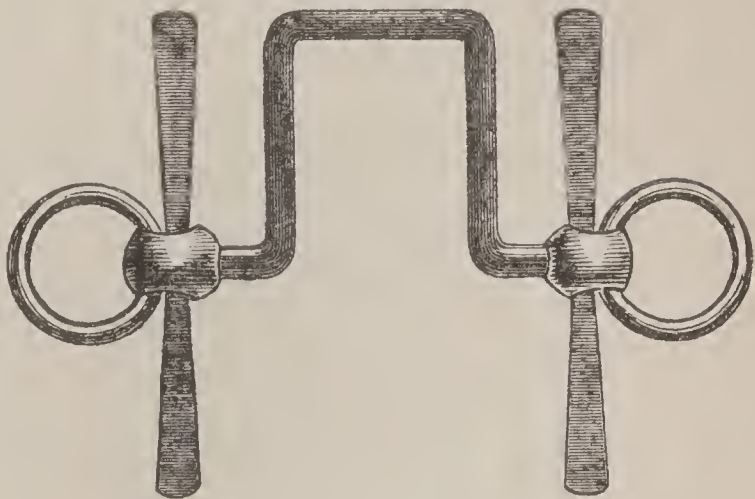


FIG. 140.

When this bit is in the mouth, these extra arrangements will so disconcert the horse that in his struggles to get them out of the way, he will forget to put his tongue out. If these fail, buckle a strap moderately tight around the nose.

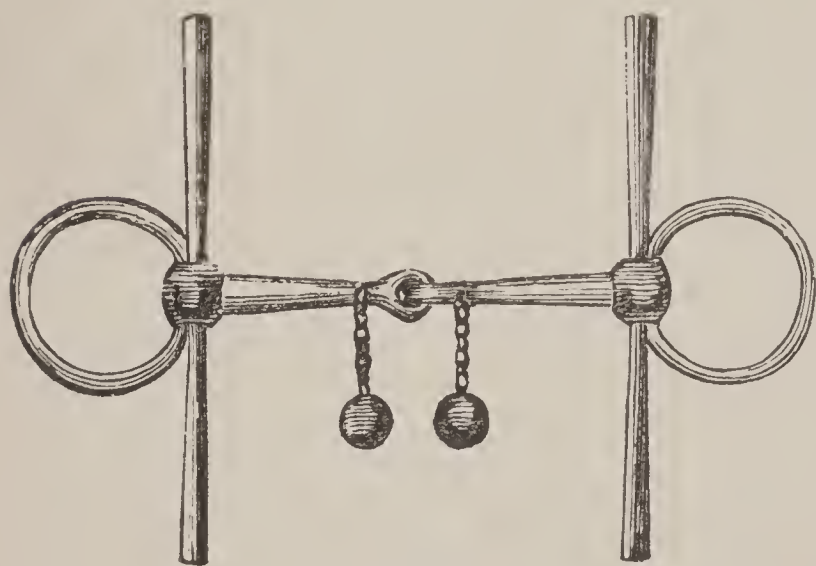


FIG. 141.

The next best way is to buckle a strap around the nose so that the mouth cannot be opened. This, of course, prevents the tongue from being

put out, and in a short time the habit will be broken up. There are bits now made for this habit, which may be obtained of dealers.

TO LEAD A COW OR OX EASILY.

Tie a rope around the head under the horns, bringing the knot over the ear. Now bring the rope forward and under the ear ; again forward over and under the cord. By now pulling the cord, it will tighten around the ear, hurting so severely that the cow will lead freely.



FIG. 142. — Arrangement of the cord for leading a cow.

CHAPTER XI.

HOW TO TELL THE AGE.

IT is sometimes very important to be able to determine the age of a horse; and this is indicated most surely by the teeth.

When the colt is one week old, the two central nippers are grown. In from five to six weeks, another incisor will appear

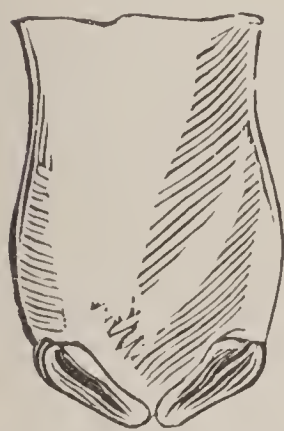


FIG. 143. — One week old.

on either side of the first two, and the mouth will appear something like Fig. 144. At two months they will have reached their natural level, and between the second and third months a second pair will have overtaken them. They will then begin to wear away a little, and the outer edge, which



FIG. 144. — Six weeks.

was at first somewhat raised and sharp, is brought to a level with the inner one. Between the sixth and ninth months, another nipper begins to appear on each side of the first two, making six above and six below, and completing the colt's mouth; after which the only observable difference, until between the second and third years, is in the wear of these teeth.

Fig. 146 is intended to show the appearance of the mouth at from two and a half to three years old. The next is intended to show it at three and a half years old. The two central permanent teeth are growing down, and are larger than the others, with two grooves in the outer convex surface, and the mark is long, narrow, deep, and black. Not having

yet attained their full growth, they are lower than the others. The mark in the next two nippers is nearly worn out, and is wearing away in the corner nippers.

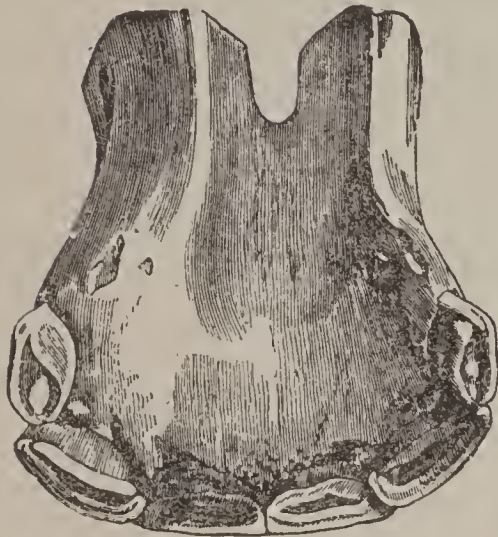


FIG. 145. — Twenty months.

Between three and a half and four years, the central nippers have attained to nearly their full growth, and the second pair will have so far displaced the temporary teeth as to appear through the gums, while the corner ones will be diminished in breadth and worn down, the mark becoming small and faint.

At four years the central nippers will be fully developed; the sharp edge somewhat worn off, and the mark shorter, wider, and fainter. The next pair will be up, but they will be small, with the mark deep, and extending quite across them.

At four years and a half, or between that and five, the corner nippers are shed, and the permanent ones begin to appear, something like Fig. 148. The central nippers are considerably worn, and the next pair are commencing to show marks of usage. The tush has now protruded, and is fully a half inch in height; externally it has a rounded prominence, with a groove or hollow on the inside.

At five years the horse's mouth is almost perfect. The corner nippers are quite up, with a long, deep, irregular mark on the inside, and the other nippers are showing the effects of increased wear.

The tush is much grown, the grooves on the inside have almost or quite disappeared, and the outer surface is regularly convex. It is still as concave within, and the edge nearly as sharp as it was six months before.

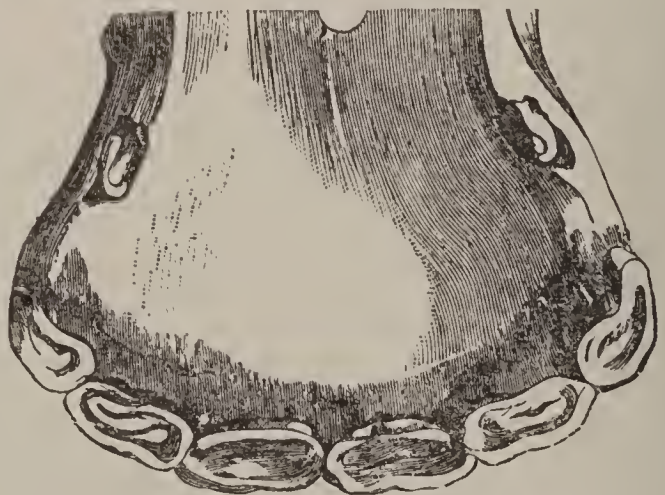


FIG. 146. — From two and one-half to three years.

At six years the mark on the central nippers is worn out. In the next pair the mark is shorter, broader, and fainter ; and in the corner teeth the edges of the enamel are more regular, and the surface is evidently worn. The tush has attained its full growth, being nearly or quite an inch in length ; convex outward, concave within ; tending to a point, and the extremity somewhat curved. The horse may now be said to have a perfect mouth, as all the teeth are produced and fully grown.

At seven years, the mark or pit is worn out in the central nippers, and fast wearing away in the corner teeth ; the tush also is beginning to be altered. It is rounded at the point and edges.

At eight years the tush is rounder in every way ; the mark is gone from all the bottom nippers, and it may almost be said



FIG. 147. — About three and one-half years.

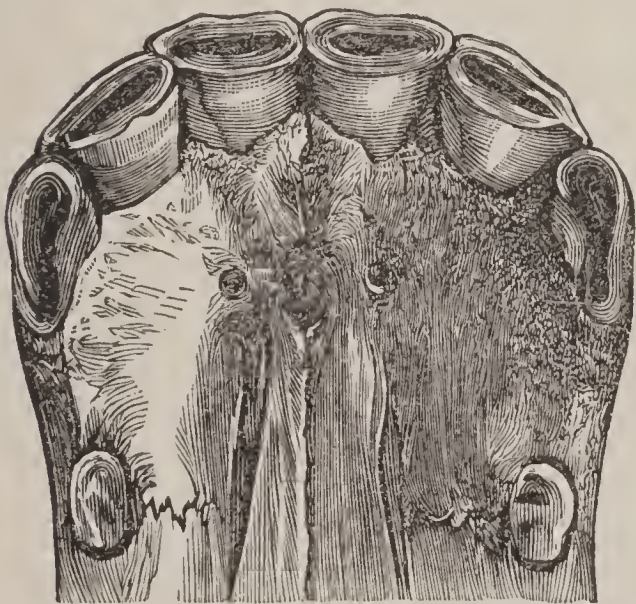


FIG. 148. — Four to four and one-half years.

to be out of the mouth. There is nothing remaining in the bottom nippers that can afterwards clearly show the age of the horse.

After the age of eight years, there are no points that will enable determining age with any degree of accuracy. A horse that is fed on corn will show an older mouth than one that is fed on oats and sloppy feed. Note the front views Figs.

155–157 which give a good idea of the difference between a young mouth and an old one.

After the eighth year, the gums begin to recede from the center, and the teeth become longer in appearance. By look-

ing at Fig. 156, showing twelve years, the gum is shown to have receded and run to a sharp point at the center of the teeth. At twenty years, the teeth are considerably narrower and longer, and the gums are drawn back sharper.



FIG. 149. — Five years.

great peculiarities in form of teeth with advanced age. The most common is shown by Fig. 160.

Jockeys frequently resort to cutting down the teeth of aged horses, so as to simulate as much as possible the appearance of the mouth at eight or nine years of age. This was formerly done by sawing or filing, but more recently by chipping or cutting off the teeth, so that the front nippers can be cut down very quickly and easily by any amateur. But the breadth of the teeth and other changes of form, as explained, will expose the deception; also the deep hollow and gray hair about the eyes, with the

By observing the face of the teeth, there will be seen a change to the triangular form, shown by Fig. 158. From the age of fourteen, we see this is more noticeable, the middle nippers gradually increasing and extending out to the corner ones, as indicated by Fig. 159. From fifteen to eighteen this triangular form becomes laterally contracted, so that at about twenty and afterward the teeth become biangular. As before explained, there are

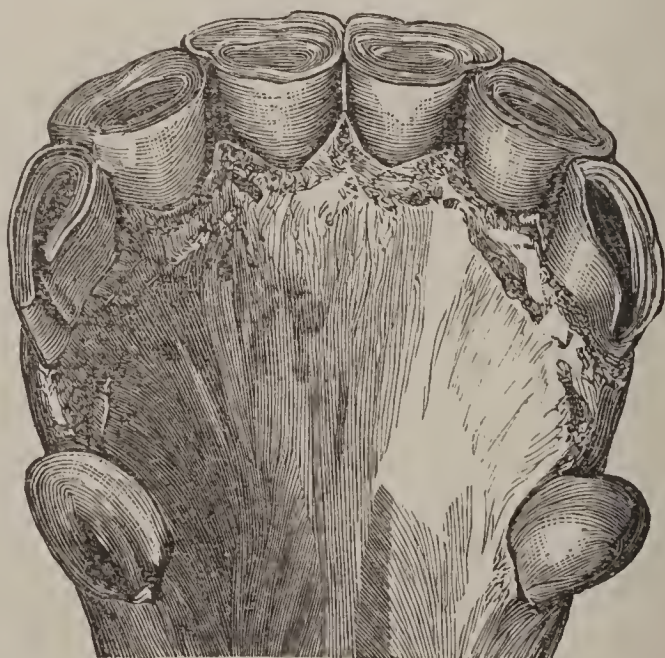


FIG. 150. — Six years.

under lip considerably pendant. This treatment is called "Bishoping," from the name of the man who introduced it in

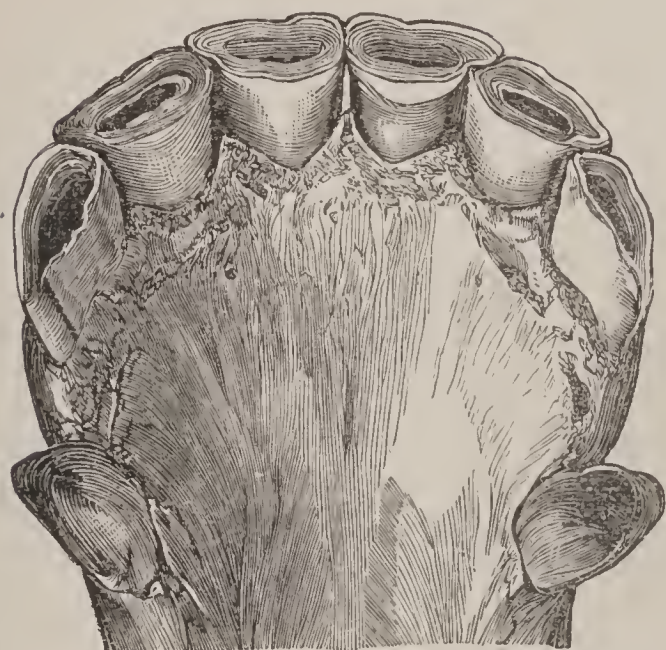


FIG. 151. — About seven years.

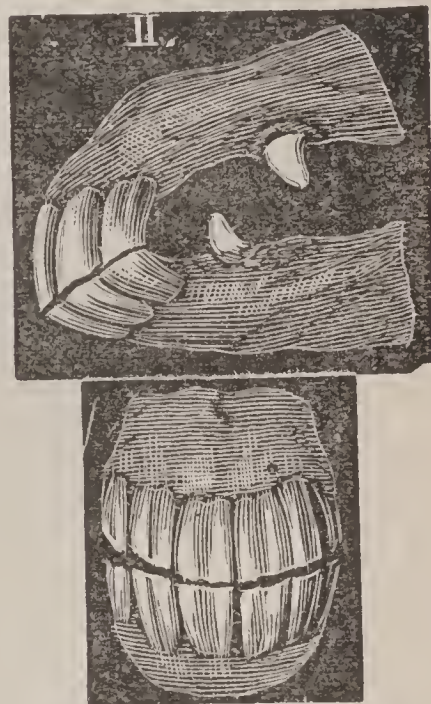


FIG. 152. — Eight years.

England, and is practiced very largely by jockeys in the larger cities of this country, especially in New York.

Horses, especially those advanced in years, are liable to have the teeth in wearing overlap one another, become very

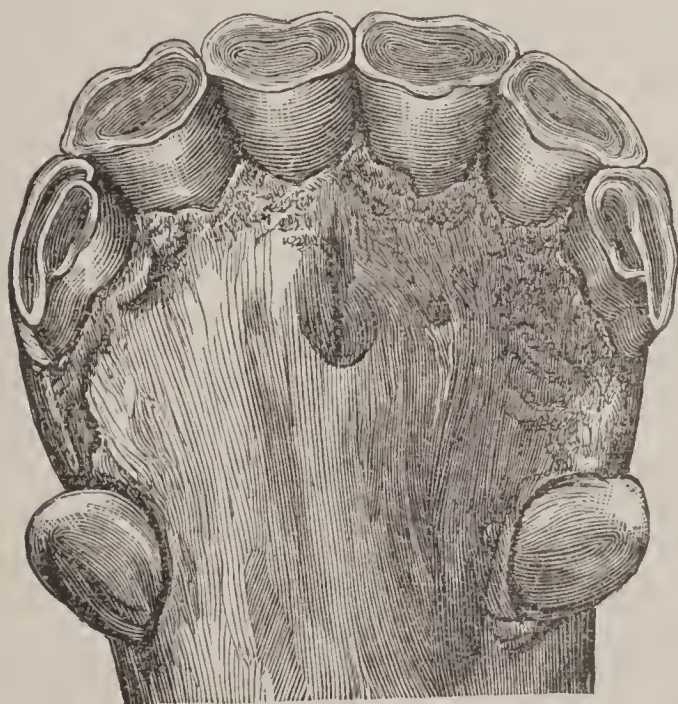


FIG. 153. — About eight years.



FIG. 154. — Eight years.

rough, and wound the inside of the cheeks ; or the grinders become irregular in length when they do not come opposite

each other in shutting, or the teeth become carious and break

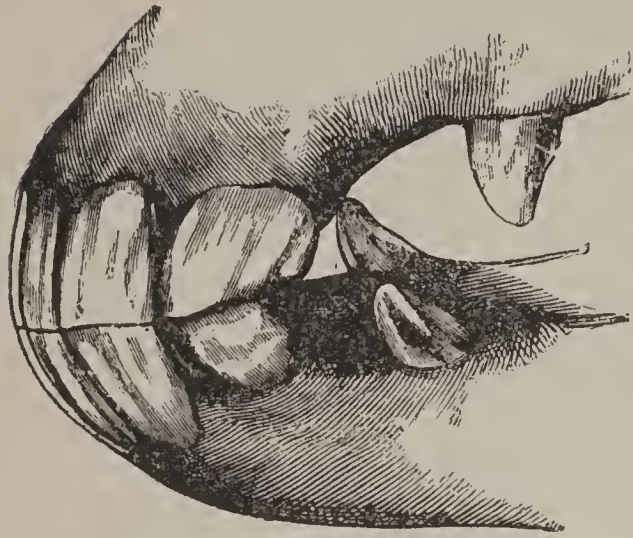


FIG. 155. — About six years.

away when not correspondingly worn with the others, shoot up to a degree to penetrate the jaw, causing soreness and inflammation, and seriously interfering with eating.

The writer saw a very interesting case of this kind at the Columbia Veterinary College, in which the unobstructed tooth had seriously penetrated into the upper jaw. In the endeavor to relieve the pressure of the parts, the animal evidently masticated the food wholly upon the opposite side of the mouth; in consequence of this the teeth on this side were so worn down that both upper and lower jaws were twisted around more than an inch out of line.

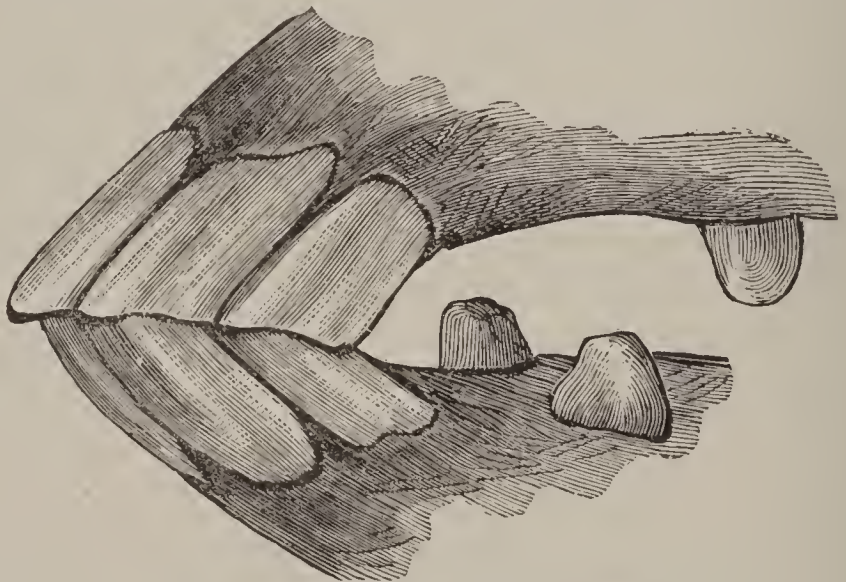


FIG. 156. — About twelve years.

Sometimes caries, or ulceration of a tooth, produces such serious disturbance that there may be an enlargement of the parts, growth of fungus, or necrosis of the parts. This, too, is much more common than is suspected.

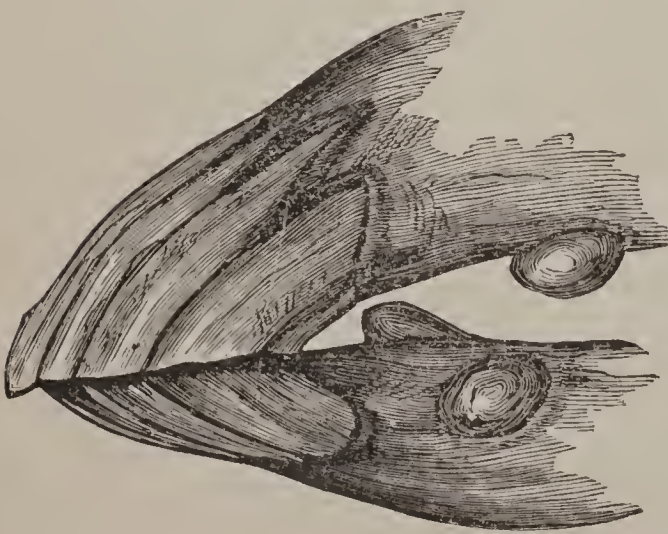


FIG. 157. — About twenty years.

When the horse, without any apparent cause, is running down, munching, or eating his food but slowly, especially if there is any lat-

eral action of the jaw, examine the mouth carefully to see whether there is any noticeable cause of trouble in the teeth. If rough and irregular, they should be rasped down. The method of doing this is now so well understood as scarcely to need explanation.

The rasping down of all irregularities should be carefully done; and if there is a decayed tooth, it should

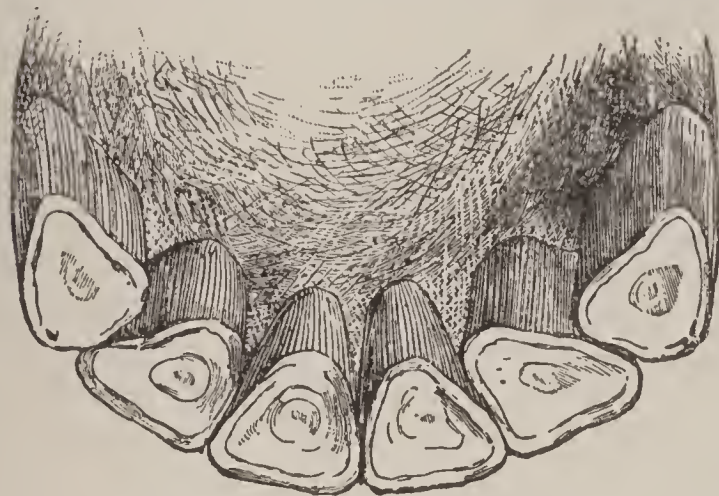


FIG. 159. — Sixteen years old.

If there is any enlargement of either jaw, more especially of the upper one, with perhaps a running sore offensive to the smell; and if in addition there is offensive matter running from the nostril on that side, the trouble may be suspected as arising from a carious tooth, and the jaw on that side must be carefully examined.

The treatment for all such cases is, first, in the removing of

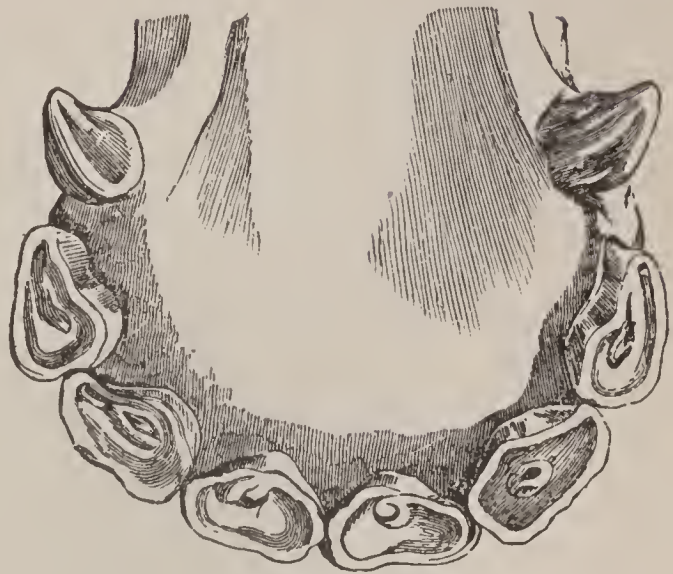


FIG. 158. — Fourteen years old.

be removed by a veterinary surgeon, or a dentist should be employed. If a tooth has grown down below the level of the others, it should be rasped or sawed off to the proper dimensions, and carefully watched afterward so as to remove any undue growth harmful to the opposite parts.

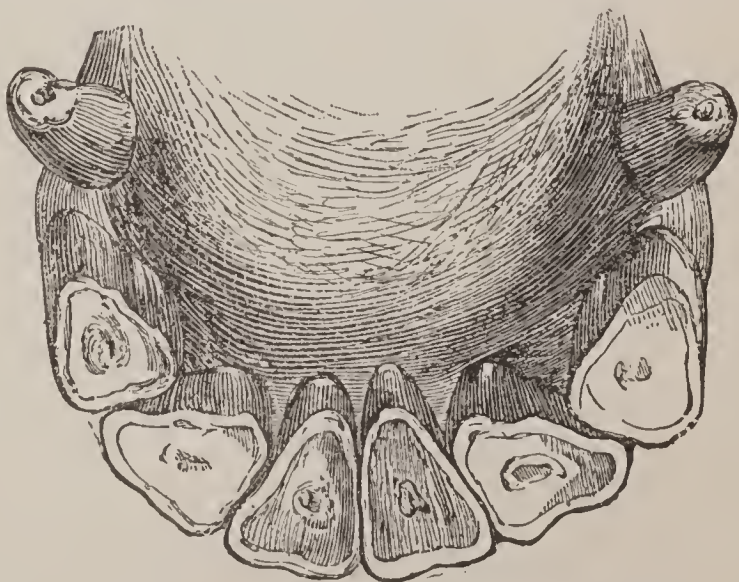


FIG. 160. — Seventeen to eighteen years.

the offending cause, namely, the tooth itself, and also, as far as possible, the dead or diseased parts, and favoring a healthy condition of growth by cleansing out the parts with a strong solution of carbolic acid or chloride of lime or any good disinfectant. Next protect the parts from the lodgement of particles of food by filling with a pledget of tow saturated with the tincture of myrrh, or any good healing astringent, and dress once a day. If there is diseased bone or fungus growth, it should be treated the same as other difficulties of the same kind.

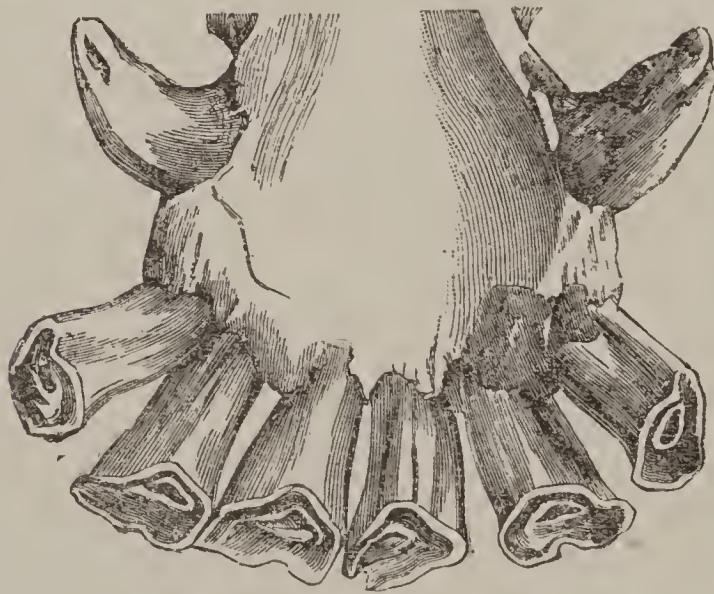


FIG. 161. — Extreme age.



Low-bred.



Ideals of well-bred, good character.



Low-bred.



Points.



Points.



Points.

PLATE VIII.

View of the hoof from its inferior face.

- P. The wall.
- S. The sole.
- L. The frog.
- A. Line indicating the commissure of the sole and the wall, known as the
linea alba, or white line.
- B. Angle of inflection of wall of the heels (buttress).
- C. Superior border of buttress.
- D. Region of the heels of the foot within the angle known as seat of corn.
- E. Inferior border of the bars.
- F. External face of the bars lining the lateral lacunæ of the frog.
- G. Glomes of the frog, or bulbs of the heels.
- H. Terminal extremity of the bars at the sides of the frog.
- I. Point of the frog.
- K. Branches of the frog.
- M. Regions of the *mamellas* of the hoof.
- P. Region of the toe of the hoof.
- Q. Median lacuna of the frog.
- U. Region of the quarters.

Fig. I.

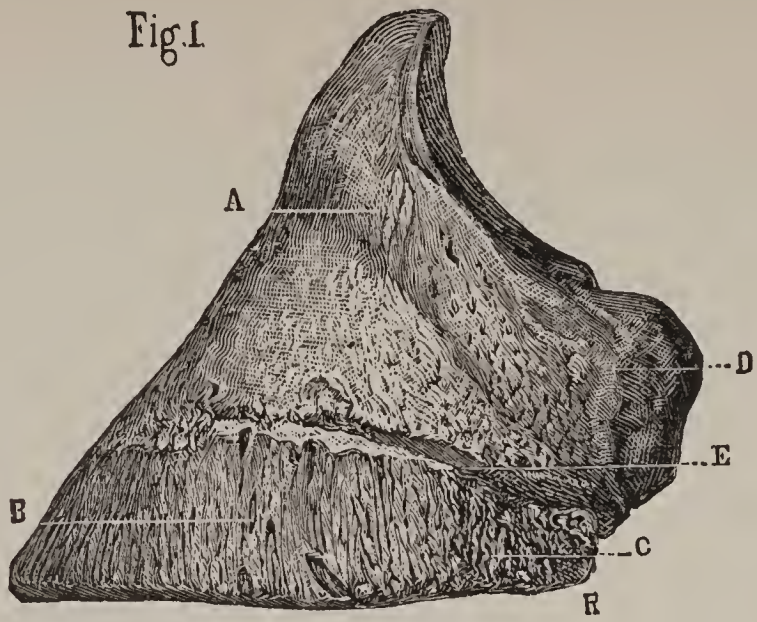


Fig. III.

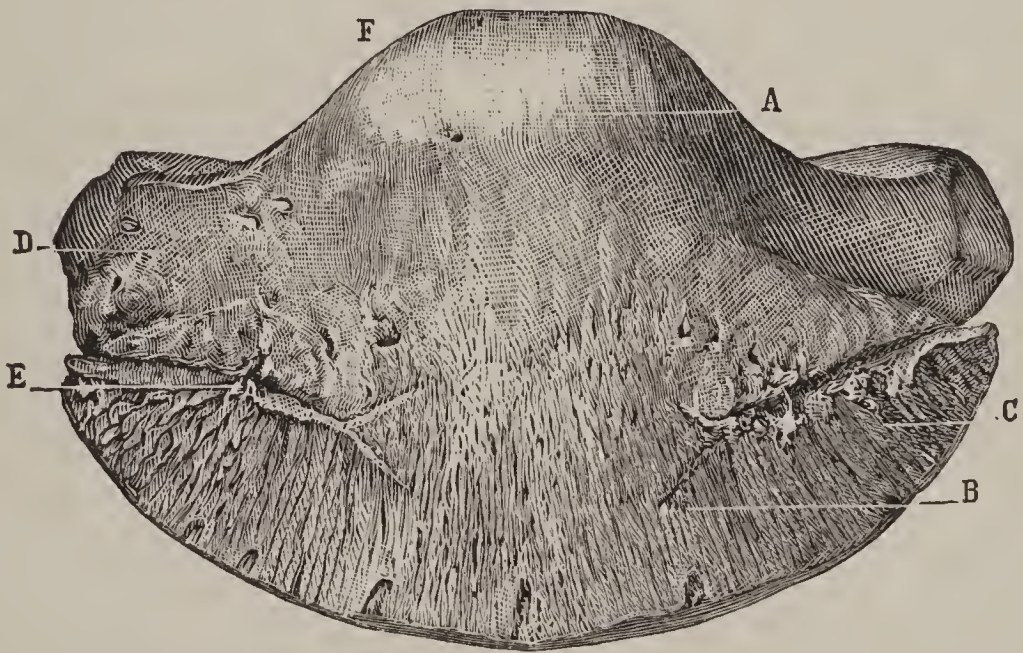


Fig. II.

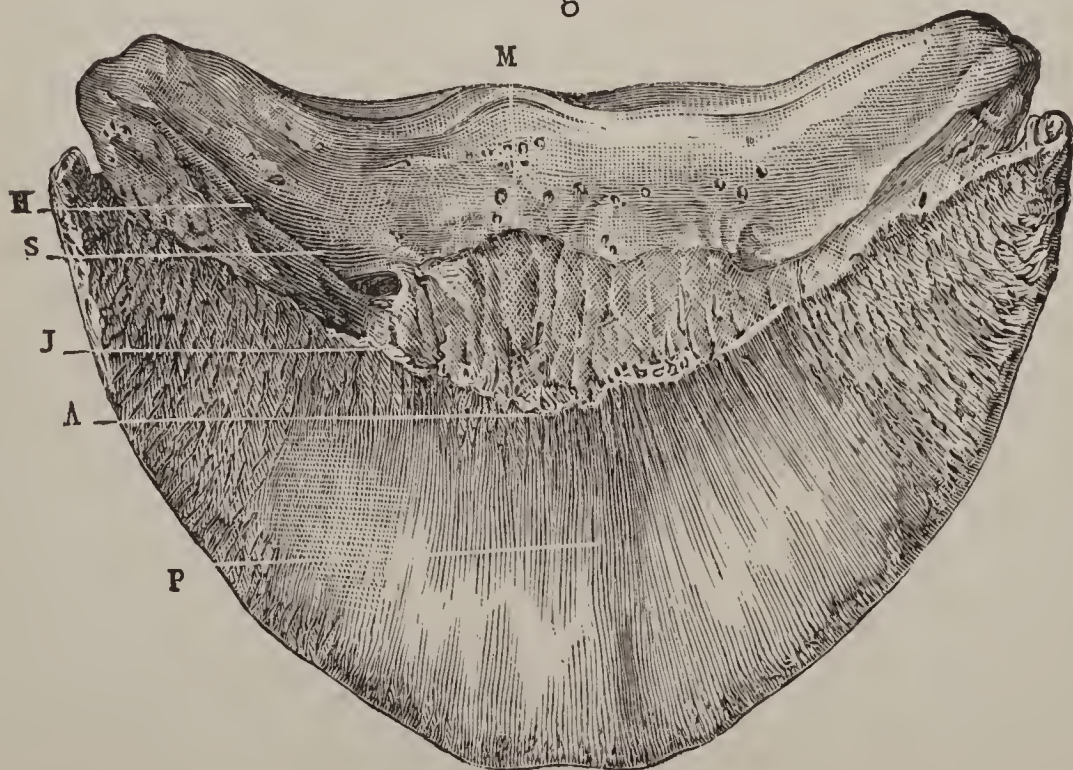


PLATE I.

This plate represents the third phalanx of the colt, seen from its lateral, anterior, and inferior faces.

Fig. I.

LATERAL FACE.

- A. Base of the pyramidal eminence.
- B. Vascular porosities.
- C. Patilobe eminence.
- D. Basilar process.
- E. Pre-plantar fissure.
- K. Pyramidal eminence.
- R. Retrossal process.

Fig. II.

ANTERIOR FACE.

- A. Pyramidal eminence.
- B. Porosities and vascular imprints.
- C. Patilobe eminence.
- D. Basilar process.
- E. Pre-plantar fissure.
- F. Superior border.

Fig. III.

INFERIOR FACE.

- A. Semi-lunar crest.
- H. Plantar fissure.
- J. Imprint of the insertion of the perforans.
- P. Inferior face.
- S. Edge of the plantar fissure.



PLATE II.

PLATE II.

This plate shows a longitudinal section of the digital region in its median plane.

Its object is to show the spongy substance in the interior of the bone, the fibrous intersections in the plantar cushion of the articular and tendinous synovial sheaths, and of the plantar cushion (or pad) in the interior of the hoof under the third phalanx and the navicular bone.

- A. Inferior part of the pad (cushion.)
- B. Ligamentous bands (filaments) representing the structure of the fibrous body forming the plantar pad.
- C. Enveloping fibrous membrane of the plantar pad.
- D. Point of insertion of the plantar pad to the inferior face of the bone of the foot.
- E. Spongy substance of the interior of the second phalanx.
- F. Articulation of the first phalanx with the second.
- H. Branches of the perforatus at its insertion to the lateral parts of the second phalanx, or small pastern bone.
- I. Insertion of the plantar aponeurosis to the semi-lunar crest.
- K. Interior of the first phalanx.
- L. Section of the perforatus tendon.
- M. Transverse ligament of the yellow fibrous tissue uniting the anterior face of the perforans to the posterior face of the os coronæ, etc. (2d phalanx).
- N. Diverticulum of the sheath of the articulation of the foot between the little sesamoid and the third phalanx.
- O. Little sesamoidal sheath.
- P. Capsule of the articulation of the foot set superiorly against the *cul du sac* of the great sesamoidal sheath.
- T. Perforans tendon.
- Y. Metacarpo-phalangial articulation, or fetlock joint.



PLATE III.

PLATE III.

ARTERIAL VESSELS.

The figure shows the superficial disposition of the digital artery on the lateral face of the phalanges.

- A, A', A''. Digital artery from its emerging point above the great sesamoids to the point where it disappears under the plate of cartilages in N.
- B. Anterior transverse branch at the metacarpo-phalangeal articulation.
- C. Perpendicular artery.
- D. Ascending branch of the perpendicular artery.
- E. Descending branch of the perpendicular artery.
- F. Transverse branch forming with the corresponding one the superficial coronary circle.
 - f. Descending ramuscles in the pad of the superficial coronary circle.
 - f'. Ascending ramuscles of the podophyllous tissue, or sensitive laminæ.
- G. Posterior transverse branches of the metacarpo-phalangeal articulation
- K. Artery of the plantar pad, or cushion.
- P. Circumflex artery.
- U, U. Ascending terminal divisions of the digital artery; they emerge from the porosities of the third phalanx, and send ramifications to the podophyllous tissue.

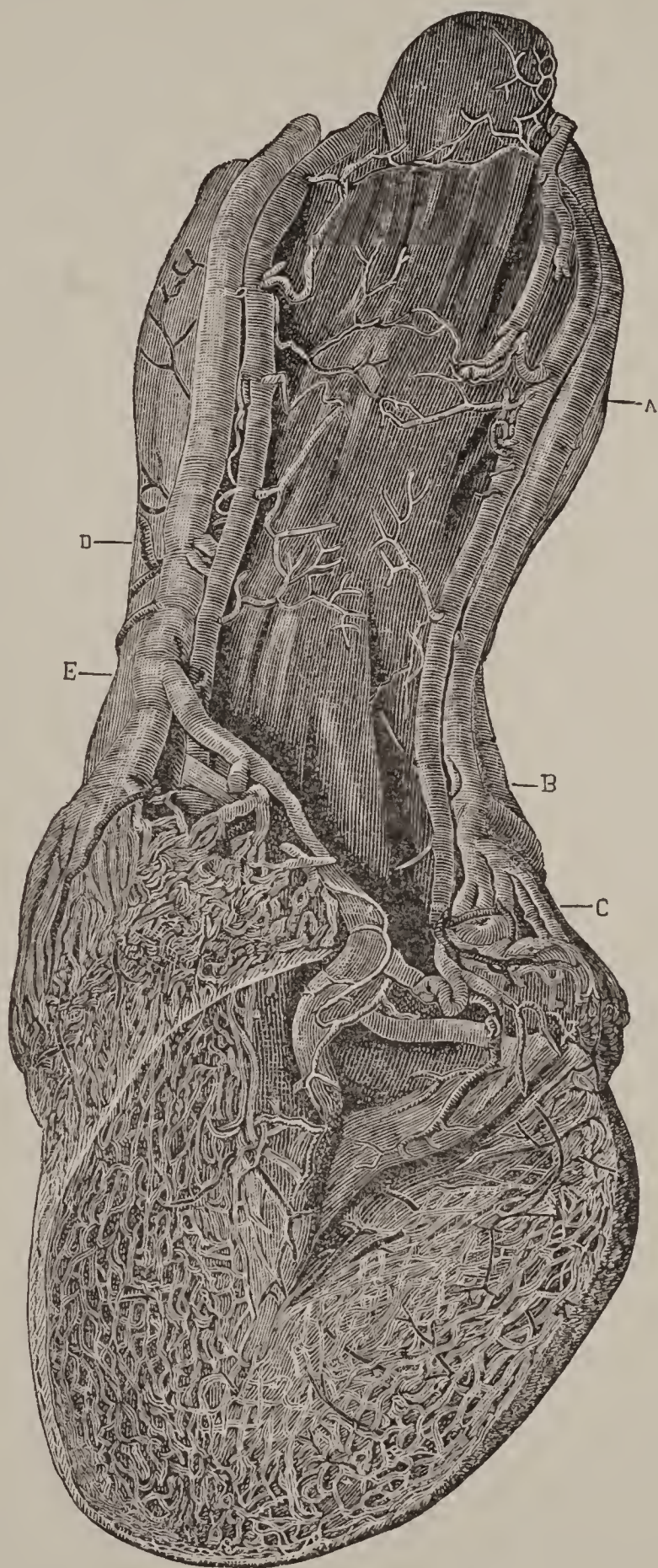


PLATE IV.

PLATE IV.

A view of the posterior surface of the foot, to show the arteries and veins. In the sketch the arteries are shaded, the veins are not.

- A. Artery.
- B. Vein.
- C. Branches of veins.

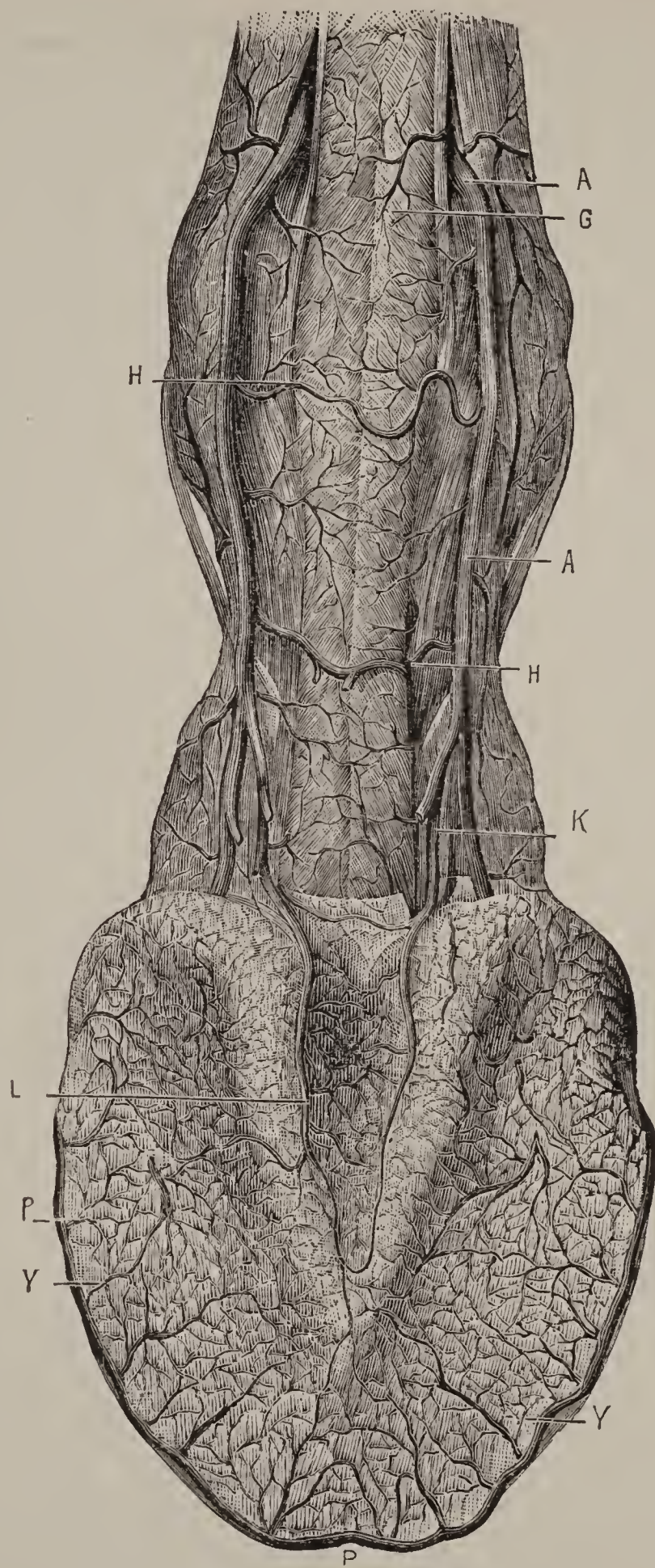


PLATE V.

PLATE V.

ARTERIAL VESSELS.

The figure represents the superficial disposition of the digital artery at the superior face of the first two phalanges and at the inferior face of the third.

- A, A'. Digital artery in its passage along the phalanges.
- G. Posterior transverse branches of the metacarpo-phalangeal articulation.
- H. Branches above one another at intervals.
- K. Artery of the plantar pad, or cushion.
- L. Internal branch of the artery of the plantar pad.
- P, P, P. Circumflex artery.
- Y, Y. Solar arteries, or arteries of plantar surface.

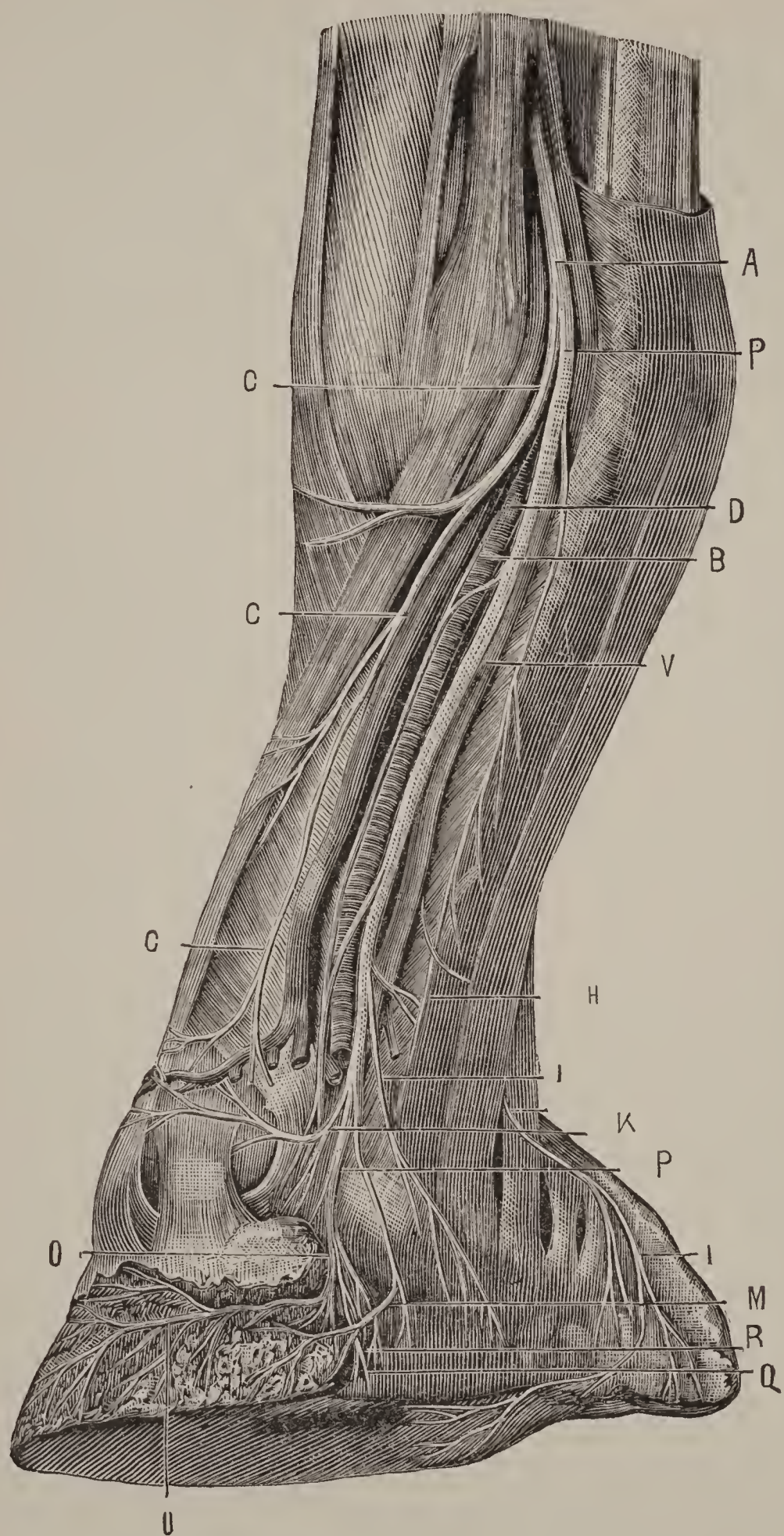


PLATE VI.

PLATE VI.

This figure represents on the digital region, seen from three-fourths behind, the disposition of the plantar nerve on the posterior face of the phalanges of the terminal divisions in the interior of the bone of the foot.

- P. Plantar nerve.
- A. Point of emergence of the plantar nerve above the sesamoids.
- B. Cartilaginous branch.
- C. Cutaneous branch.
- D. Digital artery.
- H. Occasional division destined to the cartilaginous bulbs.
- I, I. Branch of the plantar pad.
- K. Transverse coronary branch.
- M. Podophyllous division.
- O. Pre-plantar nerve.
- Q. Descending branch in the patilobe fissure.
- R. Arterial ramuscles accompanying the digital artery in the plantar fissure.
- V. Vein following sometimes behind the plantar nerve in all its phalangial course. This vessel does not always exist.

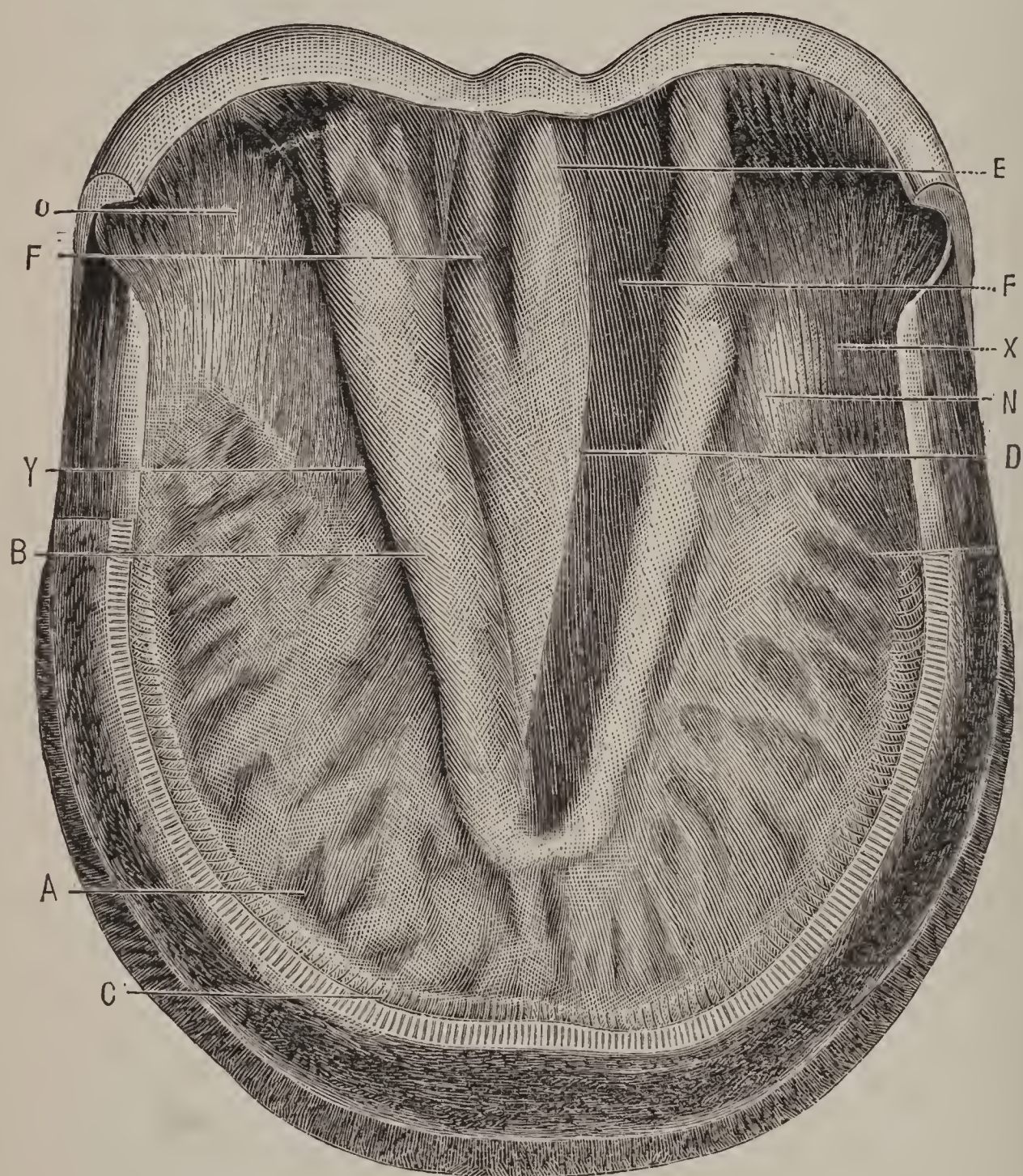


PLATE VII.

PLATE VII.

This figure represents the superior face of the floor of the hoof, formed by the sole and the frog. The wall has been cut at the level of the sole, in order to show the termination of the horny leaves in the edge, or border of the sole.

- A. Circular digital cavity at the point of reunion of the sole and the wall.
- B. Superior border of the frog.
- C. Termination of the horny leaves in the edge of the sole.
- D. Cavity formed by the superior face of the frog.
- E. Ridge of the frog, or frog stay.
- F. Groove of the superior face of the frog.
- G. External face of the glomes of the frog.
- N. Keraphyllous tissue at the internal face of the bars.
- O. Cutigeral cavity at the level of the angles of inflection.
- X. Bottom of the angle of inflection.
- Y. Point of termination of the bars at the lateral parts of the frog.

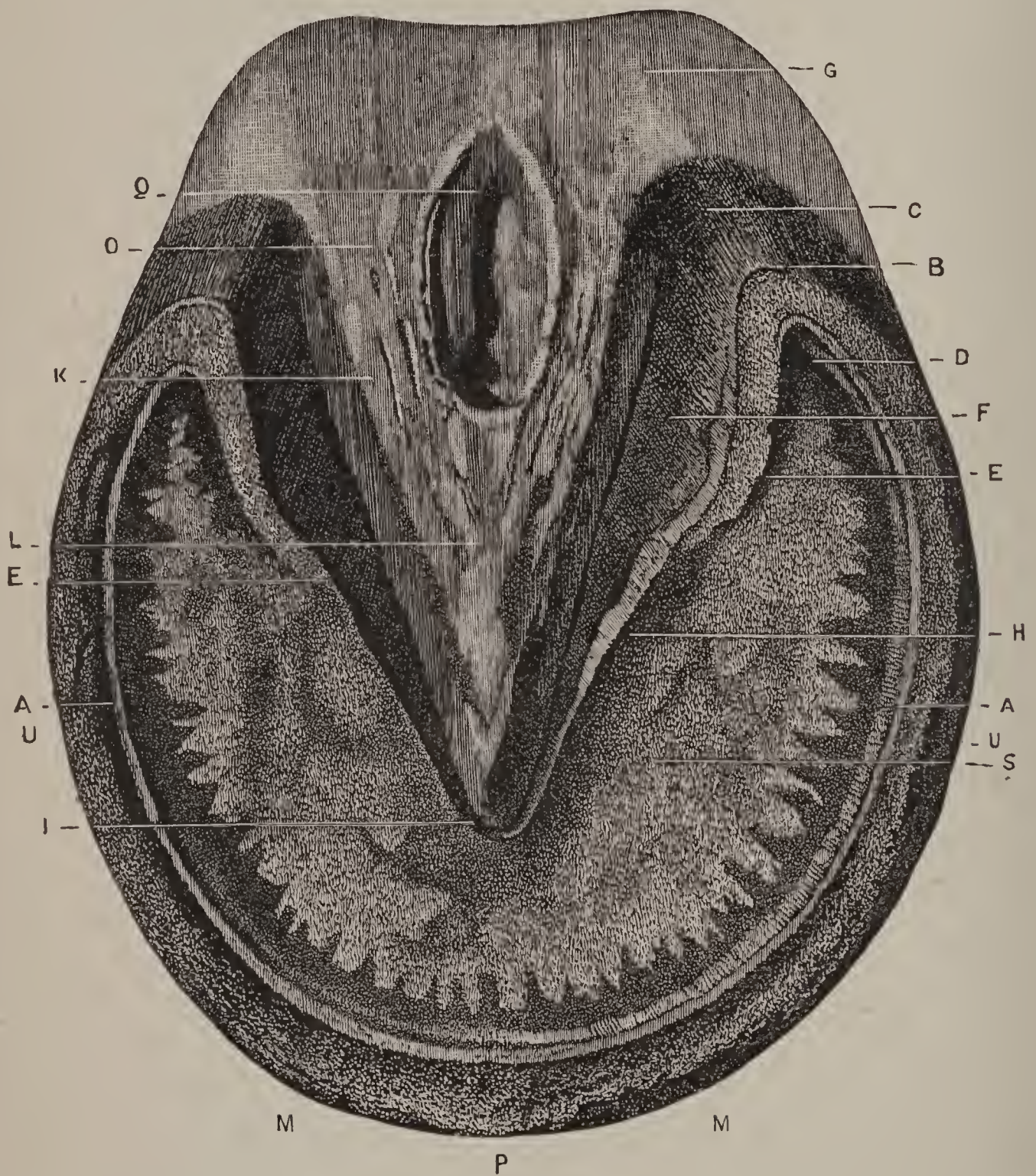
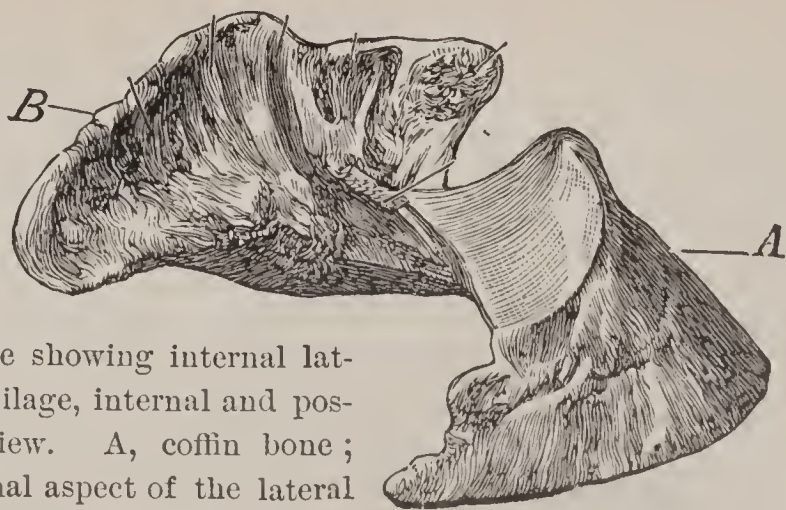


PLATE VIII.

[FOR EXPLANATION, SEE BACK OF PLATE I.]



Coffin bone showing internal lateral cartilage, internal and posterior view. A, coffin bone; B, internal aspect of the lateral cartilage.



Bones of the foot in a healthy condition.



View of foot bones and some of ligaments.



Effect of chronic inflammation.



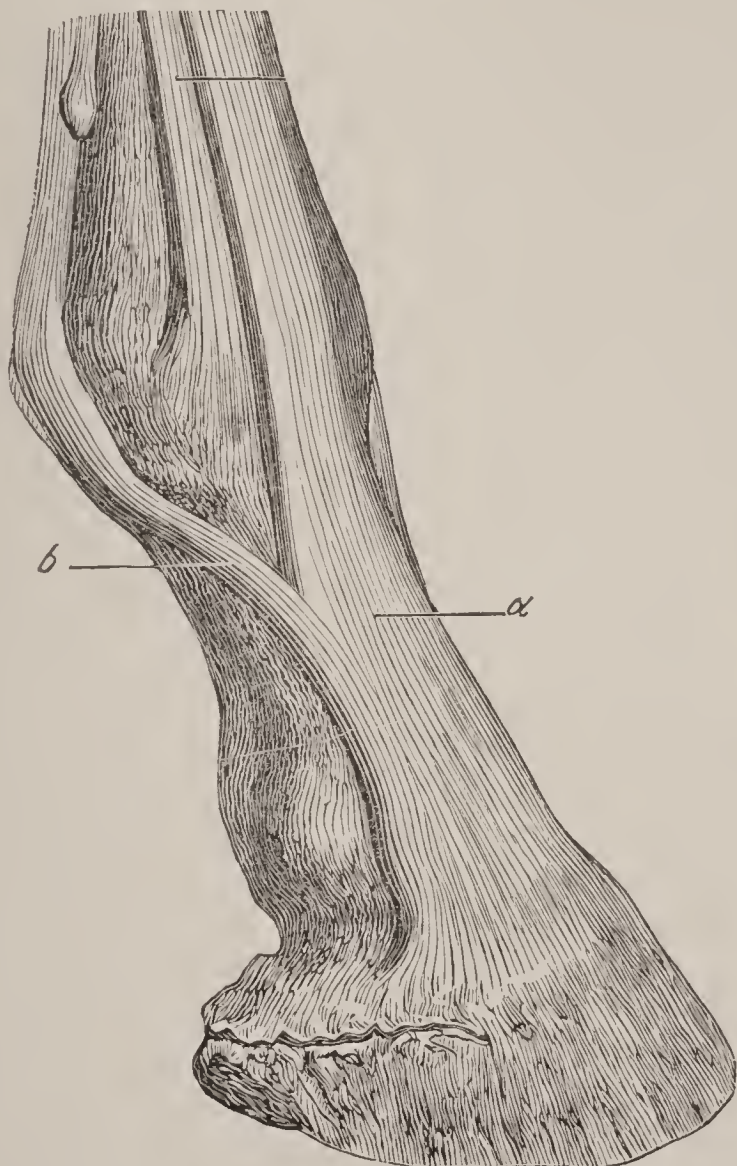
Effect of founder.



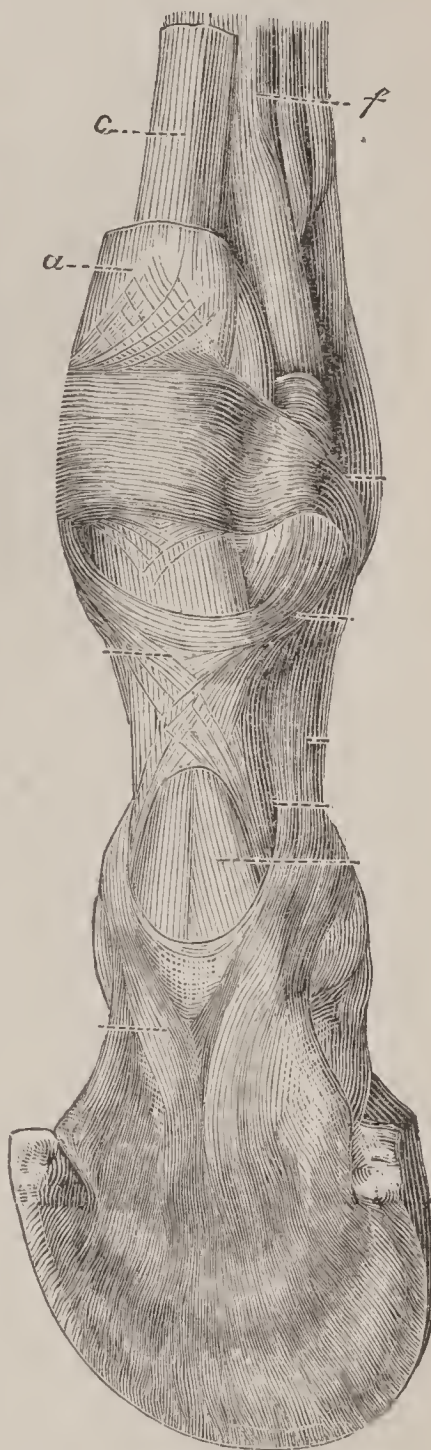
Change of structure caused by inflammation.



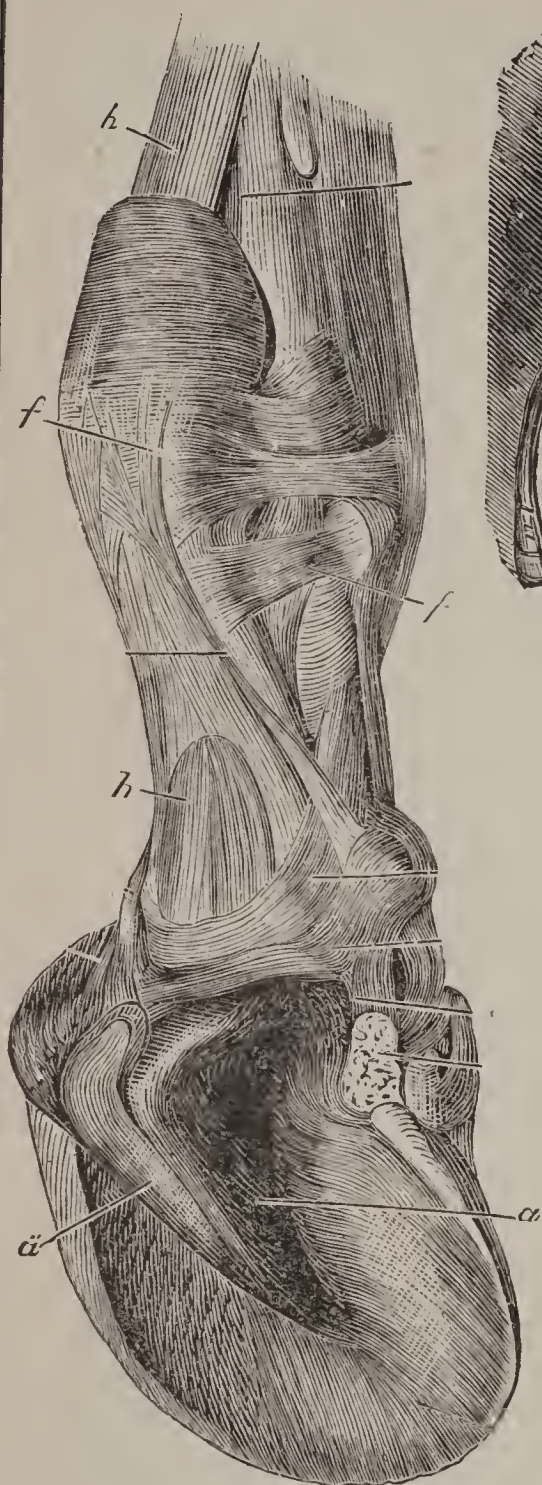
View of inside drawn from natural hoof.



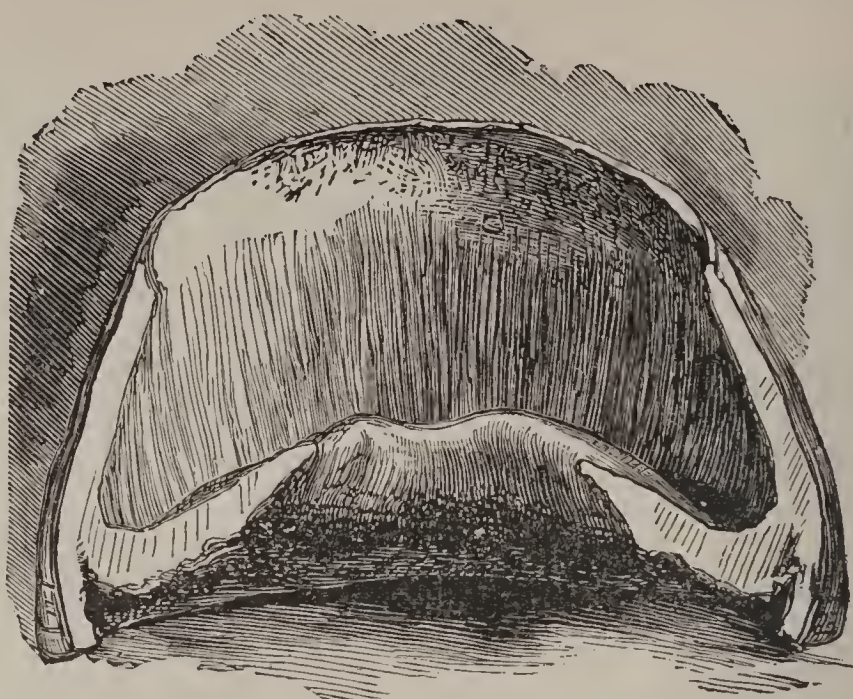
Anterior view of right front foot. *a*, exterior pedis ligament ; *b*, suspensory ligament.



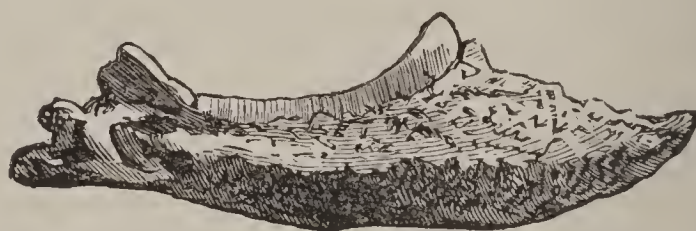
Right front foot, posterior and slightly lateral view. *a*, *c*, perforans tendon ; *f*, suspensory ligament.



Ligaments and tendons of foot.
a, sensitive frog ; *h*, perforans tendon ; *f*, suspensory ligament.



Section of hoof.



Showing absorption of coffin bone by inflammation ; effect of founder.



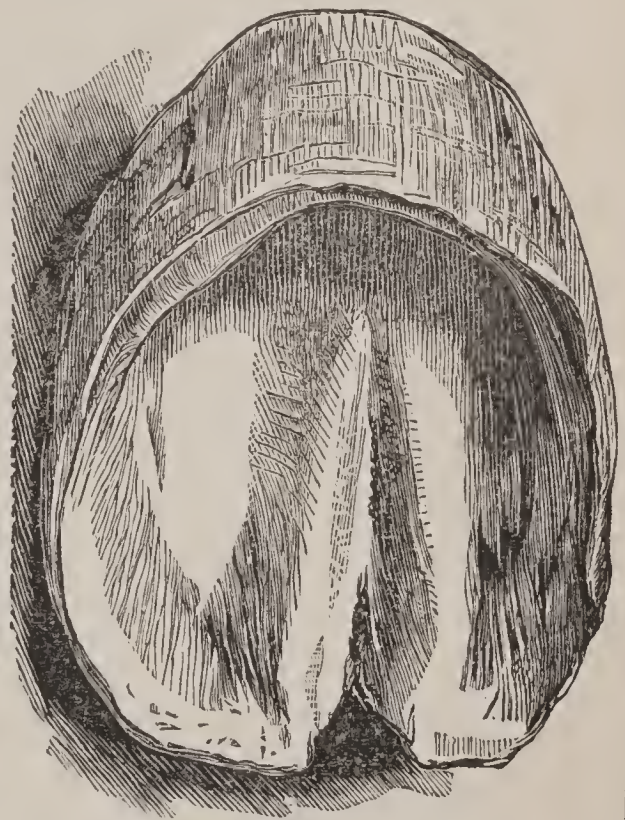
Effect of severe inflammation.



View of hoof with marked depression across front, and corresponding bulging downwards of sole.



Effect of corns.



Case of extreme contraction; belongs to inside Fig., p. 178.

CHAPTER XII.

SHOEING.

SO much harm and loss to farmers arises from bad shoeing and ignorant treatment of the feet, and valuable horses are so easily ruined by even a little carelessness from these causes, that I give all the space I can spare to instructions on this subject.



FIG. 193. — Natural.

Before taking up details, I would call your attention, by plates and other illustrations, to the structure of the foot. These illustrations should be carefully studied. I include also, in connection with them, a few engravings, showing some of the effects of injury and bad treatment.*

I give first an accurate representation of a healthy foot as it should be shod. Fig. 197 shows how the same foot is injured or ruined by cutting and rasping away the best part of the wall, the ordinary form of shoe used, and the shoe as fastened on with large nails that split and weaken the wall, not only destroying the form and proper adjustment of the foot, but raising it so much from the ground as soon to result in serious injury. Fig. 200 shows the excessive cutting away of the sole, bars, and frog, as usually done; this is a serious cause of harm. Fig. 198 shows the proper method of doing this, with the best form of shoe, etc., etc., and this should be studied carefully.

*In the best edition of my large book there are 36 plates in colors on the structure of the foot, etc.

The object of shoeing is to prevent attrition of the wall when there is greater wear on it than it can provide for by growth; next to give increased fulcrum upon the ground to prevent slipping. This being true, it is necessary to shoe a horse only when the conditions are such that the foot does not grow horn as fast as it is worn off. In shoeing, the aim should be to keep the adjustment of the foot as nearly as possible what it was while in a natural state or before being shod, providing that then the proportion of horn was natural. We notice also that the excessive wear is always at the toe,



FIG. 194. — Feet badly contracted.



FIG. 195. — Feet contracted. Mobility entirely destroyed in right foot.

and that the heels rarely suffer, even on bad roads; consequently the best shoe-

ing for all roads and seasons, when the feet are in a good condition of health, must be such as will permit them to be as nearly bare-footed as possible, or at least that the posterior part is so, yet sustaining all the attrition of wear to which they may be subjected.

If, then, the feet are strong, and with light work and ordinarily good roads they grow out of shape, simply have the blacksmith level down the foot a little, and round off the toe sufficiently to prevent splitting, and put the horse at

work without shoes. If he is a driving horse having good feet, and is driven but moderately, especially on ordinary sandy roads, better keep shoes off from him. There are very few con-

ditions of corns and contractions that, with a little care, cannot be cured by driving barefoot alone, or with shoes so thin as to restore the natural adjustment of the wall and frog to the ground.

If the toe is worn down too much, simply put on tips, as shown in Fig. 204, or a very thin steel shoe, with bar wide enough to cover the wall simply. A good form of such a shoe, with nailing, is represented by Figs. 203, 205.

There are conditions that will not admit of driving barefoot or with tips. In the preparation of the part on Shoeing,

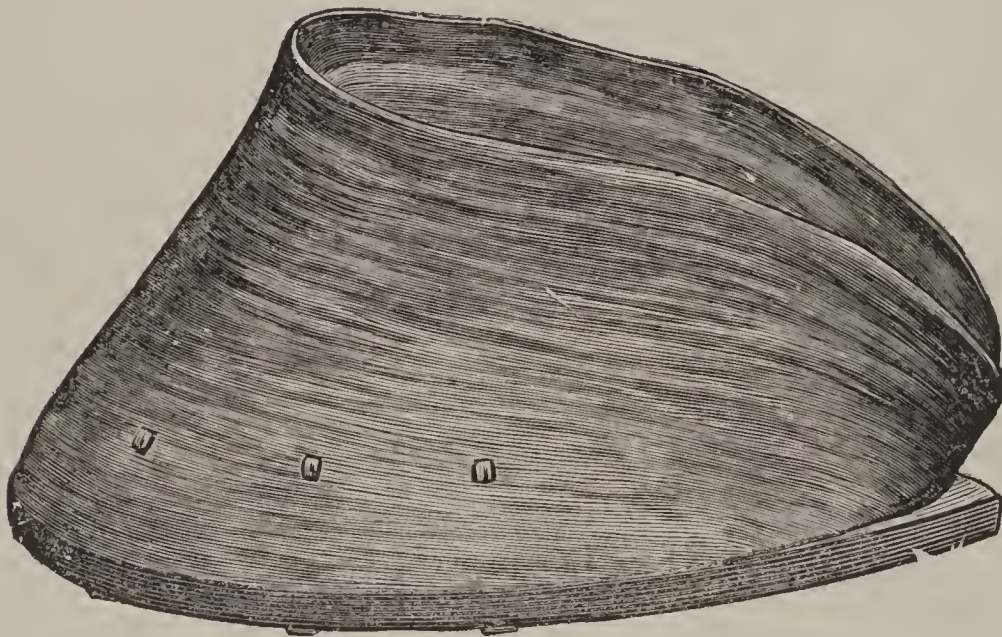


FIG. 196. — Shoe properly adjusted and nailed.

in my large work, I had the best two practical experts who had been professors of pathological shoeing, — James Hamill, D. V. S., of New York City, and Mr. McLellan, now of Bridgeport, Conn., both gentlemen having occupied the position of instructor on this subject, in the Veterinary College, — give me the details of conditions that will not admit of tips or thin-heeled shoes. Dr. Hamill says: “Any foot that is thin in its general structure, but more so in its vertical position, or from top to bottom, and with the frog full at its pyramidal eminence or body, is not a proper foot for frog pressure. In such feet the plantar cushion, or what is known as the fibrous or fatty frog, is very thin, is easily made weaker by absorption through extreme pressure or irritation on the

horny frog, and therefore offers very little protection to the great flexor tendon where it passes under the navicular bone."

Dr. Hamill gave very full details embodying other interesting points, which space will not permit me to copy.

Dr. McLellan says: "They are not applicable to feet that have thin, flat soles, with low heels. They are not applicable to heavy work horses with flat feet and prominent frogs (such frogs are liable to suffer bruises when so exposed,



FIG. 197. — Bad treatment that soon ruins a good foot. The shoe is too large ; the nails are too large and driven too deep. The shoe is set back too far, and the hoof is rasped away so much as to weaken it and destroy its symmetry.

the resulting inflammation extending frequently to deeper and more vital structures). They are not applicable to feet having navicular disease. They are not applicable when, in applying them, it is necessary to disturb the normal (natural) relation of the bones of the limb. They will be found particularly useful in strong feet that have corns in both heels, and in the case of bad interferers."

PREPARING THE FOOT FOR THE SHOE.

In preparing the foot for the shoe, the aim should be to cut away as much of the wall as would be a surplus of growth,



FIG. 198. — Foot prepared to shoe.

or only so much as would bring it back to its natural form and adjustment. As a rule, the wall should be lowered to the level of the unpared sole or to its outer margin. The sole and frog should on no account be pared or touched with the knife, nor should the heels be "opened." The horny sole and frog, unlike the wall, do not grow indefinitely; but when they have attained a certain thickness, they throw off the superfluous or old horn in flakes

or scales. This natural thickness of the sole and frog-horn is an essential condition for the healthy maintenance of the foot and its protection from injury. In any event, about all that it is necessary to do is to remove those loosened and detached flakes, which, were it not for the shoe, would have exfoliated themselves. Cutting away more than this becomes a serious cause of injury. The angles between the bars and crust should be moderately pared out; for accumulations here, with continued pressure



FIG. 199. — Colt's foot four years old.

of the shoe, are apt to induce corns. The frog does not require more paring than is necessary to remove ragged parts, and even these would better not be touched.

There is no point upon which all the best modern authorities agree more positively than upon the great harm of cutting away the sole and frog excessively, as is commonly done by country shoers. Certain English books, that are largely quoted from and used in this country as authority, and whose writers practiced early in the present century, taught this bad theory of paring out the sole until it could be sprung or bent by pressure of the finger. This should be

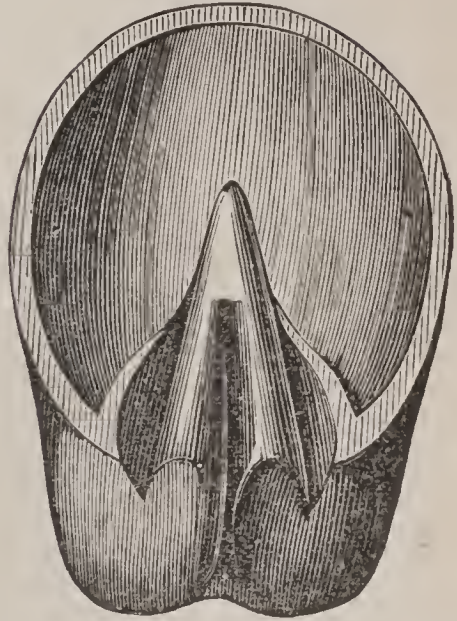


FIG. 200. — Excessively pared.

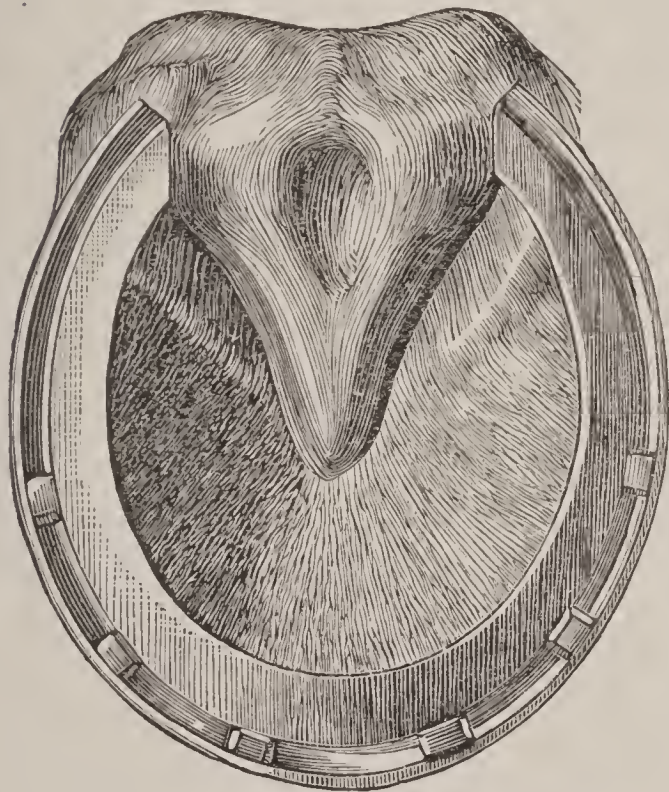


FIG. 201. — Shoe adjusted and nailed.

strictly guarded against. In referring to this, one of our modern English authorities, Prof. Gamgee, says: "It was a kind of teaching on the foot and on shoeing that did incalculable and, I fear, almost irreparable damage; which has brought suffering on horses, and shortened their existence; which has spoiled farriers by leading them astray on false pretexts, and has entailed discredit on the English Veterinary School."

Many others could be referred to, deprecating the great harm of this method of treatment.

THE SHOE.

The shoe should, in form and size, but little more than cover the wall, excepting at the heels, where it should be so

much wider and longer as to compensate for the growth of the



FIG. 202. — Model shoe-bearing surface.

foot, and be heavy enough to sustain the attrition, or wear, for the time it is expected to be on. In a condition of health, the principle of shoeing is the same, from the light family driver to the heavy draft horse; the size, thickness, and weight only differing so as to be adapted to each case, with the difference that when exceptional power is necessary, as for draft horses, or to prevent slipping, calkins must be used. As

a rule, nothing more is wanting, unless necessary for extra wear, than just iron enough to protect the outer crust of the foot, and prevent its breaking. More iron than this becomes extra weight, and causes fatigue in carrying, like thick, heavy-soled shoes or clogs

FORM AND FITTING.

The shoe should fit closely all the way around to the bearing surface prepared for its reception, so that it may give to the crust all the support it can receive, and carry out in



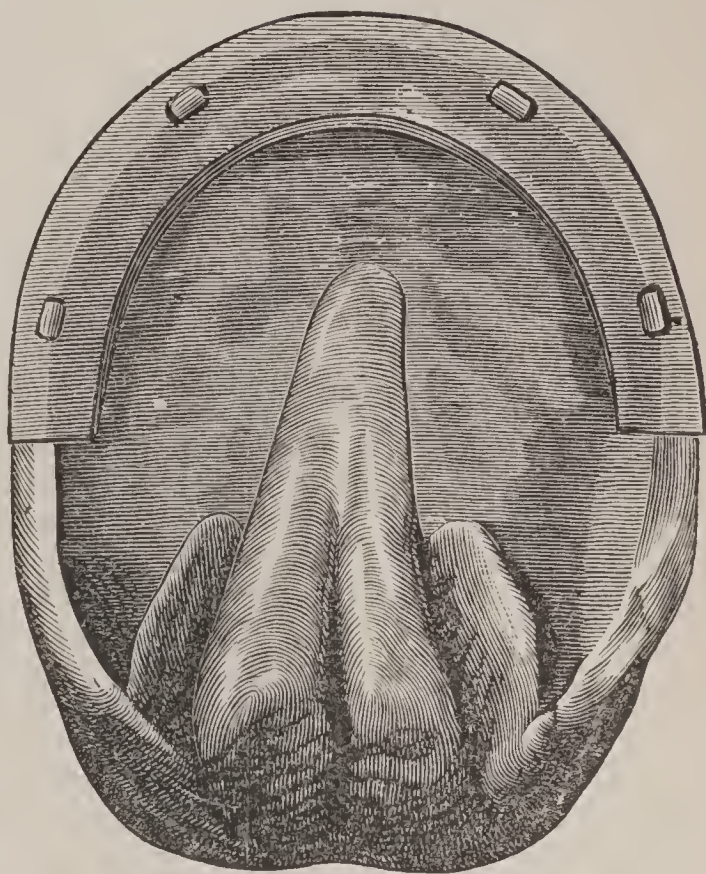
FIG. 203. — Model light drawing shoe.

its ground surface, as nearly as possible, the form of the wall before it was cut away. It is a rule recognized by the best

authorities, that the sole should not rest upon the shoe except around the toe, where the outer edge is left full and natural. But if the wall is cut down close, or the sole thin, it is advisable, if it comes too near the iron, to lower the part coming under it. As a rule, the bearing surface should be level, and the ground surface concave, or the inner edge of the bearing surface so beveled off that it will not harbor stones and dirt, and be so stiff that it will not bend.

A moderate rounding at the toe would seem desirable in all cases, especially where there is want of mobility.

FIG. 204. — Light tips.



This is especially desirable when the horse is a little stiff or sore, as it enables him to travel much easier.

NAILS AND NAILING.

The object of nailing should be to hold the shoe firmly to the foot without injuring the wall, and leave the foot as independent of the restraint of the shoe at the quarters as possible. The nails should be driven where there will be most secure



FIG. 205. — Thin-heeled shoe.

nail-hold ; more or fewer as well as heavier nails being neces-

sary in proportion to the thickness of the wall, weight of the shoe, and severity of the work. The wall is thickest and strongest at the toe, or front, and becomes thinner and more flexible toward the quarters and heels, especially so at the inner heels, where it is sometimes very thin and flexible. See pages 179–181, 188.

The principal nailing, then, should be at the toe and front, because there is more horn

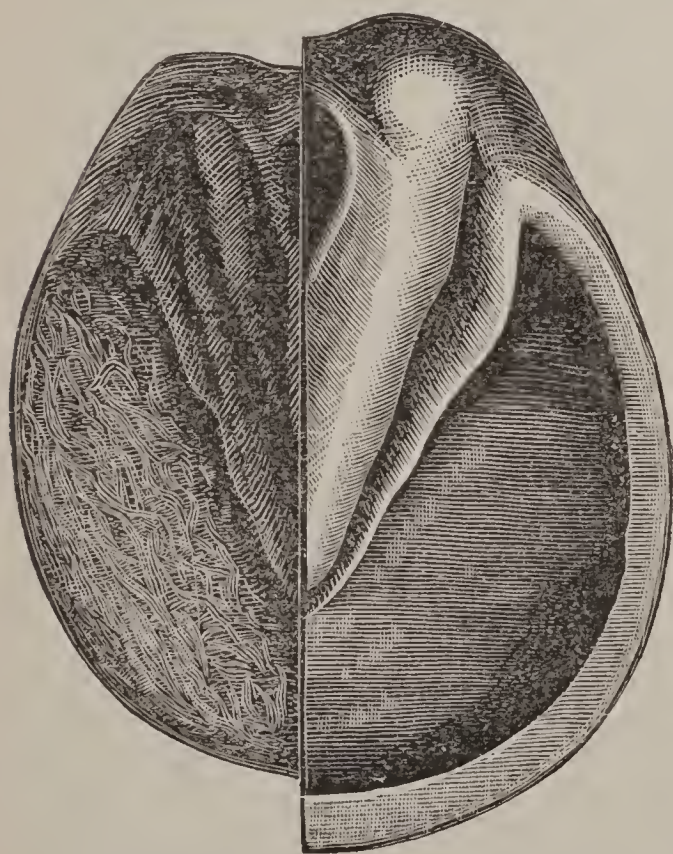


FIG. 207. — Interior view of above.



FIG. 206. — Half hoof removed.

there to nail to, and less liability to do harm by separating and breaking the fibers of the wall. The nails should not extend any farther back into the quarters than is barely necessary to give a safe hold of the shoe to the foot. The fewer and smaller the nails driven, the better, providing they are sufficient to hold the shoe. But in doing this, much will depend on the accuracy of the fitting, the thickness of the wall, and the weight of the shoe.

If the nails are driven well back on the outer quarter, and only round in the toe of the inner side, for the

purpose of affording more freedom to the quarters, it will be found that as the foot grows, the shoe will be carried to the

outside quarter and toe to such an extent that the inner heel of the shoe will be drawn inside of the wall at the heel, and rest upon the sole, causing a bruise or corn. In addition, when so much of the shoe is left unnailed, it is liable to get loose and work under the quarter, which would cause a rapid wearing or breaking down of the wall. All things considered, the best way is to nail back to the turn of the wall securely. Or the nailing may be extended a little farther back on the outside, and shortened a little on the inner side, as shown in Fig. 202, in any case giving both quarters all the freedom compatible with



FIG. 208. — Flat, weak sole.



FIG. 209. — Inside view.

security, in retaining a firm hold of the shoe. As the foot grows, the shoe will now be brought forward so evenly under it as not to do harm.

For ordinary light shoes, six or seven nails evenly distributed around the front part should be sufficient, as shown in Fig. 201. But if the shoes are heavy, and the work hard, as for draft horses, heavier nails, and about eight in number, will in most cases be required. A small, thin clip turned up at the toe, and one at the other quarter, will help greatly in holding the shoe firmly in position, but they should be turned up thin, and set well out on the edge of the shoe.

If the foot is broken, or much weakened by old nail-holes, punch the holes where there is the soundest horn to nail to, as shown in Fig. 210. A thin shoe will not admit of any fullering, because it weakens the shoe, without giving any special

advantage in nailing. The stamp form of punching the holes should be used ; that is, the hole made larger at the surface and smaller at the bottom, so that the nail-heads will fit into it exactly.



FIG. 210. — Nailing shoe to weak foot.

DRIVING THE NAILS.

If the nail is driven very near the surface, it is liable to chip out or break the horn, which injures and weakens the wall very much ; whereas driving the nails deep and bringing out

low insures a good hold, and the wall will almost be grown out by the next shoeing. Consequently they should be punched deep over those points where the wall is thickest, and less so toward the quarters where it is thinnest, or proportionately farther from the outer margin of the shoe.

If by carelessness or otherwise a nail should be driven into the quick, which will be known by the horse's flinching, it should be pulled out at once, and no nail driven in that hole.

CLINCHING DOWN THE NAILS.

No rasping of the outer surface of the wall should be allowed, excepting to touch or smooth any roughness of the clinches, as shown in Fig. 196, and to round off the edge of the wall down near the shoe.

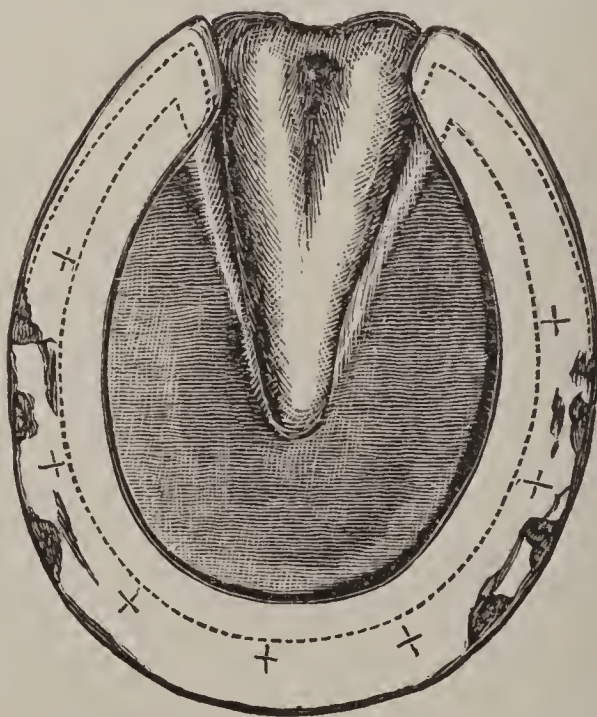


FIG. 211. — Points showing where horn is strongest.

Excessive rasping not only destroys the strongest part of the wall,—that best able to retain the nail-holes and support concussion,—but permits such rapid evaporation as to cause the hoof to become dry, brittle, and contracted.

A cause of serious harm is what is termed fitting too closely, or setting the shoe under too far (see Fig. 197), and driving and clinching the nails so hard as to draw the shoe too tight. This is called



FIG. 213. — Toe cut too short.



FIG. 212. — Toe too long.

pinching, a very serious source of trouble. This is particularly the case when the nails, as shown in Fig. 219, are bent inward against the soft parts, either in driving or when clinched. It will be noticed that as there is no support on the inside, they are liable to be bent inward. It is not an uncommon thing for all the nails to be driven through the quick in this way, especially when the nail-holes are made well into the shoe, and the shoe has been too short and set too far under, as shown in Fig. 197 referred to. Unless you know the shoer to be a careful, good man in his line, you should

stand over and watch him, and promptly check any tendency

to such work ; but if a careful, good man, encourage him by paying him a little extra ; it will pay you well in time.

Should the horse show soreness or lameness after leaving the shop, or within three or four days after being shod, especially if he puts the foot forward to ease it, give the matter attention at once. See particulars farther on.

RESETTING SHOES.

As the shod foot is continually growing and losing its original proportions with the shoe, as well as throwing the foot out of balance or adjustment by growing too long, it is necessary, at stated times, to take off the shoe, and cut down the foot again to its original form and adjustment (or what would be termed balancing the foot properly), and put the shoe on again. This is usually necessary in from four to five weeks ; longer than this will increase the strain upon the tendons and ligaments, on account of the increased leverage of the toe ; and if the shoe is nailed at all back upon the quarters, will bring a proportionate lateral restraint upon them, and consequently be a direct cause of contraction.

Great harm usually results from a neglect to reset the shoes in winter, when the horses may not be used much. The shoes not being worn, are frequently left on for months, crowding the heels together, and frequently making the foot appear as contracted as that of a mule. Carefully guard against this. It would be better to leave the shoes off entirely, or if any, let them be very light and thin, and nailed around the toe.

CONTRACTION.

As this is one of the principal results of bad treatment of the feet, and is most serious in its consequences, I will include a few words on the treatment of simple cases.* There is a compression of the soft parts ; the hoof is simply too small, and consequently impairs mobility, and tends to serious change of structure and injury.

* Persons desiring to obtain full details on this and other causes of injury must refer to my large work, where new and important treatment is given, including a method patented by the author, which will enable the prompt relief and cure of the most aggravated cases.

The first thing to do is to soften the feet thoroughly. Usually there will be found an excessive accumulation of horn, heels high, and frog hard, which must be removed, and the wall leveled down to its proper proportions. Then with the drawing-knife pare out the sole, not enough to make it bend to pressure, but more than enough to remove the old horn. So weaken the wall between the bars and frog, by scraping or cutting out the bottom of the channel back to the point of the heel, that when pressure is brought upon the heel outward, there will be no impediment to their opening freely. Particular care should be taken not to cut so much at any part as to cause bleeding. In ordinary cases, a simple, thin, flat shoe, that would give the frog pressure, and keeping the feet wet in the stable, would, with ordinary driving, very soon restore the foot to its natural condition. The use of convex

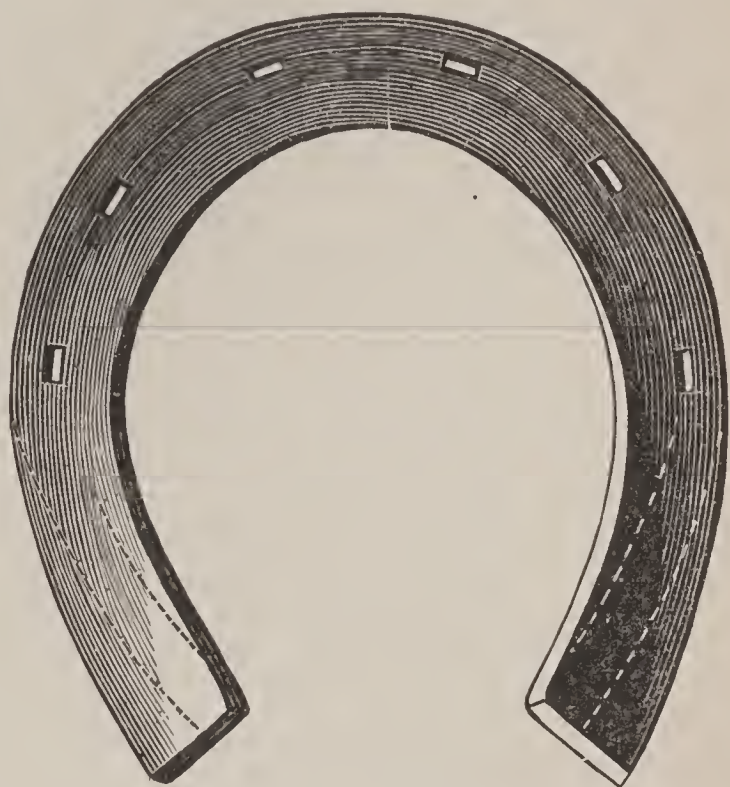


FIG. 214. — Convex shoe for contracted toe.

shoes, shown by Fig. 214, would be better. By keeping the feet soft by moisture, any ordinary case of contraction can be relieved and cured by this simple treatment. The hoof liniments advertised for the cure of this and other difficulties, are practically of no account. I give one hoof ointment, under that head, from Dr. Gamgee, which he claims to have used for many years, and which, for certain cases, is very valuable. Full instructions for its use will be found in connection.

CORNS.

Corns are simply bruises between the angle of bar and heel; bruising of the sole anywhere else by undue pressure of the shoe will produce the same effect. The proper treat-

ment is to cut away the part so that the shoe will not rest upon it, and put on a little caustic, or touch it with a hot iron, which destroys sensibility, and changes the condition of secretion.

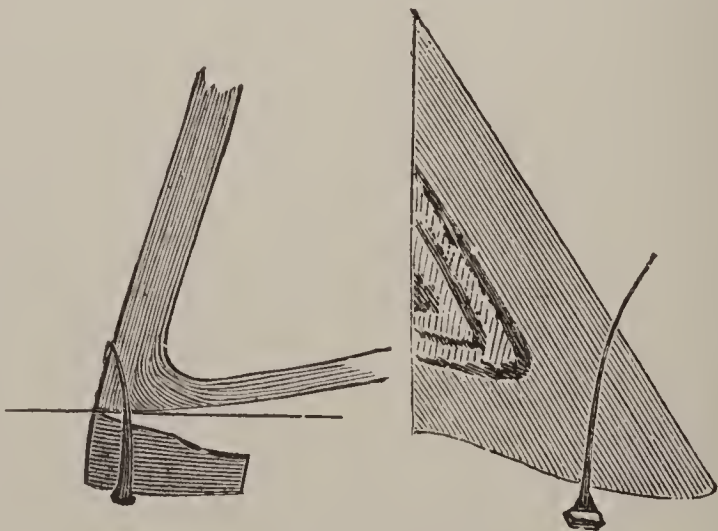


FIG. 215. — As shoe should be cut away for corn.

Butter of antimony, or salts of niter, is the favorite remedy; then melt in a little tar, resin, and tallow, and cover with a little tow to prevent gravel or dirt from working into the tender part. The usual way, in severe cases, is to put on a bar shoe, so as to enable removing all pressure from the part. This mode of treatment, however, as usually done, is only palliative, not curative. The only practical method of curing corns is to let the horse run awhile to pasture barefoot. If the feet will not stand this, simply put on thin steel shoes, extending over the walls only. I would advise that the shoe be fitted nicely, and the part extending over, as shown by Fig. 215, be cut away. Very full particulars of this treatment, with effects upon special cases, are given in my large work.

PRICKING IN SHOEING, STEPPING ON NAILS, GLASS, ETC.

Accidents and injuries to the foot, such as stepping on stones, sharp bodies, treads, etc., often cause serious bruises. Sometimes from carelessness a nail penetrates the sensitive part of the foot, usually called the quick. Sometimes the nail itself does not penetrate, but is driven so close as to cause the wall, in its course, to press on and bruise the quick, as before referred to, giving rise to inflammation, and usually terminating in suppuration, see Fig. 220.



FIGS. 216, 217. — Good nailing.

Very serious trouble is also liable to be caused by carelessly driving the nails deep and clinching them too tightly.

Symptoms. — Lameness may appear in a day or two, sometimes not for a week. The foot is found to be hot and tender, and the least tap with the hammer causes pain; in moving, the horse sets the foot down so as to throw the pressure off the tender part, and when standing, he will rest the foot. This difficulty must be attended to promptly. Sometimes the leg swells considerably; the swelling is often very painful, and is very apt to mislead the inexperienced.

Treatment. — Remove the shoe, and having with the hammer or pincers discovered the faulty nail, thin the sole around it, and with a fine drawing-knife follow the course of the nail till the matter is evacuated;

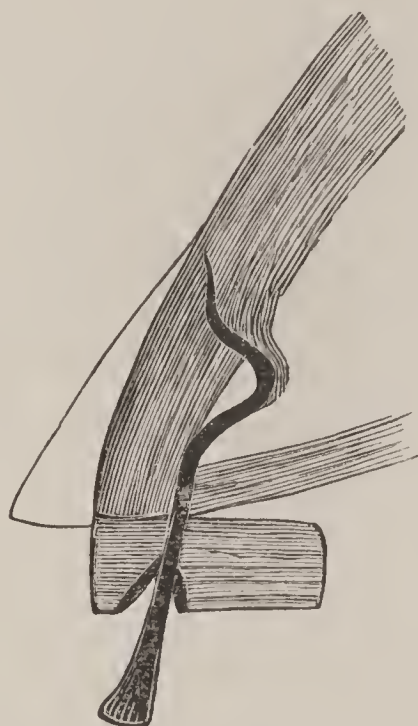


FIG. 218. — Nail rucked.

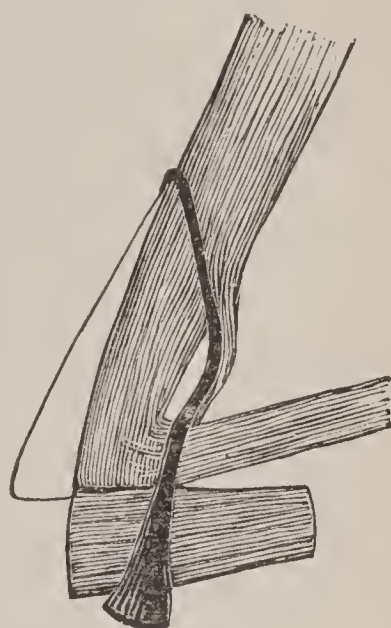


FIG. 219. — Bad nailing.

make a free vent for it, and immerse the foot in a warm poultice for a day or two (the poultice must be large to do any good); or stand the foot in water coming to top of hoof. When the symptoms subside, the shoe may be applied, and the sole filled with tow and tar, or Friar's balsam, tincture of myrrh, etc., retained by cross slips or a leather sole, care being taken not to bruise the sole. The crust at the injured part should not rest on the shoe.

If the nails are driven so deep as to bind, which, (see page 193), is a very common occurrence, particularly in feet with thin hoofs, the first thing to do is to remove the nails; if there is much inflammation, poultice until relieved; then let the shoe extend farther out under the crust, and drive smaller nails, using care not to drive deeply.

If a nail has been driven into the foot, or rather if the horse steps on a nail, get him to the stable as quickly as you

can, and take off the shoe. If it has not been done before, carefully remove the nail, glass, or whatever it is, from the foot. See that no part remains, and remove a little of the hoof from around the opening. Drop a few drops of Friar's balsam or compound tincture of benzoin into the orifice, either of which can be obtained in almost any drug store, or use the simple digestive ointment given under head of Cuts, and cover the foot with a large flax-seed poultice. If inflammation is very severe, then apply hot fomentations, or stand in water kept as hot as the hand can bear, and continue this until inflammation subsides. (See treatment for treads or calks, on following pages.) This is indispensable, and must not be neglected. If the injury is at all severe, give a sharp dose of physic, and let the animal stand quietly. The object is to keep down inflammation. No hot oils or anything stimulating is to be applied. If there is much inflammation, omit dressing until after it is reduced ; then dress with digestives.

There is liable to be tenderness if the sole should strike the ground afterwards, as there may be inflammation of the periosteum—the membrane covering the bone—to relieve which, put on a high-heeled shoe, round the toe a little, and blister around the coronet. The sole is sometimes bruised by the shoe's pressing upon it, causing much inflammation and lameness. Take off the shoe, and poultice for twenty-four hours or more. Fit the shoe so as to remove all pressure from the sole ; and if sore yet, continue the poultice. If matter is formed, treat as before directed by covering over with a little resin and tallow or anything that will protect it from gravel and dirt.

TREADS, OR CALKS.

Should the shoe be sharp, which is commonly the case in the winter, the horse is liable to cut himself by striking the calk into the coronet. If the wound is at all deep, this is a matter you should not regard lightly ; for it must be attended to promptly.

The first thing to be done is to remove carefully any dirt or other foreign matter. When thoroughly clean, it may be

bound up with a pledget of tow dipped in tincture of myrrh or compound tincture of benzoin, or Friar's balsam, which, if available, will be found an excellent remedy. If nothing else is accessible, pour on a little kerosene oil. Keep the horse quiet, feed bran mashes, etc., but no grain; and if there is enough inflammation to cause much soreness, cover the foot with a large, hot poultice. If the soreness becomes at all excessive, at once use hot fomentations, following up this treatment for at least one or two hours three or four times a day. This must not be neglected, as the most important thing is to lessen pain, and bring down the inflammation as soon as possible, and the constant and repeated application of hot water is by far the very best means of doing this; after which, keep the leg tied up with wet cloths, or poultice. If there is extreme pain, give an anodyne, or inject a little morphine under the skin, as a horse cannot endure pain very long, and continue fomentations industriously; this, at all events must not be neglected.

I am aware that most owners may attach but little importance to a mere calk. The top of the wall may appear to be torn quite badly, and yet not be very seriously injured. But should it be deep, running down inside the wall, the injury may not seem at all serious, and perhaps for the first twenty-four hours the horse will not show very much soreness; and yet it may be a very serious thing indeed. You should be very particular when you notice much soreness; if the horse lifts the foot or stands on the toe, you must look to the matter at once. The stitch in time here will save nine, as the saying is; yes, several times nine. See that the part is carefully cleansed out, and keep down inflammation by the use of hot water. The better to explain the importance of this, I will include details of a special case, one of my own horses.

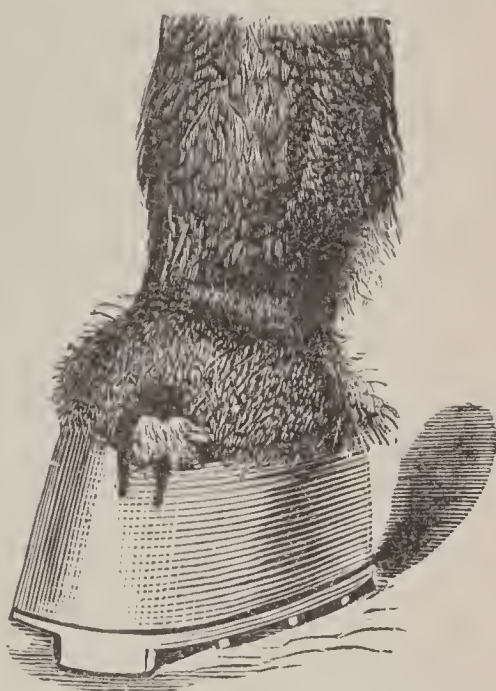


FIG. 220.—The coronet as it usually appears when badly calked.

One of my men foolishly had one of the ponies that he had charge of shod with very sharp calks, and in some way the horse calked himself. The injury did not seem serious, and my attention was not called to it; but in consequence of being compelled to drive him, inflammation set in so seriously that in a short time the horse could scarcely put his foot to the ground. Finding it was serious I employed a man specially, provided



FIG. 221. — The foot drawn, the effect of severe inflammation caused by a nail being driven into the foot, the hoof growing about half an inch larger after the inflammation subsided.

him with several thicknesses of blanket, and I had these rung out of hot water and tied around the foot. This was done almost continuously for three days by having a bucket of hot water close by, and every ten minutes or so repeating this fomentation, when the inflammation subsided. The horse was now shipped forward free from lameness; but in consequence of being driven through deep mud, serious inflammation again set in, and the same thing had to be done over, but it saved the horse. Now without the hot fomentations, this case could not have been treated successfully; with it, it was entirely simple. There must be no fooling or nonsense; a serious case must be fol-

lowed up night and day until the inflammation is controlled, alternating slightly with cold water, as directed under the head of Fomentations. Of course it is advisable to call in a veterinary surgeon if one is available.

PLATE VIII.—RESPIRATORY APPARATUS.

- | | |
|-----------------------|--|
| 1. Cranial cavity. | 10. Section of left bronchus. |
| 2. Guttural pouch. | 11. Ramifications of the right bronchus, |
| 3. Nasal cavity, | 12. Right lung. |
| 4. Tongue. | 13. Left lung seen from above. |
| 5. Pharyngeal cavity. | 14. Sternum. |
| 6. Cavity of larynx. | 15. Ribs—fifteenth section of the left ribs. |
| 7. Epiglottis. | 16. Heart. |
| 8. Trachea. | 17. Posterior aorta. |
| 9. Œsophagus. | 18. Anterior aorta. |



Plate I.

PLATE I.—EXTERNAL REGIONS OF THE HORSE.

1. Lips.	17. Back.	35. Pastern.
2. Nose.	18. Ribs.	36. Coronet.
3. Face.	19. Girth.	37. Foot.
4. Forehead.	20. Loins.	38. Ergot and fetlock.
5. Eyebrows.	21. Croup.	39. Haunch.
6. Forelock.	22. Tail.	40. Thigh.
7. Ears.	23. Anus, or "dock."	41. Stifle.
8. Lower jaw.	24. Flank.	42. Buttock.
9. Cheek.	25. Belly.	43. Leg.
10. Nostril.	26. Sheath.	44. Hock.
11. Poll.	27. Testicles.	45. Chestnut.
11 <i>a</i> . Throat.	28. Shoulder and arm.	46. Canon, or shank.
12. Parotid.	29. Elbow.	47. Fetlock joint.
13. Neck.	30. Fore-arm.	48. Ergot and fetlock.
14. Jugular channel, or furrow.	31. Chestnut.	49. Pastern.
14 <i>a</i> . Mane.	32. Knee.	50. Coronet.
15. Chest.	33. Canon, or shank.	51. Foot.
16. Withers.	34. Fetlock joint.	

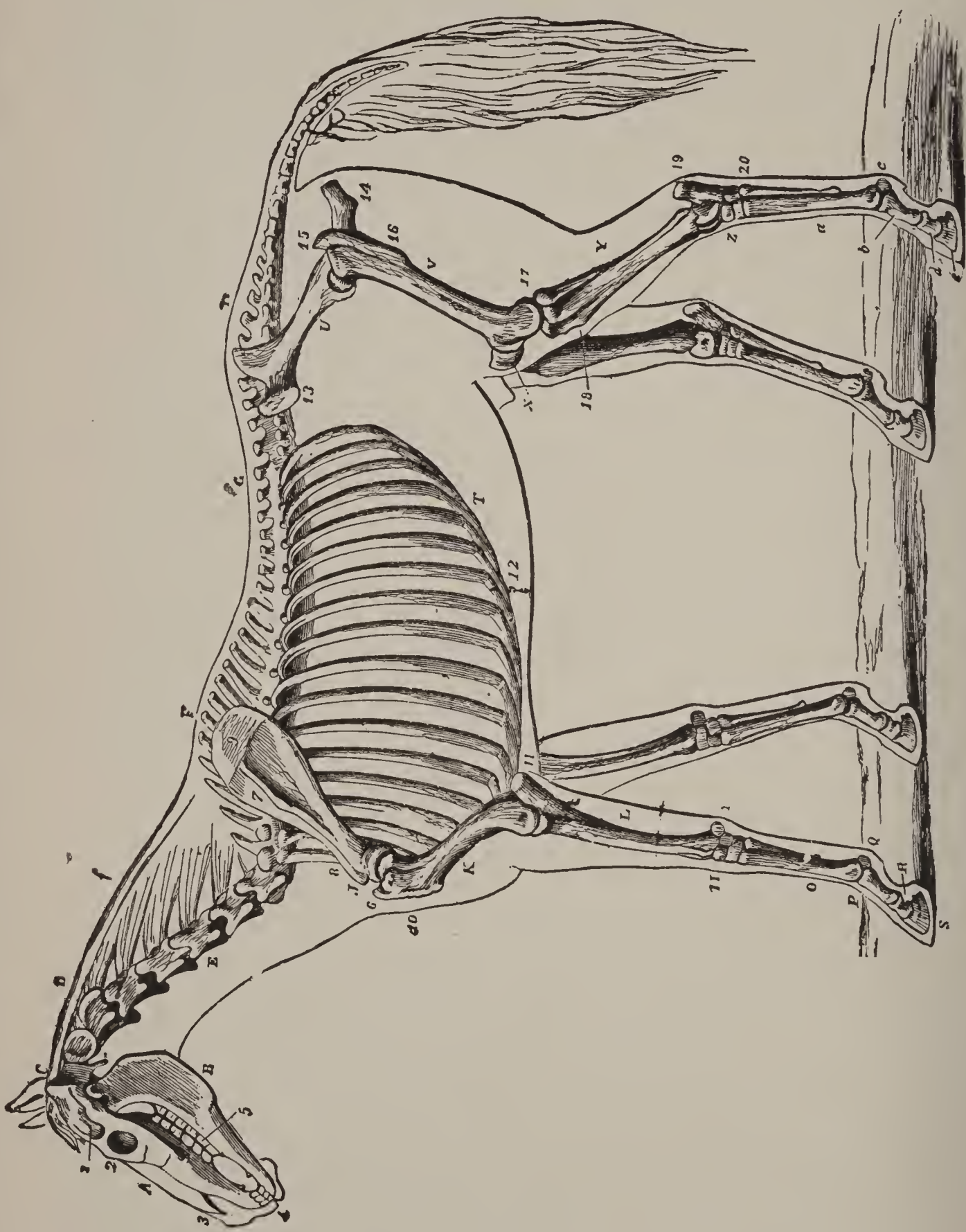


Plate II.

PLATE II.—SKELETON OF THE HORSE.

- | | |
|--|--|
| <p>A. Head.</p> <p>B. Lower jaw.</p> <p>C. Atlas, or first vertebra of neck.</p> <p>D. Axis, or second vertebra of neck.</p> <p>E. The remaining five cervical vertebrae.</p> <p>F. Spinous processes of the back or withers.</p> <p>G. Dorsal and lumbar vertebrae.</p> <p>H. Sacrum, base of the croup.</p> <p>I. Coccygeal, or tail-bones.</p> <p>J. Scapula, or shoulder-blade.</p> <p>K. Humerus, or arm-bone.</p> <p>L. Radius, or bone of the fore-arm.</p> <p>M. Carpal, or knee-bones.</p> <p>N. Trapezium.</p> <p>O. Metacarpal, or canon-bone.</p> <p>P. First phalanx, or pastern-bone.</p> <p>Q. Sesamoid bone.</p> <p>R. Second phalanx, or os coronæ.</p> <p>S. Third phalanx, or os pedis.</p> <p>T. Ribs.</p> <p>U. Os innominata, or haunch-bone.</p> <p>V. Femur, or thigh-bone.</p> <p>X. Patella.</p> <p>Y. Tibia, or leg-bone.</p> <p>Z. Hock, or tarsal-bones.</p> <p>a. Canon, or metatarsal-bone.</p> <p>b. First phalanx, or pastern-bone.</p> | <p>c. Sesamoid.</p> <p>d. Second phalanx, or coronet-bone.</p> <p>e. Third phalanx, or foot-bone.</p> <p>f. Superior band of the cervical ligament, or ligamentum nuchæ.</p> <p>1. Zygomatic arch.</p> <p>2. Orbital cavity.</p> <p>3. Nasal, or face-bones.</p> <p>4. Incisor teeth.</p> <p>5. Molar teeth.</p> <p>6. Scapulo-humeral, or shoulder and arm joint.</p> <p>7. Acromion process, or spine of the scapula.</p> <p>8. Hollow of the shoulder-blade.</p> <p>9. Cartilage of shoulder-blade.</p> <p>10. Superior tuberosity of the humerus.</p> <p>11. Olecranon, or elbow-bone.</p> <p>12. Cartilages of the ribs.</p> <p>13. Haunch—external and anterior angle of the ilium.</p> <p>14. Ischium—posterior angle of the ilium.</p> <p>15. Great trochanter.</p> <p>16. Small trochanter.</p> <p>17. Articulation between the femur and tibia.</p> <p>18. Superior tuberosity of the tibia.</p> <p>19. Os calcis.</p> <p>20. Head of a small metatarsal bone.</p> |
|--|--|

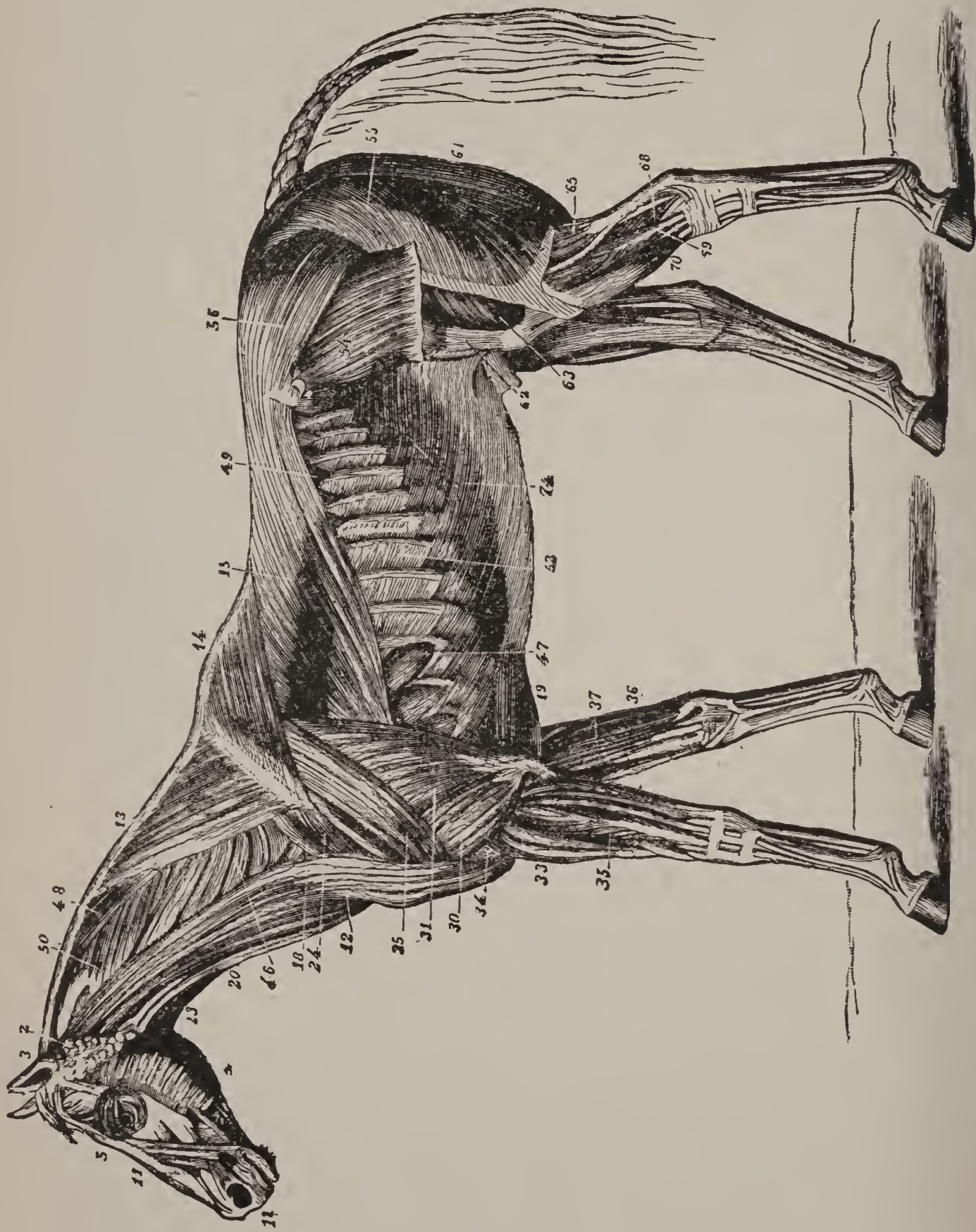


Plate III.

PLATE III.—SUPERFICIAL LAYER OF MUSCLES,

The Panniculus being Removed.

- | | |
|---|---|
| 2. Depressor muscle of the ear. | 36. Flexor metacarpi externus. |
| 3. Auricularis, or motor muscle of the ear. | 37. Extensor suffraginis. |
| 4. Masseter. | 46. Rhomboideus anterior. |
| 5. Orbicularis of the eyelid. | 47. Serratus magnus. |
| 11. Muscles of the lips and nose. | 48. Levator humeri. |
| 12. Levator humeri. | 49. Serratus parvus. |
| 13. Cervical trapezium. | 50. Splenius. |
| 14. Dorsal trapezium. | 52. Intercostal muscles. |
| 15. Latissimus dorsi. | 54. Fascia lata. |
| 18. Pectoralis parvus. | 55. Gluteus externus. |
| 19. Pectoralis magnus. | 56. Gluteus medius. |
| 20. Sterno-maxillaris. | 61. Semitendinosus. |
| 23. Subscapulo-hyoideus. | 62. Rectus femoris. |
| 24. Antea-spinatus. | 63. Vastus externus. |
| 25. Postea-spinatus. | 65. Gastrocnemii. |
| 30, 31. Triceps extensor brachii. | 68. Deep flexor of the phalanges. |
| 33. Extensor metacarpi magnus. | 69. Lateral extensor of the phalanges. |
| 34. Flexor brachii. | 70. Anterior extensor of the phalanges. |
| 35. Extensor pedis. | 74. Obliquus abdominis. |

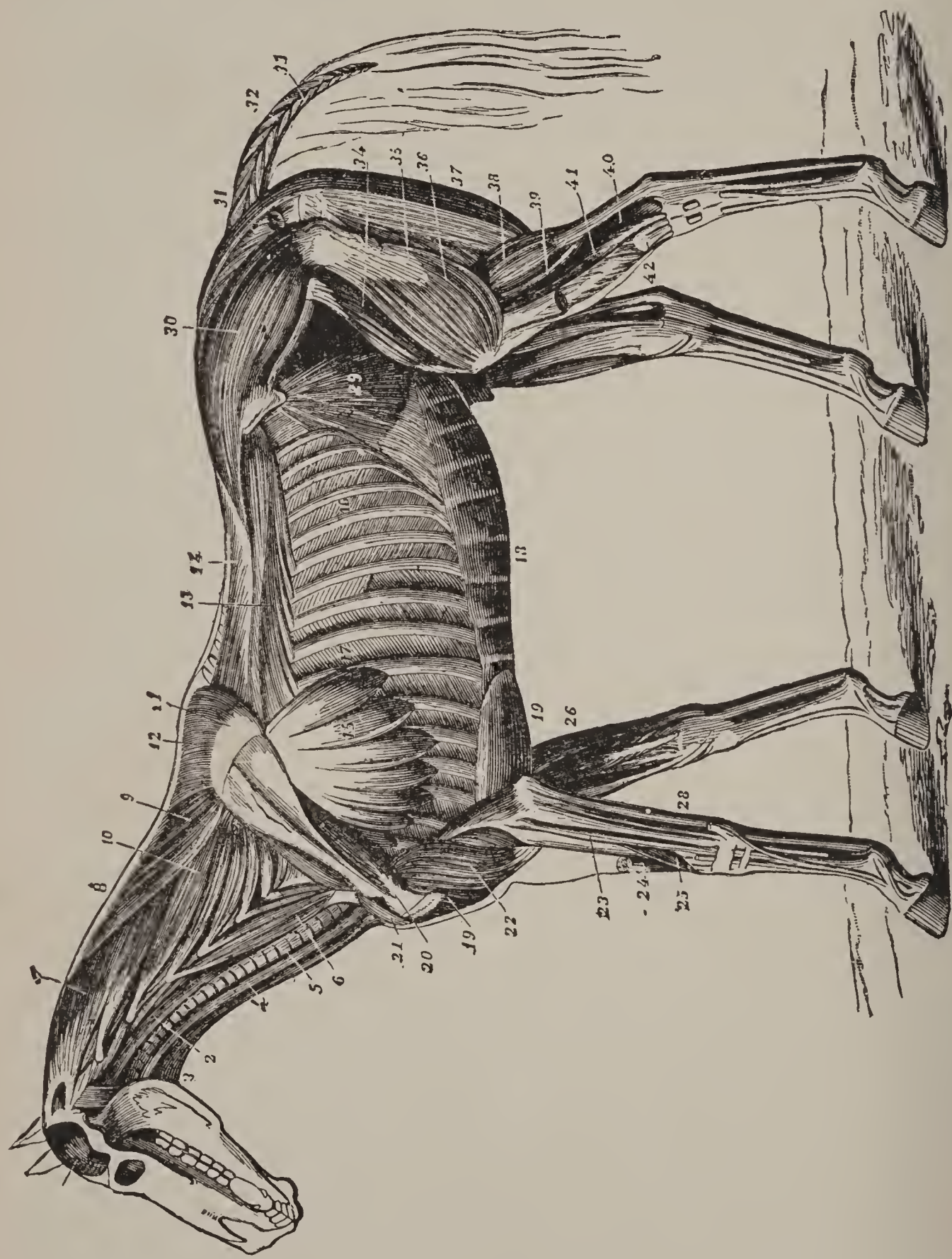


Plate IV.



Plate V.

PLATE V.—CIRCULATORY APPARATUS.

The left anterior limb has been removed to show the vessels on the inner aspect of the right limb.

With the exception of the two aortæ, the vena cava, and the vena portæ, all the other vessels are double and symmetrical; *i. e.*, found on each side of the body.

- | | |
|----------------------------------|--|
| 1. Heart (right ventricle). | 18. Cœliac trunk distributed to the stomach. |
| 2. Heart (left ventricle). | 19. Mesenteric vessels. |
| 3. Heart (left auricle). | 20. Renal artery. |
| 4. Pulmonary artery. | 21. Spermatie artery. |
| 5. Pulmonary veins. | 22. Posterior vena cava. |
| 6. Anterior aorta. | 23. Vena portæ. |
| 7. Carotid artery. | 24. External iliac artery. |
| 8. External maxillary artery. | 25. Internal iliac artery. |
| 9. Left axillary artery. | 26. Lateral sacral artery. |
| 10. Dorsal axillary artery. | 27. Femoral artery. |
| 11. Superior cervical artery. | 28. Posterior tibial artery. |
| 12. Vertebral artery. | 29. Metatarsal artery. |
| 13. Humeral artery. | 30. Venous network of the foot. |
| 14. Radial artery. | 31. Internal saphena vein. |
| 15. Metacarpal artery. | 32. Superficial brachial vein. |
| 16. Coronary, or digital artery. | 33. Jugular vein. |
| 17. Posterior aorta. | |



Plate VI.

PLATE VI.—NERVOUS SYSTEM.

With the exception of the spinal cord and the corresponding portion of the great sympathetic, as with the blood vessels, all the other nerves are double and symmetrical, being found in each side of the body.

- | | |
|--|---|
| 1. Brain. | 14. Semi-lunar ganglion—the center of the solar plexus. |
| 2. Optic nerve. | 15. Sacro-lumbar plexus. |
| 3. Superior maxillary nerves. | 16. Anterior femoral and saphena nerves. |
| 4. Inferior maxillary nerves. | 17. Sciatic trunk. |
| 5. Par vagum of pneumogastric, etc. | 18. Small femoro-popliteal nerve. |
| 6. Spinal cord. | 19. Great femoro-popliteal nerve. |
| 7. Brachial plexus. | 21. Posterior internal tibial nerve. |
| 8. Prehumeral nerve. | 20. Posterior plantar nerve. |
| 9. Anterior brachial. | 22. Internal radial nerve. |
| 10. Radial nerve. | 23. Anterior plantar nerve. |
| 11. Cubital nerve. | 24. Plantar nerves. |
| 12. Pneumogastric nerve. | |
| 13. Gastric portion of the solar plexus. | |

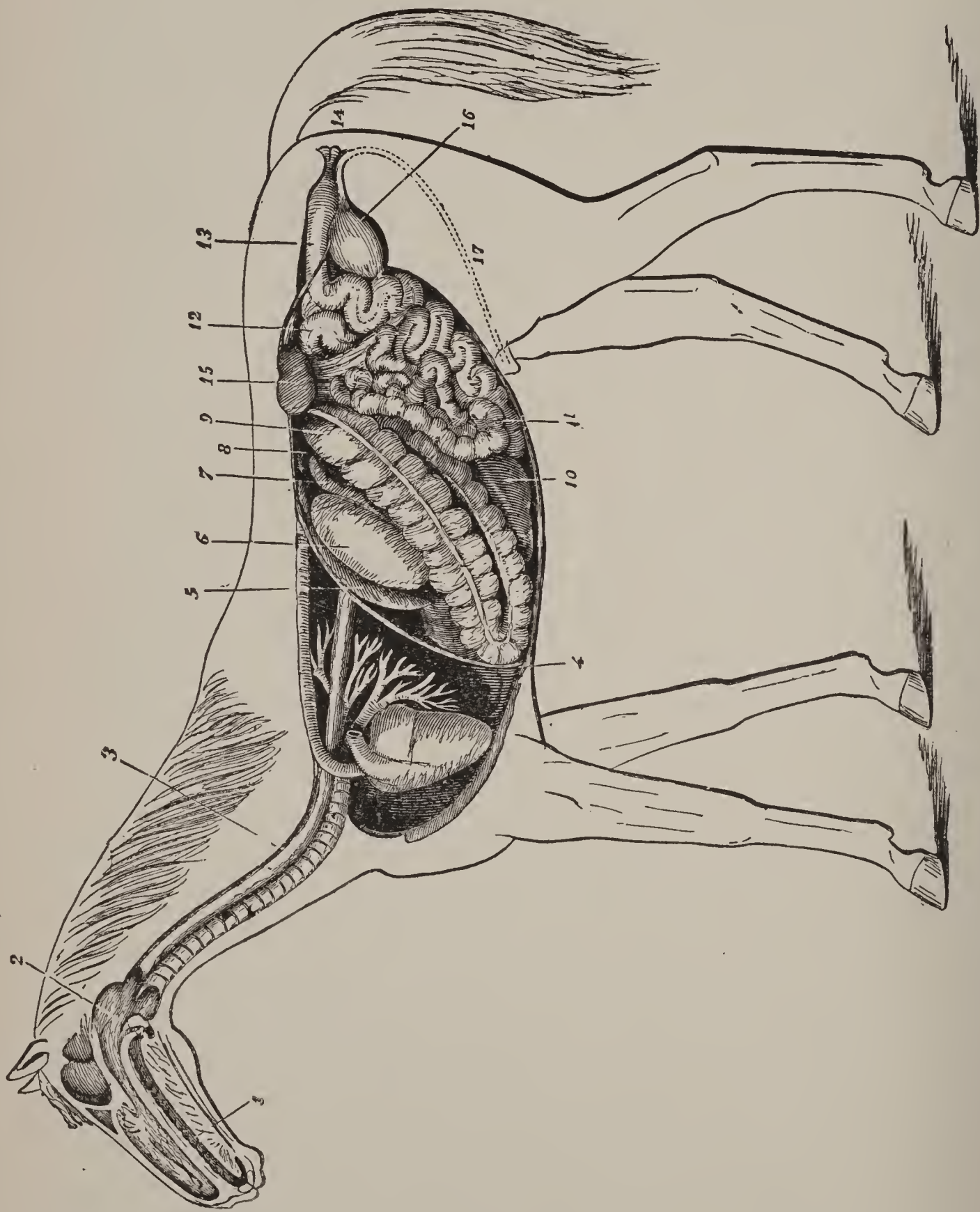


Plate VII.

PLATE VII.—DIGESTIVE APPARATUS.

- | | |
|----------------------------|----------------------------------|
| 1. Mouth. | 10. Cœcum. |
| 2. Pharynx. | 11. Small intestine. |
| 3. Œsophagus. | 12. Floating colon. |
| 4. Diaphragm. | 13. Rectum. |
| 5. Spleen. | 14. Anus. |
| 6. Stomach. | 15. Left kidney, and its ureter. |
| 7. Duodenum. | 16. Bladder. |
| 8. Liver, upper extremity. | 17. Urethra. |
| 9. Large colon. | |

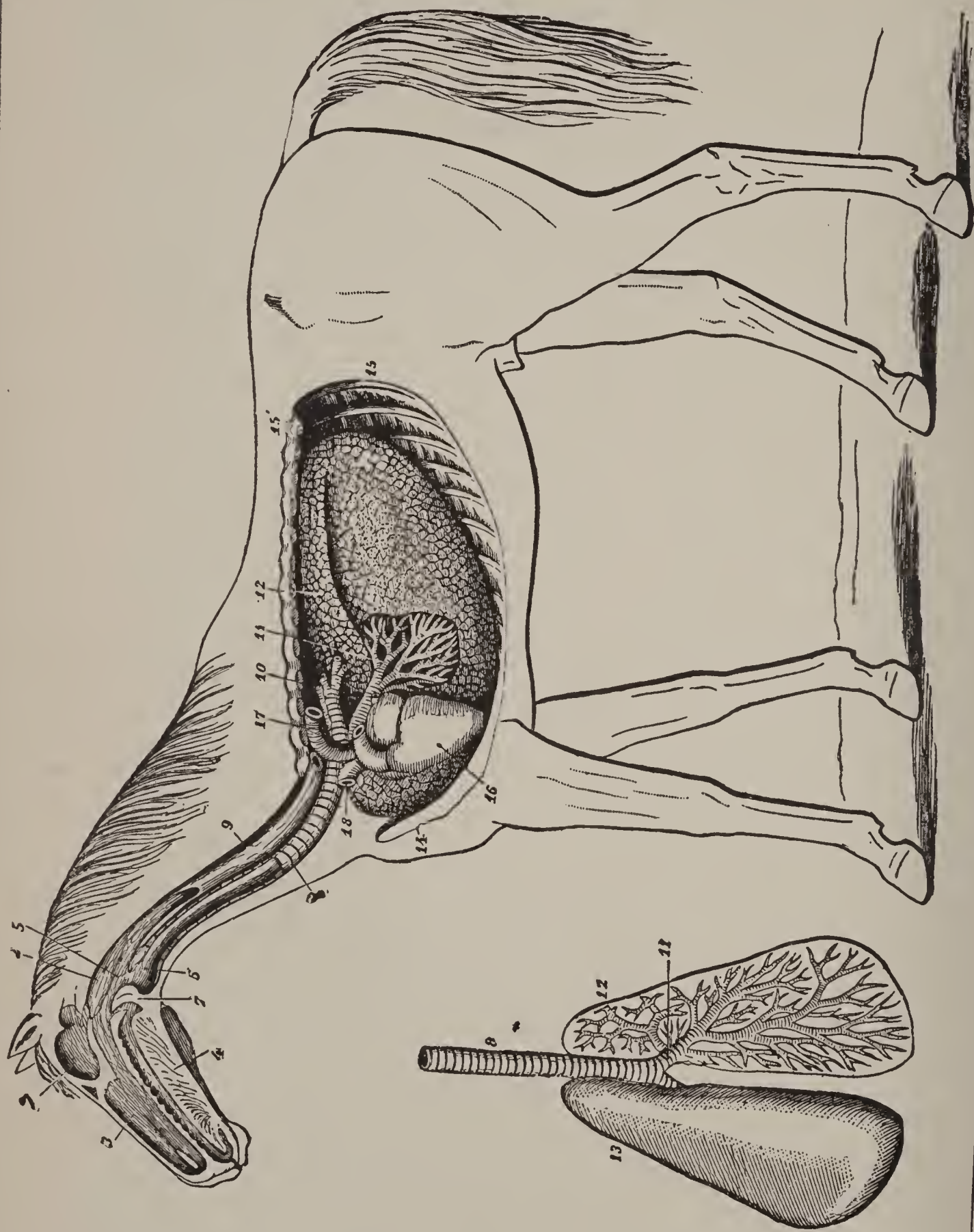


Plate VIII.

[FOR EXPLANATION, SEE BACK OF PLATE I.]

CHAPTER XIII.

DISEASES.

THERE are only about three dangerous diseases to which horses are subject, that are common; and if these can be managed successfully, nine-tenths of the losses of horses can be prevented. These are colic, pneumonia, laminitis or founder, and, I may add, the effects of bad shoeing.

A horse is liable to die in a few hours from an attack of colic, a very common occurrence. Pneumonia, or inflammation of the lungs, to which horses are very liable, is, if neglected or not treated properly, almost sure to result fatally or to leave the horse broken down and worthless. Laminitis, or founder, though not destroying life directly, leaves the horse so crippled as to destroy his usefulness and value. There are few horses that have been shod for several years that do not have the feet so seriously injured as to make them sore and lame.

The treatment of these difficulties is in reality very simple and easy if we know the symptoms and what to do. Colic is easily relieved and cured, the secret being to know what to give and to give it promptly. The management of chills and fever, or pneumonia, is easy when taken at the commencement of the trouble, one simple remedy being almost specific. In its first, or acute stage, every case of laminitis, or founder, can be cured, and that by very simple treatment, even without the use of medicine.

The management of these difficulties is explained so fully and carefully that with the directions given, almost any one should be able to treat them successfully.

There are, of course, other difficulties, such as coughs, colds, strangles, cuts, sprains, etc., with many other causes of trouble, which it is important to know how to treat, and which are carefully explained with best treatment, making this part of the work as reliable and practical as it could be made

in the space devoted to the subject. To this part are added many valuable prescriptions which have been held and used as great secrets.

The three principal points in preserving the health of a horse are feeding, air, and exercise. In the first place, irregularity of feeding, even of the best of food, will produce disease; but when with this is combined the giving of tainted or musty hay or grain, the difficulty is greatly aggravated.

Ventilation. — The stable should be neither too hot nor too cold. The horse will show the effect in a few days by coughing or having slight irritation of the mucous membrane of the throat.

A horse can take cold as easily by going out of the cold air into a hot stable, as he can by going from a hot stable into cold air, and *vice versa*. It is the sudden change of temperature which produces the change on the mucous coat of the larynx and of the throat.

The clothing of the horse in the stable should be neither too heavy nor too light. If kept too warm, he will be more likely to take cold when he goes out to exercise on a cold or chilly day.

To keep a horse doing well, constant attention is necessary to little things — properly clothing and protecting a horse when warm after a drive; care not to give so much cold water as to chill; if there is chill or inclination to fever, or the horse is “off his feed” after a drive, giving a little fever medicine, with any other prompt measures to relieve the derangement at its beginning, may prevent a very severe attack of congestion or inflammation, if not save the life of the horse. It is in attention to these little things that the real key of the owner’s success lies in the care of his horses.

There are four general principles, or points, which must influence the course of treatment in all diseases. If there is high temperature, 102° to 107° (107° to 108° is fatal), the first point is to reduce the fever. In the first stage, aconite internally is best; externally, wrapping the body and extremities to equalize the temperature.

The heart’s action is the next great point. Thirty-four to forty beats to a minute is normal; below that indicates de-

bility. If it is a quick, wiry, or thready pulse, it indicates inflammation of the intestines or abdominal organs, which calls immediately for sedatives.

Quick and feeble pulse indicates that the lungs are involved. Moderately rapid, and throbbing or bounding pulse would indicate inflammation of the extremities, such as laminitis, and is to be treated as such. While an irregular pulse-beat, whether fast or slow, would indicate that the heart itself is involved, which is to be treated by giving medicines that act upon the heart, such as alcoholic stimulants, belladonna, and digitalis. The first two stimulate the heart; the last is a heart sedative.

EXPLANATION OF PULSE.

The arteries convey the blood from the heart to the system. "The blood nowhere passes through an artery so rapidly as it is forced into it by the ventricles of the heart, on account of the resistance offered by all the tubes against which it is forced. The consequence is that when it receives the wave of blood, both the diameter and the length of the vessel is increased, and this is followed by a recoil and recovery of its previous position, owing to the elasticity of the tube; these operations constitute the pulse, which is felt when the finger lightly compresses an artery." Hence the pulsations of the artery correspond with the beatings of the heart, and consequently indicate the irritability of that organ, or the system generally. The average pulse of the horse is from thirty-four to forty beats per minute. The smaller and more nervous the horse, the quicker the pulse; while the larger and coarser bred, the slower. It can be felt easiest and best at the lower jaw a little behind where the submaxillary artery comes up and winds round to gain the cheek. Pass the finger down the jaw up near the neck on the inner edge, and a cord-like ridge will be felt, which, upon gently and firmly pressing it with the end of the finger, will plainly be felt to throb and beat.

"Frequent reference is made to the state of the pulse in different diseases, such as colic, pneumonia, laminitis, etc., etc. Hence it should be studied carefully. For example, during the early stage of colic, the pulse will be hardly affected, and the ears and legs will be natural in tempera-

ture ; while in inflammation of the bowels, the pulse will be quick and wiry, ears and legs cold, etc. In fever it is quick, wiry, and light, indicating the extreme or not of disturbance in the circulation." See plate V, also preceding page.



FIG. 230. — Suffering from cold.

CATARRH.

Catarrh, or "cold in the head," is an affection of the lining membrane of the nasal chambers and cavities of the head. It consists of a congested or inflamed state of that membrane, giving rise to a glairy discharge from one or both nostrils, and when the head of the windpipe (larynx) is implicated, accompanied by a cough.

The exciting causes are sudden variations in the state of the temperature ; undue exposure to cold when an animal is in a heated state, especially after a hard day's work or drive ; standing in stables badly ventilated, or any place exposed to cold draughts. Perhaps the most common cause in young horses is placing them in warm stables in the fall of the year immediately on taking them off the pastures. A sudden change from a cold to a hot temperature is more likely to cause catarrh than a change from a hot to a cold one.

Treatment. — At once place the animal in a comfortable, well-ventilated, loose box, as should be done in all affections of the chest ; blanket warmly, give aconite or some of the fever medicine as directed in inflammation of the lungs. If the case is serious, as stated, it may run into general inflammation of the air-passages, as bronchitis or laryngitis ; also hand-rub and bandage the legs ; the clothing and bandages must be removed twice a day, and the body well rubbed over. Give one or two drachms of aloes



FIG. 231. — Nose-bag.

in solution, combined with one-half drachm of powdered ginger. Steam the head by means of a nose-bag partly filled with scalded bran, into which put an ounce or two of turpentine. Hang the bag on the head same as in cut, being careful not to have it so tight around the nose as to heat or scald it and be oppressive. Many horses have been suffocated by having the bag brought too tightly over the nose. A few repetitions of this will cause the nose to run freely. Nurse by giving bran mashes, boiled oats, etc. Rest and care will usually do the rest. If there is much inflammation of the throat and air-passages, any good liniment may be applied on the throat and around the chest.

LARYNGITIS, OR "SORE THROAT."

Causes are similar to catarrh, as undue exposure to cold and variations in the temperature ; but in some seasons it appears as an epizootic disease, large numbers of horses becoming affected with it about the same time. These cases are always of a typhoid nature, more especially when occurring in stables insufficiently ventilated.

Symptoms of "sore throat" are well marked. The horse holds his head stiff, with his nose poked out, showing the muscles of the neck prominently ; he has considerable difficulty in swallowing ; if he attempts to drink, part of the water is returned through his nostrils ; the throat is painful to the touch, and the least pressure excites a violent fit of coughing. At the commencement of the disease it is difficult to distinguish it from "distemper" (strangles). By the third or fourth day the difference can be easily seen ; the usual tumor of distemper does not appear. The pulse varies ; in some cases but little altered, in others very quick and weak. The coat is also staring, and the functions of the kidneys partly arrested. In severe cases the breathing becomes heavy and laborious. By the third



FIG. 232. — Simple method of throat covering.

or fourth day from the beginning of the attack, a greenish yellow matter is discharged from the nostrils.

Treatment. — The general and local treatment should be very much the same as for cold or catarrh, with the addition of a free use of counter-irritants to the throat, as mustard well rubbed in, or any good stimulating liniment, or even a light liquid blister. Aim to keep up the strength by feeding soft, easily digested food; a bran mash with a little boiled oats in it, carrots, etc., — any food that he can eat easily.

When the bowels are constipated, as is often the case, clysters of soap and water must be freely used. When the cough is severe and hacking, the following ball may be given once or twice a day : —

Camphor.....	1 dr.
Powdered opium.....	1 dr.
Ext. belladonna.....	2 scr.



FIG. 233. — Covering the tumor.

STRANGLES, OR HORSE DISTEMPER.

This is another form of sore throat, occurring mostly in



FIG. 234. — Horse with strangles.

young horses from two to five years old. The general symptoms are very much the same as explained in the previous difficulties. The distinguishing points are, the horse is out of sorts; the neck becomes sore and stiff; an enlargement appears be-

tween the branches of the jaw, which is hot and tender; there is some discharge from the nose. In ordinary cases, the tumor

goes on to suppuration ; a copious discharge of thick yellow matter takes place from the nostrils ; in about a week the tumor has matured, become soft, and points, and either bursts or should be opened.

Treatment. — Provide a comfortable, well-ventilated stall ; clothe warmly ; rub and bandage the legs ; nurse by giving



FIG. 235. — The eight-tailed bandage.

bran mashes, boiled oats, carrots, etc. Bowels should be opened by injections. Use freely a poultice made of wheat bran and warm vinegar, changing as often as the poultice becomes dry, using the eight-tailed bandage until the enlargement becomes soft and can be opened, when relief will be prompt. Small doses of saltpeter should be given in the feed, or the following powders night and morning : —

Niter.....	1½ oz.
Tartar emetic.....	6 dr.

Mix, and make into six powders.

Sometimes the inflammation is so deep as to cause serious



FIG. 236. — The eight-tailed bandage as adjusted.

soreness and swelling of the throat. In this case the horse must be nursed carefully by feeding warm gruel ; the drink should be warm ; grass, or anything that will tempt the

appetite, should be given in moderate quantities.

PNEUMONIA—INFLAMMATION OF THE LUNGS.

Causes. — Exposing the horse while warm to a sudden change of temperature, by allowing him to stand in a cold

draught of air, etc. ; getting chilled or wet ; washing the belly and legs immediately after exercise, and allowing the horse to get chilled ; removing from a warm to a cold or from a cold to

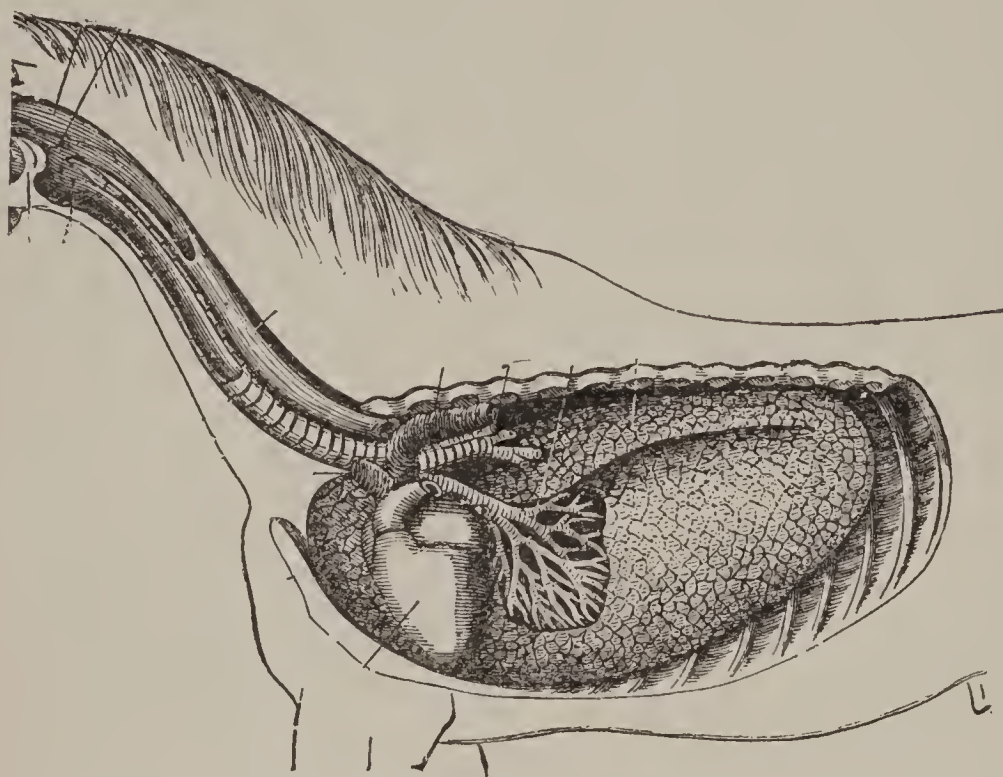


FIG. 237. — Showing respiratory organs.

a warm stable ; or cold applied to the surface of a heated animal, by which the blood is driven from the skin and extremities to the internal organs. Any slight cold or sore throat may run into pneumonia ; driving rapidly against a cold wind, especially after being confined to the stable for some time.

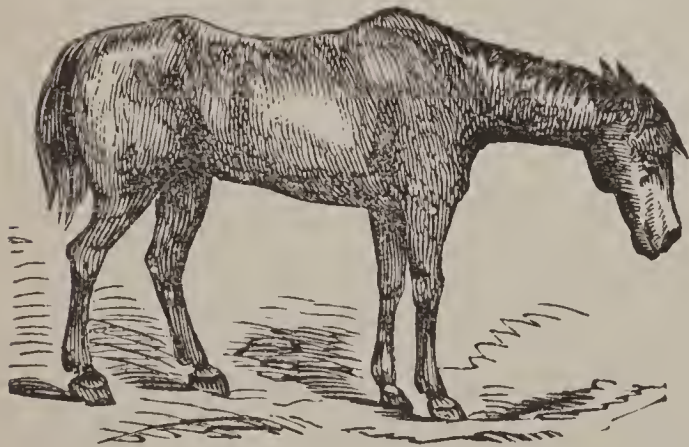


FIG. 238. — As the horse usually stands when suffering from inflammation of the lungs.

Symptoms. — Pneumonia is almost invariably ushered in by shivering, and coldness of the surface of the body. The breathing becomes hard and full, panting-like. The pulse is full and oppressed, running up to from sixty to eighty beats per minute, differing in its

character from the pulse of pleurisy, which is hard and wiry. The ears and legs are cold ; the membranes of the eyes and

nose are reddened ; the animal stands persistently with his elbows turned out, to give more freedom to the lungs. He stands with his nose toward the window or door, where he can get fresh air.

Treatment. — Blanket warmly, and put in a comfortable stall where there will be pure air, and give the following fever medicine : —



FIG. 239. — Bronchial tube, with its bronchules and ultimate ramifications.
Natural size.

Tincture of aconite	1 oz.
Tincture of belladonna.....	2 drs.
Water.....	3 oz.

Of this give from 15 to 30 drops on the tongue every 20 or 30 minutes, or about 10 drops tincture of aconite every two hours, more or less, according to the severity of the case. If the case is severe, apply strong stimulants to the legs, breast, and sides of the chest, as before explained, such as mustard made into a paste and rubbed in thoroughly, or a liniment composed of aqua ammonia reduced one half with water, and rubbed in well so as to invite circulation to surface and extremities.

Blankets wrung out of hot water and applied to the sides in the early stage, are preferred by many. If this is done at the time fever sets in, either in pneumonia or pleurisy (the treatment

for which is practically the same), with a few doses of fever medicine, it is rare that the horse will not be relieved next day ; but if not, recovery will not commonly take place before the

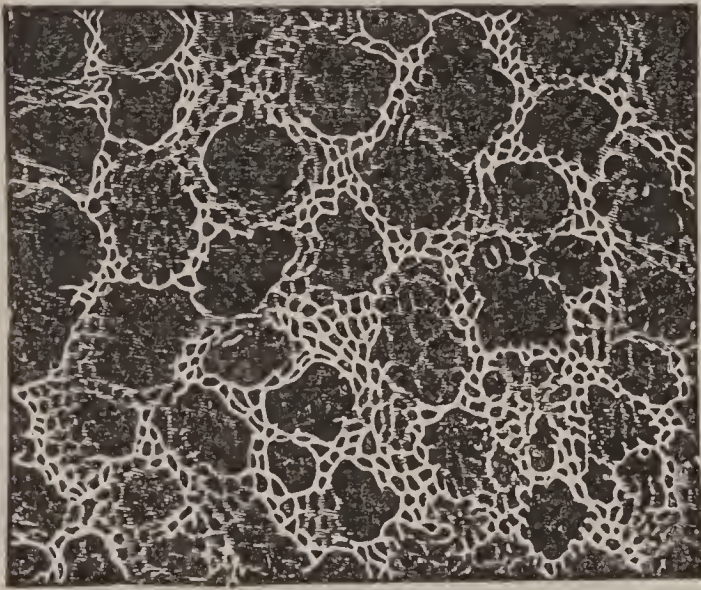


FIG. 240. — Arrangement of the capillaries around the air-cells.

fifth or sixth day. Give from 2 to 3 drachms nitrate of potass two or three times a day. When there is improvement, which will be denoted by the pulse becoming full and regular and the expression and actions being lively, give less fever medicine and at longer intervals. Should too much be given, it will be noticed

by falling of the pulse, sweating, trembling, and anxious eye, when it should be discontinued, and stimulants would be indicated ; two to four ounces of alcohol or brandy with the same quantity of water for a dose.

Nurse by giving simple food, such as a little bran with boiled oats, linseed meal, cooked carrots, with a little good hay.

PLEURISY.

Causes are similar to those of pneumonia, such as variations in temperature, exposure to cold while warm, standing in a draught of cold air, impure air, etc. Pleurisy occurs as an independent disease, or, as before stated, may be accompanied by inflammation of the lungs. If neglected or not treated properly, it is a very dangerous disease.

Treatment is practically the same as for pneumonia. Put in a cool, well-ventilated stall ; give fever medicine ; blanket the body, neck, and legs warmly ; if at all serious, using stimulants on the extremities, and hand-rubbing thoroughly, with hot fomentations to the sides ; the general treatment, in a word, is the same as for pneumonia. Should there be cough

or soreness of the throat, it is to be treated in connection, as directed for laryngitis.

DR. MEYER'S TREATMENT FOR PNEUMONIA.

In conversation with Dr. Meyer, of New York, on the treatment of pneumonia and pleurisy, he stated that he treated them with decided success without using aconite, which is recognized as the best sedative for fever. I include details of this treatment.

Have the animal well blanketed and cared for in a roomy stall, where there is plenty of circulating air, and give one of the following balls every eight hours.

Carbonate of ammonia...	1 oz.
Pulverized cinchona bark.	2½ oz.
Pulverized nux vomica...	½ oz.
Pulverized digitalis leaves	3 dr.
Pulverized gentian.....	2 oz.

Make into eight balls.

Also give the following in water twice a day :—

Nitrate of potash.....	6 oz.
Bicarbonate of soda.....	1 oz.

Make into six powders.

Have the animal's chest rubbed with alcohol two or three times a day for the first two days. Feed nutritious food, or anything that may tempt the animal to eat. The medicine must be continued until the animal commences to lie down, which will be from the sixth to the eighth day.

DR. MEYER'S TREATMENT FOR PLEURISY.

Hot applications to the chest. This can be done best by wringing blankets out of hot water and applying them to the chest, — two or three blankets, one over another, and all covered with oil-cloth or other blankets so as to keep in the heat. Rub limbs with alcohol ; they may also be loosely bandaged. One of the following balls should be given every eight hours :—

Powdered opium.....	½ oz.
Muriate ammonia.....	1½ oz.
Powdered cinchona bark.....	3 oz.

Mix, and make into six balls.

Give the animal anything he will eat or drink. If the horse is taken during the early stages, this will cut it short in from 48 to 60 hours.

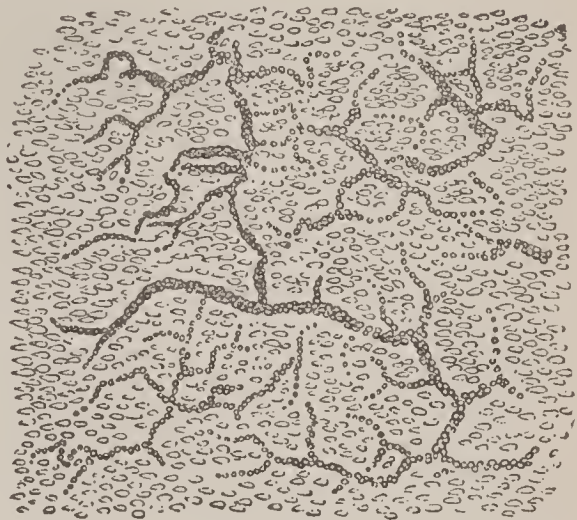


FIG. 241. — The pleura as it appears when inflamed, magnified.

If, in an after stage, swelling begins to show itself below the chest walls, that is, between the fore legs, and, extending backward, shows the least symptom of the trouble known as hydrothorax, give the following remedy: Fluid extract digitalis, from twenty to twenty-five drops, more or less according to the size of the horse, every four hours, and continue until the swelling begins to lessen, then the intervals of giving the drops should be lengthened to eight hours. If the swelling is very large, the skin should be punctured in from twenty to thirty places, and the parts bathed with hot water three or four times a day.

EPIZOOTIC PINK-EYE,

ALSO TERMED INFLUENZA OR CATARRHAL FEVER.

This belongs to the class of diseases called epizootic, which are distinguished by extending over a large tract of country, and attacking a number of horses at the same time. In its nature it resembles an epidemic form of catarrh, but it is essentially different, and is easily distinguished from that complaint by its epizootic character, and the marked prostration and low typhoid form of fever which always accompanies it. It does not affect horses alike in all seasons; some years it is apt to involve the lungs principally, with a marked tendency to dropsical effusion, whereas in others the liver and digestive organs are chiefly implicated.

The symptoms are shown in a staggering gait, hanging head, trembling, shivering as from cold, loss of appetite, watery discharge from the eyes, one eye closed, especially the left one. The pulse is quickened and weak, from 50 to 60 in the minute, and the breathing is hurried, temperature 104° to 106° . The bowels are bound, and the urine scanty. The disease is often complicated with bronchitis, pneumonia, pleurisy, etc. A pinkish color of the mucous membrane of the eyelids is always present in this disease. There is a discharge from the nostrils, swelling of the limbs, which are tender to the touch. The animal is weak, lying down most of the time. The body seems to be hot all over. The head hangs low, and the horse seems to be suffering from pneumonia. The only difference between pink-eye and pneumonia is that in the former the pink-eye is noticeable, and the horse lies down, while in the latter he does

not. It occurs in spring or fall, and attacks a number of animals in the same way.

Dr. Meyer treated thousands of cases without losing a single one, complications excepted; and of true pink-eye he never lost a case by the following treatment:—

Good nursing and good air are indispensable; the patient should be well blanketed, and fed on anything he chooses to eat; the stable should

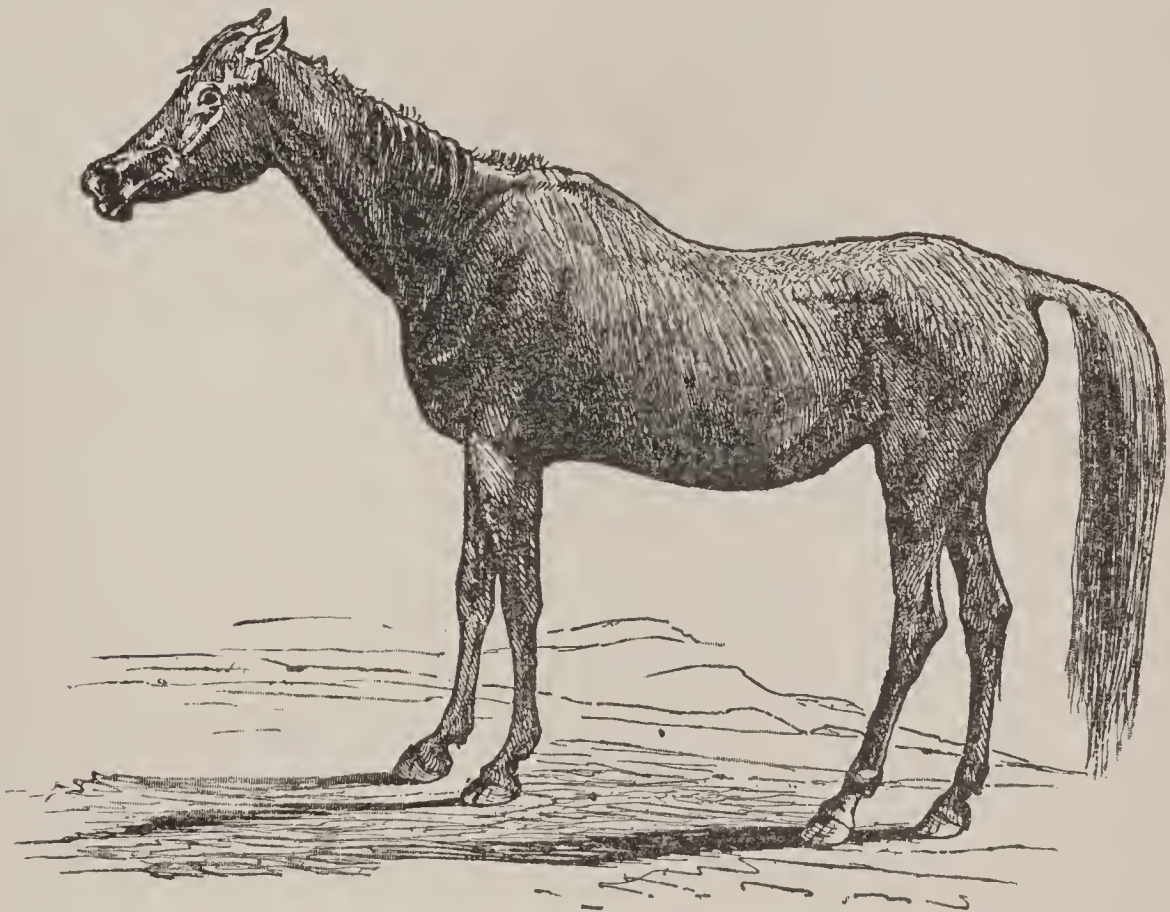


FIG. 242. — Usual position of horse when having a chill.

be purified by throwing air-slaked lime in the stalls, etc.; and from the first begin by giving the following remedies every eight hours:—

Carbonate of ammonia	1 oz.
Cinchona bark, powdered	2 oz.
Nux vomica “	$\frac{1}{2}$ oz.
Digitalis leaves “	2 dr.
Gentian root	3 oz.

Mix, and make into eight balls.

Give as much water as the patient chooses to drink, to which add some saltpeter. About two ounces a day should be used. The above balls should be used after the second day by giving one at morning and night; when feeding is resumed, discontinue the remedies, and continue with good nursing. Will cure in from six to eight days. Bathe with hot water and salt. He should have green food when procurable, or a little boiled oats, and bran mash, or anything else he will eat.

It is also necessary to exercise quite slowly at first, as a very little overdoing or exposure is liable to bring on a relapse, which is almost sure to be fatal. When the throat is very sore, and the cough troublesome, rub on the throat a counter-irritant.

HEAVES, OR BROKEN WIND.

Heaves are indicated by an increased action of the flanks. The inspiration is natural, but the expiration requires two efforts to expel the air. There is at times a short cough or grunt while the air is being expelled from the lungs. Heaves are never found in the racing stable where the horses are properly fed. They are always found among cart or team horses which are fed upon large quantities of coarse food or hay. The seat of the disease is found in the air-cells of the lungs, in the form of enlargements and sometimes ruptures of the cells. The cause of the disease is the immense quantity of hay forced into the stomach, the greedy animal perhaps, not being satisfied with his allowance, eating the bedding. The bowels and stomach press hard against the diaphragm, and the lungs not having room to expand, the air-cells are enlarged or ruptured, and the horse is said to have the heaves. The worst conditions exist when a horse is left in the stable for days and weeks, eating clover hay, or even imperfectly cured, dusty hay of other kinds, and then is suddenly taken out and driven at a rapid rate. It is mainly a difficulty common to old horses, but may attack a colt two years old.

Treatment. — Turning out on natural pastures, feeding corn-stalks and other laxative food, will relieve, and even cure, mild and recent cases. Feeding on dry grain, with carrots, turnips, beets, or potatoes, and a very limited supply of water, will enable many broken-winded horses to do a fair amount of work in comfort. Hay should never be allowed except at night, and then only a handful, clean and sweet.

The bowels must be kept easy by laxatives, and the stables well aired. Tar-water as an exclusive drink may be given, and a course of carminatives (ginger, caraway, cardamoms, fennel) may be added with advantage. But nerve tonics, and above all, arsenic in five-grain doses daily, and continued daily for a month or two, are especially valuable.

No broken-winded horse should have food or water for from one to two hours before going to work.

The following is also very effective : —

Powdered ginger.....	$\frac{1}{2}$ oz.
Capsicum.....	$\frac{1}{4}$ oz.

Form into a ball, and give three nights in succession ; then omit two or three nights, and give again two or three nights in succession.

Or —

Tincture of phosphorus..... 8 or 10 drops.

If kept up, the horse should have regular exercise, and be watered often with a small quantity at a time, and have straw instead of hay to eat. Under this treatment, heaves will disappear.

CHRONIC COUGH

is often a sequel of sore throat (laryngitis) as also of distemper (strangles), and is a disease from which, when once fairly established, complete recovery seldom occurs. It consists of a chronic inflammation of the many glands imbedded within the lining membrane of the larynx, causing an irritation of that highly sensitive organ. The cough is easily excited by pressure externally.

Treatment. — If the horse has been affected for some time, treatment is generally very unsatisfactory, and must be more of a palliative than a remedial nature. If it is of more recent development, treatment may be undertaken with better chances of success. Give the cough ball as recommended for laryngitis, and apply the following liquid blister, or any good counter-irritant, externally, and in some cases great benefit will attend the use of setons.

Olive-oil, oil of turpentine, aqua ammonia, equal parts.

To be shaken well and rubbed down with the hand.

Medicinal treatment is greatly assisted by feeding the animal properly and regularly, giving small quantities of food at a time ; carrots in winter and green food in summer should be given. Feeding nice clean corn-stalks is much better than hay ; if hay is fed, it should be bright and clean, or the dust

shaken out of it, and dampened a little, and of this only a limited quantity should be given. If a greedy eater, either remove from his reach the bedding, which he will be likely to eat, or put on a muzzle. The following are also excellent cough remedies : —

Camphor	1 dr.
Powdered opium	1 dr.
Powdered digitalis	1 dr.
Calomel	1 dr.

Make into a ball, and give every second morning until six doses are given.

Tar-water	$\frac{1}{2}$ pt.
Lime-water	$\frac{1}{2}$ pt.
Powdered squills	1 dr.

An old writer says : “ I have known an obstinate cough cured by drenches composed of a syrup made of molasses and vinegar ; also by a decoction of garlic with linseed-oil. Barbadoes tar and oil with balsam of sulphur, have also been employed as remedies for a cough.”

COLIC.

There are two forms of this disease, namely, spasmodic and flatulent colic. The first is wholly of a spasmodic nature, and if not promptly relieved, will, in severe cases, run into inflammation of the bowels, causing speedy death. The second, while exhibiting the same general symptoms, shows marked enlargement of the belly, from generation of gas, which, if not checked and neutralized, results fatally, by rupturing the diaphragm, causing suffocation and death.

Causes. — The common causes of colic are a sudden change in the feed ; very often during the summer, when running at pasture, if taken up for a day, and a feed of oats or dry food given, it is apt to cause gripes ; feeding new oats or new corn is a common cause ; applications of cold water to the body, drinking freely of cold water when heated, especially if hard well-water, often gives rise to a severe attack ; worms and other intestinal irritants may induce it ; costiveness and unwholesome food often cause it ; overloading the stomach, or being put to work on a full stomach, will give rise to it.

Symptoms. — The animal is suddenly seized with pain in the bowels, becoming restless and uneasy, crouching, sometimes striking up toward the belly with the hind foot, looking round to his flanks, evincing great distress; he gets down after several apparent efforts, rolls about, sometimes on his back, sometimes quite over. Profuse perspiration breaks out over him. The paroxysm soon passes off, and he gets up, shakes himself, and begins feeding; during the interval the pulse is unaltered; the legs and ears are natural in temperature. After

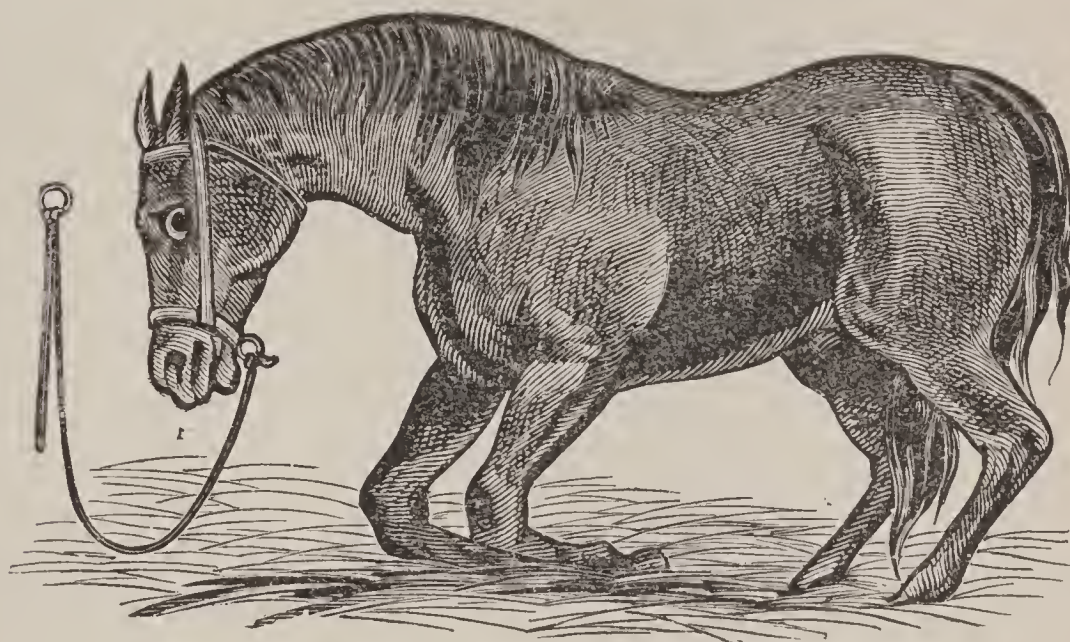


FIG. 243. — Second stage of spasmodic colic.

an interval of longer or shorter duration, the attack returns, perhaps with increased violence, when he gathers himself, falls down, and rolls about as before. As the disease advances, the symptoms become more severe.

Treatment. — Blanket comfortably, so as to keep up evaporation, and immediately give the following as a drench:—

Peppermint.....	1½ to 2 oz.
Sulphuric ether.....	1½ to 2 oz.
Laudanum.....	1 oz.
Soft water.....	1 pt.

Shake up thoroughly, and keep covered with the hand or cork before administering. If not relieved, it should be repeated in one half to three quarters of an hour. If the horse is small, and the attack not severe, less may be given; while

if very large, and the attack severe, even more may be given.* During my practice, I gave this preparation with invariable success for either spasmodic or flatulent colic.

Stable-keepers should always keep this medicine on hand,



FIG. 244. — Third stage of spasmodic colic.

in readiness for an emergency, as it is very important to be able to treat this disease promptly.

FLATULENT COLIC.

Symptoms the same as in spasmodic colic, with this difference, that there is so great an accumulation of gas in the stomach and intestines that the belly is swelled. This disease will often prove fatal in from one to three hours. It is generally very sudden in its attacks, often occurring while the animal is at work, particularly during warm or changeable weather; but it is generally caused by indigestion, producing gases in the bowels and stomach.†

Treatment. — Give drench as for spasmodic colic.

* This is the average dose for a large horse. For a medium or small-sized, nervous-tempered animal, two thirds the quantity would be equally large.

† The ether disturbs the breathing, making the horse apparently distressed, breathing laboriously, which will pass off in a few hours.

Dr. Meyer's method of treatment is so good, explaining as it does some symptoms, with other points of treatment not given, that I include it in full : —

First, there is a switching of the tail, followed by a pawing with the fore feet, and acting as if there were an inclination to lie down. Usually gets down and rolls, looks at the belly, rolls, then up again, and seems at rest for a few minutes, when he goes through the same actions again. The pulsation is full and strong, about natural.

Treatment for Colic. — 2 ounces laudanum, $\frac{1}{2}$ ounce spirits of camphor or 1 drachm gum camphor, 2 ounces sweet spirits of niter, 2 drachms fluid

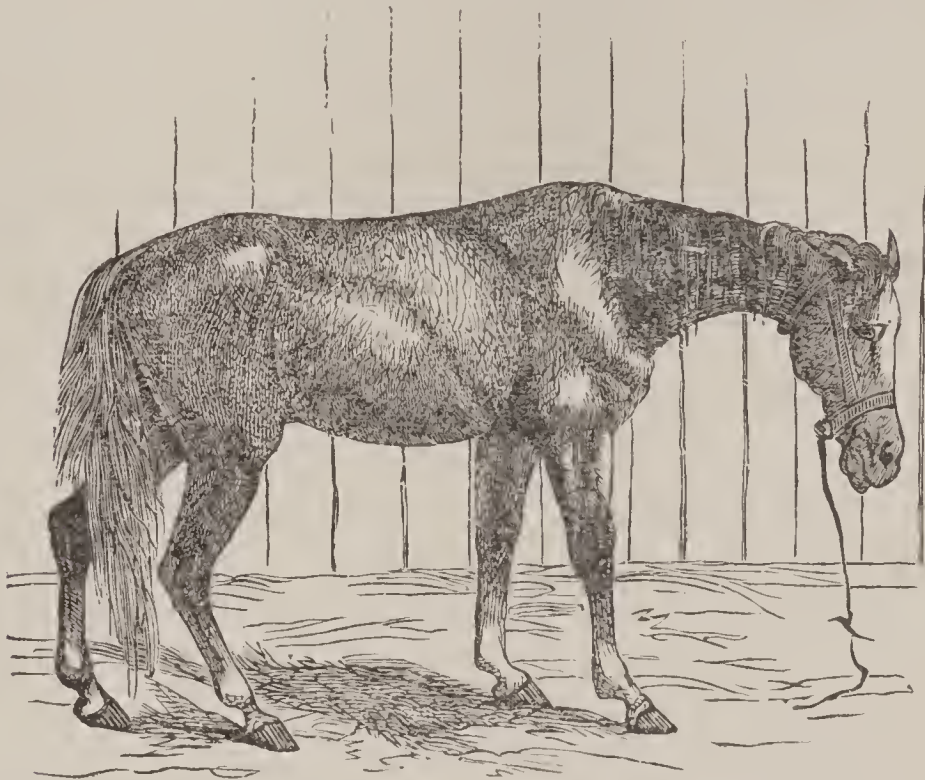


FIG. 245. — Advanced stage of flatulent colic, or tympanites.

ex. belladonna. Mix with one half pint of water, and give as a drench. If the patient is no better in one hour, repeat, and, if constipated, use warm water injections.

Flatulent colic, treatment the same as above. In the early stage, if after about half an hour the patient seems no better, give two ounces of essential hartshorn in water, with warm water enema. If by this time there is no flatus, or breaking of wind, and the animal's abdomen or belly is very much distended, and is belching up air out of the nostrils, and commences to tremble in his legs, an operation will have to be performed. Take a lance or knife, and make a slight incision through the skin on the right flank (the ox is always punctured on the left flank, and the horse on the right), at a point where the tympanitic sound is most marked. As a rule, this point is midway between the edge of the last rib and the hip bone, and about six inches from the lateral processes of the spine — about where the cross mark is on Fig. 246. Take trocar and canula, put the

point into the incision previously made with the knife. Direct the instrument inward, slightly downward and forward, and hit it a sharp blow with the flat of the hand to send the instrument through to the hilt. Now draw out the trocar, when the gas will escape. When the escape of gas has ceased, put a finger over the opening of the canula to prevent the air from filling in, and withdraw. When withdrawn, rub slightly with the finger over the wound, and leave it alone. The horse will have instant relief after the operation. If he remains quiet, feed nothing for about twelve hours. Give flaxseed tea to drink. After the expiration of this time, feed



FIG. 246. — Cross showing place to be punctured.

bran mashes, with oatmeal or ground oats, and continue from four to six days, when the animal will be well. When there is no hope by medicine, this operation is the only treatment that promises success. Should the horse be uneasy after the operation, give one of the balls used for inflammation of the bowels, which should be repeated once in from four to six hours until quiet.

During the warm months, Dr. Meyer usually performs this operation from twenty-five to thirty times, to save life. His loss is about one in ten. This is a simple operation, and enables the cure of many cases which otherwise would be beyond help.

INFLAMMATION OF BOWELS.

The first stage of inflammation of the bowels is when the animal sits on his haunches like a pig, gradually gets up, and walks around as if in great agony; makes attempts to lie down, and when he does, goes down very carefully; may make a few rolls; gradually straightens out again, attempts to rise, and sits on his haunches again like a pig. This position is a sign of bowel inflammation, and to save the patient, treatment must begin in earnest. Should the patient be fat and plethoric, bleed from the neck from two to eight quarts, according to the size of the horse. Apply a strong rubefacient to the abdomen, of 1 lb. of strong mustard, 2 oz. aqua ammonia, and water sufficient to make into a plaster; rub in well, and cover with paper, to keep in the heat. Then give the following medicine:—

Opium, pulverized.....	4 dr.
Subnitrate of bismuth.....	2 oz.
Chloroform.....	4 dr.
Nux vomica, pulverized	2½ dr.
Licorice root.....	Q. S.



FIG. 247. — Sure indication of inflammation of the bowels.

Make into four balls ; give one every 4 to 6 hours, according to the uneasiness of the patient, which must be kept quiet, and these balls will do it. Feed soft, nutritious food, warm water, and no hay, for about one week.

LAMINITIS, OR FOUNDER.

Laminitis, or Founder, is simply congestion or inflammation in the feet. It may be severe or moderate, according to the degree of disturbance. If inflammation runs high, and is allowed to continue, it is liable soon to produce so much disorganization as to induce loss of the hoof, which is, however, rare ; or so much change of structure in the feet as to make the horse ultimately so stiff and sore or so much of a cripple as to become practically worthless excepting for slow, easy work.

There are two stages of this disease, — acute and chronic. The first produces a high state of excitement and inflammation of the sensitive lamina, and more or less of the internal struct-

ure of the foot generally ; the second, a morbid or insensitive feeling of the parts generally. The first or acute stage can be invariably cured, if treated properly, which is not at all difficult to do ; the second, or chronic stage is not curable, but may be palliated to a limited extent.

Symptoms. — At first, if the result of exhaustion and chill, there will be the marked effects of great disturbance of the circulation, so that there may be a general stiffness and soreness, with high, quick pulse, etc., which will be soon followed by

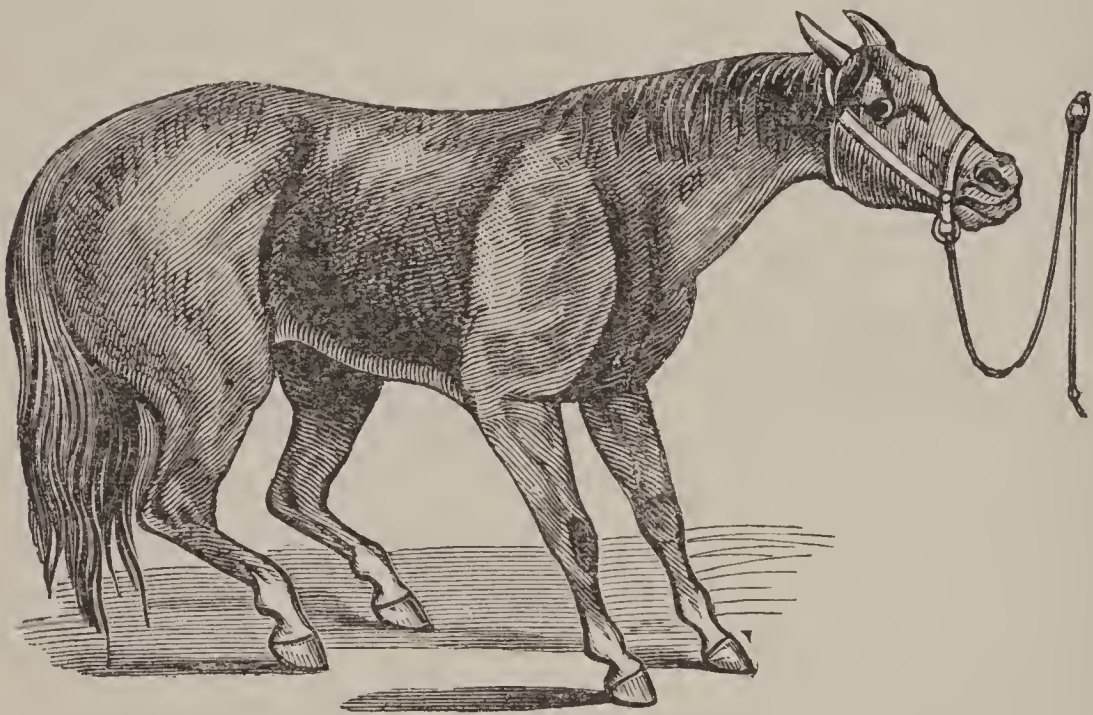


FIG. 248. — Horse suffering from severe attack of laminitis.

tenderness, congestion, and inflammation of the feet. To relieve the pain in the feet, he endeavors to throw his weight upon the hind ones. He advances them in front, resting principally on the heels, when the hind ones are drawn well under him, something like the position shown in Fig. 248. On backing him, he backs with evident reluctance ; when forced back, he drags one foot after the other, showing considerable pain in doing so. When moved forward, he walks on the heels, his movements being slow and difficult. He will often be found lying down, as removing weight from the feet gives relief ; and while down, he will usually point with his nose toward the feet. Sometimes the inflammation may be in but one of the fore feet, or sometimes in the hind feet, which is not common ;

and in some isolated cases, inflammation may be in all four feet ; but is usually limited to the two fore feet.

The following is the treatment used by one of the most talented and successful practitioners in the country :—

If the animal is taken within the past twenty-four hours, have the shoes removed, and put the feet into a tub of hot water. Wind flannel wrappings or bandages around both legs up to the elbows, and keep them

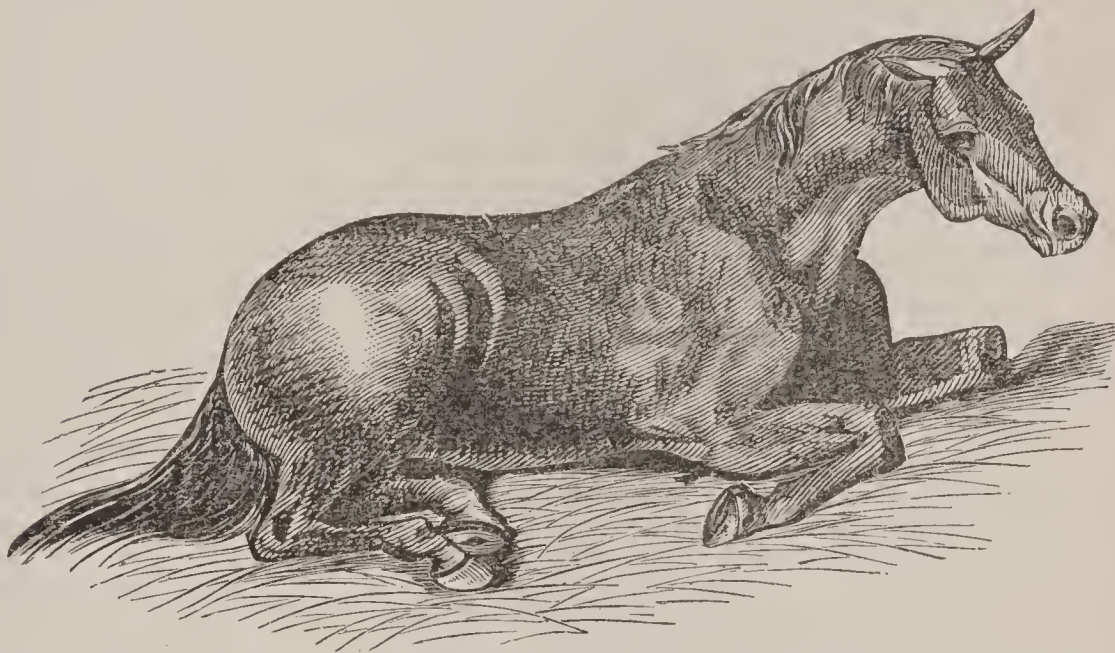


FIG. 249. — As the horse usually lies down when suffering from laminitis.

constantly wet with hot water for from two to three hours. In the meantime have the horse well covered with blankets, and give the following remedy :—

Fluid extract aconite.....	30 drops.
Oil of sassafras	1 oz.
Saltpeter	2 oz.
Linseed-oil.....	1 pt.

This is to be given at once. There will be a profuse perspiration in from fifteen to twenty minutes. Keep the blankets on about six hours, then remove and put on dry ones. Keep wet swabs on the horse's feet, and stand him on wet clay. All stiffness and soreness in the feet will be removed in from thirty-six to seventy-two hours. In the meantime give one of the following powders :—

Bicarbonate of potash	3 oz.
Nitrate of potash.....	6 oz.

Make into six powders, and give two every eight hours until well. In my large work, very full details with illustrations showing changes of structure, etc., are given, which should be consulted.

CHRONIC FOUNDER.

When the inflammation is very intense, and is allowed to continue very long, there is an exudation or lymph thrown out that separates the wall from the sensitive laminæ at the toe. In time there are immorphous horn-cells grown from the sensitive laminæ, or phodofilous tissues of the coffin-bone, making a soft, spongy horn, which, pressing against the wall in front, forces the anterior part of the bone downward against the sole, making it bulge downward, and in some cases perforating it, with a corresponding falling in of the wall above, producing what is termed a drop sole, which will be more or less marked according to the amount of dis-organization. In some extreme cases where inflammation runs high and is allowed to continue very long, this separation of the wall



FIG. 250. — Foot broken and outer margin turned up. Effect of founder.



FIG. 251. — Showing great displacement of pedal bone. Dotted lines show point to which the foot should be trimmed

from the internal structure may be continued so far as to cause ulceration of the coronet and loss of the entire hoof; but this

is rare. Figs. 250 and 251 give a good idea of the injury and change of structure produced by this cause when severe. Fig. 252 shows the great absorption of bony structure by same cause. The central figure on page 180 is also an extreme case, but a very common effect when the inflammation is extreme and allowed to continue for any length of time.

There is no cure for chronic founder. All that can be done is to palliate it to the best advantage. Some good practitioners, when they suspect any exudation at the toe and a separation of the laminae, open the toe, so as to give free vent to it. When there is some dropping of the sole, the best way to produce a healthy condition of circulation and cell-growth is to put on tips or very thin shoes that will allow pressure upon the sole.



FIG. 252. — Substance of bone greatly reduced in size.
Effect of acute laminitis.

CHAPTER XIV.

DISEASES.—CONTINUED.

LAMENESS, SPRAINS, BRUISES, ETC.

WHEN the horse has strained the shoulder, the affected limb is brought forward with a very noticeable dragging motion; whereas if the trouble is in the foot, the limb will be raised and brought forward without much difficulty, but put

down tenderly to lighten the concussion. While standing, the joints will be somewhat relaxed, the heel raised with the toe resting upon the ground. In shoulder lameness the head will be carried low, the limb brought forward with a good deal of difficulty and pain, and without ability to bring it in front of the other.



FIG. 253. — Method of applying the bandage.

In severe cases of sprain the part is swollen, hot, and tender; the limb is thrown into a position

that relaxes the sprained part. If extensive, we have symptomatic fever, and he refuses his food, the mouth is hot, pulse accelerated, etc., which passes off when the more acute symptoms subside. Lameness, of course, is continuous, thus differing from disease of the joint, in which he is always lamest at starting, getting less lame as he gets warmed up.

Treatment. — No matter where the location of the sprain is, or what part is injured, the principle of treatment is the same, when we have three indications presented : First, to allay the inflammatory process ; second, to promote absorption of the decayed fibers ; and third, to hasten the production of new ones.

Keep the bowels open by laxative and easily digested food, such as bran mash, linseed tea, roots, etc. If pain and swelling are excessive, hot fomentations continued for an hour or two, alternated with cold water, will be found to give most relief. (See “Fomentations.”) Gentle and equable pressure, by means of a judiciously applied bandage, is very beneficial in sprains of the leg.

Rest must be given from the first, and the patient must be turned into a loose box. Having by these means succeeded in subduing the inflammation, one or two applications of an absorbing blister will generally remove any enlargement that may remain. The following cooling lotion may be well rubbed in, and a thick woolen bandage applied, well saturated with it, and kept wet with cold water : —

Niter (saltpeter).....	2 oz.
Sal-ammoniac.....	2 oz.
Common salt.....	4 oz.
Spring water.....	1 pt.

Good home treatment would be as follows : —

Make a bag as long as the limb — an old trouser’s leg of good size, sufficiently long to extend from the hoof to above the knee, would be the thing. Tie a string rather loosely around the foot below the fetlock. To keep it in place, secure a wide tape or strip of cloth to the upper edge of the bag, pass it over the shoulder, and fasten to the opposite edge ; next take bran, to which add a little salt, and pour on it as much boiling water as will bring it to a thin consistence. While hot as the horse can bear, fill the bag with it. This



FIG. 254. — Severe strain.

will form a poultice around the part, and keep it moist and sweating. It can be kept hot by pouring on hot water occasionally, and should be renewed, if necessary, in twenty-four hours, and so continued until the inflammation subsides. In all cases of severe sprain, a purgative should be given ; it reduces the fever, and acts as a counter-irritant. In any event give opening, easily digested food.



FIG. 255. — Effect of strain.

Having in this way reduced the inflammation, if the swelling still remains, apply a good strong liniment or blister. The biniodide of mercury ointment is best in these cases, and should be repeated : —

Biniodide of mercury.....	1½ dr.
Lard.....	1 oz.

SPAVIN.

Symptoms. — The first symptom usually shown in spavin is a stiff moving on the toe, which causes a peculiar, quick catching up of the leg, especially in trotting. This varies according to the amount of inflammation and its location, from being scarcely noticeable at first, and passing off entirely after going a little ways, to severe lameness or stiffness of the hock, which greatly improves or disappears when warmed up during a sharp drive of a few miles, but appearing much worse after such a drive when the blood is again cooled.



FIG. 256. — A healthy hock.



FIG. 257. — A jack spavin.

An enlargement usually makes its appearance from the fifth to the sixth week. Any prominence can be seen by

standing in front of the horse about three or four feet from the shoulder, and looking back across the hock, or by standing behind the horse and looking forward across the hock.

Treatment.— If there is heat during the first few days, use cooling applications.

Blistering is adapted for only simple cases. When serious, firing is the most reliable and effectual treatment. In either blistering or firing, the hair should first be clipped from two to



FIG. 258. — Healthy hock.
Dissected.

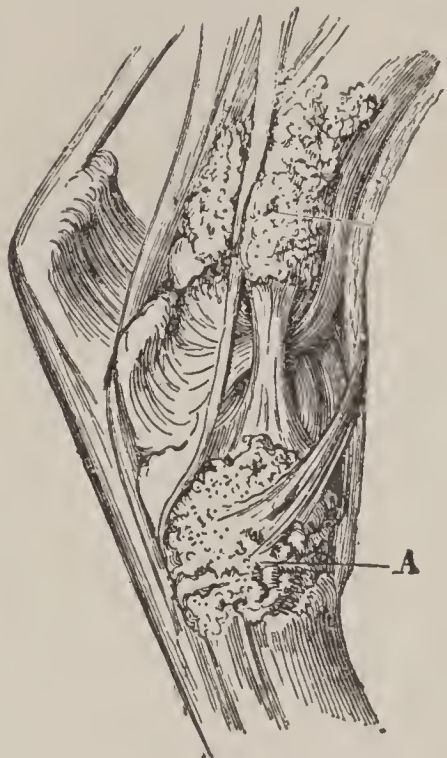


FIG. 259. — A, location of
spavin.

three inches above and below the enlargement. A favorite remedy used by one of the best practitioners in the country is prepared and applied as follows : —

Biniodide of mercury	3 dr.
Iodide of potass	1 dr.
Iodine in crystals, pulverized	1½ dr.
Blue ointment (mercurial)	1 oz.
Lard	1 oz.

Mix, and apply to the seat of the spavin three days. When the parts become sore, omit the treatment for the same length of time ; then apply once in three days for two weeks, after which stop all treatment.

The following will also be found a very good remedy : —

Equal parts of biniodide of mercury and cantharides, and three parts each of tar and lard.

The blister should be thoroughly rubbed on with the hand about ten minutes. Twenty-four hours afterward apply a little vaseline or oil, and repeat night and morning until the action subsides. This will prevent the skin from cracking, as well as lessen the pain. After which, wash with castile soap and warm water. In my large book I give very full details on the treatment of Spavin and Ring-bones, very fully illustrated with method of firing.

RING-BONE.

Treatment. — The same principles must be observed in all these cases. Rest is most essential ; continued cold applications, by making him stand up to the fetlocks in soft clay, with cold water frequently applied, would be the proper treatment until the acute stage has passed ; after which repeated blistering or, if thought necessary, firing, would be advisable. Same as for spavins.



FIG. 260. — Ring-bone as it usually appears

CURB.

This is a swelling upon the back part of the hock about five or six inches from the point (an illustration of which is given in Figs. 261 and 262). If there is heat and tenderness, with more or less lameness, use cooling applications. The quickest way to reduce inflammation of this kind is to direct a stream of cold water against the part for ten or fifteen minutes, and repeat at intervals. It would relieve considerably to raise the heels of the shoe, and when the inflammation subsides, blister repeatedly.

First put on a high-heeled shoe; then take boiling water, and with a sponge have the curb well bathed for about ten minutes. Then apply the following liniment:—

Aqua ammonia	1 oz.
Tinct. of iodine	2 oz.
Glycerine	3 oz.

Apply to the part two or three times a day, until quite sore.



FIG. 261. — An ordinary curb.



FIG. 262. — A very bad curb.

Then stop for a few days, when repeat the medicine as before, and so continue until again sore.

CAPPED HOCK.

This is an injury or bruise at the point of the hock, and is usually caused by striking the parts against some hard object. If the inflammation is acute, use cooling applications. When the inflammation has subsided, use liniments given for “Curb.”



NAVICULAR OR COFFIN-JOINT LAMENESS.

If this is suspected, call in at once, if available, a veterinary surgeon. If none, consult my large book if you can, in which are given very full particulars. This is the most insidious and dangerous lameness we

FIG. 263. — Capped hock.

have to deal with, and must be attended to promptly. In ordinary cases the horse will show no apparent lameness while on a walk; but on a trot may flinch considerably, showing a great tendency to stumble. Driving down hill, or on a rough, cobbly road, will greatly aggravate the lameness, because going down hill increases the force of concussion; and a stony or un-

even road so wrenches and strains the joint, or exposes the frog to such incidental pressure, as greatly to increase the pain and soreness.

Treatment.—The first and most important condition of cure is *rest*; the horse should be at once taken from all work; he must not, as is commonly the case, be allowed to run even in pasture, or anywhere where there would be any freedom to run or walk around much; give him simply the limits of a large, level stall. Remove the shoe by raising the clinches, and pull out the nails one by one; then cut



FIG. 264. — Usual appearance of foot with chronic coffin-joint lameness.

off or hammer down the toe-calk, and partly turn up the toe like the ground surface of an old, worn-out shoe. Next, raise the heel-calks from five eighths to three quarters of an inch, fit the shoe nicely to the foot, and nail on, being careful not to wrench or hammer it unnecessarily in doing so. Two important points are gained by this: First, raising the heels from the ground throws the articulation of the pastern bone well forward upon the pedal bone, relieving pressure of the navicular bone from the tendon supporting it; second, the removal of all pressure of the frog from the ground, which aggravates the inflammation, and rounding the toe, aids mobility, and thereby lessens the strain upon the joint.

If there is much lameness and heat in the foot, provide a tub or box, into which put water as hot as can be borne with the hand, and sufficient to come up even with the ankle, and let the horse stand with the foot in it for about an hour, keeping the temperature up to the point stated. Now take a bag or cloth, into which

put a sufficient quantity of bran to envelop the foot thoroughly, and tie loosely around the foot or ankle; pour on hot water moderately, and then let the horse stand,

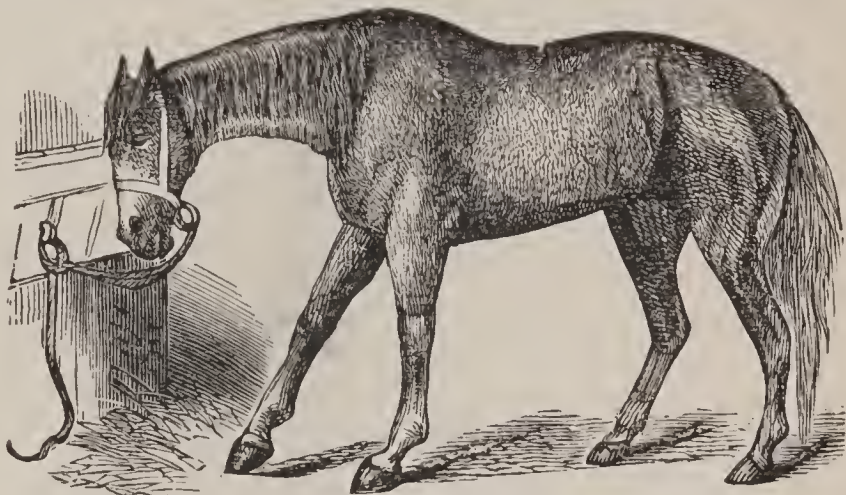


FIG. 265. — As the horse usually stands when lame.

allowing the poultice in the meantime to become cool. If there is much inflammation and lameness, this method of hot fomentation may be repeated two or three times during the day, until all the inflammation subsides.

After the inflammation and lameness have disappeared, put the horse to moderate work. Keep the foot soft, and gradually lower the heels until the adjustment is natural.

FITS, MEGRIMS, OR VERTIGO.

The nature of this disease is but imperfectly determined.

Causes. — It is often connected with worms or other derangements of the stomach or bowels, said also to depend on over-accumulation of blood in the head.

It is most commonly seen in harness horses, usually during hot weather. It occurs generally on a heavy pull going up hill, probably from pressure of the collar interrupting the return of blood from the head; or “the long-continued constraint the *bearing-reins* put the head to” is claimed to be often the exciting cause.

Symptoms. — All at once, when going along the road, he is observed to jerk up his head in a convulsive manner; he seems giddy, reels, staggers, may fall down and lie for a few

moments insensible ; he gets up, looks stupidly about, shakes himself, and proceeds as if nothing had happened.

At other times he merely stops, experiences a few convulsive movements of the head, with slight giddiness, which by letting him stand for a few minutes soon passes off. He is ever after subject to these fits, especially during the hot summer months.

Treatment. — When depending on organic changes in the brain, it is incurable, and he is subject to these attacks from time to time. When a fit comes on on the road, stop him at once ; throw the collar forward off his shoulders, and let him stand ; if convenient, pour a stream of cold water over his head. Bleeding in the mouth has been recommended, but is quite empirical ; it soon passes off. When occurring in a young horse for the first time, he should be well physicked out, and if worms are suspected, treat as recommended for worms. Tonics are often beneficial, especially arsenic given in doses of from three to five grains daily. Megrim subjects are dangerous hacks, and should only be used where they can do no harm to life or property.

INJURY OF THE EYES, INFLAMMATION OF THE EYES, OR OPHTHALMIA.

This is inflammation of the conjunctival membrane covering the eye. It may be produced by many different causes ; the most common is from the introduction of a foreign substance into the eye, as a hay seed or chaff pickle becoming lodged in the external covering (cornea), or by direct injury to the eyes, as from the blow of a whip, or something of the kind. When from a blow or direct cause of injury, but one eye will be affected, while if from cold, etc., both eyes will be involved. It is also caused by allowing horses to stand in foul stables, especially in the summer months, whereby ammoniacal gases are generated, proving very injurious to the eyesight. It proceeds from exposure to cold, and is often an accompaniment of catarrh.

Symptoms. — The eyes are weak ; the conjunctiva, or inner lining of the lids, inflamed ; water running from the eyes ; the

lids partly, if not wholly closed, according to the severity of the case. Bluish or white film, the result of inflammation, comes over the cornea, extending no deeper than the surface, and may vary from slight cloudiness to entire opacity.

Treatment.
—If there is any foreign matter in the eye, remove it promptly, which can be done either by means of a feather or a pair of forceps.

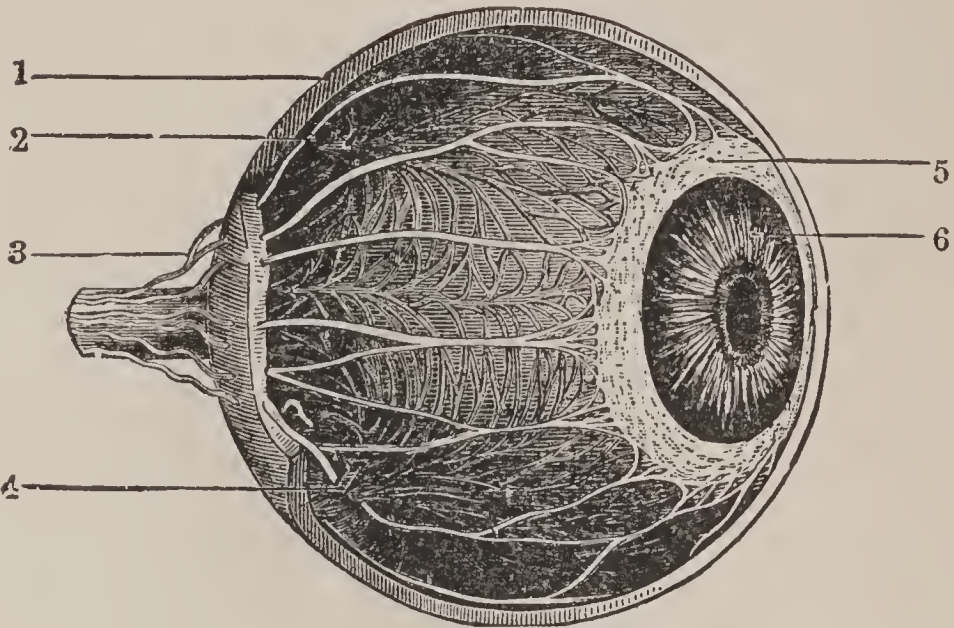


Fig. 266. — 1. Sclerotic coat; 2, 4. Veins of the choroid; 3. Ciliary nerves; 5. Ciliary ligament; 6. Iris.

The eye should be fomented with tepid or warm water, and the horse kept in a darkened stable or loose box; next, the eye may be kept constantly moist by means of a sponge or cloth wet with tepid or cold water, and applied over the eye; or bet-

ter, Goulard's extract, used in the proportion of 1 drachm to a pint of water. If accompanied by great pain, the following lotion should be applied around the eye several times a day :—

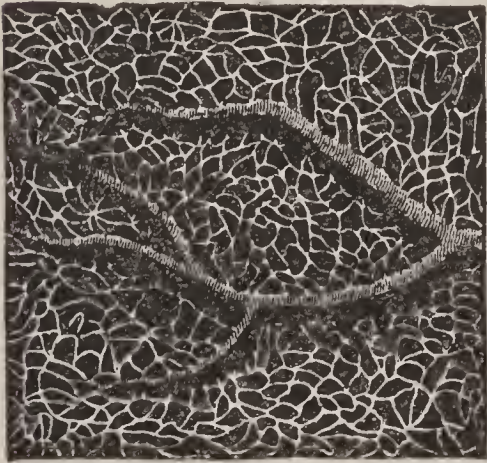


FIG. 267. — Capillaries of the vascular layer of the retina.

Watery infusion of opium.. 1 oz.
Goulard's extract 4 oz.
Water 12 oz.

When the cloudiness or opacity of the cornea is tardy in being removed, the eye should be stimulated daily with the following collyrium :—

Nitrate of silver..... 5 gr.
Distilled water..... 1 oz.

Apply by means of a feather or camel's-hair brush.

If he must be used or kept in the sunlight, the eye should be kept covered with a blue cloth tied loosely over it. It is very important to attend to any such form of local inflammation



FIG. 268. — Physiological papillæ, as seen with the ophthalmoscope.

promptly; not only treating properly, but, if possible, taking him from all work, since, if neglected, or the inflammation is aggravated by heating the blood, the sight is liable to be destroyed, or run into periodic ophthalmia.

The following simple treatment, employed by a very successful practitioner, has by special

request been written out for the author's use : —

When the lids are swollen and not due to any disease, such as pink-eye, etc., but to a cold, and injuries of numerous descriptions, the eye should first be bathed with hot salt water for a few minutes; then turn the lower lid down, and drop on the lid and eye-ball, with an eye-dropper, the following collyrium : —

Sulphate of atropa.....	10 gr.
Sulphate of zinc	1 dr.
Aqua rosæ.....	6 oz.

Drop on the diseased eye 10 to 15 drops two to three times a day. This remedy is a certain cure in most all eye troubles.

In diseases of the eye due to liver complaint, first give a strong cathartic combined with 1 to 2 drachms of calomel, and treat the eye as above.

From other causes, the nature of which is not clearly known, *inflammation of the eye* is produced, which goes and comes after a time, the attack be-



FIG. 269. — Excellent eye covering.

ing gradually more severe, and the intervals between the attacks shorter, until the inflammation extends to the internal part of the eye, the lens becomes opaque, *cataract* ensues, and the horse is incurably blind. This trouble is often constitutional. This is called periodic ophthalmia, and must be treated as any other inflammation.

BOTS.

A leading author says: "They are generally attached to the cuticular or insensible coat of the stomach; but sometimes clusters of them are found at the pylorus, and even in the be-

ginning of the first intestine, named the duodenum. In one case they were so numerous in this last situation as to obstruct the passage completely, and cause the animal's death."

Another says: "When very numerous, and above all when attached to the highly sensitive right half of



FIG. 270. — Gadfly depositing eggs, and full-grown bots.

the stomach or the duodenum, they seriously interfere with digestion, causing the animal to thrive badly, to be weak, and easily sweated or fatigued, and even determining sudden and fatal indigestion. This last result is especially liable to occur in spring or early summer, when the bots are passing out in great numbers, and hooking themselves at intervals to the coats of the sensitive bowels in their course. They will sometimes accumulate in such numbers as actually to block the passage."

Treatment. — This is doubtful. I give that which has been advised as the most effectual. Leading authorities give the following remedies: —

The most likely means of expelling bots is to keep the horse without food during the night, and give him in the morning a quart of new milk sweetened with honey ; and about ten minutes after, give four, five, or six ounces of salt in a quart of water.

Common oil given in large quantities has sometimes succeeded in detaching bots from the stomach. It is the only medicine that seems to have any effect in making them loosen their hold on that organ.

The continued use of salt mixed with the food appears to be obnoxious to them ; for sometimes under its use their hold gives way, and they are ejected.

WORMS.

Worms are most commonly found in the stomach and bowels ; they are also sometimes met with in almost every part of the body. An old author says : “I have found worms in the wind-pipe, in the mesenteric artery, in an abscess in the substance of the abdominal muscles, and according to Lafosse, they have been found also in the pancreatic and salivary ducts.”

Symptoms of worms are debility, feebleness, sluggish movements, emaciation, staring coat, hide bound, skin covered with blotches, irregular and capricious appetite, tucked-up belly, pallid appearance of the lining membrane of the lip, badly digested feces ; rubs the tail, and when fundement worms exist, a whitish substance will be found about the fundement. Many horses have worms, and their presence is never suspected till they appear in the dung. Troublesome diarrhea is sometimes produced by the presence of ascarides in the cæcum, which are sometimes found in vast numbers in the rectum.



FIG. 271. — *Ascaris marginata*, enlarged.

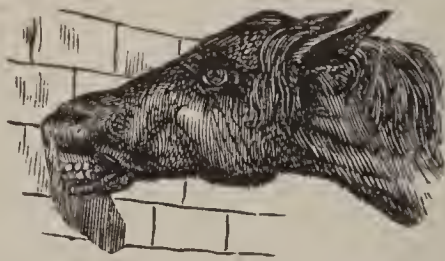


FIG. 272. — Sign of worms.

Treatment. — First, give bran mash. In 24 hours give one drachm of santonine, which should be dissolved in water; then mix in a quart of starch, and give as a drench; in thirty minutes give aloes in solution sufficient to move the bowels promptly.

Prof. Gamgee's favorite remedy: —

Asafetida 2 dr.
Calomel and savin... $1\frac{1}{2}$ dr. each.
Oil of male fern..... 30 drops.

Mass sufficient to form a ball to be given at night, and a purge in the morning.

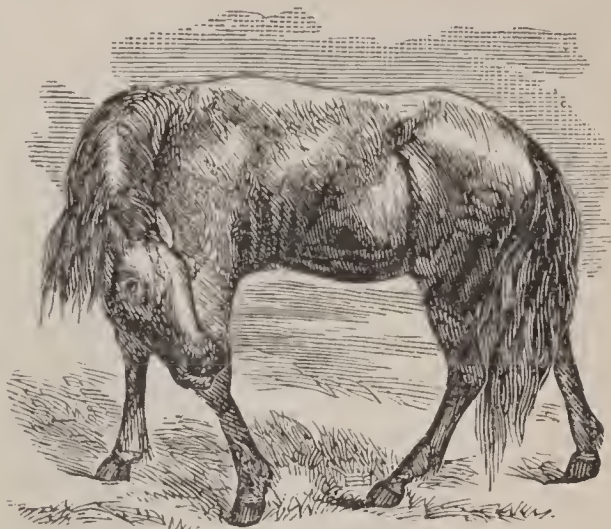


FIG. 273. — Appearance of horse troubled with worms.

A run at grass in the spring is perhaps the best remedy of all; for it is the most effectual means of invigorating the digestive organs and purifying the blood. When it is not convenient to turn the horse out, he should be fed green grass in the stable.

SUPERPURATION, DIARRHEA, ETC.

Causes. — An over-relaxed state of the bowels may arise from various causes. In some animals it is favored by peculiarities of conformation, as is seen in *washy* horses, animals with long legs, open ribs, and flat sides, with tucked-up bellies, such being liable to purge from the simplest cause.

The incautious use of purgative medicines is a common cause of superpurgation. It often occurs in the latter stages of debilitating diseases, when it is always an untoward symptom, betokening a breaking-up of the vital powers. The presence of little white worms (*ascarides*) is occasionally the cause. It sometimes follows the drinking of cold water when an animal is in a heated state.

Treatment. — Great care must be exercised in feeding and watering washy horses, dry feed being best suited to them. They should not be allowed to drink too freely of water,

especially before work. In many cases it may be necessary to give them some starch or chalk mixed up in the feed.

If some irritant be suspected, nature must be assisted in her efforts, by giving a quart of linseed or castor oil, followed up by starch or well-boiled flour gruel, keeping the animal warm. If worms are suspected, or seen in the dung, one or two ounces of spirits of turpentine, or any of the vermifuges recommended, should be added to the oil. Should it not yield to this, neutralize the acids in the bowels by giving an ounce and a half of prepared chalk and a dram and a half of powdered catechu, mixed in a pint of water. Give once or twice a day until purging ceases. Keep the animal without exercise, and do not give much water to drink.

If the disease should arise from nervous excitement, give a drachm of powdered opium in the food once a day for three or four days. Or give the following astringent drench : —

Powdered opium.....	1 dr.
Prepared chalk.....	4 oz.
Gum acacia.....	1 oz.

Dissolve in warm water, and give in well-boiled flour or starch gruel. It may be given two or three times a day, the gruel being given frequently. If very severe, injections of solution of catechu and starch, with a little tincture of opium, should be given.

See Cuts and Wounds, p. 264, where is given a new method of treating cuts and ulcers, making the cure simple and easy. In ulcers where pipes are formed, the principle is to open to the bottom of the burrowing matter, and then dress as directed, once or twice a day, when they will heal the same as any simple wound.

FISTULA OF THE WITHERS AND POLL-EVIL.

Fistula of the withers is caused by an injury to, or bruising the top of, the first vertebra of the neck, or the ligament covering it. At first there is simply inflammation, with some swelling, making the part very tender and sore ; if this is not arrested or dispersed, matter will form and penetrate in different directions around and between the dorsal vertebra, and under the shoulder blade, before it comes to the surface.

Consequently the fistula may extend to both sides, and if neglected, may seriously involve the bones, in which case the cure will be proportionately more difficult.

At its early stage, when there is simply inflammation and soreness, cooling applications, such as pouring cold water upon it, or directing a small stream from a hose against it, and repeating, is good; or apply hot fomentations until relieved, after which lay on a few thicknesses of cloth and keep the part wet by the following lotion:—

Saltpeter.....	4 oz.
Sugar of lead.....	1 oz.
Muriate of ammonia.....	1 oz.
Common salt.....	1 pt.
Cold water	2 gal.



FIG. 274. — Showing seton.



FIG. 275. — Fistula of the withers showing seton.

If, however, matter forms, the sooner the abscess is opened the better. When this is done, the extent of the injury, or the sinus, if any has formed, must be carefully ascertained with a probe, or by introducing the finger. If this cannot be done to advantage, then the pipes must be destroyed by the introduction of the caustic tents; then a depending opening for the matter to run off must be made by passing

a seton from the bottom outward, and sponge or syringe it out once a day with a strong suds of warm water and castile soap. It must be borne in mind that if allowed to heal over while pus

or any unhealthy matter remains at the bottom, matter will continue to form, and finally break out anew, making, if anything, a more complicated condition of ulcer. The point is to see that all foreign matter, sinuses, or unhealthy bone, are thoroughly removed.

I will include here a remedy which is claimed to be very effectual in the cure of poll-evil, fistula of the withers, etc. Burn corn-cobs, and fill the cavity to the bottom with the ashes. It may be necessary to repeat two or three times before a cure is effected. The ease with which this can be applied, makes it worthy of trial.

This remedy was used as a great secret, and has been used with decided success. The recipe cost me \$5.00. One case in particular which was cured by it, had run two years, and had been doctored at considerable expense without doing any good. Three applications of the cob ashes cured it. The principle of treating poll-evil is the same as fistula of the withers.

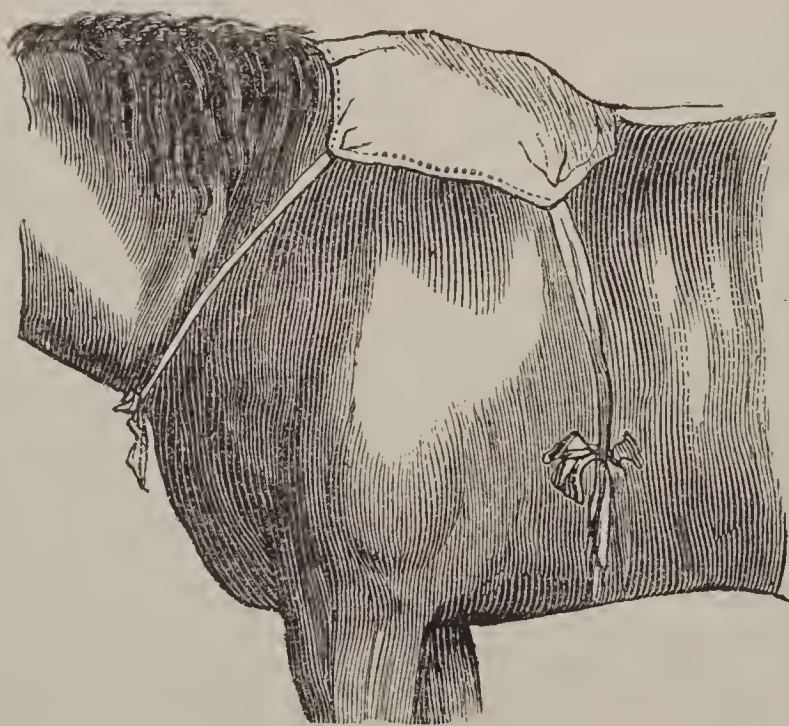


FIG. 276. — Good method of covering the parts.

CHAPTER XV.

DISEASES.—CONTINUED.

FOR SCRATCHES AND CRACKED HEELS.

THE following remedy of great value is given by one of the leading veterinary surgeons in the United States :—

Oxide of zinc.....	1 dr.
Veterinary cosmoline.....	1 oz.
Powdered gum benzoin.....	10 gr.
Camphorated spirits.....	1 dr.

Mix thoroughly.

The mode of application is a matter for attention. It should be gently rubbed upon the cracks with the finger, so as to distribute it in a moderately thick layer over the whole of the affected part, and to insinuate it as much as possible under any crusts that may be formed in the disease. Once properly applied, it will prevent further crust from collecting, while it serves the several purposes of a new cuticle to the abraded skin, a water-dressing, and a barrier to the oxidizing action always present in inflammation. The heels must not be washed after the application of the ointment; they may be wiped with a soft napkin as much as may seem necessary, but when the ointment is once applied, it should not be removed by washing without good reason.

Or the following liniment may be successfully applied :—

Goulard's extract	2 parts.
English glycerine.....	2 parts.
Skunk oil.....	2 parts.
Liquor ammonia.....	$\frac{1}{2}$ part.

Mix.

Agitate before using, and apply with a soft brush twice a day.

See “hoof ointment” given below.

HOOF OINTMENT.

This is one of the best remedies for scratches and skin diseases. Used by Joseph Gamgee, V. S., formerly professor

in the new Veterinary College, Edinburgh, Scotland, over forty years. It is also used as a remedy of great value for skin diseases; referred to particularly in "Scratches and Cracked Heels."

As a preventive of the injurious effects resulting from changes from humidity to dryness, and *vice versa*, I have used a hoof ointment which I have found an admirable adjunct to all other good management.

When I began to see that humidity impaired the texture of the hoof, I had recourse to oil, lard, or tallow, with the view to exclude moisture; but my experiments were attended with questionable effect, except in the case of mutton tallow, which, during wet weather, I found beneficial.

The following is the formula, as improved:—

Resin	2 parts.
Mutton tallow	2 parts.
Barbadoes tar	2 parts.
Yellow wax	1 part.
Castor-oil	1 part.

This ointment is a perfect anti-septic, and as soon as it is applied to horses' feet having bad thrushes, the offensive odor ceases.

The ointment should be applied after the feet are washed clean and become dry, and is most effectually applied by rubbing in with the hand.

Take a piece the size of a walnut, press it on the sole at the point of



FIG. 277. — Bad case of scratches.

the frog, then into the commissures; and lastly, rub it well into the sole and frog, and then extend it over the wall and round the coronet, using as much as may be sufficient to cover these parts effectively. It may be repeated about every fourth day; and the evening, after work, is the best time; or once a week will suffice to keep the feet in good condition under ordinary work.

Skin Diseases. — Though I have called the preparation a hoof ointment, it is as effectual for the cure of many of the most troublesome skin diseases as it is good for the preservation of the feet. The breaking out of blotches and *cracks of the heels*, to which horses are so liable in winter, after the very objectionable practice of clipping and trimming, is cured by nothing so readily as by this ointment, well rubbed in, after the parts have been thoroughly washed with warm water and soap. In the same way as directed for horses' hoofs, the ointment is good for the feet of cattle, sheep, and sporting dogs.

GREASE.

This may be considered as an aggravated condition of scratches, and is induced by the same general causes. In the early stage, it consists in inflammation of the sweat glands, followed by an offensive, white, oily discharge from the heels. The acrid character of the discharge often causes large portions of the skin to slough away, leaving ugly sores behind.

The following lotion may be applied daily, which, in mild cases, will generally suffice:—

Chloride of zinc..... 30 gr.
Water 1 pt.

In cases of long standing, the hair must be cut off, and the parts softened with linseed-meal poultices; to which may be added charcoal, yeast, or bleaching powder. After removing the poultices, dust the parts over with oxide-of-zinc powder, or apply the following ointment every morning, to be washed off at night:—

Acetate of lead..... 1 scr.
Soft soap..... 4 dr.
Lard..... 4 dr.

As in other skin diseases, small doses of Fowler's solution of arsenic are generally attended with beneficial results.

MANGE, HEN LICE, ETC.,

is another eruptive disease, and is very contagious. It is caused by the repeated attacks of minute insects which burrow into the skin; these insects are called *acari*, and can be easily seen by means of a magnifying glass.

Generally, the first symptom observed is the animal's rubbing his head and neck against the stall or manger; small



FIG. 278. — Bad condition of grease.

pimples appear, and the hair falls off ; the skin is dry and hard, and upon the hardened patches may be seen small red spots. A horse affected with mange is kept in a constant state of irri-



FIG. 279. — A test for mange.

tation, which soon reduces him in flesh.

Treatment. — He should be separated from other animals, and thoroughly washed with soap and

water every second or third day ; afterward dressed with the following application : —

Linseed-oil	4 oz.
Oil of tar	4 oz.
Sulphur.....	3 oz.

Mix and rub well into the affected parts.

All clothing, harness, etc., which have been used on a horse affected with mange, should be thoroughly cleansed before they are used again. The only means of preventing this disease is to keep both animal and stable in a cleanly condition.

The following is highly recommended by a very successful veterinary surgeon : —

Take the horse in the sun, and scrub him thoroughly all over with castile soap and water ; then wash him well from head to tail with gas water, in which put 2 drachms white hellebore to the gallon. He must now be put in another stall, distant from the one in which he has been standing. Thus treated, it rarely requires more than one washing to effect a permanent cure. The harness should be thoroughly scrubbed, and put away for six or eight weeks. These precautions are necessary to success in this otherwise troublesome disease.

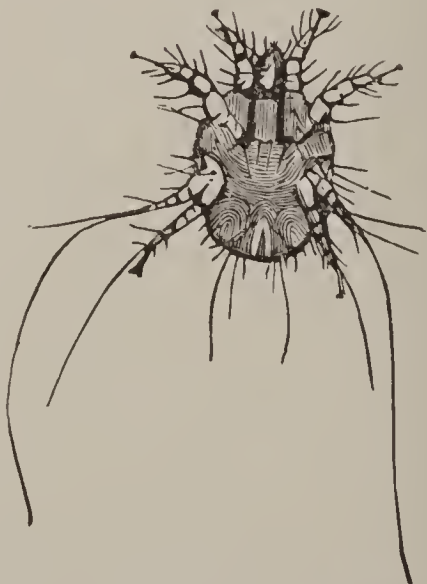


FIG. 280. — Mange parasites.

It is not known to many that hen lice and common human body lice grow on horses with great rapidity. Hen lice espe-



FIG. 281. — Hen lice.

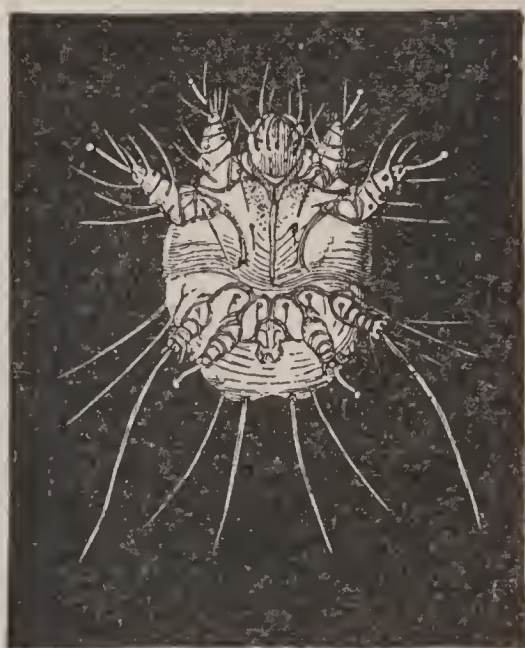


FIG. 282. — Mange parasite.

cially are sometimes very troublesome. There is irresistible itching, sometimes the horse acting half frantic in his efforts to relieve himself by scratching, biting, striking with his hind feet, and stamping. This trouble is to be particularly looked for where hens have access to, or roost in, the stable. Hens should never be kept near a horse stable, nor allowed to roost in it. Wash the horse with a decoction of tobacco or staphysgia; white-wash the stable, and observe cleanliness.

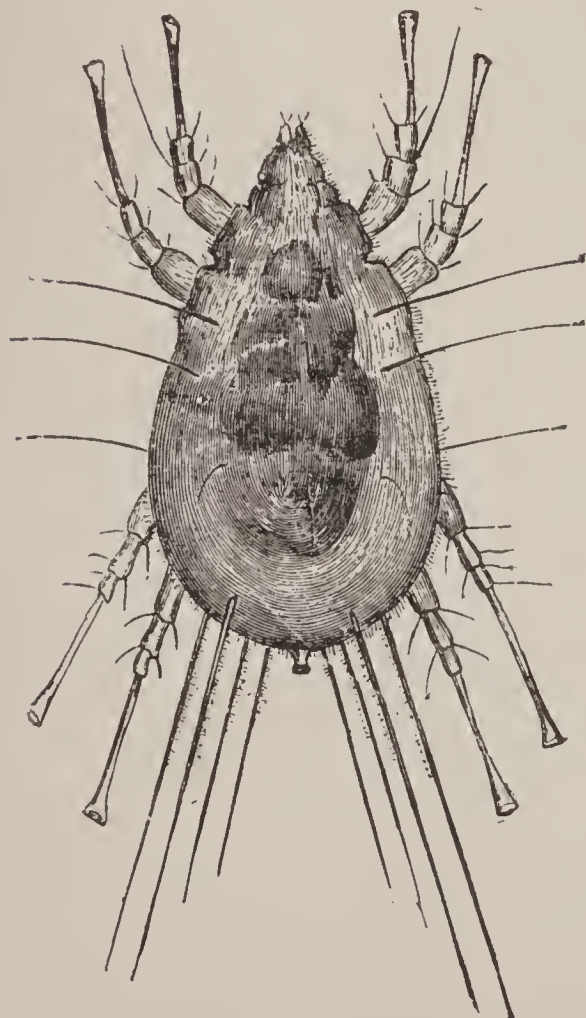


FIG. 283. — Parasite largely magnified.

An ounce of arsenic to a pail of soft water, with which to wash the horse thoroughly in a warm place, is claimed to be a sure remedy for destroying either kind of lice. — *Summerville*.

CUTS AND WOUNDS.

NEW METHOD OF TREATMENT.

The discovery has been recently made that by using a preparation of one part of corrosive sublimate (bichloride of mercury) to two or three thousand parts of water, and cleansing out the part with it, covering it over with cotton thoroughly saturated with the solution, a wound will heal by first intention without any inflammation, all ordinary cases requiring no further dressing. This is one of the most important discoveries ever made in the treatment of surgical cases.

In the sanitarium where the author makes his home, the surgeons, who use this treatment, have no inflammation or

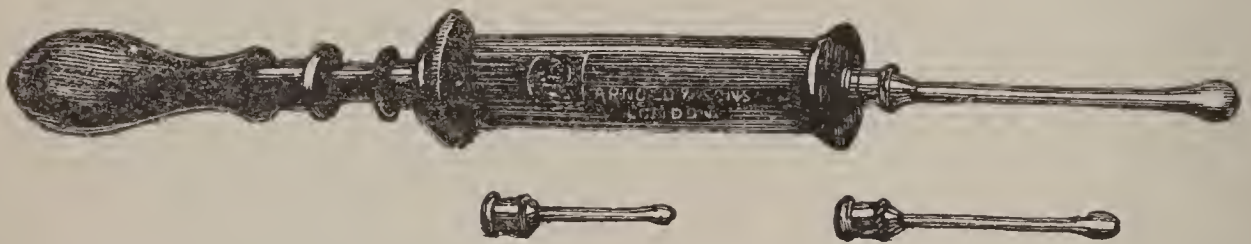


FIG. 284. — Syringe for washing out wounds.

trouble in even the most serious cases, unless through some neglect or accident on the part of the surgeon or nurse. They are, in the first place, very careful to have all the instruments cleansed with five per cent solution of carbolic acid, and everything else in connection with the operation thoroughly cleansed with the bichloride solution, the wound thoroughly dressed with it, and then carefully protected from the air; and there is always healing in a few days without inflammation, no matter forming at all. The secret is that all wounds exposed to the air have myriads of germs formed in them; these set up irritation, and hence the trouble with inflammation and suppuration. This preparation destroys all germs instantly, and hence its value. I would call your particular attention to the value of this. Bathe all wounds thoroughly with it; keep from the air, and let the part alone afterward, unless the dressing is removed, or the wound is exposed to the open air. If necessary to open

the wound in the future, repeat the process of cleansing, as before described.

In case of an abscess formed under the skin (all deep-seated abscesses), it should be thoroughly opened, and the wound douched with the corrosive sublimate solution once or twice daily, taking care that all the solution is removed from the wound or abscess. If the corrosive sublimate is not at hand, boil water, in order to kill all the germs in it, and douch with this; but the solution is indispensable.



FIG. 285. — Severely lacerated wound.

In large wounds, it is best to have a piece of thin white muslin saturated with the solution and laid on; over this put a layer of cotton also wet with it; the cloth will not irritate the wound as much as cotton, and a layer of cotton has been found the best to keep out the germs.

It is very important to have the hair around the edge of the wound clipped or shaved closely, as the cotton must lie close to the skin to exclude the air and germs. No adhesive plaster can be used under this dressing; the parts must be drawn together with stitches, if anything.

In addition, I include the regular treatment for wounds and injuries; but the treatment above referred to is by far the simplest and best.

DETAILS OF REGULAR TREATMENT.

In ordinary cases, clip the hair from the edges of the wound, remove any hair or dirt from it by sponging the part with warm water, and dress it with any of the healing preparations or digestives hereafter given, which will cause a secretion of yellow matter, and a healthy granulating process. Each day following, cleanse the wound by sponging out with a lather made of cas-



FIG. 286. — An incised wound.

tile soap and warm water, and repeat the application of the medicine.

In a very serious, deep, or contused wound, if any large blood vessels are severed, they should be tied up. Arteries will throw the blood out in jets, and veins in a steady stream. If an artery is cut, it must be stopped promptly; if it cannot be tied up, it can usually be stopped by touching it with a hot iron, or applying any good styptic. Covering over with cobwebs will usually answer a good purpose. Clip the hair from the edges, also any bits of loose skin which would be liable to slough off; but it is always advisable to save every bit of skin that can be kept alive; the part to be sponged out daily, and the dressing repeated. The injury will heal from the bottom, gradually filling up. If there is serious inflammation, swelling, and pain, poultice; but if poultices cannot be used to advantage, or if pain and swelling are very severe,



FIG. 287. — Small suture needles.

hot fomentations must be applied, and continued without intermission until the inflammation subsides; then dress daily as directed. Care must also be taken to keep the horse

quiet in a comfortable stall, free from the annoyance of flies, and fed with easily digested, laxative food; if there is much tendency to fever, give a small dose of physic.

In case there is too rapid granulation, or proud flesh, check it by touching with a little caustic. If a wound is indolent, or does not seem to granulate, simply use a stronger stimulant; if serious, use a caustic, which will remove the unhealthy parts, and set up a healthy condition of granulation. A very good simple stimulant to rouse an indolent ulcer to action, is an ounce of blue vitriol, pulverized, to a pint of water; and for a simple healing preparation, use two drachms to a pint of water; to be used as a dressing once a day. If the wound is deep, so as to make a pouch of accumulated matter, it must be syringed out from the bottom every day; or better, a dependent opening should be made from the bottom, and kept

open by a piece of tape or string passed through it, to let the matter pass off.

In any case of sinuses being formed, they must be opened up to the bottom, and made a simple wound, when it is to be treated as for a wound.

If there is an injury to the bone, ligament, or tendon, and it is not treated properly, a small sinus is formed, from which matter will ooze. In such a case, a probe must be introduced, and its extent ascertained; if the sinus extends to the bone, which can be known by the probe striking it, a free opening should be made to the bottom,—if the situation will admit, the diseased surface should be scraped off,—when it can be treated as before explained, or by the use of Friar's balsam,

etc. (See "Friar's Balsam.") If all dead matter is not removed, sinuses are almost sure to form again after the wound is healed, when the whole treatment must be repeated.

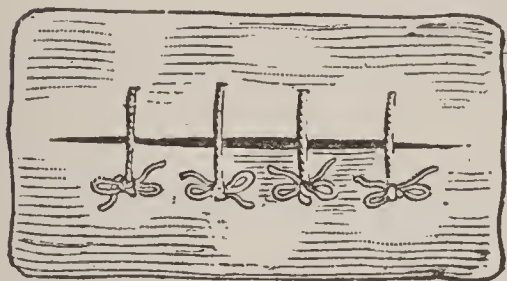


FIG. 288.

If clean cut, or the wound is of a character that will permit the edges being brought together, as in cases where the skin is widely separated, the point is, after sponging out the part so as to remove any foreign matter, to bring the edges together, and hold them in apposition, if it can be done without the skin sloughing, until healing by first intention takes place; but this can seldom be accomplished, excepting to a partial degree, in the horse, on account of the amount of muscular action of the skin; but in many cases it must be resorted to, and will enable holding the edges together sufficiently long to allow the wound to heal without leaving much of a scar.

The stitches, which should be from three quarters to an inch apart, can be made by means of a curved, flat needle, with silk or linen well waxed.

The following for this purpose, obtained from one of the best practitioners in the country, is included:—

In wounds where the muscles are badly contused and lacerated, the following wash has taken the precedence above all other remedies, and by far supersedes carbolic acid. It acts as an antiseptic, and prevents ex-

cessive granulation. Take 1 oz. white vitriol, or sulphate of lime, to 16 oz. water. Syringe the parts out well with the lotion, after being well cleansed, twice a day. By taking 1 oz. of white vitriol to 4 oz. of water, and penciling on the parts with a camel's-hair brush two or three times a day, it will cut down the excessive granulations commonly called "proud flesh."

For a healing or digestive ointment, the following is unrivaled, and is alone worth the cost of this book:—

Palm-oil	2½ lbs.
Lard.....	2 lbs.
Gum turpentine.....	½ lb.
Bees-wax	¼ lb.
Calamine.....	1 lb.

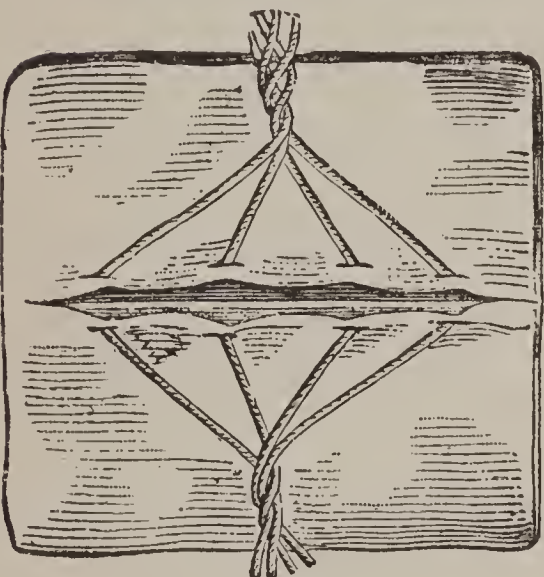


FIG. 289.

Simmer all together over a slow fire, and it will be fit for use. Put a little in the wound once a day. Wash the wound with warm water and castile soap before applying the ointment.

The following is also a fine healing preparation, good for old sores or injuries in the feet, etc. :—

Tincture of myrrh.	1 oz.
Tincture of aloes.	2 oz.
Water	1 pt.

To be applied once a day.

Magic healing powder :—

Burnt alum.....	½ oz.
Prepared chalk.....	1 oz.
Pulverized gum camphor.....	1 dr.
Calamine, pulverized	2 dr.

Mix, sprinkle on the sore.

When a wound will not heal, or there is not skin enough to cover it, dust on a little of this powder, and it will cicatrize it quickly. It is good for galls, saddle wounds, or other parts where the skin is thin or broken, providing there is no inflammation and condition requiring healing astringents. This is the original recipe for the famous magic healing powder, and

has often been sold as a great secret, for from ten to twenty-five dollars.

A great deal is claimed for the following ointment. It has been in use in the British army, and by British farriers with decided success : —

Mutton tallow	2 parts.
White resin.....	2 parts.
Barbadoes tar.....	2 parts.
Yellow bees-wax.....	1 part.
Castor-oil	1 part.

Melt the resin and the bees-wax together, then add the tallow. When melted, add the tar and castor-oil ; then remove from the fire and stir until cold.

This ointment is used for diseased conditions of the feet, for the cure of troublesome skin diseases, and blotches and cracks of the heels, to which so many horses are liable in winter.

INJURIES TO THE TONGUE.

If not too much lacerated, the divided edges should be brought together by the metallic suture, and dressed frequently with the following lotion : —

Alum	1 oz.
Borax	1½ oz.
Honey.....	1 oz.
Water	1 qt.

If it is nearly cut across, it may be necessary to remove it, and tie the blood-vessels, and dress frequently with the above lotion.

LYMPHANGITIS, WEED, OR MONDAY MORNING LEG.

This disease is attributed to high feeding and insufficient exercise, generally in working-horses. Those having worked steadily are kept standing in the stable for a few days, given all they can eat, when, on a morning, the animal will be found lame. This usually occurs in dray horses. The owner comes in late Saturday night, and feeds ; on Sunday he gives an extra allowance, enough to last all day ; the horse eats all. Perhaps the owner does not come again until the following day, when

he finds his horse is unable to back out of the stall. For this reason the disease is called by some Monday morning leg. It usually affects one of the hind legs, and is an inflammation of the lymphatics. The left leg is usually affected.

The leg is swollen, is favored and held from the ground; the swelling extends on the inner side from the foot up to the body. There is heat, and great tenderness to the touch. Horses that have once been attacked by lymphangitis are liable to a recurrence time after time, until the limb assumes permanently an enlarged condition.

Treatment. — Clothe the animal warmly, and give a moderate purge, and bathe the affected limb with very hot salt water three or four times a day. After each bathing, apply the following lotion :—

Tincture of arnica.....	2 oz.
Water.	1 pt.

Feed no oats or stimulating food, simply bran mashes, to which add plenty of salt; after the third or fourth day feed one of the following powders morning and night :—

Iodine of potass.....	2 oz.
Bicarbonate of potass.....	1½ oz.
Powdered gentian root.....	3 oz.

Mix, and make into 10 powders.

In 8 to 10 days, when the symptoms have disappeared, if any swelling remains, there being no pain, apply for a few times an ointment.

Mercurial ointment.....	2 oz.
Iodine ointment.....	1½ oz.
Vaseline.....	4 oz.

Make into a salve.

THRUSH.

Copying the language of a standard authority, “Thrush is inflammation of the lower structure of the sensitive frog, during which pus is secreted with or instead of horn.”

Symptoms. — There is seldom much lameness, unless the animal steps on a stone, or sand or gravel gets into the cleft. The cleft of the frog is deeper than in health, and a thin, acrid

discharge oozes from its sides and bottom, emitting a fetid odor. If not checked, it extends, and the frog becomes loose and ragged; scales fall off in layers, exposing the sensitive parts, which are tender and contracted. If neglected, the entire foot may be involved, and it may degenerate into canker.

Treatment. — No time should be lost, and no case, however slight, should be neglected. The foot must be thoroughly cleaned, and all loose, detached parts freely removed. The secreting surface should be exposed, and calomel dusted on, and pressed with a spatula or thin slip of wood into every crevice. Keep the foot thoroughly dry, and more than one or two dressings will seldom be required. Sometimes it readily yields to cleanliness and simple dressings, with *hot tar* placed in the cleft with tow, and retained with cross slips, or applications of *sugar of lead* or *sulphate of zinc*. Or, after the parts have been washed, and the diseased part removed as directed, apply powdered *sulphate of copper* to the parts, and fill up all parts with cotton packed in so as to keep out all dirt. If necessary, this should be repeated in a few days.

It is generally advisable to give some opening medicine, and attend to the general health and exercise.

WIND GALLS.

Wind-galls generally appear suddenly.

Treatment. — There are three methods of treatment: First, during the acute stage they can be easily removed by any firm but even pressure by pads and bandages, with cold water frequently applied.

Second, when it has been long neglected, or the case is complicated, counter-irritation or any good, stimulating liniment or light blister may be used. The biniodide of mercury oint-



FIG. 290. — Showing two enlargements.



FIG. 291. — Clearly marked condition of wind gall.

ment may be well rubbed in several times, or a cantharides blister may be used.

Third, letting the synovial fluid out. This is done with an instrument called "the aspirator," which is a bottle attached to a small suction pump, or more properly, a syringe attached to a bottle, and worked so as to draw out the fluid. The method of operating is as follows: Force the needle of the aspirator into the wind-gall, and draw off the fluid. When it is all drawn, inject a little of the following solution into the part:—

Tinct. iodine	$\frac{1}{2}$ oz.
Iodide of potassium	20 gr.
Water	3 oz.

Bandage well, and keep the parts wet with cold water, the bandage to remain on from three to five days. This produces

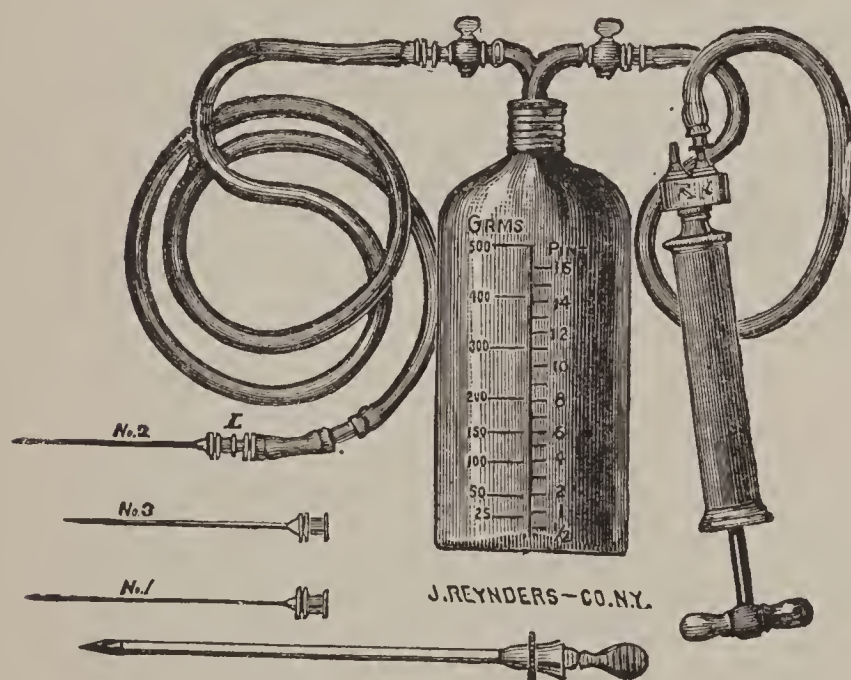


FIG. 292. — The aspirator.

an adhesive inflammation of the part. This treatment can be used with safety in all cases where there is enlargement of the sheaths of the tendons. It cannot be safely used in what is called a blood spavin, because there is danger of puncturing the vein, and, too,

it may extend into the true hock joint, which would induce so much inflammation as to produce a stiff joint or even suppuration of the coverings of the bone, which would finally destroy life. The hypodermic syringe may be used.

SADDLE AND COLLAR GALLS,

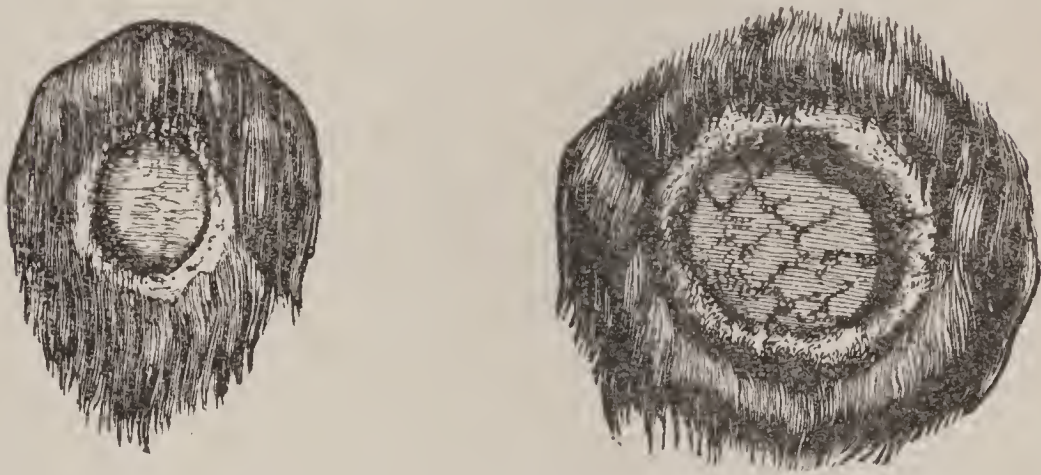
a very common occurrence among horses, are caused by uneven pressure of the saddle or collar; the skin becomes excoriated, and the hair falls off. Large inflammatory swell-

ings appear, which may form into abscesses, or the skin may become indurated and thickened.

Treatment. — The parts should be fomented with warm water, and some simple or cooling lotion applied; as, —

Acetate of lead.....	1 oz.
Water	1 pt.

If abscesses form, they must be freely opened, and well



FIGS. 293, 294. — Sitfasts. Result of saddle and collar galls.

fomented or poulticed. When the skin becomes indurated, forming what are called sitfasts, they must be dissected out.

The following is an excellent healing lotion for saddle or collar galls : —

Sulphate copper.....	1½ oz.
Sulphate zinc	1 oz.
Sugar of lead.....	1½ oz.

Put in three pints of water. Swab on the parts two or three times a day. Reduces inflammation, and sets up healing granulation of parts.

SWEENY.

The simplest and most effective treatment for filling up the shoulder is the rubbing on thoroughly with the hand of soft soap, to which a little salt has been added. This do four or five times in the course of a week. This simple remedy, which is very effectual for this purpose, has been kept as a great secret by a leading horseman in Toledo, Ohio, who has re-

peatedly sold it for five dollars, first showing its effect in filling up the shoulder, when he could easily sell the prescription.

COUNTER-IRRITANTS.

THEIR USES, HOW TO EMPLOY THEM, ETC.

In all painful affections, hot water fomentations or poultices must be used. In the course of some days, however, if the pain is subsiding, and the parts seemingly relaxed, much benefit

will be obtained by making a change to cold, mild astringents and bandages, to promote absorption of the exude.

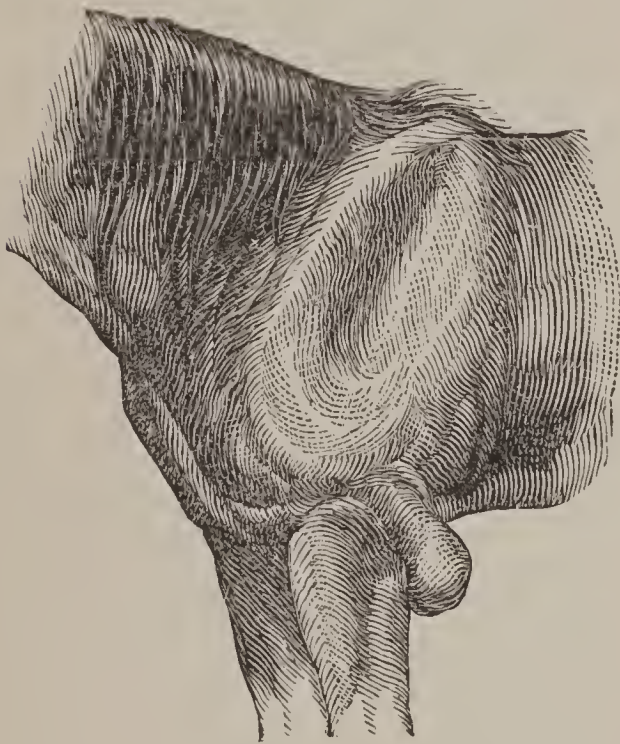


FIG. 295. — Ideal representation of shoulder with sweeny.

After the acute signs of inflammation have subsided, if the lameness still remains, the application of the so-called counter-irritants will be rendered necessary. These consist of rubefacients, blisters, setons, and the actual cautery.

Rubefacients may be employed in the less severe forms of lameness, in sprains of tendons, or in slight affections of joints, along with rest and fomentations, after the more acute symptoms have passed away.

It is usual to apply blisters in all cases of some standing, when organic changes in the parts involved are suspected. Before a blister is applied, the hair should be clipped from the part, which, if dirty, ought to be washed, and when dry, the blister applied with smart friction for about ten minutes. To obtain the full effect of a blister, a quantity of ointment is to be thickly laid on after the rubbing in is completed.

The best agent is cantharides, in the form of acetate, tincture, or ointment, to the limbs, the ointment in preference;

one part of cantharides to twelve parts of lard or palm-oil. If prepared with a temperature equal to the boiling point of water (212°), it will be sufficiently *strong* and will *never blemish*. It is a mistake to think that the powdered flies should be mixed with the vehicle when it is nearly cold. An ointment so prepared will require three times the quantity of cantharides. The heat melts the cantharidine.

If the effects are not sufficiently apparent in about thirty hours after the blister has been applied, a very little more, or what is remaining on the skin, which may be sufficient, should be gently rubbed in; and in about forty-eight hours after the application the part is to be washed, and every trace of the blister removed, a little oil being now applied.

HOT FOMENTATIONS.

This is so often advised for acute inflammation, sprains, etc., notwithstanding the simplicity of its application, that I think it advisable to give such additional details as will serve to aid in its use. The use of hot and cold water alone, intelligently applied, will be found a safe, simple, and effective remedy for allaying local inflammation, pain, and congestion; in fact, the best remedy known.

The principle is to apply all the heat the animal will bear, but not enough to scald or burn. It is best accomplished by wringing through a common clothes-wringer a woolen blanket (a common horse-blanket will do) out of boiling water, fold it quickly into four or more thicknesses, and place it over the affected part. Cover the hot cloth well with dry blanket. If continued or repeated long enough to relax the skin, cold water is to be applied to tone it up, when, if necessary, the heat is to be again continued.

For Strains and Sprains. — Apply hot fomentations vigorously, changing them every five or ten minutes till the pain and swelling subside. Apply a cold compress for the last application; the compress can be left on continuously, but it should be covered with the woolen cloth.

POULTICES.

The simplest and cheapest poultice can be made by pouring boiling water on about a peck of bran, so as to make a very thin mash ; or linseed meal could be added to it. Boiled turnips make a good poultice, which would also be improved by the addition of a little linseed meal.

Poultices are generally too small, confined, and dry. A poultice should be made large, so as to cover the parts thoroughly and keep them moist. When a horse gets a nail in the foot, or it is calked, or when there is any local inflammation from an injury, covering the parts with a warm poultice will be found a very simple and good way of keeping down inflammation. If it is desired to poultice the leg for a sprain of the tendons, a flannel bag can be made for the purpose, or an old pant's leg, if convenient, can be pulled up over the leg ; tie a string loosely around the foot below the fetlock, and fill the bag with the poultice above the knee, which can be kept up by tying a piece of listing or a strip of flannel over the shoulder. Poultices are also useful applications for promoting suppuration in inflamed tumors, and when there is irritation or inflammation in the heels, such as scratches, cracks, or grease. The poultices commonly employed for these purposes are of an emollient character. The following is a standard formula :—

Linseed meal	1 lb.
Bran.....	2 qts.
Hog's lard.....	2 to 4 oz.

Boiling water enough to make a soft poultice.

Or, turnips thoroughly boiled and mashed, any quantity, linseed meal enough to form the poultice. A good poultice can be made of carrots grated fine. Either of these simple poultices may be converted into an anodyne poultice by the addition of opium ; into a fermenting poultice by the addition of yeast, and by substituting oatmeal for linseed meal ; into an astringent poultice by the addition of Goulard's extract, sugar of lead, or powdered alum ; and into a detergent poultice by the addition of white or blue vitriol.

ADDITIONAL PRESCRIPTIONS.

WARTS.

These are very common to horses, and quite annoying to most owners to manage, and it is very important to know how to treat them. Warts are of three kinds. The first is of a cartilaginous nature, and is contained in a sac, or shell, grown from the skin; and when this sac is divided, its contents drop out, leaving a clean cavity, which pretty soon vanishes. The operation is a comparatively painless one. The second kind is also cartilaginous, but is not in a sac, adheres to the skin, and grows large, with a rough crown and a vascular body. When severely injured, it rarely heals, but ulcerates in a tedious manner. This is the same species of wart usually found on the human hand. The third species is hardly of the same nature as the others, consisting of a cuticular case, inclosing a soft granular substance.

When the warts are found to be inclosed in a well-defined cuticular shell, the quickest and most humane practice is to take a sharp-pointed knife, and run the blade through each in succession. The edge should be cut away from the skin, and the knife being withdrawn with an upward, cutting motion, the sac and substance are both cut open. The inside may then be easily removed, and the part touched with this solution : —

Chloride of zinc.....	1 gr.
Water.....	1 oz.

When the growth proves to be of the fixed cartilaginous kind, it should be at once removed. This is best done with a knife, and the excrescence should be thoroughly cut away. The bleeding that will follow may be controlled by means of a hot iron.

Should excision be objected to, caustics may be applied, such as strong acetic acid, butter of antimony, nitrate of silver, or lunar caustic. Afterwards treat as an ordinary sore.

CAUSTICS

are substances which burn away the tissues of the body by decomposition of their elements, and are valuable to destroy

fungous growth and set up healthy action. They are, consequently, often required to destroy proud flesh, kill the virus in poisoned wounds, stimulate old ulcers, excite healthy action in fistula, and remove warts, tumors, etc.

Corrosive sublimate, in powder, acts energetically ; nitrate of silver is excellent to lower granulation ; sulphate of copper is not so strong as the above, but good ; chloride of zinc is a powerful caustic, and may be used in sinuses, in solution, 7 drachms in a pint of water ; verdigris, either in powder or mixed with lard, is good as an ointment, in proportion of one to three parts. Carrying this treatment to extreme implies using a hot iron, the actual cautery.

EMBROCATIONS

are external applications in a liquid form, that are rubbed on a diseased part, as in strains and indolent swellings, and as an auxiliary in the treatment of internal inflammation. They are of a stimulating nature, and are greatly assisted by friction. Of this kind are opodeldoc, soap liniment, etc.

EMBROCATIONS FOR HARD, INDOLENT TUMORS.

Olive-oil	4 oz.
Camphor	4 dr.
Mix.	

ANODYNE LINIMENT.

Castile soap	4 troy oz.
Spirit camphor	2 troy oz.
Oil rosemary	$\frac{1}{2}$ oz.
Alcohol	2 pts.
Water	4 oz.

Good for sprains, bruises, rheumatic pains, etc.

CONDITION BALLS.

No. 1. — Barbadoes aloes	10 dr.
Castile soap	12 dr.
Powdered caraway seed	12 dr.
Powdered ginger	4 dr.

Molasses or palm oil sufficient to form a mass. Divide into six balls, one to be given every morning till the bowels are freely opened. Useful in hide-bound, costive bowels and skin diseases.

No. 2. — Powdered ginger	1 dr.
Powdered gentian	3 dr.
Sulphate of iron	2 dr.

Molasses sufficient to form a mass. To be made into one ball. Improves the appetite, and stimulates digestion.

DRENCH FOR STOMACH STAGGERS.

Barbadoes aloes.....	5 dr. to 1 oz.
Oil of peppermint.....	20 drops.
Warm water.....	1 pt.
Tincture of cardamoms.....	2 oz.
Calomel.....	2 dr.

Mix, and give at one dose.

FOR COLIC.

Laudanum.....	1 to 2 oz.
Sweet spirits niter.....	1 to 2 oz.
Tincture belladonna.....	1 to 2 dr.
Linseed oil.....	$\frac{3}{4}$ to 1 pt.

If tympanitis (flatulent colic), would add to the above one-half to one ounce tincture Jamaica ginger, and one-half to one ounce aromatic spirits of ammonia, with a few drops tincture nux vomica, every one-half hour, until relieved. This is the favorite prescription of one of the best veterinary surgeons in the country.

DRYING POWDERS.

Prepared chalk.....	4 oz.
Sulphate of zinc.....	1 oz.
Charcoal.....	1 oz.
Armenian bole.....	2 oz.

Mix.

To be finely powdered, and dusted over raw surfaces. Useful for healing wounds.

LIQUID BLISTERS.

Rectified spirits of wine.....	15 oz.
Powdered cantharides.....	1 oz.
Powdered camphor.....	$\frac{1}{2}$ oz.

Macerate for ten days. To be used as a sweating blister.

COMPOUND IODINE LINIMENT.

Iodine.....	1 part.
Soap liniment.....	8 parts.

Mix, and shake well. Useful in sprains, thickened tendons, enlarged glands, etc.

CORDIAL DRENCH.

Good old beer (warm).....	1 qt.
Powdered ginger.....	$\frac{1}{2}$ oz.

Shake well. To be given in exhaustion, and recovery from debilitating diseases.

VETERINARY AROMATIC POWDER.

Powdered caraway seeds.....	6 oz.
Powdered allspice.....	4 oz.
Jamaica ginger, powdered.....	2 oz.
Licorice powder.....	2 oz.

Mix.

This is a good cordial powder, and may be given in a dose of two or three drachms in warm ale, in such cases as require the use of cordials. If the form of a ball is preferred, it may be obtained by beating up a dose of the powders with a little molasses.

DRENCH FOR A COUGH.

Bruise 3 ounces of fresh squills in a mortar, or 4 to 5 ounces of garlic, and macerate them in 12 ounces of vinegar in a slow oven or on a hot plate for one hour; strain off the liquid part, and add to it one pound of treacle or honey. The dose in bad coughs is 3 to 4 ounces. If there exists much irritation, a tablespoonful of tincture of opium may be added to every 6 ounces.

COUGH BALLS.

Calomel,	} of each.....	1 dr.
Opium,		
Camphor,		
Digitalis,		

Made into a ball, with molasses. One daily, till six are given, when a gentle laxative should be administered. — *Dick*.

FRIAR'S BALSAM.

Friar's Balsam, or compound tincture benzoin, is made in the following manner:—

Benzoin.....	3 oz.
Storax Balsam, strained.....	2 oz.
Balsam of tolu.....	1 oz.
Extract of spiked aloes...	$\frac{1}{2}$ oz.
Rectified spirit.....	2 pts.

Macerate for fourteen days (seven days, *dub.*), and filter or strain through blotting paper. The properties of this tincture are stimulating and expectorant, and it is therefore prescribed by some in combination with other remedies, in cases of old chronic cough or broken wind. As it is decomposed by water, it should first be amalgamated with mucilage or yolk of egg, in order to suspend it in aqueous liquids, when given internally. However, its principal use is that of a stimulant external application to indolent sores or wounds.

OINTMENTS.

No. 1. — Lard.....	1 lb.
Turpentine.....	4 oz.
Powdered flies.....	3 oz.
Biniodide of mercury.....	6 dr.

To be thoroughly incorporated. Useful for splints, spavins, ring-bones, and enlargement of glands.

No. 2. — Lard.....	1 lb.
Bees-wax.....	4 oz.
Biniodide of mercury.....	1½ oz.

Melt the lard and wax, and add the biniodide, and stir till cold. Useful for enlargement of bone or glandular tissues

IODINE OINTMENT.

Iodine.....	1 dr.
Iodide of potassium.....	½ dr.
Lard.....	1 oz.

Mix.

Useful in glandular and bony enlargements, malanders, sallenders, ringworm, etc.

COLLYRIA (EYE-WATERS).

Nitrate of silver.....	2 to 10 gr.
Rain, or distilled water.....	1 oz.
Infusion of opium.....	5 drops.
Mix.	

LICE MIXTURE.

Olive-oil.....	1 qt.
Oil of tar.....	3 oz.

Mix.

To be well shaken. Wash well with soap and water, rub dry, and rub well in. At the same time feed well.

MANGE OINTMENT.

Linseed, or train oil.....	8 oz.
Oil of tar.....	2 oz.
Sulphur.....	4 oz.

Mix.

Shake well, and wash with soap and water; then rub the mixture well in, washing every second day.

TONIC MASS.

Ginger (powdered) gentian,	{equal parts.
Caraway seed and anise seed,	

Molasses sufficient to form a mass. Dose, one ounce in a ball night and morning.

WORM BALLS.

No. 1. — Gentian quassia, camphor, sulphate of iron,
of each..... 2 dr.

Made into a ball with common mass. — *Dun.*

No. 2. — Assafetida..... 2 dr.
Calomel and savin, of each..... 1½ dr.
Oil of male fern..... 30 drops.

Common mass sufficient to form a ball given at night, and a purge in the morning. — *Gamgee.*

GRAIN FOUNDER.

Take three pints of vinegar, into which put six red pepper pods, and boil until reduced to one quart. When cool, give as a drench. Blanket the horse warmly. This will put the horse in a profuse perspiration, and perform a perfect cure. The gentleman of whom I got this, cured a valuable horse that got into his granary and ate so much grain that he was in the morning perfectly stiff. One dose made a perfect cure. He said he would not be without it for one hundred dollars.

CONDITION POWDER.

Grains paradise (ground)..... ½ lb.
Ground ginger..... ½ lb.
Powdered gentian..... ¾ lb.
Cumin seed (ground) 6 oz.
Fenugreek (ground)..... 6 oz.
Carbonate soda..... 6 oz.
Common brown sugar..... 6 lbs.
Salt..... 1¾ lbs.

Put in one hundred pounds of meal. Dose : One pint to be given with the usual food.

This is considered one of the best tonic condition powders ever used. It is sold in the Eastern cities at a large price, under the name of Condition Food, and is held as a secret of great value. I have known \$50 to be refused for the recipe.

A VERY FINE HEALING PREPARATION FOR CUTS.

Equal parts tincture myrrh and balsam copaiba. To be used once a day. This is the favorite remedy of one of the most successful horsemen in the country. It is one of the best of healing remedies.

FOR BRUISE AND CUT ON MAN OR HORSE.

A favorite prescription of great value.

Laudanum..... 1 oz.
Arnica tinct..... 1 oz.
Sassafras oil..... 1 oz.

Mix.

Bandage lightly, when possible, and keep wet.

Said the gentleman who gave the above prescription, “I bruised one of my fingers terribly, literally smashing nail and flesh. I was in the greatest pain; when, after hours of suffering, a gentleman from New York accosted me, and learning my trouble, said, ‘For thirty cents I can relieve and cure you.’ He gave me this prescription. I had it put up, kept my fingers wet with it during the night, and next day there was no pain, and in two days my finger was well.” It removes all fire and pain, and heals by first intention.

TO RECRUIT A HORSE HIDE-BOUND, OR OTHERWISE OUT OF SORTS.

Nitrate potassa (or saltpeter).....	4 oz.
Crude antimony.....	1 oz.
Sulphur	3 oz.

Nitrate of potassa and antimony should be finely pulverized, then add the sulphur, and mix the whole well together. Dose: A tablespoonful of the mixture in a bran mash daily, for a week or two.

This is the favorite prescription used by one of the best horsemen I ever knew, who was also a leading physician. He kept it a secret, but gave it to the writer on condition it should not be made known in his neighborhood.

TO REDUCE SWELLING OF THE LEGS, AND STRENGTHEN THE TENDONS
AFTER HARD DRIVING.

A favorite remedy on Long Island.

Alcohol	1 pt.
Ordinary-sized beef gall.....	1.
Organum.....	1 oz.
Oil of spike	1 oz.
Gum myrrh	1 oz.
Camphor gum	$\frac{1}{2}$ oz.

First wash and rub clean and dry. Then bathe with the liniment and rub dry. Then apply again and bandage the leg, being careful not to bandage too tight.

This is the best liniment for the purpose recommended I have ever used. It should be kept in every stable.

CHAPTER XVI.

THE FARM.

PROFITABLE farming requires that such manures as embody all the deficient elements in the soil should be added to it in sufficient quantities to develop fully and rapidly such crops as are sought from it. It becomes, then, a matter of the highest consequence to the farmer to understand, not only what substances may be useful as manures, but also how to apply them in the best manner to his crops so far as they may be made profitable.

Barn-yard Manure. — The bulk, solubility, and peculiar tendency to fermentation of barn-yard manure, renders it a matter of no little study so to arrange it as to preserve all its good qualities, and apply it undiminished to the soil. A part of the droppings of the cattle are necessarily left in the pastures, or about the stacks where they are fed ; though it is better, for various reasons, that they should never receive their food from the stack. The manure thus left in the fields should be beaten up, and scattered with light, long-handled mallets, immediately after the grass starts in the spring, and again before the rains in the autumn. With these exceptions, and the slight waste which may occur in driving cattle to and from the pasture, all the manure should be dropped either in the stables or in the yards. These should be so arranged that cattle may pass from one directly into the other ; and the yard should, if possible, be furnished with wells, cisterns, or running water. There is twice the value of manure wasted annually on some farms in sending the cattle abroad to water, that would be required to provide it for them in the yard for fifty years.

The premises where the manure is dropped should be kept as dry as possible ; and the eaves should project several

feet beyond the side of the building, so as to protect the manure thrown out of the stables from the wash of rains. The barns and all the sheds should have eaves-troughs to carry off the water, which, if saved in a sufficiently capacious cistern, would furnish a supply for the cattle. The form of the yard ought to be dishing toward the center; and if on sandy or gravelly soil, it should be puddled or covered with clay to prevent the leaking and escape of the liquid manure. The floors of the stables may be so made as to permit the urine to fall on the properly prepared bed of turf under them, where it would be retained till removed; or it should be led off by troughs into the yard or to a muck heap.

Superphosphate of Lime. — Take a large tub, or barrel, and put into it 100 lbs. water; add, very slowly and cautiously, 43 lbs. of pure sulphuric acid; you must be very careful while handling this article not to let it touch your skin or clothing, as it will instantly blacken the skin, and destroy the clothing, wherever it comes in contact; and, when mixed with water, it engenders a very intense heat. Into this mixture throw 100 lbs. weight of bones, no matter how old or useless they may be. The sulphuric acid instantly attacks and enters into combination with the bones, reducing them to a pasty consistency, and completely dissolving them. Keep under cover, and turn them over occasionally, while the process is going on; and, when completed, dump out the whole contents on to the barn floor or on a platform of boards, and thoroughly work into the mass four times its bulk of dry bog earth or dry road dust; mix and pulverize completely with a wooden shovel. The bog earth acts as an absorbent, or dryer, retaining the fertilizing properties of the compound, and rendering it easy of uniform distribution. If whole bones are used, it will take six or eight weeks to dissolve them; if they are broken with an axe, they will dissolve in about three weeks; if they are ground in a bone mill, four days will be sufficient. This manure is the most powerful fertilizer in existence; and, when made by these directions, it is the cheapest, as one ton is equal to thirty-two tons of barn-yard manure. For top dressing grass lands, use 300 lbs. per acre; for corn, potatoes, beans, turnips, etc.,

apply 450 lbs. per acre in the drill, mixing with the soil ; for wheat, rye, oats, or barley, 400 lbs. per acre, harrowing in with the seed ; for buckwheat, 300 lbs. per acre.

Home-made Guano of Unequalled Excellence. — Save all your fowl manure from sun and rain. To prepare it for use, spread a layer of dry swamp muck (the blacker it is the better) on your barn floor, and dump on it the whole of your fowl manure ; beat it into a fine powder with the back of your spade ; this done, add hard-wood ashes and plaster of Paris, so that the compound shall be composed of the following proportions : Dried muck, three bushels ; fowl manure, two bushels ; ashes, one bushel ; plaster, one and one-half bushels ; mix thoroughly, and spare no labor ; for in this matter the elbow grease expended will be well paid for. A little before planting, moisten the heap with water, or, better still, with urine, cover well over with old mats, and let it lie till wanted for use. Apply it to beans, corn, or potatoes at the rate of a handful to a hill, and mix with the soil before dropping the seed. This will be found the best substitute for guano ever invented, and may be depended on for bringing great crops of turnips, corn, potatoes, etc.

Solid Animal Manures. — Of these, horse dung is the richest and the easiest to decompose. If in heaps, fermentation will sometimes commence in twenty-four hours ; and even in midwinter, if a large pile be accumulated, it will proceed with great rapidity ; and, if not arrested, a few weeks, under favorable circumstances, are sufficient to reduce it to a small part of its original weight and value.

The manure of sheep is rich and very active, and next to that of the horse is the most subject to heat and decomposition. The manure of cattle and swine, being of a colder nature, may be thrown in with that of the horse and sheep in alternate layers. If fresh manure be intermixed with straw and other absorbents (vegetables, peat, turf, etc.), and constantly added, the recent coating will combine with any volatile matters which fermentation develops in the lower part of the mass. Frequent turning of the manures is a practice attended with no benefit, but with certainty of the escape of much of its valuable prop-

erties. Many farmers assign a distinct or peculiar merit to the different manures. Much of this opinion is fanciful; for there is frequently more difference in the comparative value of that from the same species, and even the same individual, at different times and under different circumstances, than from those of different species.

To Dissolve Large Bones for Manure without Expense. — Take any old flour-barrel, and put into the bottom a layer of hard-wood ashes; put a layer of bones on the top of the ashes, filling the space between the bones with them; then add bones and ashes alternately, finishing off with a thick layer of ashes. When your barrel is filled, pour on water (urine is better) just sufficient to keep them wet, but do not on any account suffer it to leach one drop; for that would be like leaching your dung-heap. In the course of time they will heat, and eventually soften down so that you can crumble them with your finger. When sufficiently softened, dump them out of the barrel on to a heap of dry loam, and pulverize and crumble them up till they are completely amalgamated into one homogeneous mass with the loam, so that it can be easily handled and distributed whenever required. You may rely on it, this manure will leave its mark, and show good results wherever it is used.

How to Double the usual Quantity of Manure on a Farm. — Provide a good supply of black swamp mold or loam from the woods within easy reach of your stable, and place a layer of this, one foot thick, under each horse, with litter, as usual, on the top of the loam or mold. Remove the droppings of the animal every day, but let the loam remain for two weeks; then remove it, mixing it with other manure, and replace with fresh mold. By this simple means any farmer can double, not only the quantity, but also the quality, of his manure, and never feel himself one penny the poorer by the trouble or expense incurred, while the fertilizing value of the ingredients absorbed and saved by the loam can scarcely be estimated.

Josiah Quincy, Jr., has been very successful in keeping cattle in stables the year through, and feeding them, by means of soiling. The amount of manure thus made had enabled him to improve the fertility of a poor farm of 100 acres, so

that in twenty years the hay crop has increased from 20 tons to 300. The cattle are kept in well arranged stables, and are let out into the yard an hour or two morning and afternoon; but they generally appear glad to return to their quarters. By this process, one acre enables him to support three or four cows. They are fed on grass, green oats, corn fodder, barley, etc., which are sown at intervals through the spring and summer months, to be cut as required; but he remarks that his most valuable crop is his manure crop. Each cow produces $3\frac{1}{2}$ cords of solid, and 3 cords of liquid, manure, or $6\frac{1}{2}$ cords in all. He uses twice as much muck to mix with it, making 20 cords in all. Five to eight miles from Boston, such manure is worth from five to eight dollars a cord. From this estimate, he has come to the conclusion that a cow's manure may be made as valuable as her milk.

Twenty Dollars' Worth of Manure for almost Nothing. — If you have any dead animal, say, for instance, the body of a horse, do not suffer it to pollute the atmosphere by drawing it away to the woods or any other out-of-the-way place, but remove it a short distance only from your premises, and put down four or five loads of muck or sods, place the carcass thereon, sprinkle it over with quick-lime, and cover over immediately with sods or mold sufficient to make, with what had been previously added, 20 good wagon-loads, and you will have within twelve months a pile of manure worth \$20 for any crop you choose to put it upon. Use a proportionate quantity of mold for smaller animals, but never less than twenty good wagon-loads for a horse; and if any dogs manifest too great a regard for the inclosed carcass, shoot them on the spot.

Fish Compost, Substitute for Bone-dust. Manure from Fish Refuse, etc. — The fish owes its fertilizing value to the animal matter and the bone earth which it contains. The former is precisely similar to flesh or blood, consisting of 25 per cent of fibrin, the rest being water; and their bones are similar in composition to terrestrial animals. As fertilizing agents, therefore, the bodies of fish will act nearly in the same way as the bodies and blood of animals; 100 lbs. in decaying

produce $2\frac{1}{2}$ lbs. of ammonia. Hence, 400 lbs. of fish rotted in compost are enough for an acre. The great effect is due to the ammoniacal portion ; for it renders the herbage dark green, and starts it very rapidly. One of the best composts is made as follows : Dried bog earth, loam, or peat, seven barrels ; hard-wood ashes, two barrels ; fish, one barrel ; slacked lime, one bushel. Place a thick layer of the bog earth on the bottom ; on the top of this put a layer of the fish, then a sprinkling of lime, then a layer of ashes ; on top of the ashes put a thick layer of bog earth, loam, or peat ; then another thin layer of fish, lime, and ashes, and so on till your materials are worked in ; then top off with a thick layer of the absorbents, to retain the fertilizing gases. The decomposition of the fish will proceed very rapidly, and a very rich compost will be the result. It should be shoveled over and over, and thoroughly intermixed and pulverized. Put this on so as to have 400 lbs. of fish to the acre. It may be applied with the greatest benefit to corn, turnips, potatoes, beans, etc., in the drill, and broadcast on the grass.

Manuring with Green Crops.—This system has within a few years been extensively adopted in some of the older settled portions of the United States. The comparative cheapness of land and its products, the high price of labor, and the consequent expense of making artificial manures, renders this at present the most economical plan which can be pursued. The object of this practice is, primarily, fertilization ; and connected with it, is the clearing of the ground from noxious weeds, as in fallows, by plowing in the vegetation before the seed is ripened ; and finally to loosen the soil and place it in the mellowest condition for the crops which are to succeed. Its results have been entirely successful, when steadily pursued with a due consideration of the objects sought, and the means by which they are to be accomplished. Lands in many of our Eastern States, which have been worn out by improvident cultivation, and unsalable at \$10 to \$15 an acre, have, by this means, while steadily remunerating their proprietors for all the outlay of labor and expense by their returning crops, been brought up in value to \$50.

Ashes from Soil by Spontaneous Combustion. — Make your mound 20 feet long by $10\frac{1}{2}$ feet wide. To fire, use 72 bushels of lime. First a layer of dry sods or parings on which a quantity of lime is spread, mixing sods with it, then a covering of eight inches of sods, on which the other half of the lime is spread, and covered a foot thick, the height of the mound being about a yard. In twenty-four hours it will take fire. The lime should be fresh from the kiln. It is better to suffer it to ignite itself than to effect it by the operation of water. When the fire is fairly kindled, fresh sods must be applied, but get a good body of ashes in the first place. I think it may be fairly supposed that the lime adds full its worth to the quality of the ashes; and when limestone can be got, I would advise the burning of a small quantity in the mounds, which would be a great improvement to the ashes, and would help to keep the fire in.

Substitute for Barn Manure. — Dissolve a bushel of salt in water enough to slack 5 or 6 bushels of lime. The best rule for preparing the compost heap is, 1 bushel of this lime to 1 load of swamp muck intimately mixed, though 3 bushels to 5 loads makes a very good manure. In laying up the heap let the layers of muck and lime be thin, so that decomposition may be more rapid and complete. When lime cannot be got, use unleached ashes, 3 or 4 bushels to a cord of muck. In a month or six weeks overhaul and work over the heap, when it will be ready for use. Sprinkle the salt-water on the lime as the heap goes up.

Ashes may be pronounced the best of the saline manures. They are also among the most economical, as from our free use of fuel they are largely produced by almost every household. Good husbandry dictates that not a pound of ashes should be wasted, but all should be saved and applied to the land; and, where they can be procured at a reasonable price, they should be purchased for manure. Leached ashes, though less valuable, contain all the elements of the unleached, having been deprived only of a part of their potash and soda. They may be drilled into the soil with roots and grain, sown broadcast on meadows or pastures, or mixed with the muck heap.

They improve all soils not already saturated with the principles which they contain.

The quantity of ashes that should be applied to the acre must depend on the soil and the crops cultivated. Potatoes, turnips, and all roots ; clover, lucern, peas, beans, and the grasses, are great exhausters of the salts, and they are consequently much benefited by ashes. They are used with decided advantage for the above crops in connection with bone-dust ; and for clover, peas and roots, their effects are much enhanced when mixed with gypsum. Light soils should have a smaller, and rich lands or clays a heavier, dressing. From twelve to fifteen bushels per acre for the former, and thirty for the latter, is not too much ; or, if they are leached, the quantity may be increased one-half, as they act with less energy. Repeated dressings of ashes, like those of lime and gypsum, without a corresponding addition of vegetable or barn-yard manures, will eventually exhaust tillage lands.

Salt. — As a manure, salt was extensively used by the ancients, and has ever since been employed by intelligent agriculturists. On some soils it yields no apparent benefit. Such as are near the sea-coast, and occasionally receive deposits from the salt spray, which is often carried far inland by the ocean storms ; or such as contain chlorine and soda in any other forms, are not affected by it. But in other situations, when used at the rate of three to sixteen bushels per acre, the crops of grains, roots, or grasses have been increased from 20 to 50 per cent. It may be applied in minute portions in the hill, or scattered broadcast, or mixed with the muck heap. Its great affinity for water has the effect, like that of gypsum, of attracting dews and atmospheric vapor to the growing vegetation, by which it is supplied with moisture in a period of drought, much beyond what is conveyed to such as are destitute of these manures. Salt is also useful in destroying slugs, worms, and larvæ, which frequently do much injury to the crops.

Old Lime Plaster from Walls of Buildings, etc. — For meadows, and for most other crops, especially on clays and loams, this is worth twice its weight in hay ; as it will produce a large growth of grass for years in succession, without other

manure. But the farmer cannot too carefully remember that with this, as with all other saline manures, but a part of the ingredients only is thus supplied to vegetables; and without the addition of the others, the soil will sooner or later become exhausted.

Value of Liquid Manures. — The urine voided from a single cow is considered in Flanders, where agricultural practice has reached a high state of advancement, to be worth \$10 per year. It furnishes nine hundred pounds of solid matter, and, at the price of \$50 per ton, for which guano is frequently sold, the urine of a cow for one year is worth \$20. And yet economical farmers will waste urine and buy guano! The urine of a cow for a year will manure one and a quarter acres of land, and is more valuable than its dung, in the ratio by bulk, of seven to six, and in real value as two to one. How important, then, that every particle of it be carefully husbanded for the crops.

Plowing. — The time, the depth, and the manner of plowing must depend on the crops to be raised, the fertility and character of the soil, and other circumstances.

Plowing Clay Lands. — Whenever practicable, these should be plowed in the fall for planting and sowing the ensuing spring. The tenacity of the soil may thus be temporarily broken up by the winter frosts, its particles more thoroughly separated, and the whole mass reduced to a finer tilth than can possibly be effected in any other manner.

The furrows of clay soils should be turned over so as to lap on the preceding and lie at an angle of 45° ; and for this purpose the depth of the furrow slice should be about two-thirds its width. Thus a furrow six inches deep should be about nine inches wide, or, if eight inches deep, it should be twelve inches wide. This will allow of the furrows lying regularly and evenly, and in the proper position for the drainage of the soil, the free circulation of air, and the most efficient action of frosts, which in this way have access to every side of them. Land thus thrown up is found to be finely pulverized after the frosts leave it, and it is comparatively dry and ready for use some time earlier than such as is not plowed till

spring. For sowing, land plowed in this manner requires no additional plowing, but it is better fitted for the reception of seed than it can be by any further operation, unless by a slight harrowing if too rough. The different kinds of grain or peas may be dibbled in, or sown directly upon the surface and covered by the harrow; and, if sown very early, grass and clover seeds require no covering, but find their best position in the slight depressions which are everywhere made by the frosts, and which the subsequent rains and winds fill up and cover sufficiently to secure a certain growth.

Plowing Sandy or Dry Soils. — These require flat plowing, which may be done when they are either quite wet or dry, but never till wanted for use. To insure flat plowing on an old sward, the depth of the furrow should be about one-half its width, and the land or ridges as wide as can conveniently be made, so as to preserve as much uniformity of surface over the whole field as possible.

Depth of Plowing. — For general tillage crops, the depth of soil may be gradually augmented to about twelve inches, with decided advantage. Such as are appropriated to gardens and horticultural purposes, may be deepened to fifteen and even eighteen inches to the manifest profit of their occupants.



SCHRADER'S GRASS — FESCUE GRASS.



FALL RED TOP.

TALL PANIC GRASS — SWITCH GRASS.



FEATHER GRASS.





MEXICAN CLOVER.

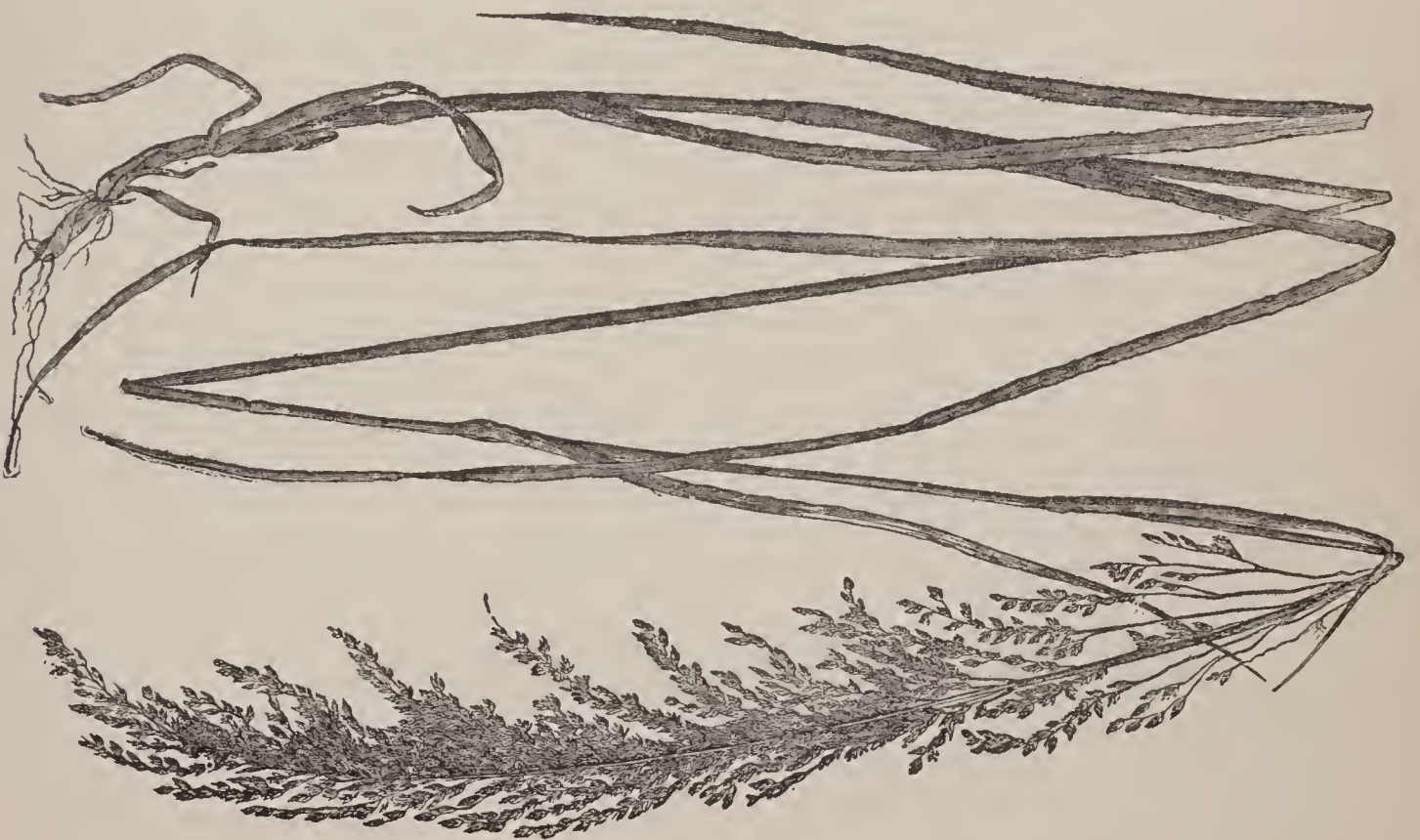


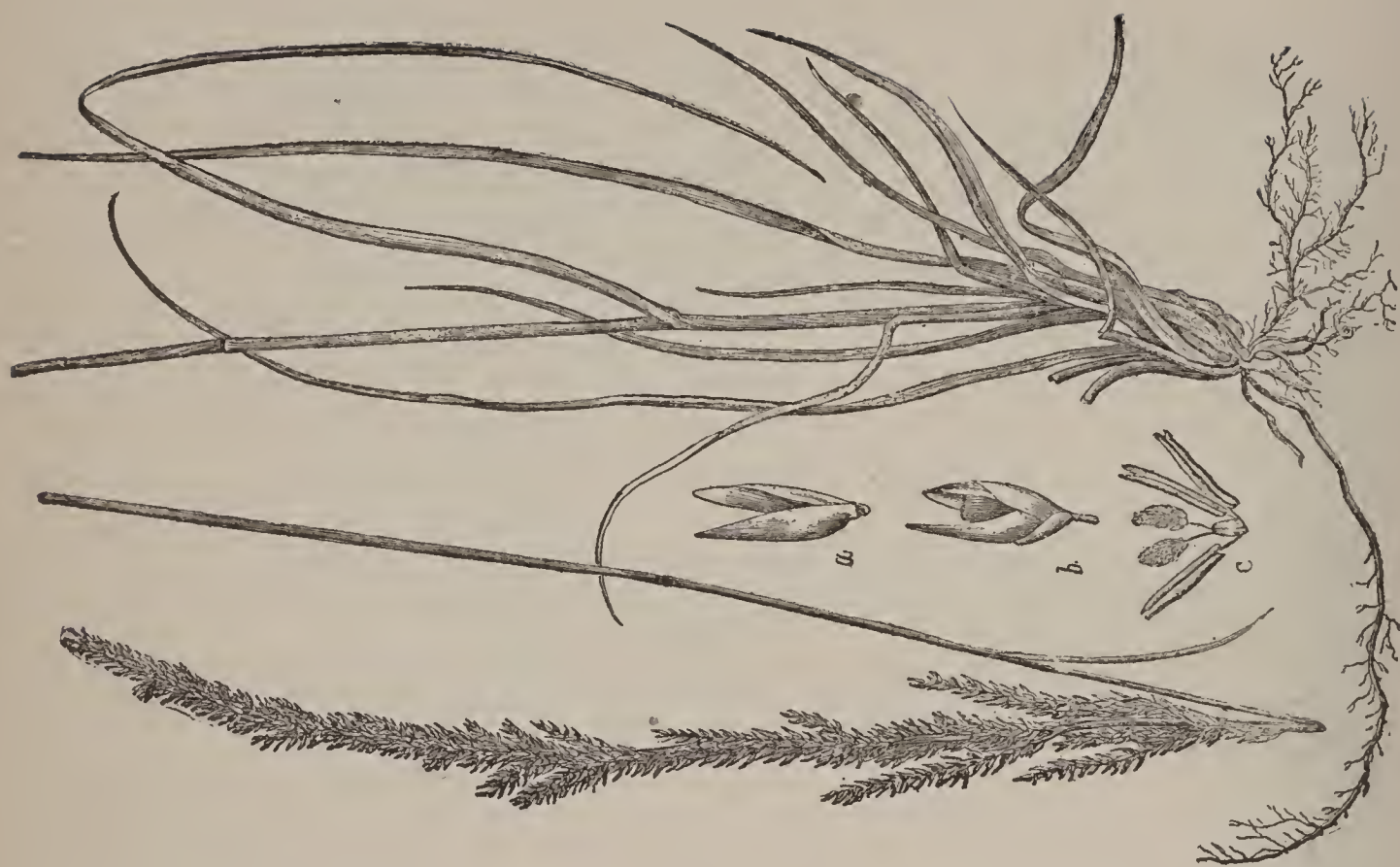
JAPAN CLOVER.

BROOM GRASS.



POWL MEADOW GRASS.



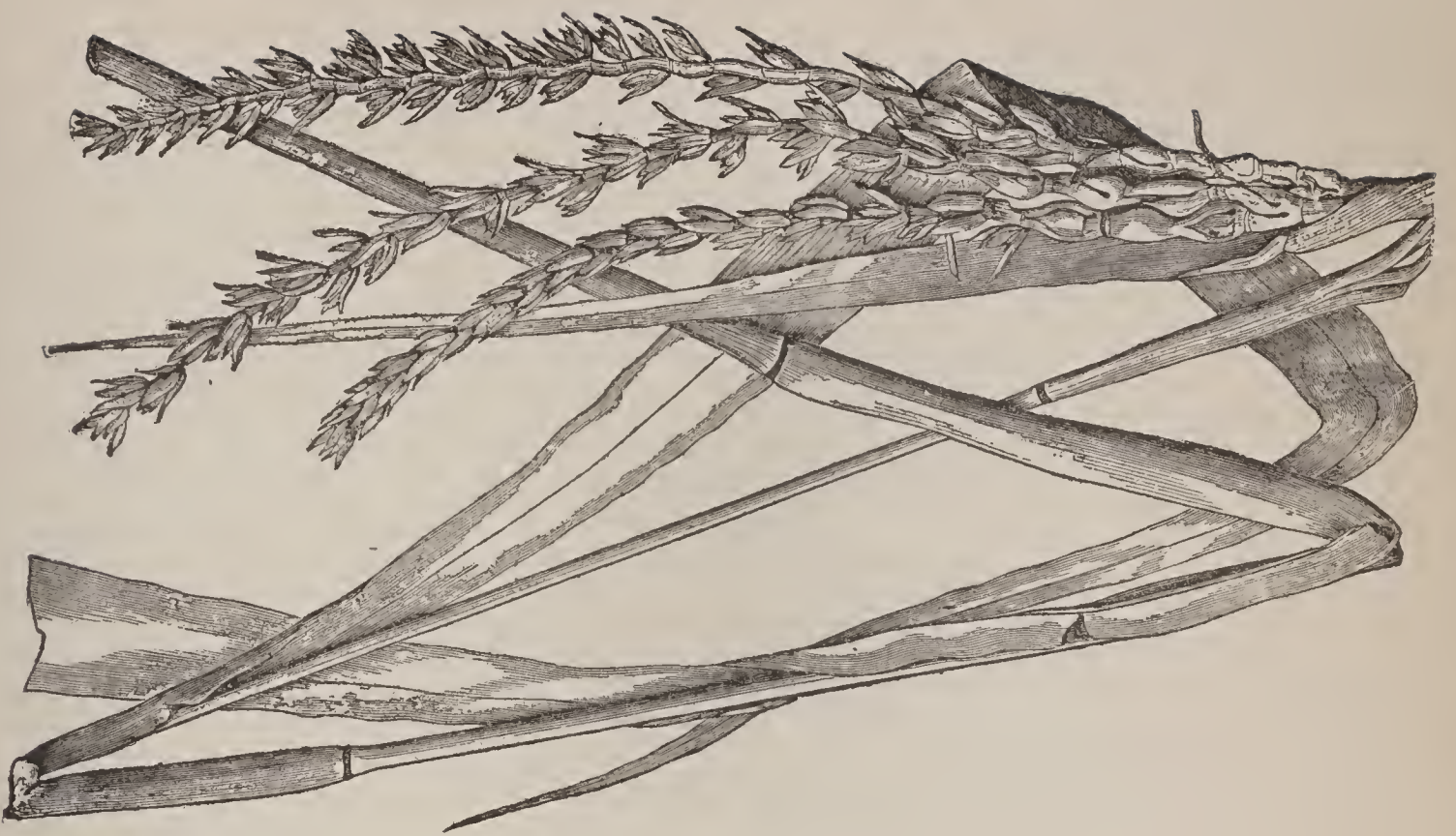


SMART GRASS.



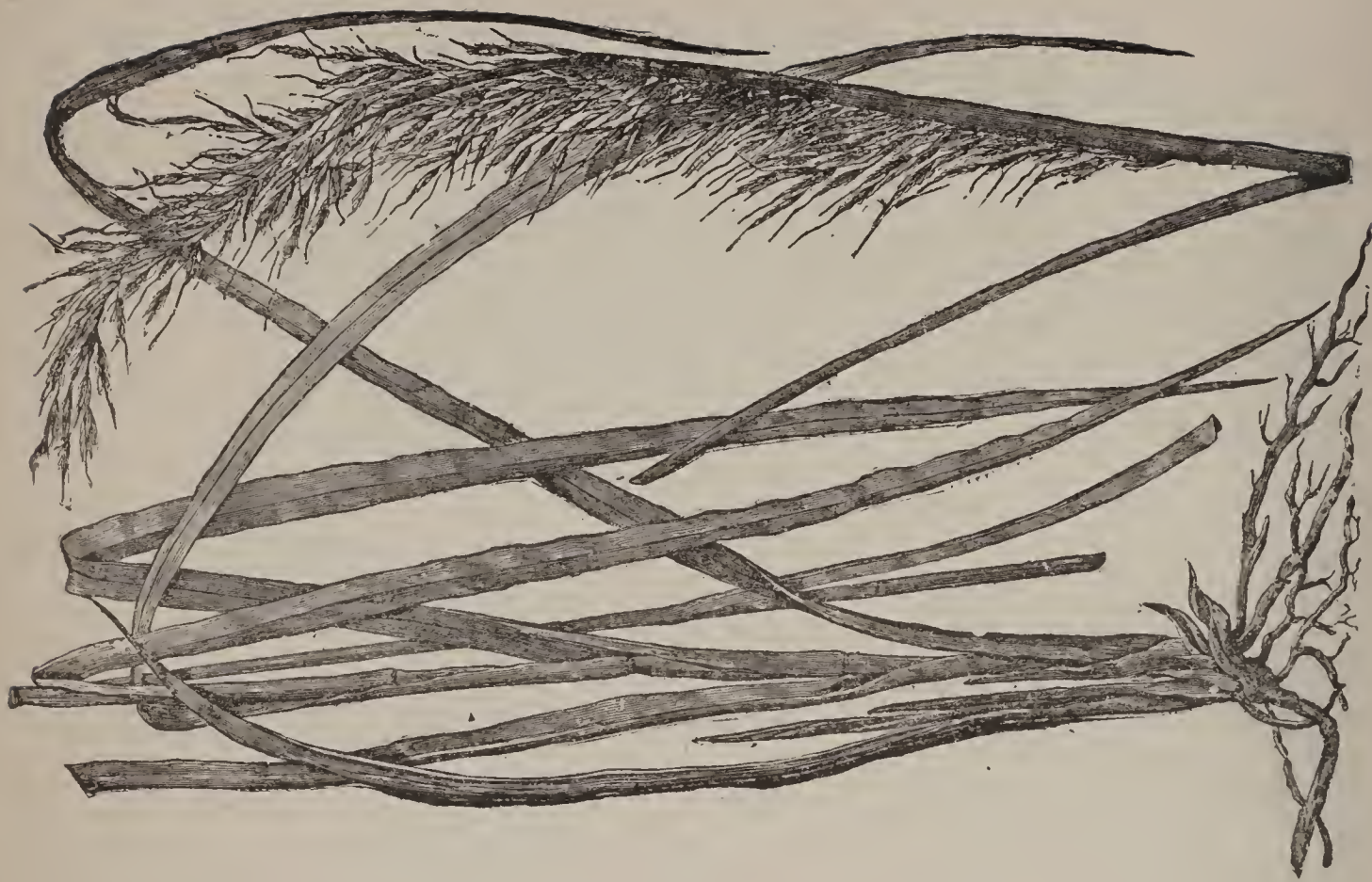
MOUNTAIN RED TOP — NORTHERN RED TOP.

GAMA GRASS.

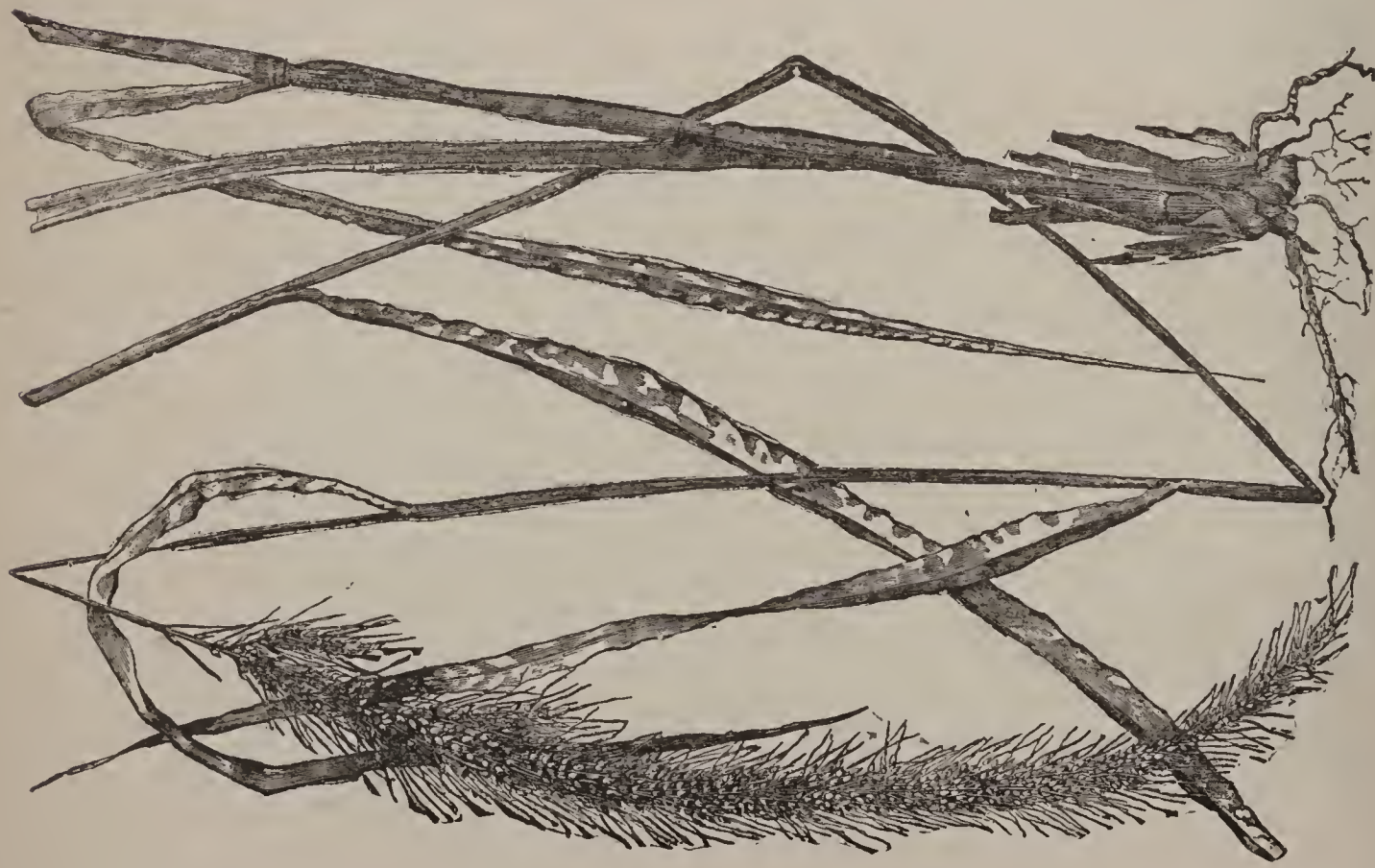


WILD FESCUE.





INDIAN GRASS — WOOD GRASS.



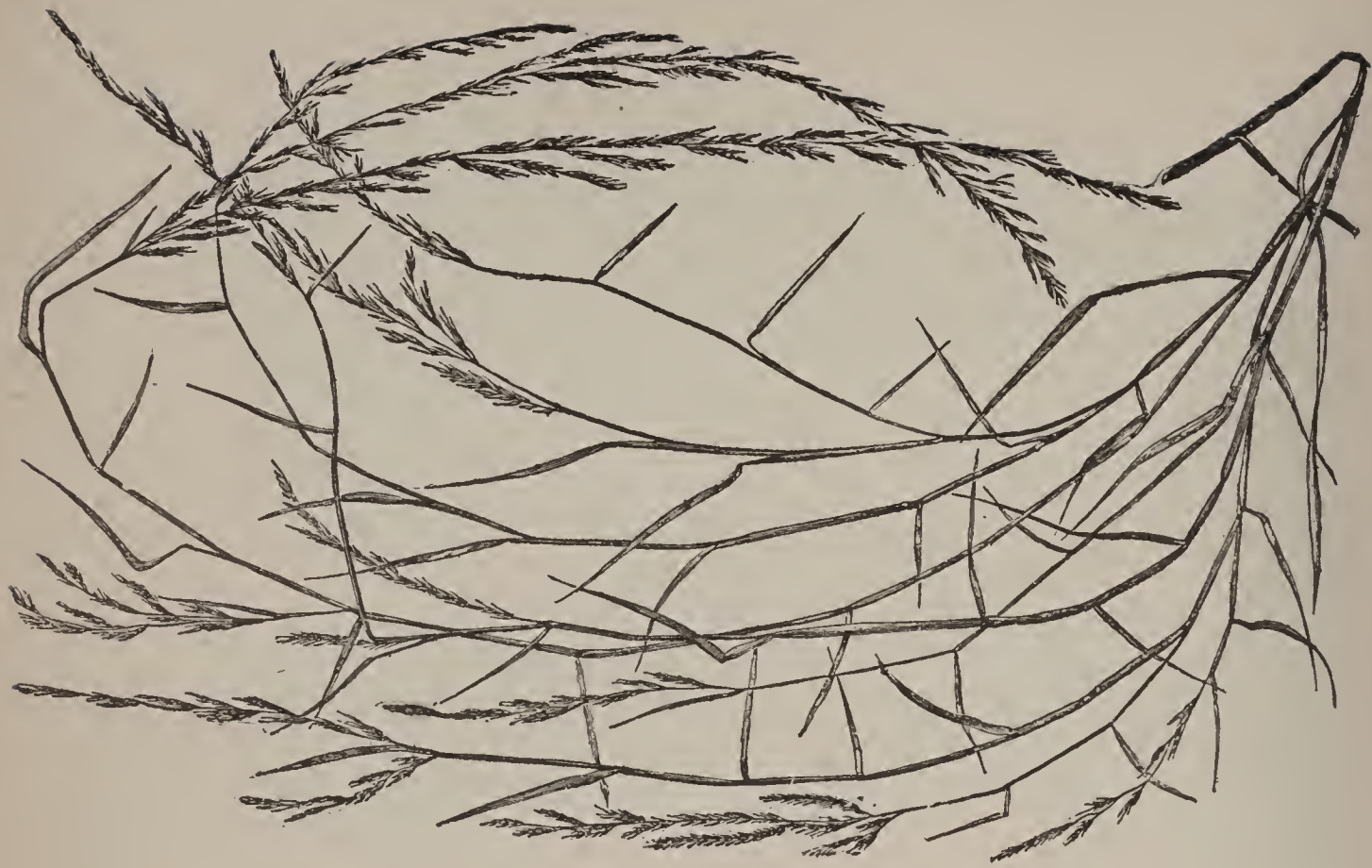
PIGEON GRASS — BRISTLE GRASS.

BARN-YARD GRASS — COCK'S FOOT.



JOHNSON GRASS — FALSE GUINEA GRASS.





DROP SEED — NIMBLE WILL.



BROOM GRASS — BROOM SEDGE.

CROW FOOT — YAKED GRASS — DOG'S TAIL.



WATER GRASS.





KENTUCKY BLUE GRASS.



VANILLA GRASS — SENECA GRASS.

CHAPTER XVII.

GRASSES.

THE cultivation of the grass crop is now regarded as the basis of all successful farming. An important condition of its successful culture is a proper selection of varieties. There are thousands of kinds known to botanists, but only about thirty sorts are recognized as valuable for extensive growth in this country.

Timothy. — This is considered by far the best grass for hay which can be produced. It flourishes throughout the North and on the drained lowlands of the South. It is very productive and highly nutritious. It usually needs reseeded in from three to six years. It does not do its best in a wet soil or on very dry and sandy land. Still, fair crops are often grown on very moist land, and also on gravel knolls. It ripens rather late, and on this account does not yield much aftermath. As a pasture grass it is very good. At the North it is often grown with clover for hay ; but as the two plants do not ripen at the same time, one of them must be used at a disadvantage. It makes splendid hay when grown alone, and can be profitably cultivated in this way. Red top is sometimes grown with it. This mixture is a decided disadvantage as far as the hay is concerned, but it makes a more permanent crop for moist land than timothy alone. Timothy should be cut when in blossom. It will increase in weight if it is allowed to ripen, and horses will eat it well in this state ; but when mature, it is rather too hard and woody for cows. If used alone, from twelve to twenty-four quarts of seed per acre should be sown.

Red Top. — This is a tall, hardy, luxuriant, perennial grass, which flourishes in moist soils, and grows in dry ones. Some authorities consider it very valuable, while others assert

that the hay is of poor quality. When grown by itself, from twelve to sixteen quarts of seed per acre should be used. It is not desirable for permanent pastures, especially for those which are moist. This grass is known in the Middle and Southern States by the name of herd's-grass.

Orchard Grass. — This grass flourishes throughout the whole country. It grows readily in the shade, and endures drought remarkably well. It ripens at the same time as clover. For hay it should be cut before the seed is formed, and is better for an admixture of meadow oat-grass and clover. It springs up quickly after being cut, and yields a good crop of rowen. It is also valuable for pasture, and may be quite closely fed. The seed is light and chaffy. From one to two bushels are used when this grass is grown separately; but as it grows in tufts, some other kind should be mixed with it in order to cover the whole of the land.

Oat Grass. — This is a large-growing variety, which starts early in the spring, and is very good for either hay or pasture. It is quite permanent. The seed is light, and about two bushels per acre should be used. The seed ripens while the stalk is yet green, and a crop of seed can be secured in connection with a very good quality of hay. This grass grows in bunches, and needs thick sowing in order to, as far as possible, counteract this tendency. It is adapted to rich land, and will give two crops per year. This is one of the very best of plants for winter pastures in the South.

Blue Grass. — This grass flourishes on rich uplands, and, where soil and climate are favorable, gives excellent hay and permanent pastures. Some writers claim that the June grass of New England and the Middle States is the same as blue grass; but others deny its identity. If the same, it does not reach that degree of perfection in other localities which it attains in the limestone soils of Kentucky. It is liable to be affected by severe drought, but otherwise endures the changes of climate as well as other grasses. It should not be grown upon land which is often plowed. It starts very slowly, and needs four years in which to become fully developed. The first year after seeding, but little of it will appear, and that

will be very small and fine. The next season there will be a little more, the third year a great deal more, while during the fourth season it will make a luxuriant growth. On account of this slow development, orchard-grass seed and clover or oat-grass should be sown with the blue grass. The other grasses will keep down the weeds, and give ample shade. The blue grass will, in time, overpower the other varieties, and take entire possession of the soil. About four quarts of seed are required for an acre. Before sowing, the land should be made rich, and the surface finely pulverized. This grass is one of the very best for pastures, and ought to be more generally used.

Meadow Fescue. — This is an early grass, which thrives on wet land, and gives a good quality of hay as well as excellent pasturage.

Fowl Meadow. — This is a valuable grass for moist soils. It is very early, but, unlike most other varieties, it remains good for several weeks. If grown on rich land, two crops per year can be obtained. The quality of the hay is very good.

Bermuda Grass. — This grass was introduced from the West Indies. It is a permanent plant; once in the soil, it resists all ordinary efforts for its eradication. Cattle like it, and will thrive when kept upon it. It produces a very heavy sod, which is valuable to turn in as a fertilizer for other crops.

In addition to the kinds which have been named, there are many others which are of different degrees of value. There are marsh grasses, which grow only in very wet soils; prairie grasses, which grow wild at the West; and several native grasses which appear at the South. As a rule, the native grasses are of inferior quality, and should be superseded by the finer cultivated varieties. It never pays to grow a poor kind of grass, where a much better one can easily be produced.

When grass seed is used alone, it may be sown either in spring or late in summer. As far as the grass is concerned, the former may be considered the best time, as it gives the plants a longer period in which to develop before they are cut, and enables them to obtain a stronger hold upon life.

But this requires the use of the land two seasons in order to obtain the crop which should be produced in one. On this account, later seeding, which permits the removal of a crop the first year, is usually preferred. The best time for this work is during the month of August at the North and September farther South. Sod land is often turned over for reseeding. The land should be plowed to a medium depth, a fair coating of manure should be spread upon the plowed surface, or guano or grass fertilizer should be sown broadcast upon it, and a wheel-harrow or some other good pulverizer should be used until the surface soil is made fine. The seed may then be sown, covered with a bush-harrow, and the land thoroughly rolled. As a rule, to which the culture of timothy is the prominent exception, it is much better to mix several kinds of grass seed than it is to sow any one of them alone.

The quantity of seed required will depend upon the varieties to be grown, and the purposes for which the grass is designed. Light seeding makes large, coarse stalks, and invites a growth of weeds. Heavy seeding makes finer stalks and nicer hay for cows or sheep. There are extremes in both directions, and both should be avoided. For pastures it is best to sow several different kinds, using seed with a liberal hand. One kind alone will not furnish as many plants or make as vigorous growth as a mixture of different sorts. Besides, some kinds ripen earlier than others, and by sowing several, a succession may be secured, and the pastures be kept green much longer than they otherwise could. In addition, cattle like a variety of food better than any single kind, and thrive better when furnished with many sorts than they do on one alone. In mowing-lots a larger quantity of hay can be secured, and the fields will remain longer in grass, if several kinds of seed are used. But in using different kinds of seed, a wise selection should be made in order to secure a good quality as well as a large quantity of hay. The varieties sown should ripen at the same time, and be grown in suitable proportions. For feeding to horses, for at least half of the time, timothy which is grown without admixture of any kind is liked; but for cows and sheep a variety is to be preferred. The following mixtures, with slight changes, are recommended for one acre of land:—

FOR MOWING-LOTS.

Orchard Grass.....	6 lbs.	Timothy.....	6 lbs.
Red Clover.....	10 "	Red Top.....	4 "
Rye Grass	5 lbs.		

FOR PERMANENT PASTURES.

Meadow Foxtail.....	2 lbs.	Rye Grass.....	4 lbs.
Orchard Grass.....	5 to 6 "	Timothy	4 to 5 "
White Clover.....	5 "	Blue Grass	4 "
Red Clover.....	4 to 5 "	Meadow Fescue.....	4 "
Rough-st'ked Meadow Gr's	4 "	Red Top	4 "

HAY AND PASTURE COMBINED.

Timothy	6 lbs.	Wood Meadow Grass..	4 lbs.
June Grass	4 "	White Clover	4 "
Orchard Grass.....	4 "	Perennial Clover.....	2 "
Rye Grass.....	4 "	R'gh-st'ked Meadow Gr's	2 "
Sweet-scented Vernal Grass.....	2 lbs.		

The care of permanent grass fields, or fields which for several years are to be kept in grass, is very simple. It is one of the great merits of the grass crop that it can be grown with but very slight expense for labor, and with only a moderate quantity of manure. The main things to be done are to give suitable protection, avoid too close cutting, and provide a reasonable quantity of plant-food.

Both mowing-lots and pastures should be occasionally manured. If the latter can be plowed and occasionally seeded, it will be a great benefit except in cases of the fields, which are occasionally seen, in which the best qualities of grass are productive and permanent, and which would be injured instead of improved by reseeding. On all pastures which it is not desirable to plow, manure of some kind, such as guano, plaster, and ashes or other commercial fertilizers, should be occasionally used.

Upon mowing-lots the manure can be applied late in the fall or early in the spring.

HAY-MAKING.

It is always a matter of great importance that the hay-crop be well secured, free from rain, and well made. In the Northern States, farmers depend to a large extent on the hay-crop for the wintering of stock, and some depend wholly on it; hence

it is very desirable that the crop be harvested in good condition. Hay that is well-harvested, cut at the proper time, and neither under nor over dried, is very nearly as valuable as its equivalent quantity of green and succulent grass; while badly-harvested hay, cut much too young or too old, sunburnt with too much exposure, or badly weathered by showers of rain, is so much reduced in value as to be no better, and sometimes worse, than so much straw.

There is ground, therefore, for the anxiety and energy that are brought into play on a farm at the time of hay-harvest. There is plenty of excuse for the laying aside, for the time being, of all other farm operations that can possibly afford to wait, and for directing all the available force toward saving the all-important hay-crop in the best possible condition. When this is done, the farmer always feels as if a weight had been removed from his mind. There is some difference of opinion as to whether or not well-made hay is equal in nutritious properties and in general usefulness to stock to the grass from which it was made. The grass must, as a matter of course, be preserved in some way for use in winter; it cannot in this climate be left on the land and consumed *in situ* through the whole of the year. If it were so left, it would not only become faded and weather-beaten, the nutritive properties having mostly gone back to the roots, but the cattle could not safely remain out-of-doors to eat it. Green grass is, of course, the most nearly perfect food for dairy cows, and it becomes a matter of importance that winter forage should differ from it as little as may be, that it should not suffer in feeding value, and that it should be very nearly as palatable as the grass was at the time of cutting it. When the summer's sun is hot enough and not too hot, when the grass is cut at the right stage of growth, when the hay is carefully and intelligently made, and when there is no rain about, all the valuable properties of the grass are secured in the hay, and water only is given off in the drying. Even the color, the sweet taste, and the pleasant smell are retained, the two latter improved and the former not much reduced; and the solid constituents remain in much the same state of combination as they were in the grass.

Time of Cutting. — A high authority on this subject says :—

“ The time to cut meadow-grass is when the complexion of the field *begins* to wear a brownish tinge. At this stage the bulk of the grasses are flowering, and some of the earliest ones have gone to seed. Very heavy crops should be cut earlier than this, particularly sewage grass, or they will become laid and rotten in the bottom. *Clover should be cut* when the majority of the heads are in blossom ; for if it stands till it has done flowering, the woody fiber increases, and the nutritive qualities decrease in proportion. All grass and clover should, in fact, be cut a little under rather than over ripe, as at this stage they contain a considerable quantity of sugar, gum, mucilage, albuminous and other soluble compounds, which are all liable to be washed out by repeated or long-continued showers of rain, and particularly so after the hay is partly made. While the grass is still newly cut and fresh, a coating of waxy or oily matter is found on the epidermis, giving it a water-proof covering, and protecting it from injury by rain ; this protection remains so long as the grass is fresh and unbruised ; but when it has been turned and knocked about repeatedly, the fibers are more or less bruised or broken, the cell-walls are lacerated, and the juices containing the soluble constituents begin to ooze out and escape, unless the drying proceeds pretty rapidly, sealing them up in the stems and leaves. If rain falls at this period, the drying is checked, the escape of the compounds is promoted, and fermentation sets in, during which the two most valuable properties of the hay are destroyed, viz., albumen and sugar ;” so that in —

Cutting and curing hay, except when grown specially for seed, grass should be cut before the seed has matured. As a rule, grass is at its best when in the blossom. If cut much sooner, it is very watery and innutritious. If allowed to stand much longer, it becomes woody and much of it is indigestible. It is not well to attempt too much at a time. Cut only what can be properly managed.

Grass dries much more rapidly if cut after the dew is off than it will if it is wet when the mowing is done. During the first part of the season, two days will be needed for properly

curing heavy grass. Later, when the grass is nearly ripe, it can be cured in one day. In order to obtain the best quality of hay, rapid drying will be an absolute necessity.

The degree of drying which it receives will greatly modify the quality of the hay. But we do not believe in getting in hay, or rather grass, without any drying. Too little drying is worse than an excess, as it will cause the hay to “smoke,” and it may heat so much as to be utterly ruined. It is best to dry just enough so that the hay will keep well, and come out bright and nice in the spring. All the drying which is given after this point has been reached, is a decided injury. Hay should go into the barn or stack not crisp and dry, but slightly soft and moist in its own juices ; and as soon as properly cured, place it under cover.*

Clover. — This is one of our most valuable agricultural plants. There are a large number of varieties, of which the red and white are of the greatest value to the farmers of this country. Red clover is the most extensively grown, and is regarded as the standard. The seed can be sown upon the snow in the spring, and be allowed to work its way into the soil — with grain in the spring or the fall, or alone or with other grass in August. It is important that there should be considerable moisture in the surface soil at the time of sowing, and that some protection should be afforded from the heat of the summer sun when the plants are small. It often happens that clover sown in the spring with grain succeeds better than that which is sown alone.

The quantity of seed to be used depends upon the soil and the purpose for which the crop is to be grown. From eight to sixteen pounds may be considered as the extremes. The more seed the finer the stalks, and the better the quality of the hay which can be made from them. When sown with the grasses, from four to six pounds on well prepared loams, and eight to twelve pounds on clay land, is about the average.

* In packing or stacking hay, salt should be slightly sprinkled through it so as to destroy insects. It also aids in preserving it bright, and makes it more palatable and healthful for the horse.

Clover is better suited to dry land than to that which is wet. Its long roots enable it to resist the influence of drought to a high degree.

Clover should not be pastured when very young. The cutting of a crop for hay should be done when the heads begin to turn brown, but while most of them are green. In the swath, unless very heavy, it ought not to be stirred open, but be allowed to wilt on the top. It may then be carefully turned over; and when thus partially cured, place on light, slender cocks, and let it remain until sufficiently dry to remove into the barn.

Japan clover, recently introduced from Japan, is especially adapted to the Southern States, not growing well above 36° lat., but growing with great luxuriance on the poorest soils, and retaining vitality in its roots in the severest droughts. It is a fine grazing plant, and needs no resowing and but little attention on soils unfit for anything else. It furnishes good pasture.

Mexican clover is becoming extensively grown in some parts of the South, and is good for green soiling and as a fertilizer. On thin pine lands it grows from six to eight feet branches, and spreads in every direction, forming a thick mat and shade to the earth. It makes a sweet, pleasant-flavored hay, which horses and cattle relish.

NOTE. — The principal authorities consulted in the preparation of this and the preceding chapters are, Sheldon's Dairy Farming, Harris's Manual, Penam's Encyclopedia of Agriculture, Reed's Farming for Profit (Mc Curdy & Co., Philadelphia), and files of agricultural papers.

CHAPTER XVIII.

FRUIT CULTURE.

THERE is nothing that rewards the efforts of the farmer so liberally as the growth of fruit, or gives such an appearance of comfort to the home.



FIG. 318. — Cut too close.



FIG. 319. — Cut too long.

And as every farmer is more or less interested in fruit, we have had this chapter prepared for us by one of the best horticulturists in the country. It is also important to know how to protect them from the ravages of pests in the way of insects; and we have, at considerable expense, endeavored to give such information as would be found

most valuable on the subject.

The first important operation in growing fruit is to have it properly transplanted. Trees should be set out, as nearly as possible, in the same position as that in which they grew, as regards depth and the position of the roots. All mutilated and broken roots should be removed with a sharp knife, and all roots should have a downward tendency from the tree, always digging the holes large enough to admit the roots straight out from the tree. *Never put*



FIG. 320. — As it should be.

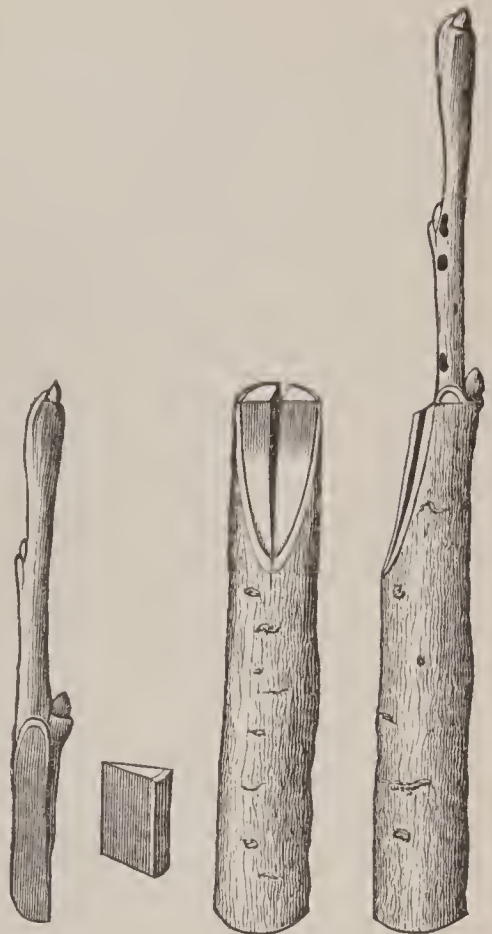
FIG. 321.

any manure in contact with the roots of any tree or plant. Put only finely pulverized top-soil in among the roots, pressing all firmly by tramping with the feet, being careful *not to bruise the roots*. Do not fill up around the tree above the surrounding surface; and leave the surface earth loose, so as not to turn off rains or water put on in dry spells. Put some straw litter or coarse manure around the tree, and in very dry weather, water thoroughly not oftener than once a week; too frequent drenching is very injurious.

Grape-vines should be set from eight to ten inches deep, the ends of the roots cut back to about six or seven inches for one-year-old vines, and eight to ten inches for two-year-olds, the same general rules being observed as in setting trees.



FIG. 325. — Graft adjusted.



FIGS. 322-4. — Method of preparing and adjusting grafts.

Black and red raspberries and blackberries should be set at least five inches deep, so that the canes will be supported by the earth, and stakes can be dispensed with in the cultivation in the field.

Strawberry plants should have one third of the length of root cut off, and be set with the crown just even with the surface.

In pruning red and black raspberries, one fact should be borne in mind, — that a large root with small top will bear larger and better-flavored fruit, and is not as liable to be affected by drought as a root with as large a top as will grow from it. We advise severe thinning

out and cutting back, and are confident that it will be more satisfactory to the grower. Plant thickly, two and one half

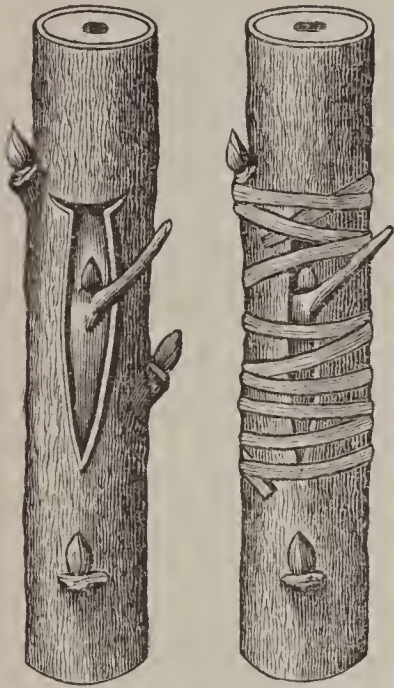


FIG. 326. — Method of adjusting bud.

feet in the row, and rows six feet apart, with three to four canes in a hill, and these pinched back in the growing season to form laterals, and let these be severely pruned. To have the ground filled with roots, and a less number of canes more evenly distributed, secures us more quarts of fruit, which is larger in size, better flavored, consequently commands better prices; and then in dry weather, when others are complaining of their fruit drying up on the bushes, we will experience no such un-

satisfactory results.

GRAFTING.

Since there are so many drawbacks or obstacles in the way of insect pests, droughts, and hard winters, none but valuable varieties of fruits should be grown, and these should receive the necessary attention to secure full crops as far as possible.

For the benefit of such as may not be experienced, we give a brief summary of instructions in the art of grafting, accompanied with illustrations carefully designed and executed, so as to render the subject plain to the reader.

Grafting is the uniting of a shoot, or scion, containing one or more buds, to a stalk or root, with a view, by their union, to produce a superior fruit upon the inferior stalk. Its object is to attach one vegetable to another which is to sustain and furnish matter for its subsistence—to nurse it, in fact. There are various methods of grafting, but we describe here



FIG. 327.
Fruit and wood buds.

only two kinds — *approach-grafting* and *cleft-grafting*, illustrations of both of which are given.

APPROACH-GRAFTING

is an imitation of nature. We sometimes see in forests certain trees, particularly the hornbeam, in which a branch of one is firmly united to a neighboring tree of the same species. This process is practiced artificially to a great extent in gardening. The operator cuts corresponding slices of bark from two trees, brings the two equal places into contact, and lashes them firmly together with cord, which is again covered with some sort of clay, to keep the wound moist until a junction has taken place.

CLEFT-GRAFTING,

which is the method usually practiced, is operated successfully on both the trunks and the roots of trees. It consists simply in splitting a stock which has first been sawed off square, and inserting on each side a scion tapered down with a sharp knife to a thin wedge-shape, so that the inner bark of the scion and that of the stock will just meet. To insure this junction at some point, the top of the graft is sometimes carried in slightly. The whole is then covered with grafting-wax for the purpose of excluding moisture and air, and the grafts usually take kindly, if the grafting be done at the right time of the year — that is, in the spring, before the leaves appear. The grafts may be cut any time in mild weather in winter, tied in small bundles, and kept in moist sand until wanted. By means of cleft-grafting the fruit-grower changes with advantage the products of trees of the same species, making the head bear fruit and flowers other than those belonging to the principal stem.



FIG. 328. — Branch of the cherry.

The only tools for grafting on the farm are a sharp panel-saw, a keen pocket-knife for paring the stalks and sharpening the grafts, a butcher-knife and mallet for splitting the stalks, and grafting-wax for spreading over the mutilated parts.

THE BENEFITS OF GRAFTING.

Old orchards of inferior fruit may be entirely remade and reformed by grafting the limbs with such varieties as we may



FIGS. 329, 330. — Approach-grafting.

desire. A new life is by this process often infused into the trees, which is due to the very severe pruning they then receive. In renewing an old orchard tree by grafting its head, it will not be a good plan to attempt the whole tree at once, as the pruning would be too severe, and would be followed by a profusion of succulent shoots breaking out from the large branches, such as are called water-sprouts.

Those who have practiced most, prefer at first to remove about one third of the limbs for grafting, and those should be selected at the top of the tree. The next year another third of the limbs may be grafted, and the remainder the year following. A good grafting-wax is made by melting together four parts of rosin, two of tallow, and two of bees-wax.

INSECTS INJURIOUS TO FRUIT.

It is very important to every fruit-grower to protect his trees and vines from insect pests, as their ravages are very great, and are becoming more destructive each succeeding year.

ROUND AND FLAT-HEADED APPLE-TREE BORERS.

While these insects prefer the apple, they are at home in the pear and other trees.

These pests are common almost everywhere. They attack the pear, plum, and sometimes the peach, as well as the apple. They do not confine their work to the base of the tree, but affect the trunk more or less throughout, and sometimes the large branches. The eggs are deposited late in June and during July, one in a place, on the bark of the tree, usually near its base. Within two weeks the young worms are hatched, and at once commence with their sharp mandibles to gnaw their way through the outer bark to the interior.

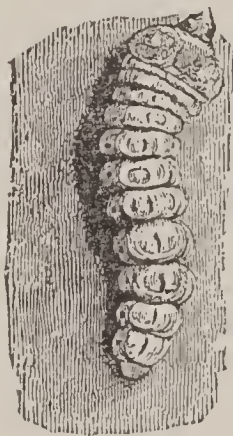


FIG. 331. — Larva of Lorer.



FIG. 332. — Beetle in perfect state.

Take soft soap, and reduce to the consistency of thin paint by the addition of a strong solution of washing soda in water. Apply to the bark of the tree, especially about the base or collar, and up to the crotches. If applied during the morning of a warm day, it will dry in a few hours, and is not easily dissolved by rain. This should be applied early in June and a second time during the early part of July.

THE WOOLLY-LOUSE OF THE APPLE.

This is the same species as the Apple-root Plant-louse, but in this form the insects attack the trunk and limbs of the apple-tree, living in clusters, and secreting over themselves small patches of a cotton-like covering.

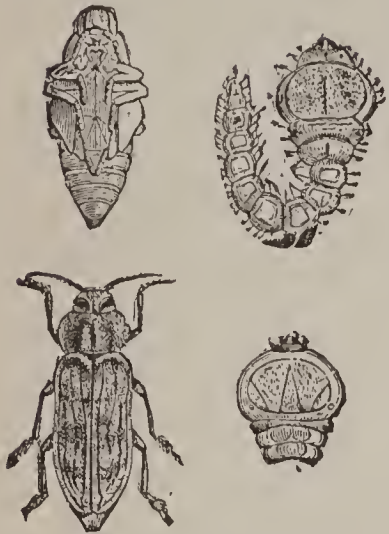


FIG. 333. — Flat-headed apple-tree borer.

The vigorous use of a stiff brush wet with the alkaline solution of soap, recommended under the Round-headed Borer, will be found very efficient; or a solution made by mixing five pounds of fresh lime with one pound of sulphur and two gallons of water, and heating until the sulphur is dissolved. After destroying those on the trunk and cutting away all suckers, the earth should be removed from above

the base of the trunk, the parts below the surface cleaned, and fresh earth placed about the roots.

OYSTER-SHELL BARK-LOUSE.

This appears in the form of minute scales, about one sixth of an inch long, of a brownish or grayish color, closely resembling that of the bark of the tree, and somewhat like the shell of an oyster in shape, adhering to the surface of the bark, and placed irregularly, most of them lengthwise of the limb or twig, with the smaller end upward. In some instances the branches of apple-trees may



FIG. 334. — Yellow-necked apple-tree caterpillar.

be found literally covered with these scales. (See Fig. 336.)

During the winter, the trees should be examined, and the scales scraped off. The insect should be fought also at the

time when the eggs are hatching, late in May or early in June, and the young lice are crawling over the limbs, as they are then tender and easily killed. With this



FIG. 335. — Codling moth, magnified.

object in view, the time of hatching of the remnants left after the winter or spring scraping should be watched; and while the young larvæ are active, the twigs should be brushed with a

strong solution of soft soap and washing soda, as recommended under the Round-headed Borer, or syringed with a solution of washing soda in water, made by dissolving half a pound or more in a pailful.

THE APPLE-TREE TENT-CATERPILLAR.

The Tent-caterpillar is easily detected by its conspicuous nest; the larvæ may easily be destroyed while sheltering within it. Repeated visits to the orchard should be made, and not a fragment of a nest be permitted to remain.

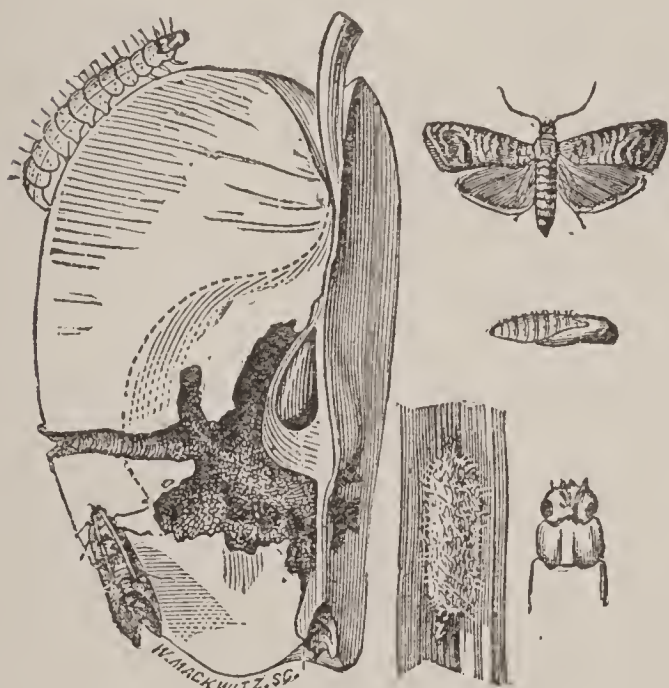


FIG. 337. — Codling moth and larvæ.

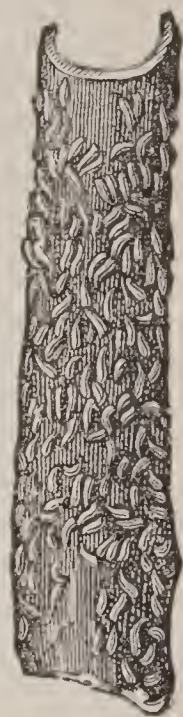


FIG. 336.
Oyster-shell bark-louse.

CANKER-WORMS

usually hatch about the time when the young leaves of the apple push from the bud, when the little Canker-worms cluster upon and consume the tender leaves. These caterpillars are called Loopers, because they alternately loop and extend their bodies

when in motion. Tar mixed with oil to prevent its drying, and applied either directly around the body of the tree or on strips of old canvas or stiff paper, about five or six inches wide, and tied in the middle with a string, may be used with success. It

should be applied as early as the latter part of October, and kept on until the leaves expand in the following spring.

THE CODLING-MOTH.

This is one of the most troublesome insects with which fruit-growers have to contend, and is found in almost all parts of



FIG. 338. — Male.



FIG. 339. — Female.

Apple-tree tent caterpillar.

North America. The early brood of moths appear on the wing about the time of the opening of the apple-blossoms, when the female deposits her tiny yellow eggs singly in the calyx, or eye, just as the young apple is forming. In about a week the egg hatches, and the tiny worm at once begins to eat through the apple to the core.



FIG. 340.
Twig-girdler.

The most effective method yet devised for reducing the numbers of this insect is to trap the larvæ and chrysalids, and destroy them. This is best done by applying bands around the trunks of the trees about six inches in width. Strips of old sackings, carpet-cloth, or fabric of any kind, will serve the purpose; and, although not so durable, many use common brown paper. Whatever material is used, it should be wound entirely around the tree once or twice, and fastened with a string or tack. Within such inclosures the larvæ hide and transform. The bands should be applied not

later than the first of June, and visited every eight or ten days until the last of August, each time taken off and examined, and all the worms and chrysalids found under them destroyed. They should also be visited once after the crop is

secured. All fallen fruit should be promptly gathered and destroyed.

THE TWIG-GIRDLER.

This beetle nearly amputates pear twigs during the latter half of August and the early part of September. To subdue



FIG. 341. — Humming-bird hawk-moth.

the insect, all dead and fallen twigs should be gathered and burned.

THE PLUM CURCULIO.

This insect is the greatest enemy the plum-grower has to contend with. It is a small, rough, grayish, or blackish beetle, about one fifth of an inch long, with a black, shining hump on the middle of each wing case, and behind this a more or less distinct band of a dull ocher-yellow color, with some whitish marks about the middle; the snout is rather short.

When the Plum Curculio is alarmed, it suddenly folds its legs close to its body, turns its snout under its breast, and falls to the ground, where it remains motionless, feigning death. Advantage is taken of this peculiarity to catch and destroy the

insect. A sheet is spread under the tree, and the tree and its branches are suddenly jarred, when the beetles fall on to the sheet, where they may be gathered up and destroyed.



FIG. 342. —Larvæ of the grape-vine flea-beetle.

THE GRAPE-VINE BARK-LOUSE.

During the month of June there are sometimes found on the branches of the grape-vine, brown, hemispherical scales, from under one end of which there protrudes a cotton-like substance, which increases in size until the beginning of July, by which time it has become a mass about four times as large as the scale.

These scales are not usually found in any great abundance, and may be readily scraped off with a knife or other suitable instrument, which should be done before the young lice escape.

THE AMERICAN PROCRIS.

The larvæ of this destructive insect feed on vines in flocks.

While young, the little caterpillars eat only the soft tissues of the leaves; but as they grow older, they devour all but the larger veins. They acquire full growth in August. They can be destroyed by syringing the

foliage with Paris-green and water, in the proportion of a teaspoonful to two gallons.

THE GRAPE-VINE FLEA-BEETLE.

This little beetle forces itself upon the attention of grape-growers very prominently in the spring season, when it commences its work of destruction by eating away the substance of the buds as soon as they begin to swell. (See Fig. 342.) In three or four weeks the larva attains full growth, when it is a little more than three tenths of an inch in length.



FIG. 343. — The American procris.

To destroy the beetle, it is recommended to strew in the autumn air-slaked lime or unleached ashes around the infested vines, removing and destroying all rubbish which might afford shelter. In the spring the canes and young foliage may be syringed with water in which has been stirred a teaspoonful of Paris-green to each gallon.



FIG. 344. — The vine pyralis.

THE ROSE BEETLE.

This beetle, commonly known as the Rose-bug, is very injurious to the grape-vine, the apple, the cherry, the peach, the plum, etc. These beetles sometimes appear in swarms about the time of the blossoming of the rose, which here at the North and in Canada is usually during the second week in June. They remain about a month.

When numerous, these insects may be detached from the vines with a sudden jar, falling on to sheets spread below to receive them. They are naturally sluggish, do not fly readily, and are fond of congregating in masses on the foliage they are consuming; and hence in the morning, before the day warms, they can be easily shaken from their resting-places, collected, and destroyed.

The latest and best work on this subject brought to our notice, is published by J. B. Lippincott Co., Philadelphia, entitled "Insects Injurious to Fruit," from which we have taken the liberty of quoting. Another most excellent work quoted from is "Barry's Fruit Garden," published by the "Orange Judd Company," New York.

BIRDS AN AID.

A PLEA FOR THEM.

An important aid in combating injurious insects is birds; and with the view of protecting them, I add a plea in their behalf, of which I would ask a careful reading.

Birds are to the farmer in melody what flowers are in fragrance to the home. There is nothing more cheering around the farm than the singing of birds. But they are not merely a source of pleasure or ornament, they have a positive sphere of usefulness. It is a well-known fact that were it not for the birds, the farmer could scarcely raise anything; for they are constantly engaged in the destruction of insects that prey upon crops, trees, and plants. Therefore every farmer ought to be the friend and protector of birds, and do as much for them as they do for him.

The exigences of fashion have caused a most cruel and wanton destruction of birds for their feathers, with which to ornament ladies' hats and other parts of their apparel. While, from a humane point of view, this practice cannot be too strongly condemned, there is another aspect in which it appeals to the practical sense of every farmer. The very birds which are so sought after by the votaries of fashion are those

which do the most efficient service for the farmer in destroying the insects which feed upon his crops, trees, and plants.

We present illustrations of a few species of birds of beautiful plumage thus hunted for their fine feathers, regardless of the benefits they confer as destroyers of injurious insects.

We cannot better enforce the appeal we desire to make on this subject than by quoting an extract from an eloquent sermon delivered in 1886 by the eminent divine, the Rev. Henry Ward Beecher:—

“There is another department of the animal kingdom of which I wish to speak. I mean birds. I hardly know how this world would get along without them. They toil not,



FIG. 345. — Warblers.

any more than the lily, neither do they spin. Yet a summer without birds would seem almost to be no summer at all. Some of the most salient of our inspirations are connected with bird-song. I don't suppose that if you live in the city you know anything about it, because the little dribblets of bird-songs that men hear in the daytime are no adequate revelation of their minstrelsy.

“It is in the summer my habit to rise about half-past three of an unclouded morning—not to stay up, but at about four to hear the leading notes, the call of the chorister, usually in some near tree; a little piping noise, as much as to say:

‘My dear, are you awake?’ And that wakes some other one in a little further tree; and one note joins to another, until the birds in all the neighborhood are aroused, and then all at once there breaks out such a choir of song of every description that it would seem as if the heaven was packed full of birds from end to end, and that the whole neighborhood was a gigantic organ. That holds on for half an hour or so; then they go to breakfast, and I go back to bed. Their grace of motion, their beauty of plumage, the interesting study that there is in their nidification and in the rearing of their young, add also to this



FIG. 346. — Golden and Fire-Crested Wrens. Feed on tree-creepers.

vocal reason, making the birds among our most attractive summer interests. They are not only this to the fancy and to the emotions, but they are our benefactors. For it may be said, I think, that, in the temperate and tropic zones, the development of insect life is so enormous that if they were not to be reduced by the birds' feeding upon their eggs or upon them, it would be almost fatal to our wheat-fields, and certainly fatal to both our fruits and our flowers in the garden. And every horticulturist ought to be a benefactor of the birds; and to the end of his life he won't do as much for them as they have done for him.

“Now, it has become a fashion to adorn bonnets and dresses with the skins of birds; and, as color is in great de-

mand, the most beautiful of them all are selected for that purpose. And to such an extent is it carried that there is really danger that many kinds of birds will be exterminated in many portions of our country. They keep nobody warm; they are not necessary; they serve no one end except that of taste, and only taste, in fashionable circles. I admit their beauty; I admit the charm that there is connected with them, whether upon the fan, or upon the bonnet, or upon the breast, or upon the skirt. There can be no question of that. Nevertheless, it is inhuman. The slaughter of the birds that is going on is such as ought to arrest the attention of every Christian woman who decorates herself with the skins, and it ought to be with her a question: 'Am I of the spirit of Christ and of the spirit of humanity in indulging my sense of the beautiful by a method that almost insures their destruction?' I don't suppose that any amount of preaching would do much good in general. The appeal which I make is to woman. And if there be any portion of the community that is more sensitive to reasons of humanity, that is more shocked by cruelty, it certainly is woman. And I have a right to ask every reflecting Christian woman whether her happiness, her sense of the beautiful in taste, demand that she should encourage a traffic which insures this destruction of the feathered songsters. For they are brought by the hundreds of thousands into the market, from Canada to Florida, and from the Eastern coast to the Mississippi and beyond, and it increases year by year, and it will increase just so long as fashion demands them.

"Now, I have long ago made up my mind that fashion was a thing not accessible. And, therefore, to preach to fashion is love's labor lost; but it is not imperious in this respect—it is optional. I am perfectly certain that if thoughtful and humane Christian women would set their faces against it, the danger would be greatly diminished. And as all fashions are like tides that go out and come in, we should at least have a vacation in the destruction of innocent birds. We have laws for the protection of fish and deer, plovers and quails, and for nesting birds; I think there ought also to be a law for the protection of birds of plumage. Some twenty-five or

thirty years ago there were introduced into Staten Island or the eastern end of Long Island, hundreds of cages of the European skylark. They were let out in the spring, they took kindly to our climate, they nested and bred, and one could go down the Island a little way and really hear that most sonorous chant of the skylark ascending, and it looked as though, at last, we had introduced a new bird, and one most delightful. But the German pot-hunters on Sunday took their little nasty guns and went out, and in less than two years they had shot

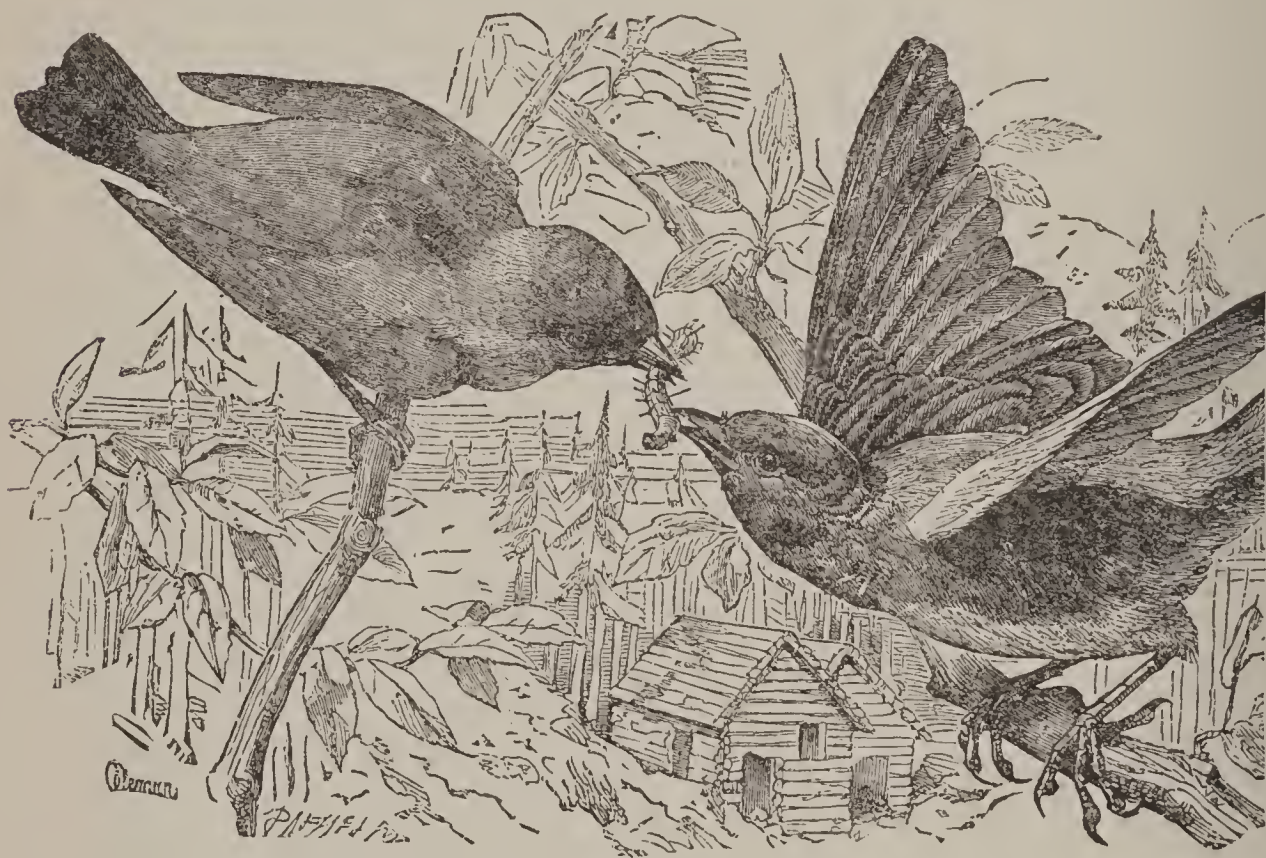


FIG. 347. — Blue-birds. Feed on spiders, small worms, and various insects.

them all away ; for they are one of the most easy of birds to be shot, and we are without them almost entirely.”

A leading journal of New York City, the *Sun*, recently had the following array of facts on this subject : —

“A single local taxidermist handles 30,000 bird-skins in one year ; 11,000 skins were brought back from a three months’ trip by a single collector ; from one small district on Long Island, about 70,000 birds were brought to New York in four months’ time. In New York, one firm had on hand, Feb. 1, 1886, 200,000 skins. But the supply is not limited by domestic consumption. American bird-skins are sent abroad. The

great European markets draw their supplies from all over the world. In London there were sold in three months from one auction room 404,464 West Indian and Brazilian bird-skins, and 356,389 East Indian birds. In Paris 100,000 African birds have been sold by one dealer in one year. One New York firm recently had a contract to supply 40,000 skins of American birds to one Paris firm."

These are startling figures, and should arrest the attention of those of the fairer sex who encourage, by wearing the feathers of dead birds, the frightful destruction thus going on in our own and other countries. It is earnestly to be hoped that the noble efforts of the American Humane Society and its various branches throughout the country, for the preservation of the feathered songsters from the ruthless hands of the hunter who caters to the vitiated tastes of capricious and imperious fashion, will be effectual, and that the time will come when the wanton killing of a bird or the despoiling of its nest by either man or boy, for any purpose, will not only be considered disreputable, but be punished by severe legal penalties.

NOTE.—The author was present when the famous and eloquent Rev. Henry Ward Beecher delivered a sermon in which the above plea for birds was made. It impressed the writer so forcibly that at the close of the service he went to the stenographer and arranged to obtain a copy of the part here presented. It is given as one of the finest tributes of the kind ever put in type.

CHAPTER XIX.

TEETH OF CATTLE.

IT is often of considerable importance to determine the age of cattle, and the common method of doing this is by an examination of the horns. This, however, is a very uncertain method, and the inexperienced are often misled by it. Sometimes the file, sand-paper, and oil are used with the intent to mislead. It is only in the cow that the rings on the horns are distinct. The first ring is usually, though not always, formed at the age of three years. If a heifer takes the bull at two years of age, or a little before or after that period, the first ring will appear, so that a three-year-old may sometimes bear the mark of a four-year-old. On the horns of a bull the rings are not seen until the age of five years, and occasionally they are not seen at all. In the ox they do not appear before the age of five, and then they are often indistinct. So that the teeth* remain the truest criterion by which to judge the age of cattle.

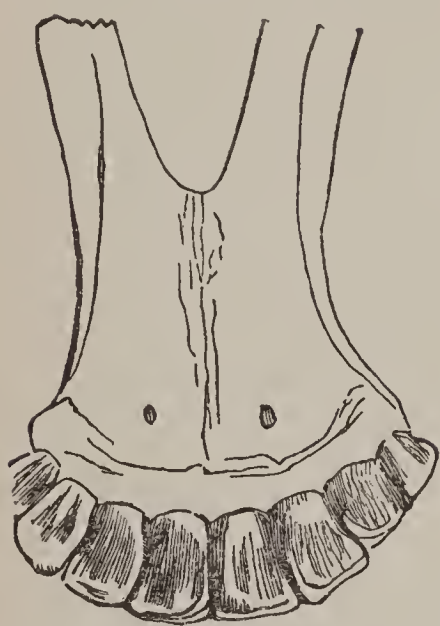


FIG. 348. — Teeth of the ox.

The description of the teeth is given so concisely in the



FIG. 349. — Teeth at birth.



FIG. 350. — Teeth in second week.

* For diseases of the teeth, the reader is referred to page 171 in Horse Dep't.

work of our friend, Robert Tennings, V. S. (now of Detroit, Mich.), on "The Horse and Other Live Stock," that we cannot



FIG. 351. — Teeth in third week.



FIG. 352. — Teeth after one month.

do better than make a free use of his language in our description.

At birth, the calf usually has two incisors, or front teeth. In some cases these are just appearing through the gums ; but

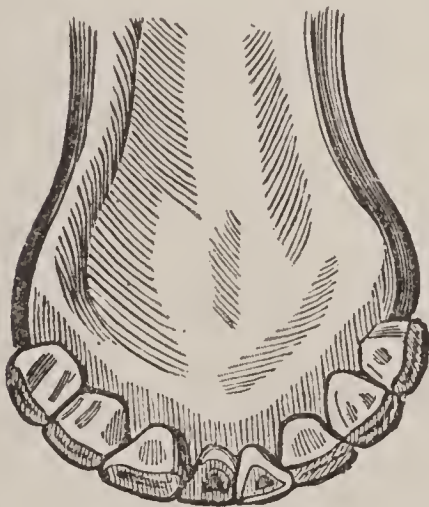


FIG. 353. — Five to eight months.

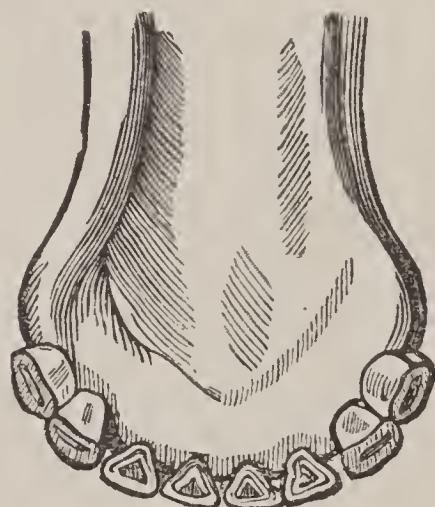


FIG. 354. — At ten months.

if the cow has overrun her regular time for several days, the teeth will be fully set, as seen in Fig. 349.

During the second week, a tooth will usually appear on each side, as shown in Fig. 350.

Before the end of the third week, the animal will usually have six incisors (Fig. 351).

In another week, two more will have come through, completing the number of incisors, which will appear as represented in Fig. 352.

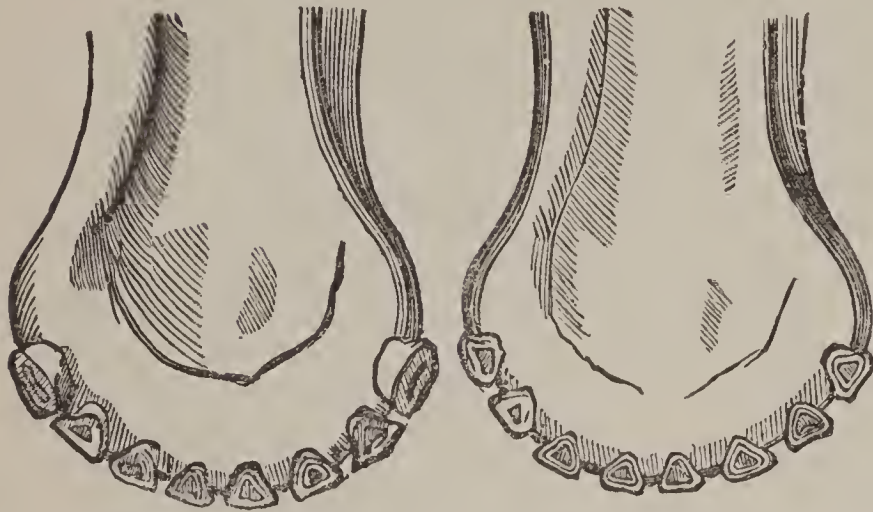


FIG. 355. — At one year. FIG. 356. — Fifteen months.

These are the milk-teeth, or temporary teeth. They wear away as the animal begins to eat solid food, and thus indicate the length of time they have been used. The middle incisors,

being the oldest, first show the marks of age and wear, and often become somewhat worn before the corner teeth appear. The four inner teeth do not appear to wear so much on the outer edge as on the inside. At the end of eight weeks they are nearly as sharp as ever. After this period the edge gradually wears down until the tooth presents a more flattened surface, while the next outer teeth wear down in the same way. At the end of three months this wearing away is very apparent, and at four months all the incisors show marks of

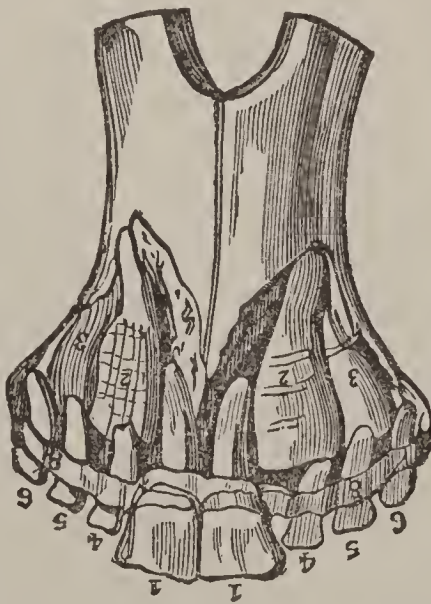


FIG. 357. — Eighteen months.



FIG. 358. — Two years.

wear, the inner ones showing the most. The teeth now begin to diminish in size, as well as to wear down, and they gradually separate.

The appearance of the teeth from the fifth to the eighth month is represented in Fig. 353.

At ten months, the change shown in Fig. 354 is clearly seen. The spaces between the teeth now begin to show very plainly.

At the age of one year, they usually present the appearance shown in Fig. 355; and at the age of fifteen months, that represented in Fig. 356. The corner teeth are now not more than half their original size, while the middle teeth are still smaller.

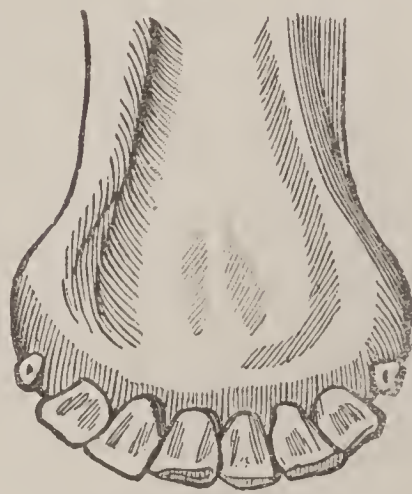


FIG. 359. — Three years.



FIG. 360. — Four years.

At the age of a year and a half, the two permanent middle incisors have made their appearance. Fig. 357 shows these, the internal structure of the lower jaw at this age, and also the cells of the teeth. The two middle teeth have come through the jaw, the next two have not yet reached the surface, while the third pair are just perceptible.

At two years past, the jaw usually presents the appearance shown in Fig. 358, four of the permanent teeth being now

seen. After this the milk-teeth disappear slowly. At three years the third pair of permanent teeth have but just appeared (Fig. 359). At four years the last pair of incisors will be through (Fig. 360), but the

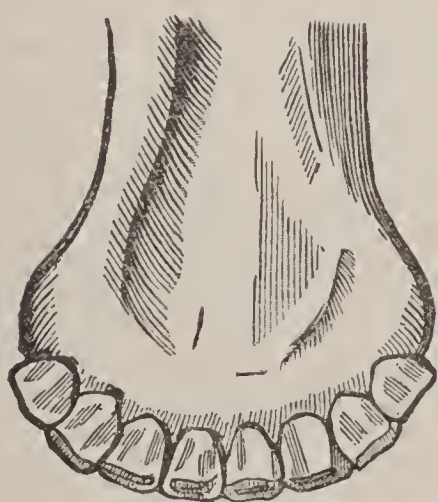


FIG. 361. — Five years.

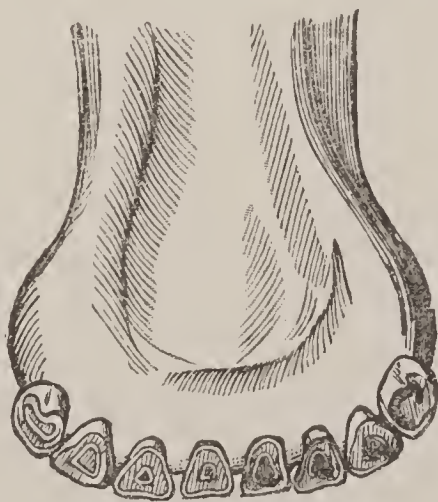


FIG. 362. — Ten years.

outside ones are not yet fully grown, as is the case in the horse at the same age. The two inner pairs of permanent teeth are beginning to wear at the edges, as shown in the cut. The ox

can hardly be said to be full-mouthed until it has reached the age of five years. The whole set has now become somewhat worn down at the top, and on the two middle teeth a dark line appears in the center, along a line of harder bone. This can be seen in Fig. 361.

There now comes a period of a year or two, and sometimes three, in which the teeth do not indicate so clearly the exact age. During this period the judgment must be guided by the extent to which the dark central lines are worn, which, however, will depend in some degree upon the feeding and exposure of the animal. At the age of seven these lines extend over all the teeth. At eight years of age another marked change begins. A slow but perceptible process of absorption begins with the two middle incisors, which become smaller than the others. The dark lines have now become worn into one in all but the corner teeth. At ten years of age, four of the central incisors (Fig. 362) have become smaller, while the central marks have grown fainter. At the age of eleven, the six inner teeth are smaller than the two outside ones. At twelve years, all the teeth have become smaller, the dark lines have nearly disappeared, except in the corner teeth, and the inner edge is now worn down to the gum.





FIG. 363. — Model dairy-barn.

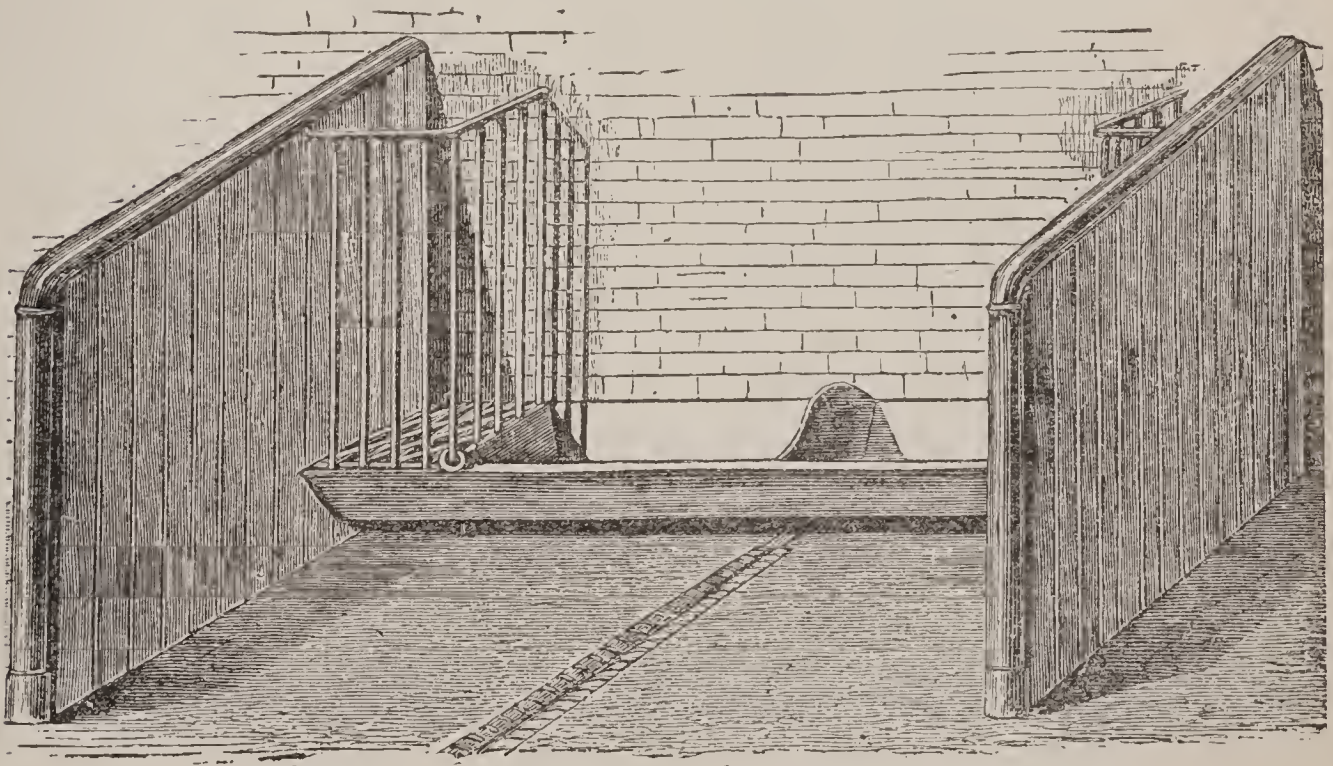


FIG. 364. — Convenient stall for two cows.



FIG. 365. — Hay-loader at work.

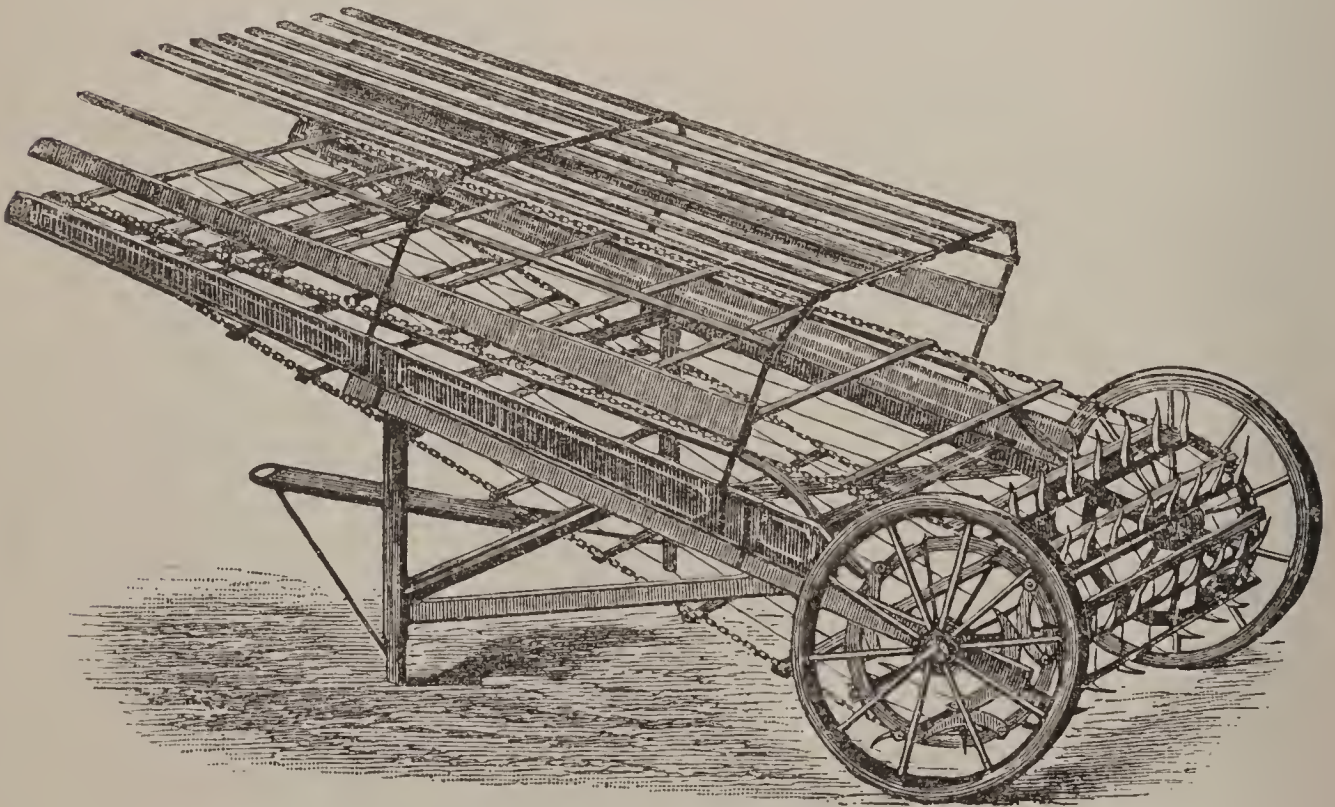


FIG. 366. — Hay-loader.

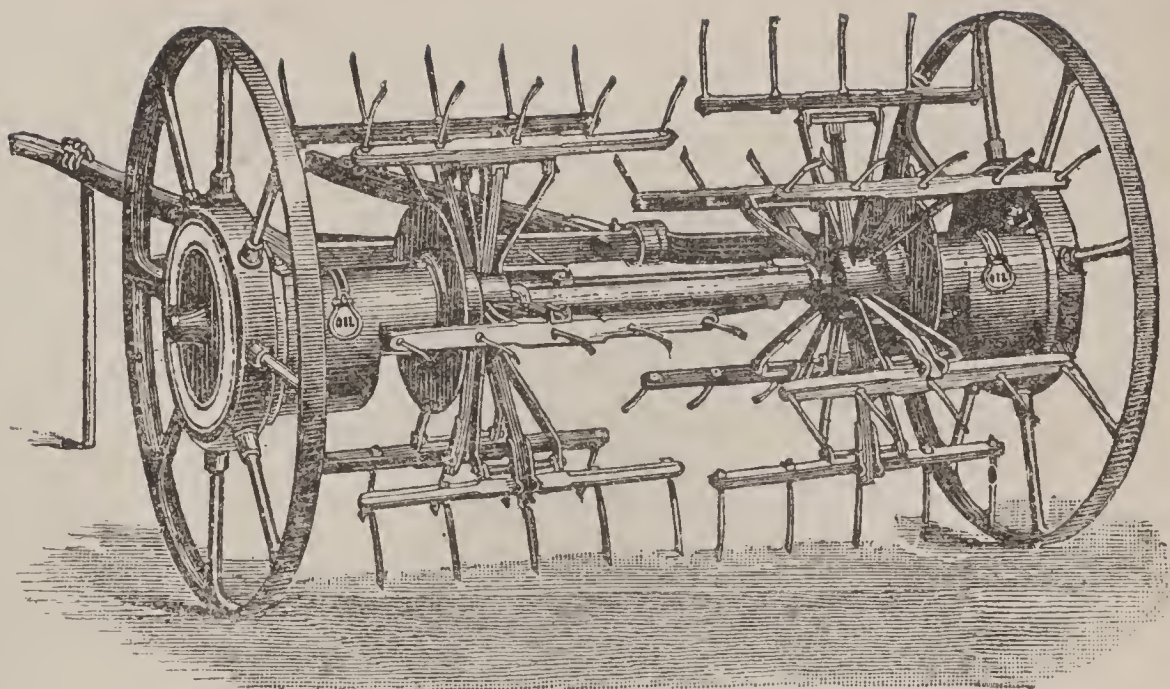


FIG. 367. — Hay-maker.

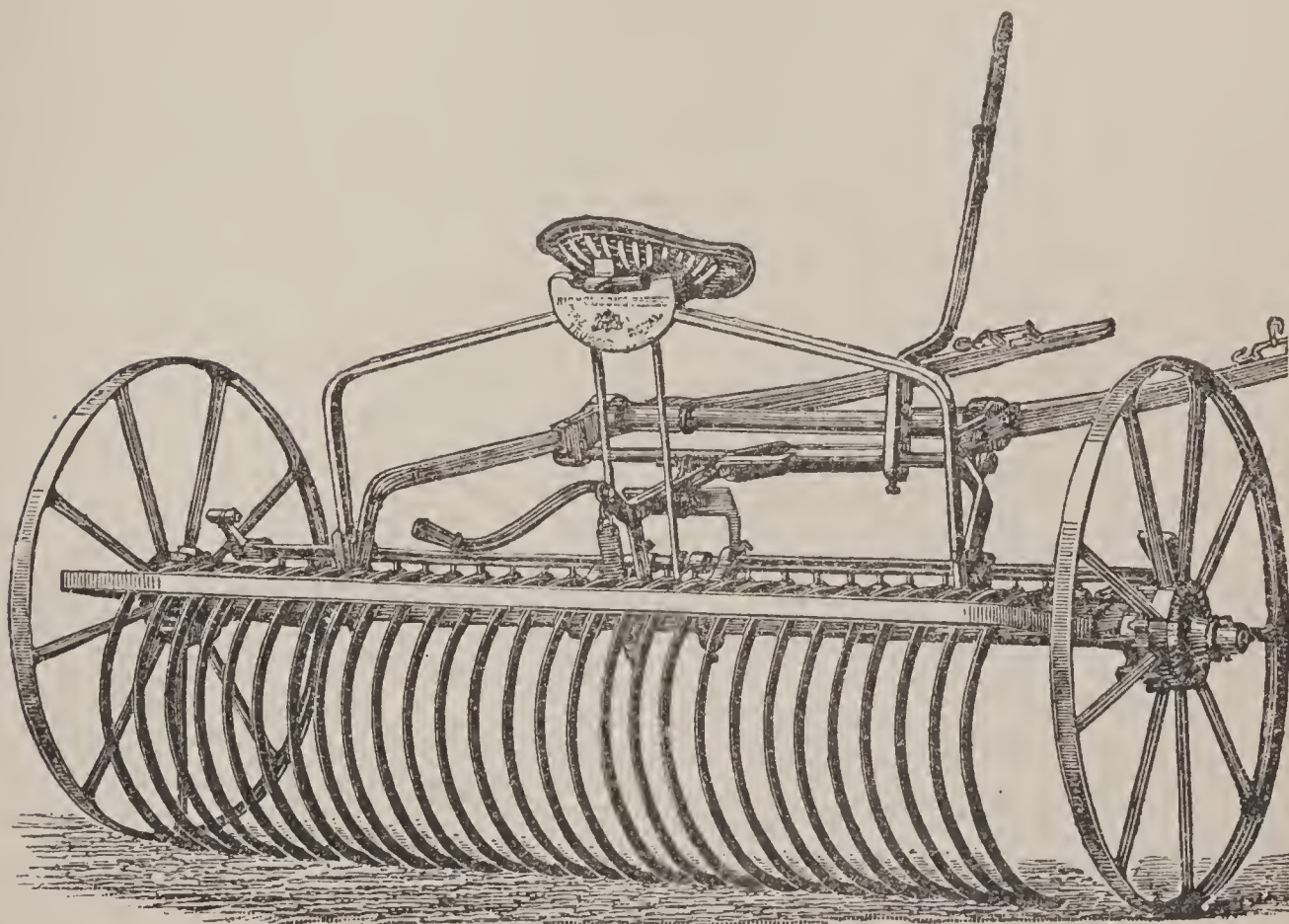


FIG. 368. — Horse-rake.

CHAPTER XX.

DAIRYING.

THE consumption of milk, butter, and cheese in this country, with the amount exported to Europe, is sufficient alone to give a controlling direction to the finances of the nation. These facts have of late years contributed in a

wonderful degree to encourage and stimulate the importation and development of the best breeds of stock, until results have been reached as unprecedented as they are gratifying.



FIG. 369. — Model Short-horn.

POINTS OF A COW.

The desirable points of a cow may be thus stated:—

As the first and most essential qualification, she should have a good and sound constitution. Such a constitution is indicated by strong lungs, deep, broad, and prominent chest, and broad, well-spread ribs; a respiration somewhat slow and regular; a good appetite; an abundant milk-giving capacity;

and also a strong disposition to drink, which a large yield of milk almost invariably stimulates.



FIG. 370. — Another Short-horn.



FIG. 371. — Premium Short-horn.

The digestive organs should be strong and energetic to make an abundance of good blood, which in turn stimulates the action of the nervous system, and furnishes the milk glands with the means of copious secretions.

The mouth should be large and broad; the eye bright and sparkling, but of a marked placidness of expression, with no indication of wildness; but, on the contrary, of a mild, feminine look. The horns should be small, short, yellow, and tapering. The neck should be small, thin, and tapering toward the head, but thickening when it approaches the shoulders. The

fore quarters should be small when compared with the hind quarters.

The form of the barrel should be large, and each rib project farther than the preceding one up to the loins. She should be well formed across the hips and in the rump. The spine, or back-bone, should be straight rather than loosely hung, or open along the middle part, — the result of the distance be-

depression or swaying in the back.



FIG. 372. — Another head of Short-horn cow.

The rump should be of great weight, and the pelvis large; the organs and milk vessels in the cavities should be largely developed. The skin over the rump should be loose and flexible. In fact, the skin all over the body should be soft and mellow to the

touch, with smooth, glossy hair. The tail should be rather thick at the setting on, and taper down fine below.

The udder is of special importance. It should be large in proportion to the size of the animal, and its skin thin, with soft, loose folds extending away back, capable of great distension when filled, but shrinking to a small compass when empty.

M. Guenon, of Bordeaux, France, a close observer of stock, after long observation and experience, laid down especial rules for the guidance of dairymen in the selection of the best points for milk in cows, or what he denominates the “mirror escutcheon.” These consist mainly in the connection between the

milking qualities of the cow and certain external marks on the udder, and on the space above it, called the *perinæum*,



FIG. 373. — Head of Long-horn.



FIG. 374. — Head of Long-horn.

extending to the buttocks. To these marks he gave the name of the “milk-mirror,” or “escutcheon,” which consists, as defined by him, of certain perceptible spots rising up from the udder of the cow in different directions and sizes, in which spots the hair grows upward, while that on other parts of the body grows downward.

These peculiar marks M. Guenon reduces to several distinct classes, and these classes he again subdivides to such a degree as to render the

classification beyond ordinary comprehension, and practically worthless for reference, making them scarcely worthy the space they would occupy should we here reproduce them.

It would, however, be useless to advise even the ordinary breeder or farmer as to the class of animals he should buy or raise. He must be governed by the requirements of the market. If he sells his milk direct, then he must aim to get those of large milk-producing qualities; if the milk goes to make butter or cheese, he should seek out the breeds known to excel in those directions; whereas if meat is more salable, he



FIG. 375. — Model dairy cow.

must study to meet that want. In any event, he must aim to have the best animals of their class. It costs no more to feed and care for a good animal than it does to do so for a poor one, the difference being in the first cost only.

VARIOUS BREEDS OF CATTLE.

SHORT-HORNS.

The highest priced cattle are the regular Short-horns, which are now so noted, and of which there are different breeds, each

having its peculiar qualities, while each individual has its own especial characteristics. Short-horn cattle are marked by their symmetrical proportions, and by their great bulk on a comparatively small structure, the limbs being generally small and fine. The head of the Short-horn is expressive, being rather



FIG. 376. — \$40,000 Short-horn.

broad across the forehead, tapering gracefully below the eyes to the open nostrils and fine, flesh-colored muzzle.

The eyes are bright, prominent, and of a peculiarly placid expression, the whole countenance being remarkably gentle; the horns, springing well from the head, curl downward briefly; and the ears are fine, erect, and hairy. The neck is thick; the back broad and flat; the hind quarters long and well filled in;

the thighs meet low down. The color varies from a soft white to a deep red, and the skin is soft and mellow.

We present in these pages a large number of portraits of notable specimens in the different breeds of Short-horns and others, as they have been developed in the process of improving and enhancing the value of the stock to meet the advancing requirements of the market, deeming this more important than labored details or descriptions.

LONG-HORNS.

Long-horned cattle once occupied a very high position



FIG. 377. — Best illustration of the milk escutcheon.

among breeders, and they have their champions to-day among dairy and cattle men of standing. The most prominent breeds among the Long-horns are the Herefords and the Devons, while the Sussex cattle stand deservedly high. The Herefords and the Devons were formerly not regarded with favor as dairy cattle, but both breeds are now turning out good milkers. It is also claimed that the Sussex cattle

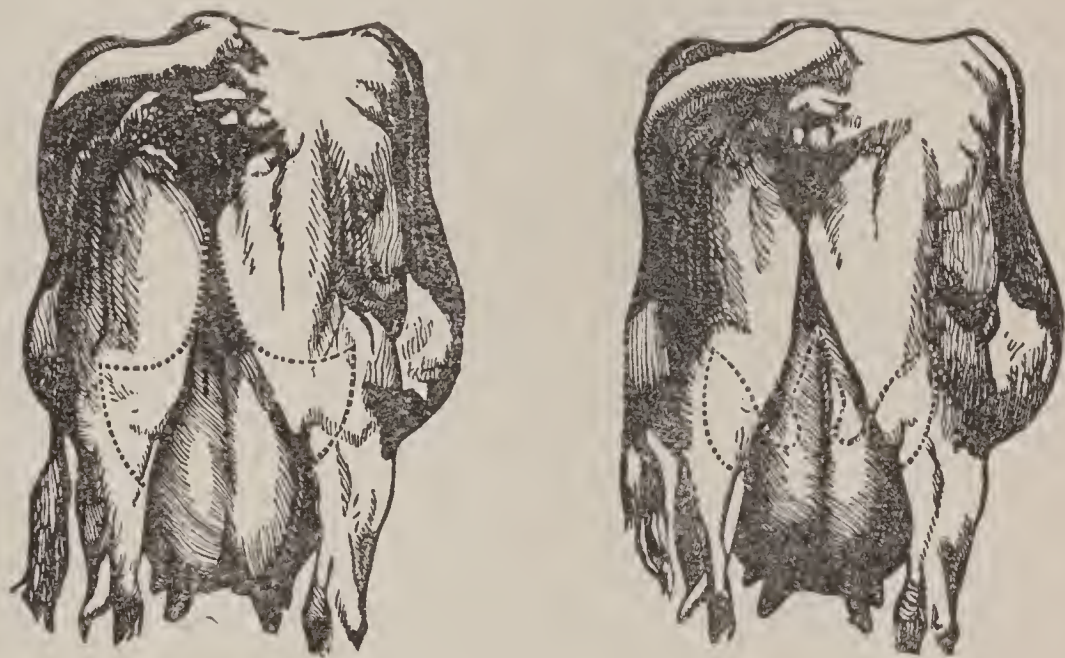
are latterly proving profitable for the dairy.

The Hereford race of Long-horns are a peculiarly abundant flesh-producing race, displaying great aptitude to fatten, and are unsurpassed for early maturity. The Herefords are great favorites in this country as well as in Canada.

The Devon cattle are a race of Long-horns that have become famous throughout the world. They are not remarkable for giving large quantities of milk, but their milk is exceedingly rich. As butter-makers they are unexcelled.

POLLED CATTLE.

The polled cattle, popularly known in this country as "mulley" cattle, are favorites wherever they exist, and many



FIGS. 378, 379. — Different forms of the milk escutcheon.

of our dairymen are turning their attention to the cultivation of this stock, the cows of which show good milking qualities.

FEEDING COWS.

No branch of dairy farming is more important than the feeding and treatment of cows, and yet none is more generally neglected. The direct influence of what the cow eats and drinks upon the milk she produces cannot be too strongly impressed upon the attention of the farmer. And of equal importance are the conditions under which food and drink are taken. If the cows be chased by dogs, or overdriven or worried by boys, on their way to pasture, their milk will surely show the effects in a deterioration of quality. If their shelter in winter be insufficient, and the food not sufficiently nutritive, the penalty will invariably be paid in a smaller milk

yield. These retributions are inevitable. One of the greatest mistakes farmers make is in supposing that they can with impunity keep their cows on "short commons" during the winter, and that they will pick up in the spring, and milk as well as ever. A cow reduced to meagerness by semi-starvation must first of all supply the wants of her system and get back into decent condition, before she can possibly give milk



FIG. 380. — Jersey Short-horn cow, "Belle of Scituate."

in either richness or abundance. While some recover from a winter's starving, many never do.

Milk from cattle fed on poor land is deficient in fatty matter, and is therefore better adapted for cheese-making than for butter-making. Again, the more exercise an animal takes, the greater will be the waste or breaking up of the tissue of the body; and, as this is the source from which the curd in milk is derived, milk produced on land whose herbage is scanty will contain a larger proportion of curd than milk produced on land

whose herbage is abundant. And so the milk of unduly exercised cows, in whatever manner the exercise be brought about, whether in search of food on poor land, or in any other way, will likewise have a large proportion of caseine in it, and a small one of butter.

Prof. G. D. Caldwell, of Cornell University, says: "That the composition of the milk may change with the changes in



FIG. 381. — Cross of the buffalo, or bison, with domestic breeds of cattle.

the composition of the food in the animal producing the milk, is a principle fully established by the results of both experience and experiment. Within certain limits the milk may be made poor or rich by supplying poor and watery or rich fodder."

ARTIFICIAL FEEDING.

In artificial feeding of cattle, the flesh-forming and heat-producing elements should bear a given relationship to each other, according to the season. If a cow is not in milk, she

may not need any more albuminoids than in warm weather; but she will need more heat-producing food. But when she is in milk, she will require a much larger proportion of albuminoids; so that to keep up the flow of milk she must receive those kinds of food in which albuminoids bear a larger proportion, as compared with heat-producing materials.

For milk-producing, grass is the most perfect food for cows. To increase the quantity and value of milk for cheese-



FIG. 382. — Cross-breed Jersey — Ayreshire heifer.

making, artificial food rich in nitrogenous matters — albumen, caseine, legumen, etc., — may be fed; to increase the butter-making qualities of the milk, non-nitrogenous food may be given, in which there is a large proportion of starch, gum, sugar, oil, etc. In winter it is desirable to steam the food, or moisten it with water or pulped turnips, and allow it to lie together in a heap until the fiber is softened by incipient fer-

mentation. In cold weather, tepid water given to cows will increase the flow of milk.

REGULATION OF FOOD.

It is impracticable to establish any system of rules for the regulation of the quantity of food which dairy cows should be given. The capacity of each cow must govern the amount of nourishment she is to receive. But one point should ever be borne in mind, — cows should never be overfed. They should receive no more and no less than what they will eat up clean. In no department of dairy farming is intelligent and discriminating judgment more imperatively needed than in this; in order also to have healthful, nutritious milk, the whole system of the cow must be in a thoroughly healthy condition.

In the process of milking, the keeping of the teats well cleansed while milking, and the avoidance of permitting any dirt, dust, hairs, or other impurities to fall into the pail, are points which scarcely need to be enforced upon the attention of dairymen of judgment and taste.

A cow will soon fail in her flow of milk if she is not milked clean each time. A good milker is almost invariably a quick milker; but undue nervous excitement not only lessens the quantity but lowers the quality of the milk. The main thing to be impressed upon the mind of the dairyman is, that the cow being a creature of habit, she is best handled and treated, in everything respecting milking, by the practice of regularity in all movements around her during milking-time; for when she is thus treated, she will be most apt to “give down” freely. More regularity can be practiced where cows are milked in the barn or shed than where they stand around in the open field.

PHYSIOLOGY OF MILK.

The basic fact upon which all calculations in regard to the yield in milk of different species of cows should be made, is that some breeds are specially adapted to butter, and others to cheese production — a fact that holds good, as well, to different animals of the same breed. The Short-horns have generally been held to be equally adapted to butter or cheese

making, though the Ayrshires are decidedly better adapted to the latter.

In Figs. 383 and 384 we present microscopic views of milk

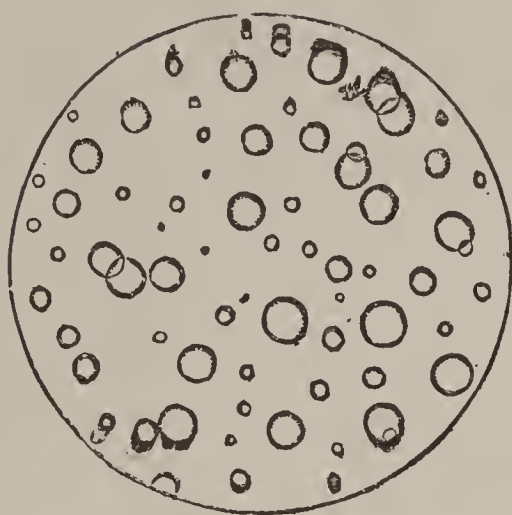


FIG. 383. — Milk for cheese.

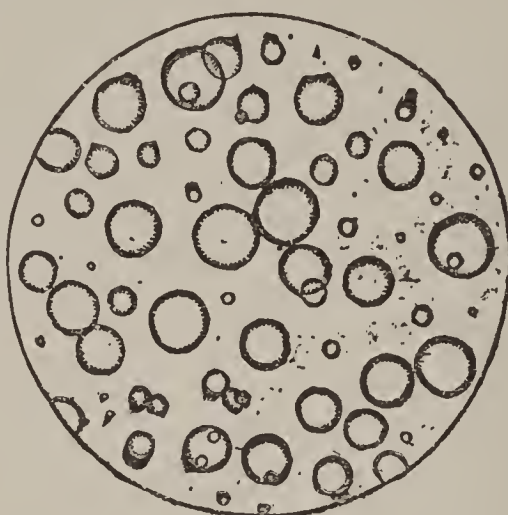


FIG. 384. — Milk for butter.

from two different kinds of Short-horn cows, the former being better adapted to cheese and the latter to butter making. The milk of which Fig. 384 is a specimen, is better adapted to but-



FIG. 385. — Udder of cow, stripped of skin.

ter-making, for the reason that the cream globules, being larger, rise the more readily to the surface of the milk, and the cream is more easily churned into butter.

The secretion of milk is generally possible when the heifer is two years old ; but when the udder is irritated, milk may be given during the first year.

The interior of a cow's udder is composed of a marvelous ramification of ligaments and tissue, which, interlacing each other, support the udder in position. Blood veins, milk ducts, cavities, glandules, lobules, and vesicles are distributed throughout the udder ; and in Fig. 385 we give an illustration

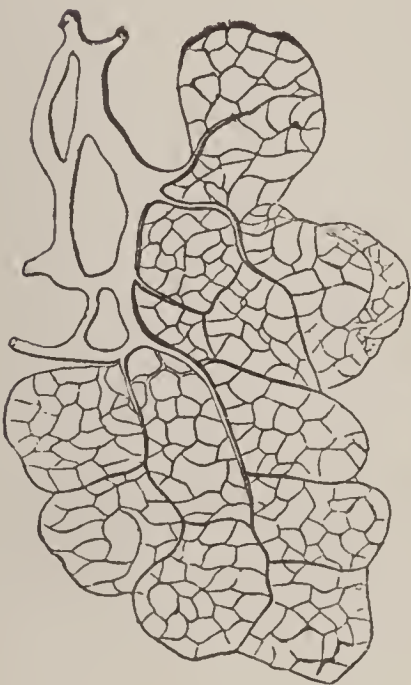


FIG. 386. — Capillary net-work of milk gland.

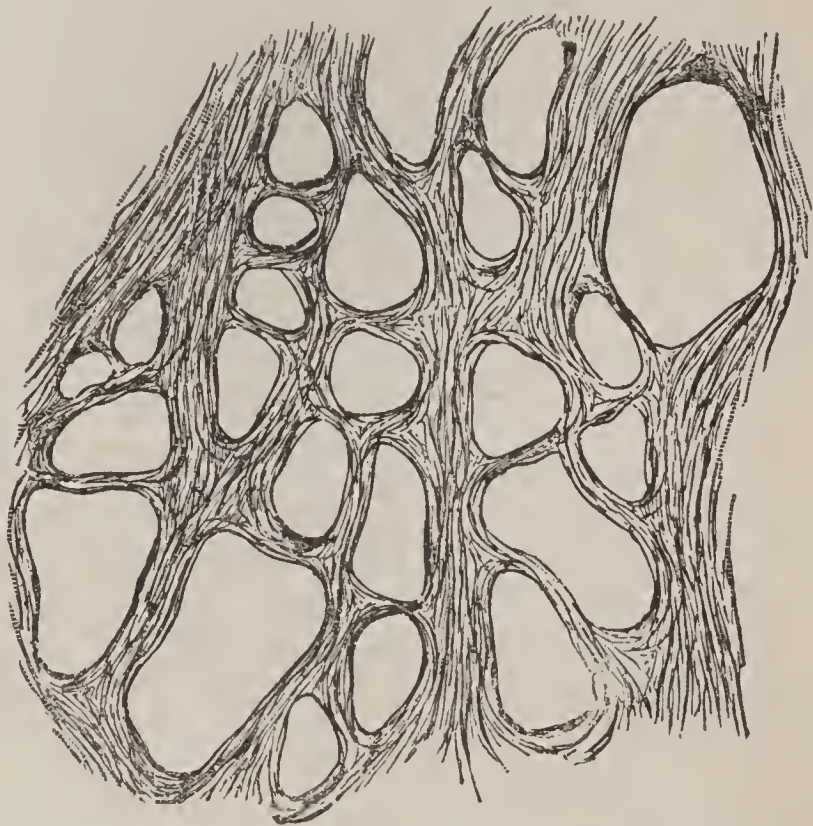


FIG. 387. — Portion of udder showing arrangement of lobule and main ducts.

of the net-work interwoven in the milk glands of this wonderful system. If a pliable probe be passed up the inside of the teat, it will traverse a duct, which opens into a reservoir communicating with other reservoirs or with ducts ; and following one or other of these ducts, the probe finally comes to a small saccular cavity, and stops. Within this cavity and its vesicles and cells the fats of milk are produced, and there are numbers of similar cavities.

The interplacing of the main ducts and the lobules is shown in Fig. 387. A microscopical examination will reveal that these cavities, or lobules, themselves irregular in size and

shape, are composed of vesicles which also vary in the same particulars.

One of the lobules is shown in Fig. 388. It consists of

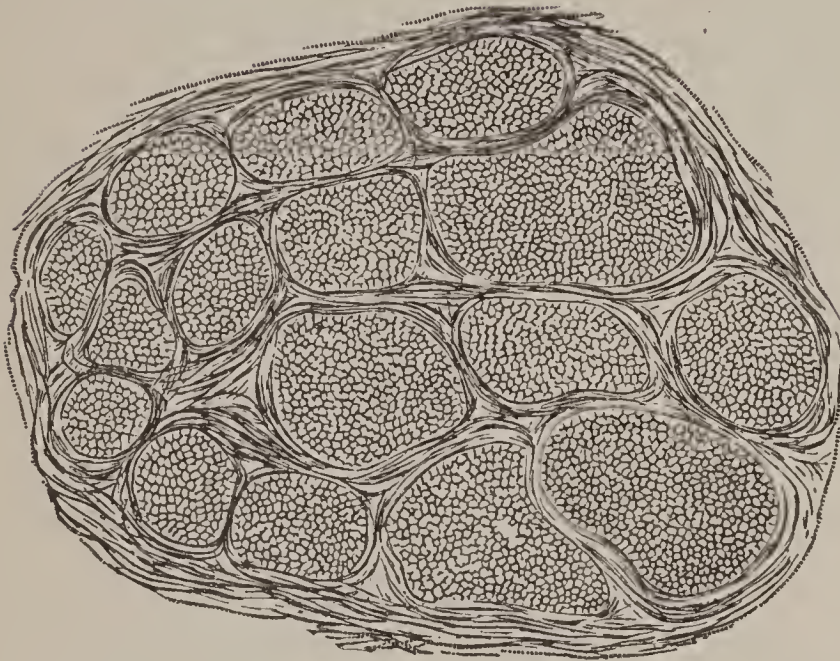
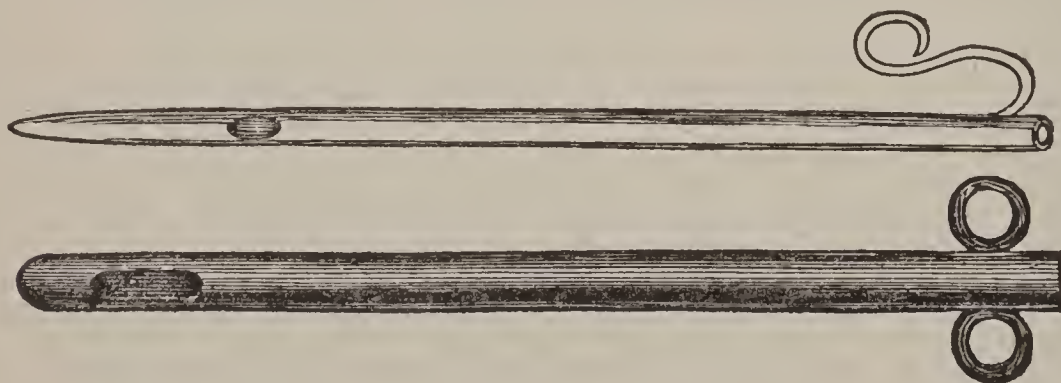


FIG. 388. — Lobule of milk gland.

sixteen vesicles, indicated in the figure; and the cells which the vesicles contain, wonderfully minute and delicate, are also shown.

The fat of the cow is constantly supplied to these cells, which throw it off in the form of cream globules. These

globules, when perfected, drop off into the cavities, in which they come in contact with and are taken charge of by the water therein, which also contains caseine, albumen, and milk sugar; and they are carried along through duct after duct into the



FIGS. 389, 390. — Different forms of teat siphons.

milk cisterns, and finally they are extracted through the teats. The product is the emulsion we name milk.

CONDITIONS OF THE PRODUCTION OF PURE MILK.

The secretion of milk is influenced to a large degree by the characteristics of the cow. If her organs of circulation and her vesicular system are well developed, so that circulation and

assimilation are not hindered, she must show a higher secreting action, under similar conditions, than if she be deficient in these organs; and more milk, by far, must be secreted by a mammary gland which is perfectly developed in all its parts, than by one which is smaller or stunted in its growth. And it may be set down as an indisputable fact, that an udder in an unsound condition cannot secrete pure milk. In order to have



FIGS. 391-3. — Milking-pails.

healthful, nutritious milk, the whole system of the cow must be in a thoroughly healthy condition.

DEFECTS OF MILK.

There are many sources and causes of impurity in milk. One is the dampness and mustiness of dark and foul cellars, which produce what is sometimes called bitter milk, showing in dirty gray spots in the cream, and in a bad taste to the butter. Another is wounds in the teats, not properly cared for, and sometimes internal wounds or injuries. Watery milk comes from foul, frozen, or watery food. Perhaps the most prevalent cause of impure milk is uncleanness in the use of vessels and utensils employed in the dairy. Milk set in sour pans, or skimmed with sour ladles, will never yield sweet butter or fine-tasting cheese. The hands, the cloths, the heating apparatus, the walls, the floors, and every other object and appurtenance of the dairy-house, should be kept scrupulously clean and neat.

In addition to the different kinds of impure milk mentioned hitherto, may be mentioned granular milk, containing small grains of lime (animals suffering from which should be killed); blue milk (from the color on the surface), which assumes a very bad taste, and which by proper feeding can be remedied; and slimy milk, which is probably caused by a certain plant called *pinguicola vulgaris*, and possibly by unclean milk-pails.

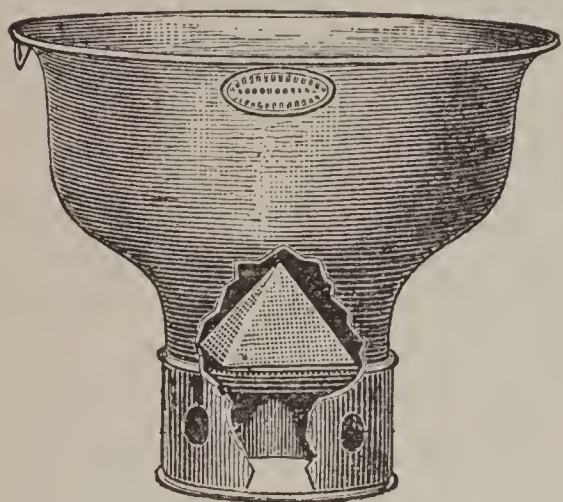


FIG. 394. — Pyramidal strainer.

MILK DIFFICULT TO CHURN.

Sometimes it happens that, notwithstanding constant churning, the butter will not come. A froth is formed, of a bad smell and taste, which fills the whole inside of the churn. Careful researches by Dr. J. Lehmann, of Munich, have proved that it is caused — 1. By uncleanness of the skimmer or churn; 2. By a too prolonged rest of the milk or cream before churning; 3. By sickly properties of the milk; and 4. By partial decomposition of the caseine or other component part. The cream which one cannot churn is generally bitter, of a bad smell and taste, which indicates a beginning of putrefaction.

The celebrated Dr. Lehmann, of Munich, has given three very concise reasons for difficulty in churning: First, uncleanness of the skimmer or churn; secondly, a prolonged rest of the milk or cream before churning; thirdly, sickly properties of the milk; and fourthly, partial decomposition of the caseine or other component parts. It is a notable point that he places uncleanness first in the list.



FIG. 395. — Pyramidal strainer in parts.

To illustrate the importance of perfect health in the cow, we insert the following communication, which appeared in the *Free Press*, of Detroit, Mich., on the 9th of June, 1886 : —

“TO THE EDITOR : The *British Medical Journal*, which is very conservative, very able, and opposed to everything sensational, which is the official organ of the British Medical Association, in the last number which comes to my table, contains the following startling information : —

“‘No more important report has been issued by the local Government board for many years than that presented by Mr. W. H. Power on March 31, and recently published. The conclusion at which he has arrived is of



FIG. 396. — Delivery milk-cans.

such far-reaching importance, so unexpected, until within the last few months, in its nature, and so disquieting, that the reader is fain to hope that it must be incorrect. Mr. Power, however, leads us on from point to point, until the conviction is forced upon the unwilling reader that it has been proved, as clearly as circumstantial evidence can prove anything, that scarlet fever can be produced by the milk of cows suffering from a disease so slight in its local manifestation as almost to escape attention, and producing so little disturbance of the general health of the cows that their appetite is not impaired, nor the quantity of milk which they yield diminished.’

“I have carefully examined a summary of the evidence, which is very strong, and produces upon my mind the same impression as that produced upon the mind of the editor of the *British Medical Journal*, and leads me to utter a word of warning. Constant scarlet fever in Detroit may have the

same origin. The only remedy in the hands of the people is to boil milk before giving it to children. The matter is undergoing the most thorough re-investigation in London, and is very alarming, if true.

“O. W. WIGHT, M. D., *Health Officer.*”

Whenever there is the least want of condition, the milk should be regarded with suspicion, and not used for family purposes, and should be submitted to the closest inspection, without the least delay.

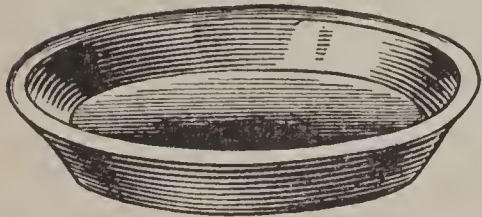


FIG. 397. — Pan for setting milk.

PRESERVATION OF MILK.

A new method of preserving milk in its natural state is adopted in Germany. The process consists in heating the milk in closed vessels, such as glass bottles, to beyond the boiling point, so as to expel all air-containing germs. The bottles are filled with milk almost to the commencement of the neck, leaving a considerable space between the milk and the cork, which latter is then driven in so far as to allow a space of about half an inch between its upper surface and the top of the neck. A layer of paraffine wax is then run in, and thereon is placed a cork disc, which, by means of a staple closure, is kept from rising. A number of bottles

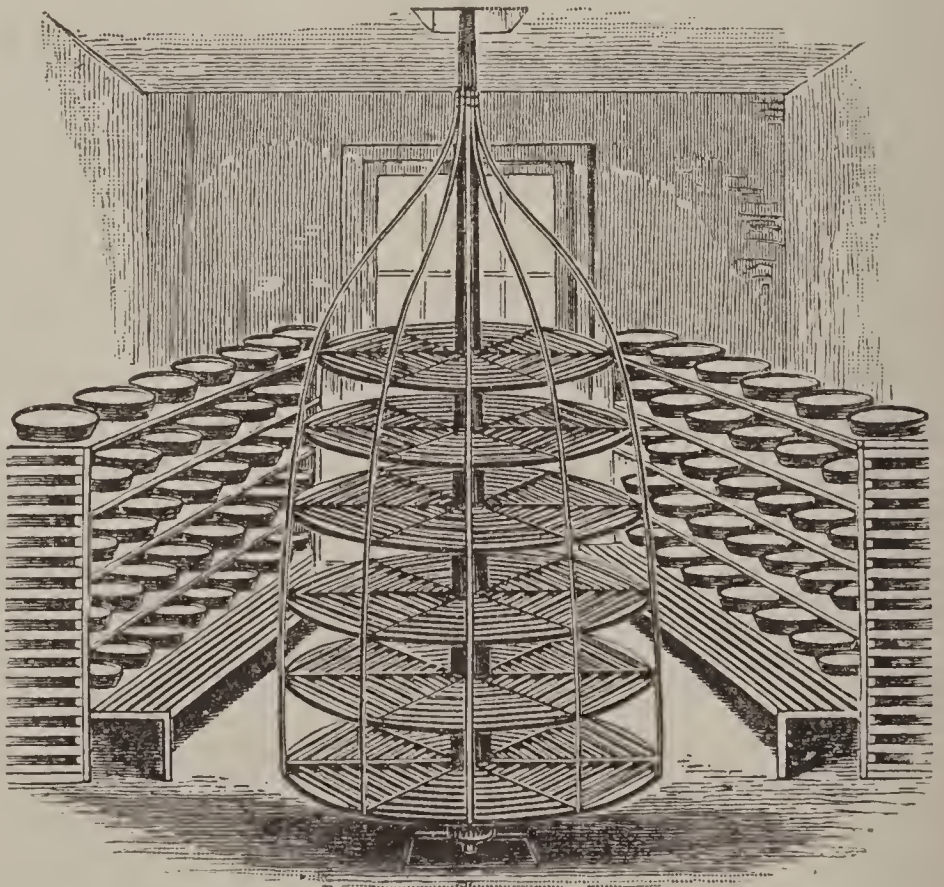


FIG. 398. — Revolving milk-shelves.

so filled and prepared are placed in a chamber or vessel that can be hermetically closed, and able to withstand an inner

pressure of four or five atmospheres. Here steam, of about two and a half to three atmospheres' pressure, and having a temperature of the same degree as the milk in the bottles, is introduced, which, on expanding, reduces the space between it and the cork, and through the paraffine rendered liquid. Care, however, is taken to see that the reduction of the space is not sufficient to allow of the milk reaching the cork. The chamber is now cooled down, the bottles removed, and, when cold, the provisional staples taken off. The cork itself is also protected from any germs entering it from the outside, by the congealed layer of paraffine, a part of which has entered the cork

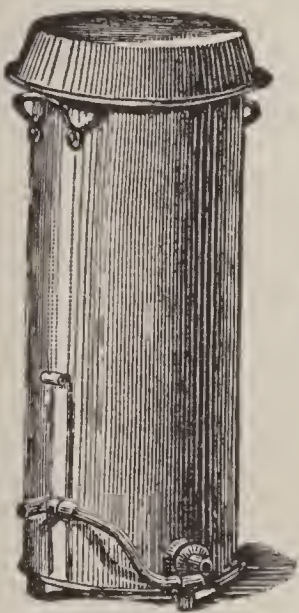


FIG. 399. — Cooley's milk-can.

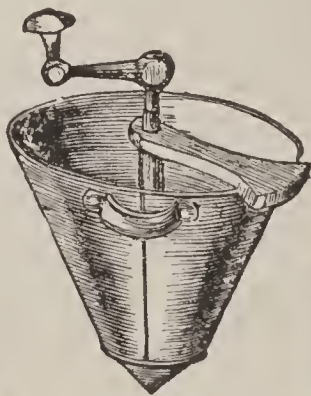


FIG. 400. — Utica cream strainer.

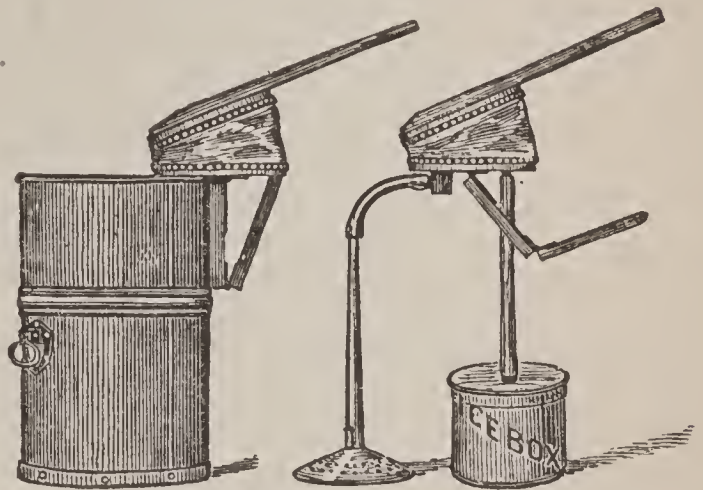


FIG. 401. — Milk Aerator.

when in a liquid state under the pressure in the chamber. Milk preserved by this method is said to keep fresh for years, and to have exactly the same taste as new milk.

BUTTER-MAKING.

The dairy should be cool, airy, dry, and free from vermin of all kinds. To prevent the intrusion of flies, the windows or ventilators should be covered with wire gauze. The floor should be laid with tiles. Cleanliness is of the utmost consequence in dairy management, and if not strictly looked after, is sure to cause serious loss.

Every article in which milk is placed, — more especially when made of wood, — should be washed in boiling water, with

a little soda or lime dissolved in it. If milk should happen to be sour in any dish, the acid thereby generated will injure any which may be afterward put into the dish; but if washed in water in which alkali has been dissolved, the acid will be destroyed.

Milk. — “Of the milk drawn from any cow at one time, that part which comes off at the first is always thinner, and

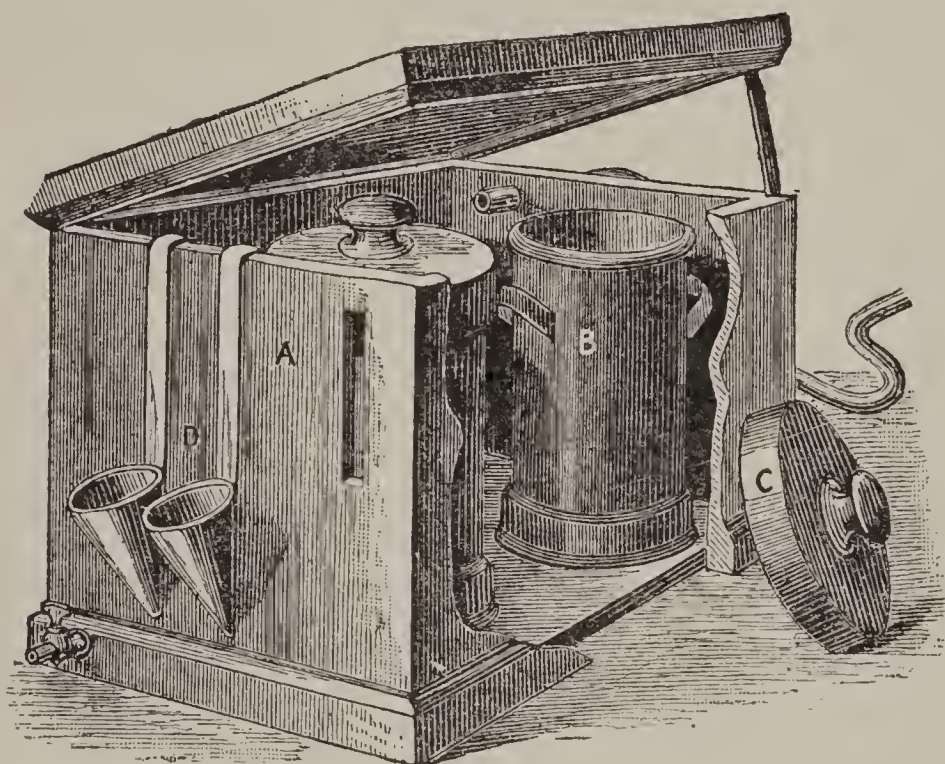


FIG. 402. — Weldon's cream-raising apparatus.

of a much poorer quality for making butter, than that afterwards obtained; and this richness continues to increase progressively to the very last drop that can be obtained from the udder.

“If milk be put into a dish and allowed to stand until it throws up cream, the portion of cream rising first to the surface is richer in quality and greater in quantity than that which rises in a second equal space of time; and the cream which rises in the second interval of time is greater in quantity and richer in quality than that which rises in a third equal space of time; that of the third is greater than that of the fourth, and so of the rest; the cream that rises continuing progressively to decrease in quantity, and to decline in quality so long as any rises to the surface.

“Thick milk always throws up a much smaller proportion of the cream which it actually contains than milk that is thinner; but the cream is of a richer quality; and if water be added to that thick milk, it will afford a considerably greater quantity of cream, and consequently more butter, than it would have done if allowed to remain pure; but its quality is, at the same time, greatly debased. Every cow's milk should be kept separate till the peculiar properties of each are so well known as to admit of their being classed, when those

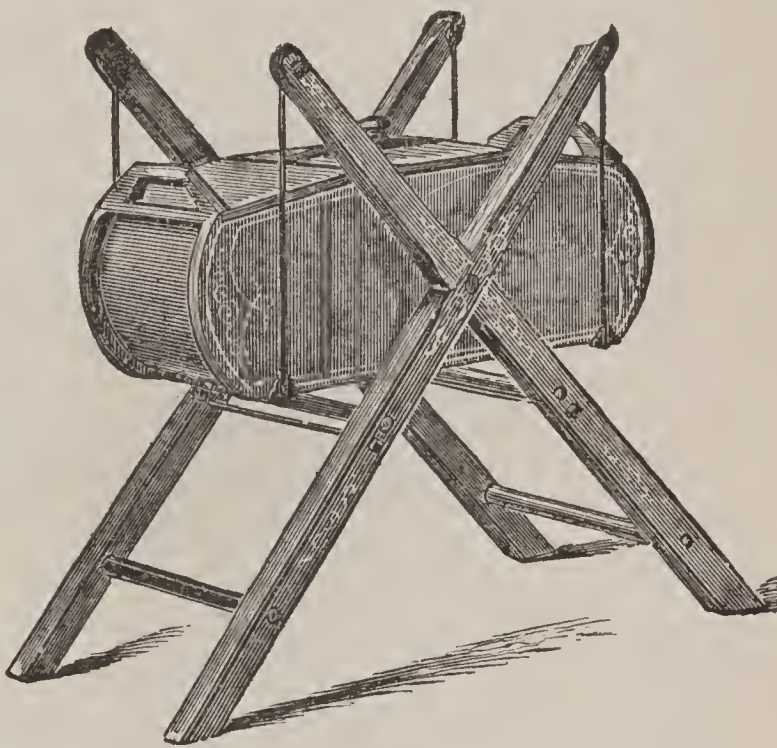


FIG. 403. — Davis's Oscillating Churn.

that are most nearly allied may be mixed together. When it is intended to make butter of a very fine quality, reject entirely the milk of all those cows which yield cream of bad quality, and also keep the milk that is first drawn from the cow at each milking entirely separate from that which is last obtained,

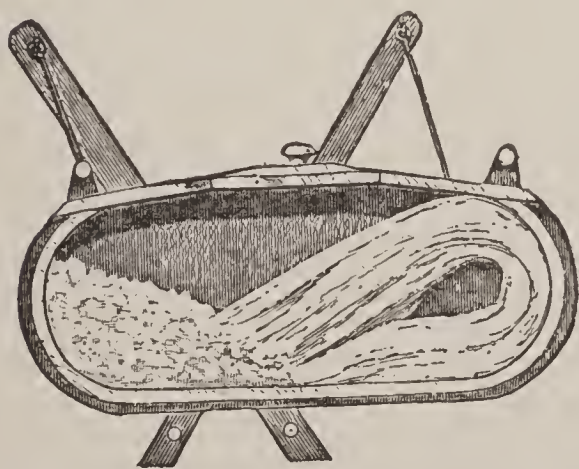


FIG. 404. — Section of oscillat'g churn.

as the quality of the butter must otherwise be greatly debased, without materially augmenting its quality. For the same purpose take only the cream that is first separated from the first drawn milk. Butter of the very best quality can only be economically made in those dairies where cheese is also made; because in them

the best part of each cow's milk can be set apart for throwing up cream, the best part of this cream can be taken in order to be made into butter, and the remainder, or all the rest of the

milk and cream of the dairy, can be turned into cheese. The spontaneous separation of cream and the production of butter are never effected but in consequence of the production of acid in the milk. Hence it is that, where the whole milk is set apart for the separation of cream, and the whole of the cream is separated, the milk must necessarily have turned sour before it is made into cheese; and no very excellent cheese can be made from milk which has once attained that state."

In the production and preparation of milk, either for butter or cheese making, or for the milk-delivery trade, we cannot

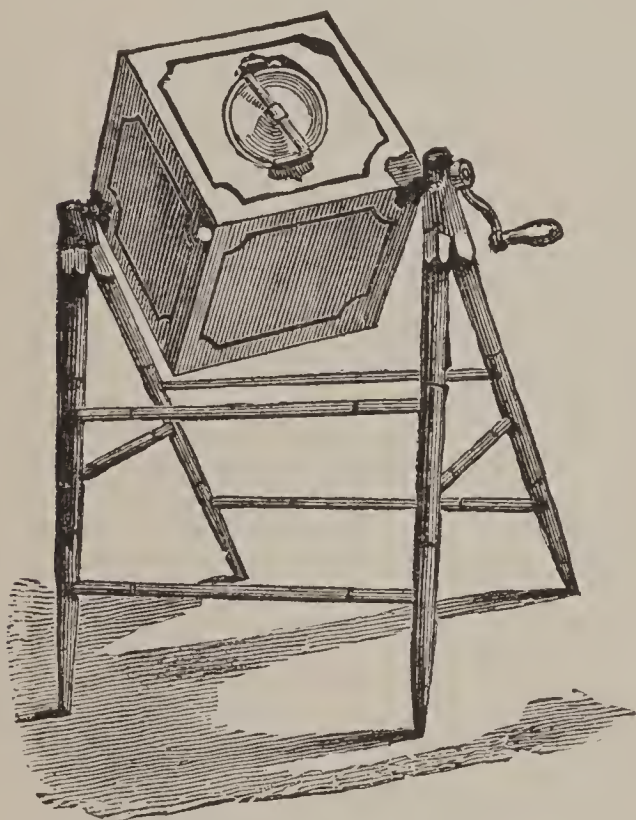


FIG. 405. — Whipple's rectangular churn.

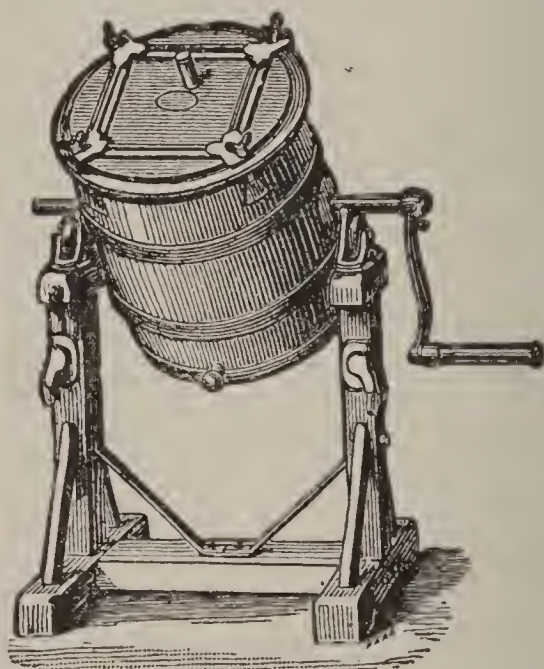


FIG. 406. — Victoria churn.

too strongly impress the supreme importance of cleanliness in every stage of the industry, and of pure air and ventilation, not only for the cow, but for the milk, the butter, or the cheese produced from her; for a lack in these essential matters, nothing will make up. Those who have achieved the greatest success and the highest distinction as butter or cheese makers, have been especially noted for their cleanliness and neatness in every department and detail.

CHURNING AND BUTTER.

Great care should be taken to wash churns thoroughly with boiling water, both immediately after they have been used,

and before they are again to be put in operation. Those churns which admit of being easily cleaned are always to be recommended, even though they should not be so elegant in construction.

The length of time which the cream should stand before churning, has never been clearly ascertained; from three to seven days, however, may be considered as the proper period.

Temperature. — A more important matter than the length of time which cream requires to stand, is the degree of temperature at which the cream will turn into butter. This has been ascertained from experiment to be from 45° to 75° Fahrenheit. The best quality of butter is obtained at a temperature of 51° according to experiments, and the greatest quantity at a temperature of 56° . During the process of churning, the agitation will increase the heat to about 5° more than it was when the cream was put into the churn.

The operation of churning, whether it be of cream alone, or cream and milk, is performed in the same manner. Milk requires more time than cream to complete the process, from two to three hours being considered necessary, while cream alone may be effectually churned in an hour and a half. It is necessary that the operation should be slow in warm weather; for if done too hastily, the butter will be soft and white. If the cream is at too high a temperature, the churn should be cooled with cold spring water, to reduce it to the proper degree of heat. In winter, again, the operation of churning should be done as quickly as possible, the action being regular; and the churn should be warmed, to raise the temperature of the milk or cream. The air which is generated

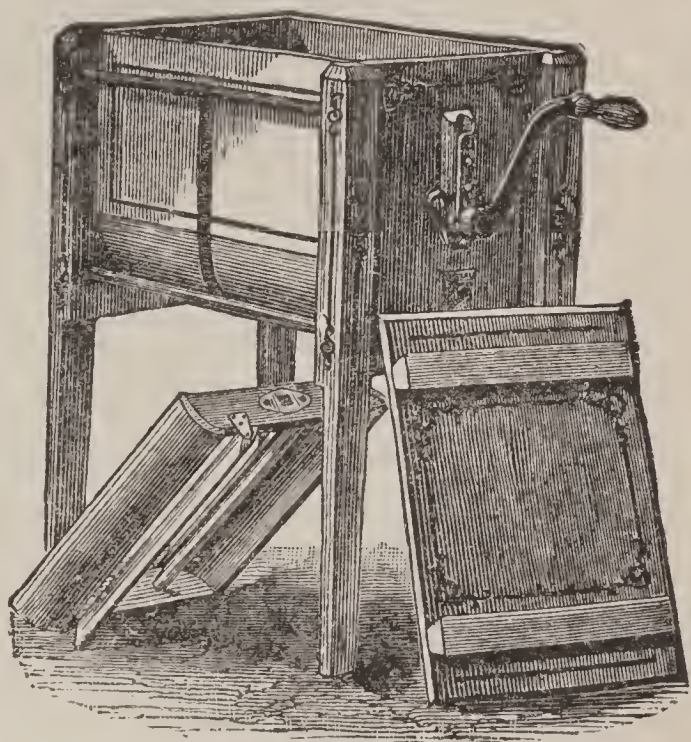


FIG. 407. — Blanchard churn.

in the churn should be allowed to escape, or it will impede the process by the froth which it creates.

After the churning is performed, the butter should be washed in cold spring water, with a little salt in it, two or

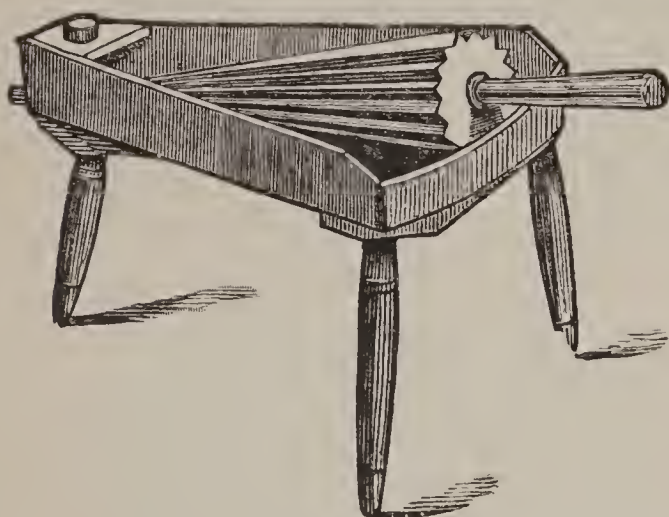


FIG. 408. — Butter-worker.

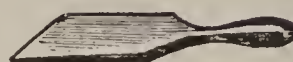


FIG. 409. — Butter-ladle.

three times, to extract all the milk which may be lodged about the mass. The extraction of the milk from butter will reduce its weight.

Salting. — After the butter has been worked over, and the milk has been carefully extracted, spread it out thin on a table,

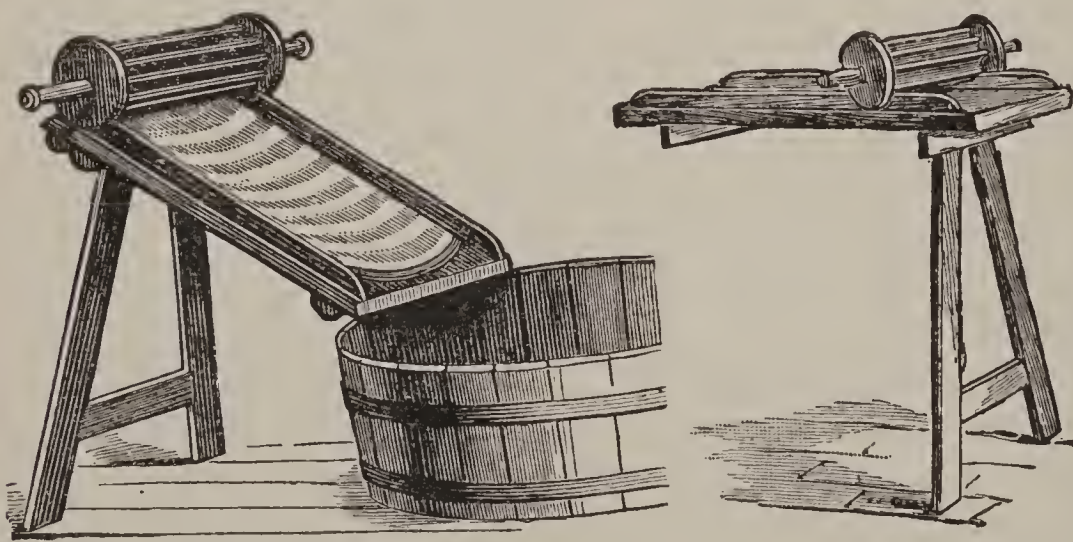


FIG. 410. — Improved butter-worker.

first having weighed it, and scatter over it the finest table-salt, which should be worked in by pressure, and by folding and refolding. The proportion of salt used is too often regulated

by guess-work. According to taste or requirement, half an ounce to an ounce of salt to a pound of butter will constitute the limit; the best butter-makers seldom use over three fourths of an ounce, while many never exceed half an ounce. An expedient mixture will be found to be the following to 22 lbs. of butter: Salt, 16 oz.; saltpeter, one teaspoonful; white powdered sugar, one tablespoonful.

Buttermilk. — If skimmed milk has been employed for churning, the buttermilk is thin, poor, and easily sours; but if from the churning of the entire milk, the buttermilk is more

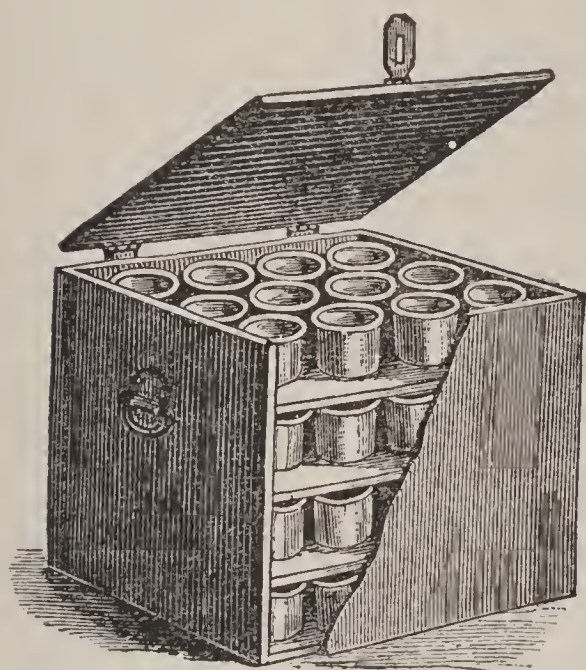


FIG. 411. — Butter-carrier.

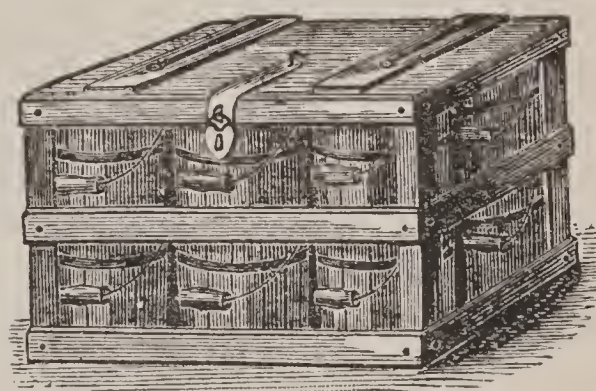


FIG. 412. — Crate for butter-jars.

thick and rich, and is considered by many a delicious beverage. Good buttermilk is, at all events, exceedingly wholesome and nutritious, and sells readily.

PACKING AND SHIPPING.

The packing of the butter for shipping should be done not later than the third day. Pack it down solid in stone jars if for your own winter use, or in firkins if for shipping. Sprinkle a little salt on the surface, and covering it with a thick, fine cloth, put on the lid, and place the jar in a dry, cool place. It is better to fill the vessel with one churning; but if not able to do so, pack in each churning solid, and exclude the air until it is full, by pouring over it a strong brine, to be poured off when ready to be filled.

CHEESE-MAKING.

The greatest difference between butter-making and cheese-making lies in the fact that whereas inferior butter is scarcely tolerable, inferior cheese is very generally tolerated, and sometimes by persons of very fair taste in other things. And there being a more variable standard in cheese-making than in butter-making, it is far more difficult to present to the reader any generally recognized set of rules or principles for guidance in

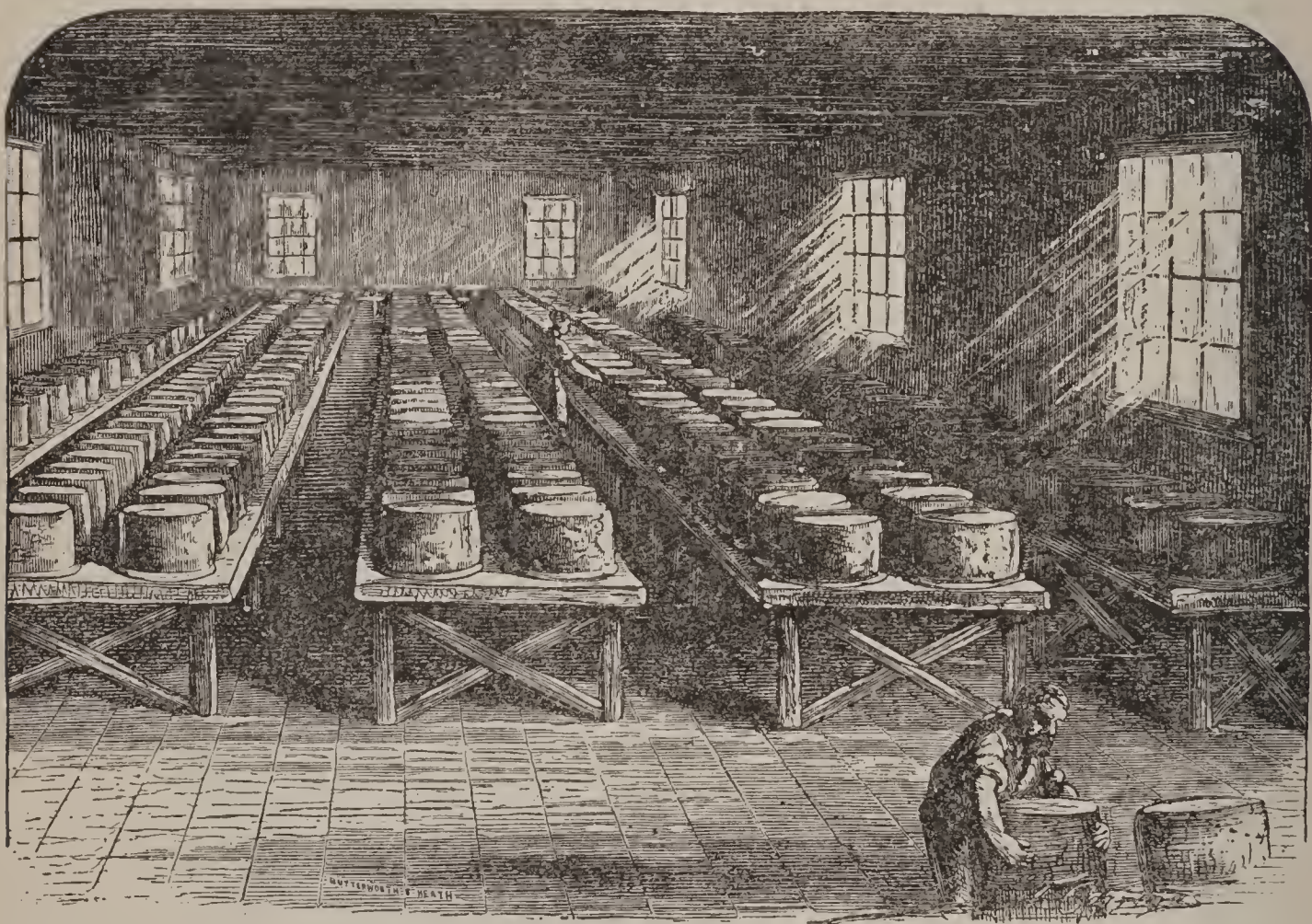


FIG. 413. — Curing-room, Whitesboro cheese-factory.

the former than in the latter. The most practical benefit we can confer upon the dairyman in reference to this department of his industry, will be to furnish him some general facts regarding the process of cheese-making as carried on by the most experienced dairy farmers, together with representations and descriptions of the implements and devices employed by them.

Cheese is made from caseine, an ingredient of milk held in solution by means of an alkali which it requires the pres-

ence of an acid to neutralize. This, in modern manufacture, is artificially added to form the curd; but the acidity of milk, after standing, acts in the same manner to produce coagula-

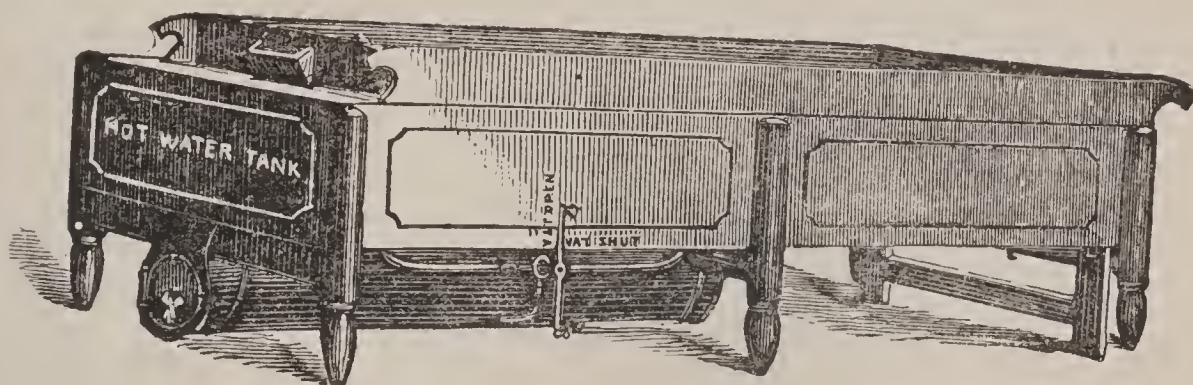


FIG. 414. — Self-heating milk-vat.

tion. This is due to the change of the milk-sugar into lactic acid.

All cheese consists essentially of the curd mixed with a certain portion of the fatty matter and of the sugar of milk. But differences in the quality of the milk, in the proportion in which the several constituents of milk are mixed together, or in the general mode of dairy management, give rise to varieties of cheese almost without number. Nearly every dairy

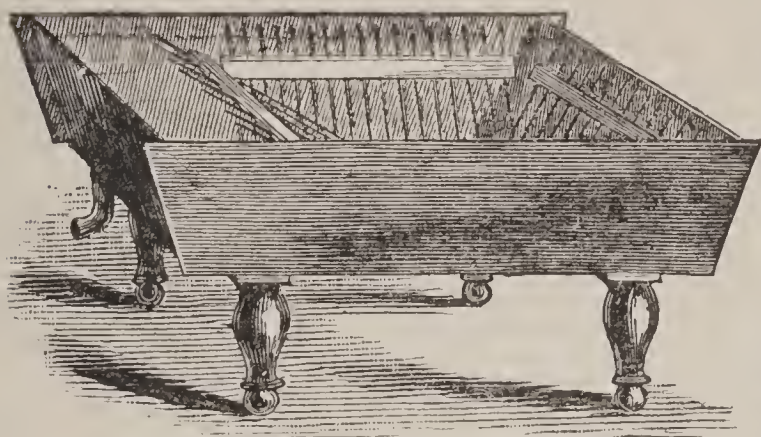


FIG. 415. — Improved curd-drainer.

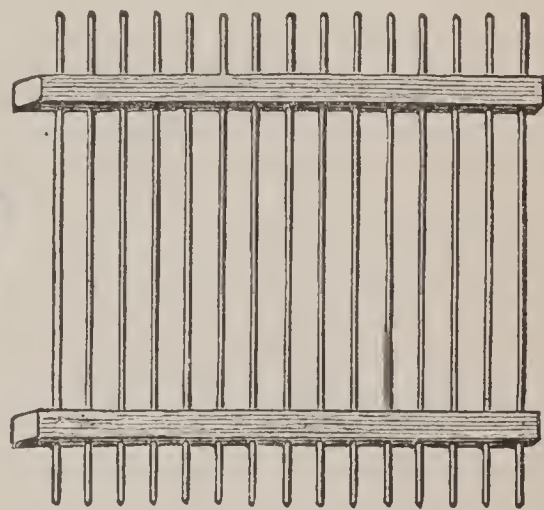


FIG. 416. — Rack of curd-drainer.

district produces one or more qualities of cheese peculiar to itself. It is obvious that whatever gives rise to natural differences in the quality of the milk, must affect also that of the cheese prepared from it. If the milk be poor in butter, so must the cheese be. If the pasture be such as to give a milk rich in cream, the cheese will partake of the same quality. If

the herbage or other food affect the taste of the milk or cream, it will also modify the flavor of the cheese. Still further differences are produced according to the proportion of cream which is left in or added to the milk. Thus, if cream only be employed, we have the rich cream cheese, which must be eaten in a comparatively recent state.

MILK-VATS.

In the remarks on butter-making, we have fully outlined the proper preparation and treatment of milk in the preliminary stages. The first *desideratum* in cheese-making is ade-

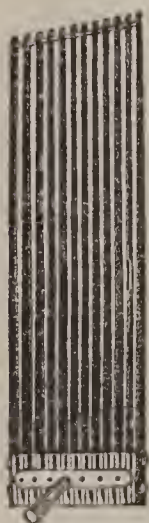


FIG. 417.

Curd-knives.

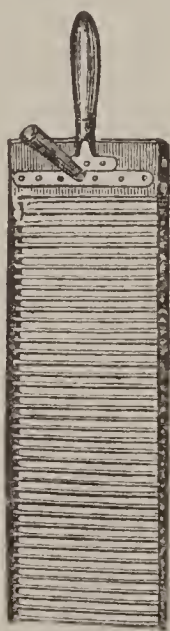


FIG. 418.



FIG. 419.

Stirring-rakes.



FIG. 420.

quate milk-vats. The milk, having been carefully strained into the vat, should be set for 24, 36, or 48 hours, according to circumstances, and all the cream that has risen, taken off with care. The skimmed milk is then heated to 75° or 80° , when the buttermilk taken from the cream in butter-making may be added, after which the mass may be further heated to 85° or 90° , and then the rennet may be added in the proportion of one pint to eighty gallons of milk. When the rennet has been thoroughly mixed with the milk, the vat is covered for from 30 to 50 minutes, according to circumstances, at the

end of which time coagulation ought to be complete. As soon as the curd, which is the coagulum thus produced, is well separated from the whey, the latter is drawn off, leaving the curd perfectly sweet. From this point the object is to get to press as soon as the curd is sufficiently cool, which is effected by pouring on cold water till the temperature is reduced to about

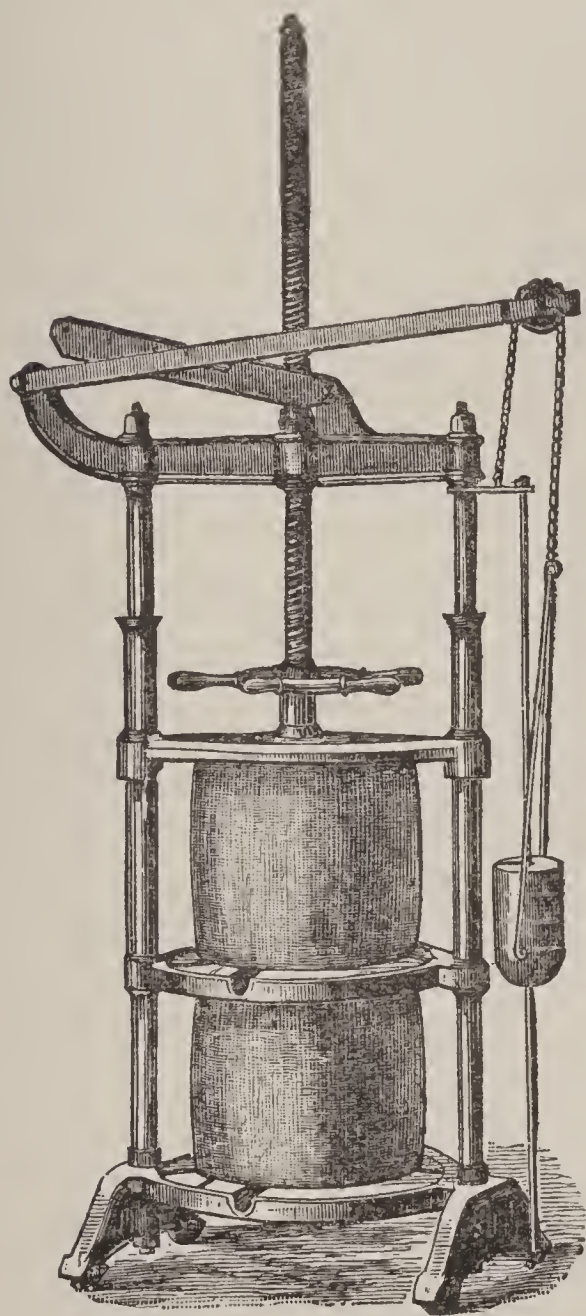


FIG. 421. — Cheshire cheese-press.

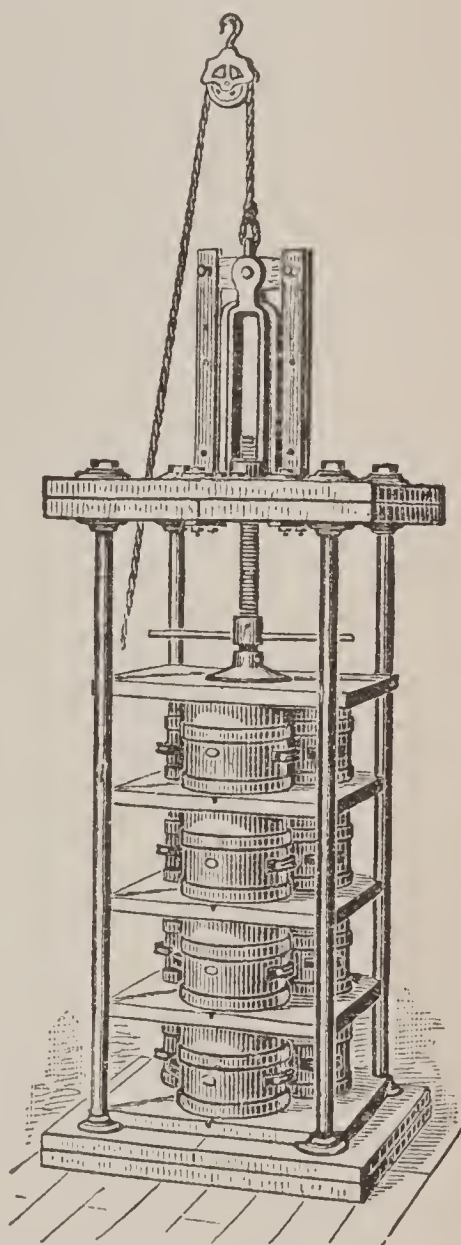


FIG. 422. — Upright gang-press.

70°. The curd is next salted, — 3 lbs. to 100 is a good proportion, — the salt being rapidly and evenly mixed in ; and then the curd is ready to put into the press. Some thoroughly drain the curd before putting it to press, but the best cheese-makers consider it of more importance to get it to press while it is still sweet, as the whey will be strained out in the press.

There are, of course, many methods for making cheese, widely different from the one we have described ; but we have sought to present simply the average process in this country.

Curing. — This has very much influence upon the after qualities of the cheese. The care with which they were salted, the warmth of the place in which they are kept during the first two or three weeks, the temperature and closeness of the cheese room in which they are afterwards preserved, the frequency of turning, of cleaning from mold, and rubbing with butter ; all these circumstances exercise a remarkable influence upon the after qualities of the cheese. Indeed, in very many instances, the high reputation of a particular dairy district or dairy farm is derived from some special attention to one or another or to all of the apparently minor items of its process.



FIG. 423. — Improved milk-vat.



DISEASES

— OF —

CATTLE, SHEEP, SWINE,

POULTRY, ETC.



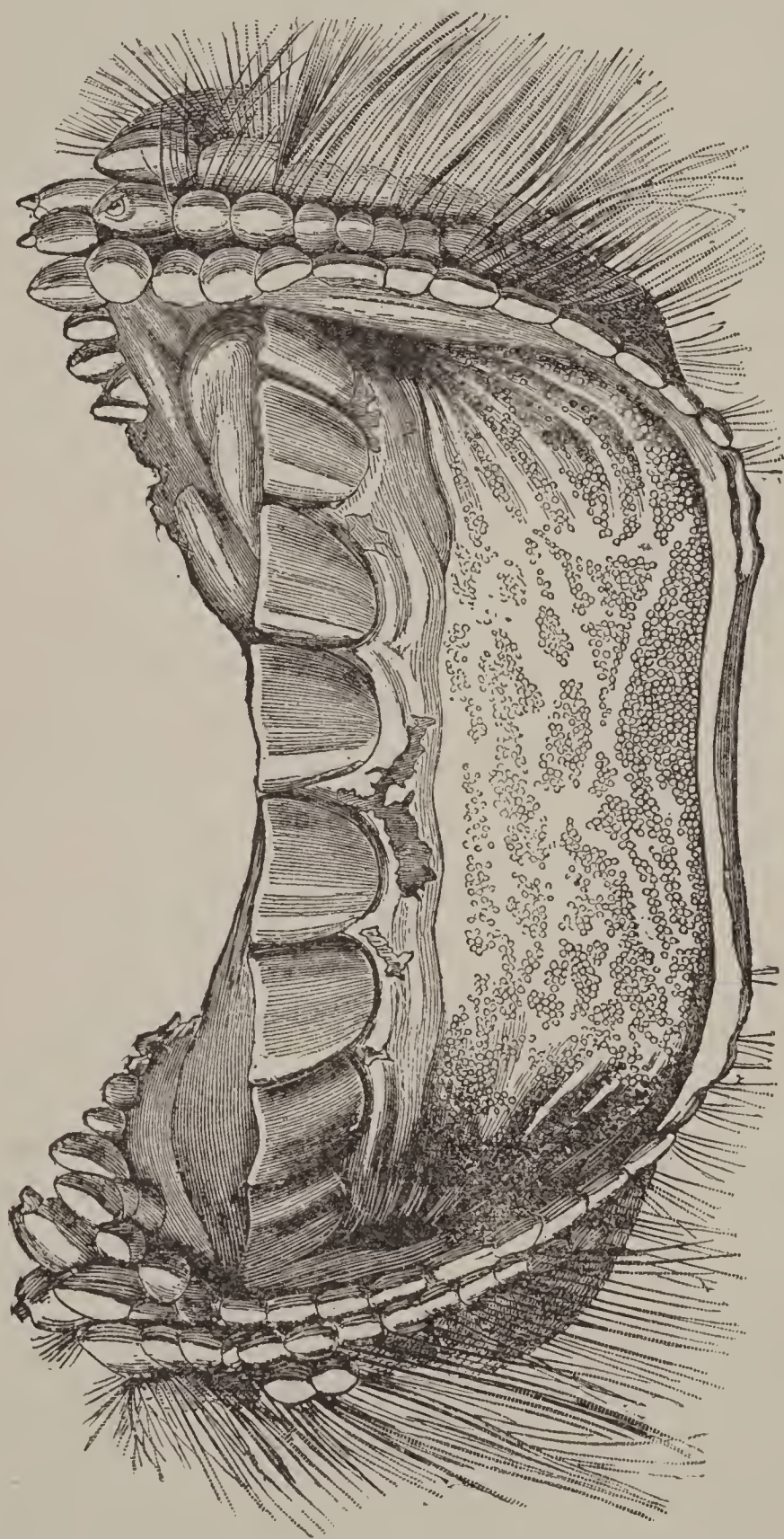


FIG. 424. — Foot and mouth disease, page 379.

CHAPTER XXI.

CARE, GIVING MEDICINE, PULSE, RESPIRATION.

IN considering the diseases of cattle or other domestic animals, it is well to remind the reader that, however careful the instructions or full the details which may be given, the real point of importance is the prevention of accident or disease.

Next in importance is the selection of such remedies as are most simple and safe in their application and effect. There should be no want of proper nursing in emergencies and during conditions of debility or exposure. Good and sufficient food, pure water, clean and well-ventilated stables, are essential. There should also be provision for shade in summer, and care taken to prevent harassing by dogs at any time. The importance of these points will be apparent when the causes of many fatal and parasitic diseases are explained. For instance, the sudden and rapid generation of gas (hoven), is the result of feeding on too rank or moist pasturage. It is well, therefore, to avoid pasturing in low or marshy grounds. This, and other precautions, needless to mention here, require constant observance in order to prevent accident and disease.

Medicines should always be given to cattle in a liquid form. It is often well to add some mild stimulant, as ginger or mustard, to arouse action in the first three stomachs, and hasten the passage of the medicine to the fourth stomach and the intestines. The doses given to cattle are, as a rule, nearly double those given to horses; and there is a marked difference in the action of certain well-known remedial agents. Aloes, from its irregular and uncertain action, is of little value for cattle, though very efficient with horses, while Epsom salts is an excellent purgative.

Every one who attempts to treat a diseased animal should be thoroughly familiar with its appearance in a condition of health. The normal pulse, respiration, and temperature need to be known, so that any variation can be immediately recognized. The *pulse* is conveniently felt at the jaw. Here the submaxillary artery, coming from the inside, passes over the lower edge of the bone, and mounts upward on the outer side of the face, in front of the large, flat muscle which closes the jaw. The artery is felt by means of the first and second fingers, which are pressed upon it towards the inner side of the

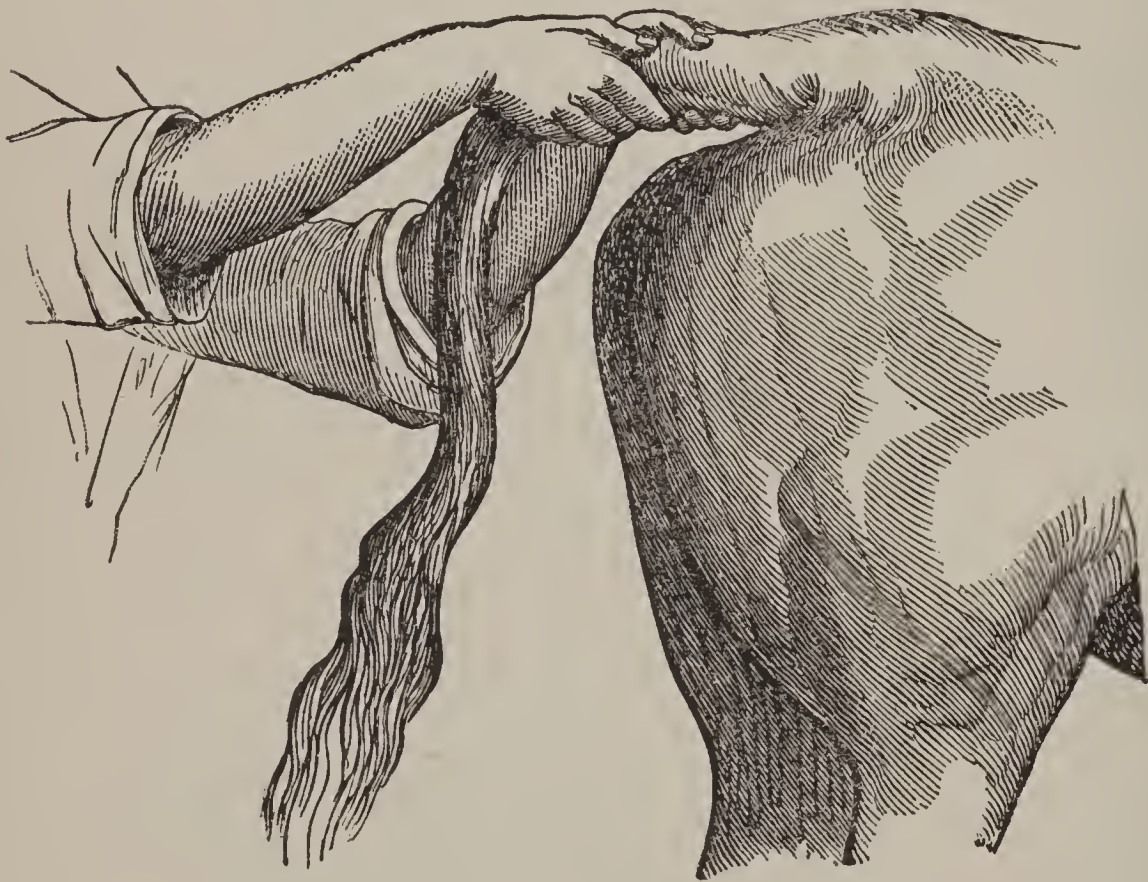


FIG. 425. — Feeling the pulse in the ox.

bone, while the thumb is placed outside, so as to maintain a steady pressure. The pulse may also be felt over the middle of the first rib, or at the root of the tail.

The number of pulsations in health differs at different ages. In young cattle, it is from 55 to 65 beats per minute ; in adults, from 45 to 50 ; and in old cattle, from 40 to 45.

Respiration should be noted as to frequency and character. This may be determined by placing the ear over the chest. The number of respirations per minute, usually from 10 to 15,

is in the ratio of 1 to $4\frac{1}{2}$ pulse-beats, nearly as can be easily counted by noting the heaving of the chest.

PLEURO-PNEUMONIA.

This is practically an incurable disease, and we can give no remedy for it. It is a malignant fever, almost entirely confined to cattle, and, on account of its contagious nature, spreads with great rapidity. Heretofore it has been confined chiefly to the regions east of the Alleghanies, but recently it has threatened an invasion of the Central States bordering on

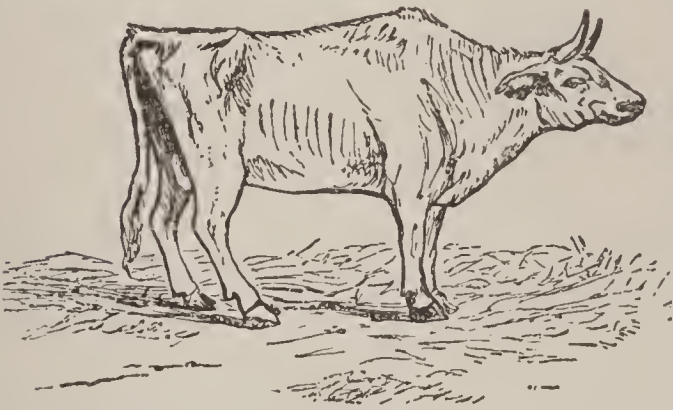


FIG. 426. — Epizootic pleuro-pneumonia.

the Mississippi River. So fatal and contagious is this disease, and so uncertain are all known remedies, that stamping it out by killing the affected animal, as soon as its symptoms are recognized, is the usual method of dealing with it. Burying the carcass deeply, or burning it

and disinfecting thoroughly, isolating suspected or exposed animals, and using disinfectants in all places where the animal virus may be present, are the only measures that can be depended on to check its course.

The disease may be conveyed by close proximity to the excretions of affected animals, as well as by actual contact. Like other contagious diseases, this has a period of incubation, in which the poison lies dormant, without any special indication of its presence. This period may extend, in very malignant cases, from four to six weeks, when the virulence of the epidemic is subsiding, or in cases where the epidemic is of a mild form.

The first stage of the disease is indicated by a rise of temperature, the thermometer indicating 103° to 106° F. There is an increased frequency of the pulse, loss of appetite, a staring condition of the coat, a hard, dry cough, shivering, diminution of milk, dry muzzle, hot mouth, scanty, high-colored urine, and tenderness on pressure between the ribs over the lungs. In a

few days the breath becomes fetid, the bowels constipated, the cough more frequent and troublesome, and the skin is yellow and scurfy; the pulse becomes full and rapid, numbering 80 to 100 beats per minute, and moans of pain accompany percussion over the lungs. The animal endeavors to facilitate breathing by extending the nose and neck in a straight line, the elbows being turned out, the back arched, and the hind legs drawn up under the body. (See Fig. 426.) Later on, a watery and sometimes purulent discharge flows from the eyes and nose, obstinate constipation may be succeeded by a thin, fetid diarrhea, the ex-



FIGS. 427, 428. — Phases of pleuro-pneumonia.

tremities, ears, and horns are cold, the tongue is clammy, the animal grows weaker and weaker, and at length dies.

In the early stages of the disease, percussion of the chest gives a clear and resonant sound; later, the sound will be dull and heavy, on one or both sides, according to the extent of the lung affected. If both lungs are affected, the animal almost invariably dies.

No reliable treatment for this disease is known; hence we do not attempt to give any. It is cheaper and safer to stamp out the disease by killing the patient at once, than to risk the spread of the contagion, in the doubtful experiment of treatment. The well animals should be isolated, and the stables and sheds thoroughly disinfected. This may be done by clos-

ing them tightly, and burning sulphur in them for two or three hours. After this, the walls and wood-work should be carefully whitewashed.

ANTHRAX, CHARBON, BLOODY MURRAIN, BACTERIDIEN, OR CHARBONOUS FEVER.

This is a malignant and contagious disease of the blood, common to cattle, but communicable to all domestic animals. It is particularly fatal in sheep and swine. It may be communicated to man, and is then known as "Malignant Pustule." In France, where it is very prevalent, it is called

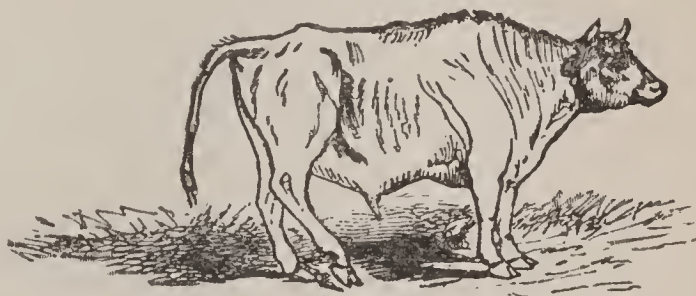


FIG. 429. — Black-leg, or bacteria charbon.

Charbon, from the word meaning "a coal," because the part affected turns dark purple, or nearly black, from the decomposition of the blood. This peculiarity of the disease has given rise to such names as "black leg," "black quarter," "black tongue," and "bloody murrain," which are common names for two kindred maladies. The contagious principle of anthrax is due to the presence in the blood of rod-like, vegetable organ-



FIG. 430. — Gloss anthrax, or black tongue.

isms, known as *bacteria*, or specifically, *Charbon bacteridia* (Pasteur), or *bacillus anthracis*. The vitality of these microbes is wonderful. Grain and hay grown on the soil where diseased animals were buried, have been known to communicate the disease; while strong alcohol, and even

stronger drugs, will not affect their virulence.

Anthrax, it seems, occurs most frequently on low, periodically flooded, and swamp lands, where there are stagnant pools

and miasmal exhalations favorable to the life of germs, or in localities where the water is contaminated by excreta or sewage.

The most common and the most frequently fatal form of anthrax in cattle, in Europe, is marked by no external lesions. The virulence of the disease expends itself on the internal organs, and is sometimes called Anthrax or Splenic fever. So rapid is its course, that frequently no indications of illness are noticed. What the night before seemed a healthy animal, may be found dead in the morning. When there is time to note the symptoms, it is found that there is general trembling, the pulse is rapid, weak, and nearly imperceptible, the eyes are red, the mucous membranes are infected, and often show purple spots. The extremities are cold, and the respiration labored and painful, and the urine becomes bloody. These symptoms increase in intensity; there is a fall of temperature, a bloody, spumous discharge comes from the nostrils, there are colicky pains, mortification sets in, and death follows in from twelve to twenty-four hours.

Gloss Anthrax, Black Tongue, Blain, or Malignant Sore Throat, is that form of Anthrax which localizes itself on the tongue and *fauces*. It is now conceded by many to be of the nature of Black Leg.

Black Leg is a malignant form of Anthrax localized in the leg, tongue, shoulder, side, etc. Cattle of all ages are subject to it, but it occurs almost exclusively in stock from six months to one or even two years old which have been changed from a poor pasture to rich, low land, or which are in rich condition generally. It is due to a bacteria. The high state of plethora induced, and the work and growth of those bacteria, result in swelling in some part, usually the shoulder, hips, or hock, which is rendered hot and painful. (See Fig. 429.) The disease rapidly increases, and we notice a lameness of the limb. There is marked tumefaction and stiffening; mortification sets in; the limb or affected part becomes cold; and crepitates under pressure, in consequence of an accumulation of gas in the subcutaneous cellular tissue. The constitutional symptoms are the same as in acute fever. Some few cases recover slowly.

Treatment. — With the first form the animals usually die from the violence of the attack, which precludes successful treatment; but in a later stage, when its violence is abated, it sometimes submits to treatment. But as a general thing it is so malignant that it is considered useless for farmers to attempt more than preventive measures.

EPIZOOTIC APHTHA, OR FOOT AND MOUTH DISEASE.

This highly contagious though rarely fatal febrile disease has prevailed in this country since its introduction in 1869; it has been observed in cattle, sheep, and pigs.

The incubative period extends from twenty-four hours to three or four days. The early symptoms are a shivering fit,



(Mouth affected.)

(Feet affected.)

FIGS. 431, 432. — Epizootic aphtha.

succeeded by a slight dullness, staring coat, husky cough, elevated temperature, with increased frequency and hardness of pulse. There is a greater flow of saliva, which becomes ropy from mixture with mucus. (See Fig. 431.) If the mouth be examined, vesicles, or blisters, will be observed, varying in size from a pea to half a dollar. In some instances they are found between the clefts of the hoofs, and on the coronets, along the upper margin, and occasionally on the udder. The blisters soon open and discharge their contents, leaving raw and sensitive surfaces, which cause great pain.

Mild cases require little treatment. While the mouth is sore, give plenty of water, and food in liquid form; an ounce of chlorate of potash or borax may be added to each bucket-

ful of water. The feet should be kept clean, and washed frequently with one of the following lotions : —

Acetate of lead.....	1 oz.
Carbolic acid.....	1 oz.
Water	1 qt.

Or —

Sulphate of iron (copperas).....	2 oz.
Water.....	1 pt.

If extensive suppuration and sloughing occurs, apply the following three times a day : —

Carbolic acid.....	$\frac{1}{2}$ oz.
Glycerine.....	2 oz.
Sweet oil.....	2 oz.

Prof. Gamgee recommends the following, to be sprinkled on the ulcer : —

Powdered chalk.....	4 oz.
“ charcoal.....	1 oz.
“ alum.....	$\frac{1}{2}$ oz.
Sulphate of zinc.....	$\frac{1}{2}$ oz.

Mix.



FIG. 433. — Mode of dressing hoofs.

To protect the spaces between the digits from irritation, from dirt, straws, etc., the feet may be bound up, after being dressed with bandages of old cotton or linen, as shown in Fig. 433.

Epizootic Aphtha is readily transmitted to the human family by the milk of diseased animals, and also by inoculation. The poison spreads with great rapidity, and the disease often proves a forerunner of other diseases.

DISEASES OF THE RESPIRATORY ORGANS.

In diseases of the respiratory organs, when the inflammatory process is located in the head, we have catarrh; when in the larynx or throat, laryngitis, sore throat, or malignant sore throat; and if the bronchial tubes become affected, bronchitis. When the connective tissue of the lungs becomes involved, we have catarrhal and croupous pneumonia. If the pleura, the

membrane covering the lungs and the walls of the chest, is inflamed, we have pleurisy. When both the pleura and the lungs become inflamed, we call the disease pleuro-pneumonia. If the mucous membrane of the lungs and lung tissue becomes involved, we have bronchi-pneumonia, or catarrhal pneumonia.

CATARRH—COLDS.

Catarrh is an inflammation of the mucous membrane of the nose and sinuses of the head, frequently involving the eyes, throat, and air passages. It is usually brought on by sudden changes of temperature, especially when animals are



FIG. 434. — Application of steam to the nostrils.

badly fed. Damp, badly drained, and poorly ventilated stables, or those built so as to allow exposure to drafts and storms, are predisposing causes.

Symptoms. — The mucous membrane of the nose and eyes, at first red and dry, soon becomes moist with a watery discharge, which eventually becomes copious, dense, and opaque. (See Fig. 436.) The eyelids are swollen, there is sneezing, and sometimes a cough. Febrile symptoms occasionally run high, with loss of appetite, suspension of rumination, shivering fits,

and a staring coat, constipation, scanty urine, etc. If the system is still exposed to the cause of the disease, and proper treatment is neglected, chronic nasal catarrh, malignant catarrh, or sporadic pleuro-pneumonia may develop.

Treatment. — If diarrhea is present, give at once the following : —

Tincture of opium (laudanum).....	1 oz.
Aromatic spirits of ammonia.....	1 oz.
Infusion of quassia	1 pt.

If the bowels are constipated, a mild laxative, like the following, should be given : —

Epsom salts.....	8 to 12 oz.
Ginger.....	1 oz.
Gentian, powdered....	1 oz.

A pint of linseed oil or melted lard will in many cases answer the purpose.

To promote a free discharge from the nostrils, and relieve difficult breathing, the head may be steamed in a nose-bag. At the bottom of the bag, which is suspended from the horns, a small quantity of chaff or sawdust is put. To this may be



FIG. 435. — Nose-bag for steaming nostrils.

added a little turpentine or vinegar. From time to time pour boiling water through a hole in the bag.

If the fever runs high, the following may be used two or three times a day, in conjunction with the steaming : —

Tincture of aconite	5 to 10 drops.
Nitrate of potash (saltpeter).....	1 to 2 dr.

Allow an abundance of water, and give warm liquid food. Green grasses and roots may be fed if available.

MALIGNANT CATARRH.

This is a non-contagious, specific febrile disorder. It not unfrequently attacks one or two of the herd, and leaves the remainder unaffected.

There is marked fever at the commencement, and the visible mucous membranes are purple and dry. Later there is extreme prostration, and ulceration of the mucous membranes. There is an abundant flow of saliva at the commencement, and soon the eyes and nose discharge a watery fluid; the eyes are closed and swollen, bowels constipated, dung black and hard, but diarrhea soon ensues, and the urine is high-colored and scanty.

Treatment. — Remove the animal to comfortable quarters. In the early stages administer a laxative of Epsom salts, or the following: —

Linseed oil	1 pt.
Sulphuric ether	1 oz.
Infusion of quassia.....	4 oz.



FIG. 436. — Malignant catarrh.
First stage.



FIG. 437. — Malignant catarrh. Second stage.

After this, to allay fever and lessen the inflammation, give the following three or four times a day in water: —

Spirits nitric ether...	2 to 4 dr.
Acetate of ammonia.	2 to 4 oz.

Use locally, at the outset, warm water fomentations, with 2 to 4 drams of borax to a quart of water. Afterward, ulcerations may be dressed with solutions of carbolic acid or chloride of zinc. The cornea of the eye can be touched twice a day with

the nitrate of silver solution, ten grains to an ounce of water, applied with a camel's-hair pencil; but not to the exclusion

of thorough cleansing with the borax solution several times a day.

LARYNGITIS, OR SORE THROAT.

This may exist independently of, or in connection with, simple catarrh of the head and nose.

Treatment. — Rub in on the throat a paste made by mixing mustard with equal parts of aqua ammonia and water ; repeat this every hour, after sponging the throat externally with warm water, and continue until the desired effect is obtained. Inhalation of steam, as recommended for catarrh, will be useful. Chlorate of potash, one ounce to a quart of water, can be converted into steam. One fourth ounce of saltpeter, or chlorate of potash, can be dissolved in water, and given morning and evening. The bowels should be moved by enemas, as there is danger of choking when medicines are administered by the mouth.



FIG. 438. — Laryngitis, or sore throat.

If suffocation is threatened from closing of the throat, or from intense congestion, tracheotomy should be performed without delay.

BRONCHITIS.

This is an inflammation of the bronchial tubes, occurring most frequently in spring and autumn, occasionally in an epizootic form. It is almost always accompanied with a cough, which is short and troublesome, or hard and distressing, according to the severity of the attack. The pulse is frequent, full, and rapid ; the breathing is also frequent, the appetite absent, rumination is suspended, and there is more or less difficulty in swallowing.

Treatment. — Put the animal in a warm stable, allow plenty of pure air, a liberal supply of tempting food, and unlimited

nitrate water. The object is to keep up the strength of the patient, and avoid lapse in the chronic stage. If the bowels are torpid, administer enemata, but not cathartics, as they may cause diarrhea, and may fatally tax the strength of the patient.

Give the following two or three times a day : —

Acetate of ammonia..... 3 oz.
Water..... 1 pt

Or —

Spirits of nitric ether..... 3 oz.
Water..... 1 pt.

To either of the above, 10 to 20 drops of tincture of aconite may be added.

To relieve the severity of the cough and promote expectoration, the following may be given : —

Ipecac (powdered) 1 or 2 drs.
Tincture of squills 2 drs.

The air passages may be steamed, in the early stages, and the sides of the throat may be thoroughly rubbed with the following: —

Spirits of turpentine..... 2 oz.
Sweet or linseed oil..... 1 oz.

PNEUMONIA.

This is an inflammation of the cellular tissue of the lungs. It may be either a primary disease, or a sequel of other diseases, as simple catarrh, laryngitis, or bronchitis.

The earliest symptoms are a fit of shivering, a staring coat, muzzle and skin hot and dry, mucous membrane red, and a suppressed cough. Breathing is short, panting, and rapid, frequently numbering 30 or 40 respirations a minute, performed chiefly by the abdominal muscles, with as little motion of ribs



FIG. 439. — Malignant sore throat.

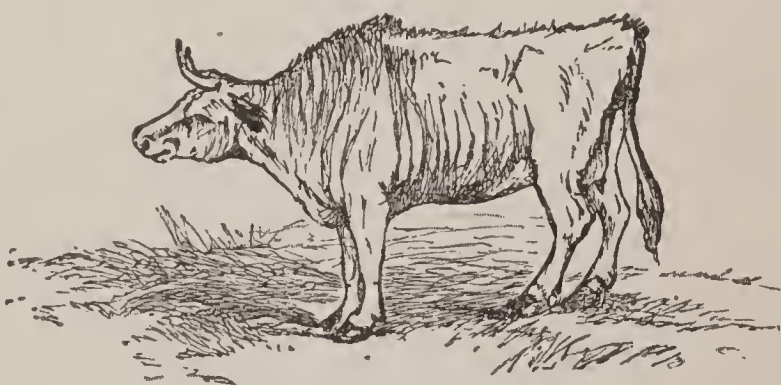


FIG. 440. — Pneumonia.

and chest as possible. The nostrils are dilated, head protruded, countenance is anxious, mouth sticky, and breath hot. Pulse is quick and full, 60 to 80 per minute, and is what is known as an oppressed pulse. One or both lungs may be affected, or



FIG. 441. — Pneumonia.

only a part of one, or all of one lung. If the ear is placed on the chest during the first stage, engorgement of the affected part with blood and bloody serum is noticed, and a characteristic crepitation is heard, like the sound produced by rubbing

the hair between the fingers, near the ear. As solidification occurs, this sound disappears; but in the part of the lung unaffected, there is an exaggerated murmur, while none at all is noted in the solidified part. The boundaries of this may be mapped out by percussion, or striking over the chest, from the flat, dull sound produced. The pulse becomes rapid, small, and feeble, the breathing is more labored and shorter, and the cough is occasional and weak. The animal now stands as in Fig. 440, with back and nose outstretched. If the head is raised quickly, there is great tendency to fall backward. (Fig.



FIG. 442. — Pneumonia. Last stage.

441.) Gradual prostration and wasting follow, and at length the animal drops head foremost—first falling upon the chest (Fig. 442)—with legs doubled beneath, and next upon the side, where she remains, occasionally lifting the head and vainly attempting to rise, under great distress, until death ter-

minates her suffering. Pneumonia may also terminate in resolution of the consolidated lung, or abscess and gangrene.

Treatment. — Clothe and house the patient according to the season of the year, but freely allow pure air; give an enema of hot soap-suds, or a saline laxative in a pint of gruel : —

Epsom salts.....	8 to 12 oz.
Gentian and ginger (powdered).....	each, 1 oz.

Bleeding at the very outset is recommended by some reliable authorities, in plethoric animals with high inflammatory symptoms, and quick, full, bounding pulse. Later give sedatives : —

Tincture of aconite.....	10 to 20 drops.
Carbonate of ammonia.....	4 dr.

Small doses of sulphate of iron (copperas), 10 to 20 drams in 24 hours, will be beneficial. Distressing symptoms may be relieved by giving a half ounce, or even an ounce, of tincture of opium (laudanum). If the extremities

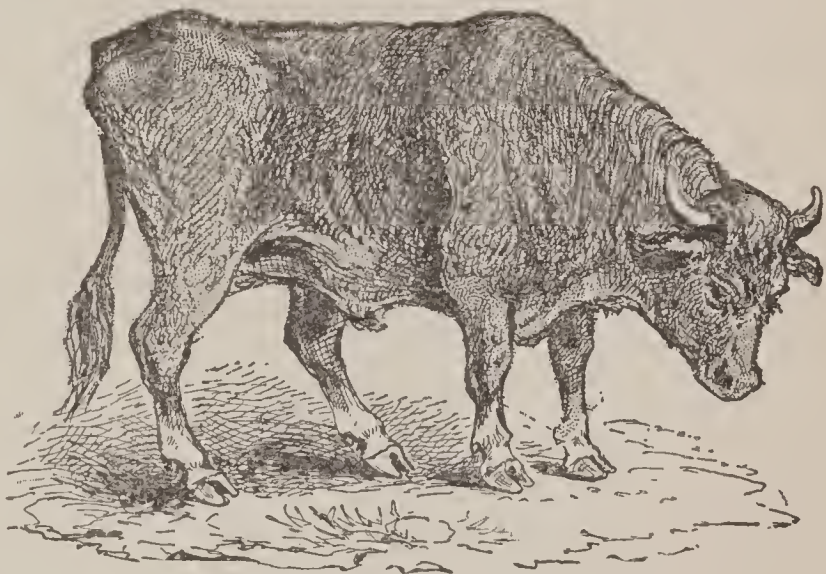


FIG. 443. — Acute pleurisy.

are cold, bathe with hot liniment, and wrap them up. With good care, recovery is probable in most cases.

ANÆMIA, OR HOLLOW HORN.

In this condition there is marked poverty of the blood. There is a great deficiency of the red corpuscles and other solid constituents of the blood, which is thin and watery in appearance. In females it is sometimes caused by an excessive yield of milk, by which the system is subjected to a heavy drain; but it is usually due to deficient food, or that of an inferior quality.

The symptoms are a marked lack of vital energy, languor, loss of appetite, tendency to indigestion, and rapid wasting away. The pulse is feeble, frequent, and irregular; the mucous membranes are very pale, the extremities are cold, and often the animal is covered with lice. Usually it is preceded by an exhausting diarrhea.

Treatment. — Simple anæmia presents very little difficulty. The first step should be the removal of the cause, by a complete change of diet, and careful nursing. The change to good food must not, however, be made too suddenly. A laxative dose will generally rouse the bowels, if torpid; but if diarrhea is present, it must be cautiously checked. If the animal is infested with vermin, these should be destroyed as soon as possible. The following tonic may be given daily in the food or by drenching, and continued, with occasional rests, until a cure is affected: —

Sulphate of iron (copperas).....	2 dr.
Nux vomica, powdered.....	1 “
Gentian.....	1 oz.

The animal should be well fed, carefully housed, and kept clean. This disease has been called Hollow Horn, or Horn Ail, from a symptom produced by the impoverished condition of the blood. Ignorant pretenders have sometimes bored the horn, and poured in turpentine to relieve one unimportant symptom of a constitutional disease.

CHAPTER XXII.

DISEASES OF CATTLE.—CONTINUED.

INJURIES OF THE MOUTH.

THESE sometimes occur from foreign substances being taken into the mouth in feeding, and becoming fixed between the teeth, injuring the soft parts. The foreign substances must be removed, and then the following wash may be applied two or three times a day :—

Powdered alum . . 2 dr.
Honey 1 oz.
Water 1 pt.

HOVEN, OR TYMPANITIS,

is known under a variety of names. It is a distention of the rumen, or paunch, by gas. (See Fig. 445.) The most fruitful cause of this disorder is green food. Feeding on wet grass or young clover, damp with dew or rain, or on frosted or rotten vegetables, will sometimes cause it. A sudden change of diet of any kind may produce the disorder.

The symptoms usually develop rapidly. A swelling appears in the left flank, and labored breathing and panting soon indicate great distress. At this stage, relief may sometimes be obtained by exercise, or by dashing cold water over the body.



FIG. 444. — Injuries of the mouth.

Treatment.—Prevention is both cheaper and safer than cure; but if by neglect or want of proper precaution the animal is found in a suffering condition, relief must be quick, or the result will be fatal. If serious, the safest course is to plunge the blade of a pocket-knife or lancet into the paunch at the point indicated. The wound may be left open; it will soon heal of itself if let alone. If not yet serious, give, if convenient, as soon as possible —

Aqua ammonia. 1 oz.
 Essence of ginger ½ oz.
 Cold water 1 qt.



FIG. 445. — Hoven.

From two to four ounces of aromatic spirits of ammonia may be substituted for the aqua ammonia.

If no relief is given, puncture the rumen without delay. If a trocar is not available, use an ordinary sharp-pointed knife, as before stated.



FIG. 446. — Method of puncturing ox or cow when bloated.

The point at which the trocar should be plunged is midway between the last rib and haunch bone, about a hand's breadth below the transverse-lumbar processes. (Fig. 446.)

The animal is secured by the horns, and the operator, standing on the left side, in advance of the hind leg, to avoid being kicked, plunges the instrument through the tissues. The trocar is at once withdrawn, and the canula left to allow the gas

to escape. A string can be attached to the canula, so that it may be left in position until the formation of gas has ceased. If the tube becomes clogged, it may be cleared by means of



FIG. 447. — Trocar for puncturing the stomach.

a probe or wire. From the great size of the distended rumen, it is comparatively easy to select the proper point for punctures. As the rumen is not highly organized, no danger need be apprehended from inflammation. For more particulars on this treatment, see Colic or Tympanitis in horses.

OBSTRUCTION OF THE GULLET—CHOKING.

The lodgment of a piece of potato, turnip, or other vegetable, in the pharynx, or in some portion of the gullet, is a frequent cause of tympanitis.

Treatment. — When the obstruction is in the pharynx, the balling-iron should be placed in the mouth, the hand passed



FIG. 448. — Holding the cow for passage of probang.

through to the pharynx, and an effort made to withdraw it. This failing, the following should be given, to relax and lubricate the parts : —

Linseed oil	$\frac{1}{4}$ pt.
Sulphuric ether	1 oz.

The obstruction may then be expelled by coughing, or pass downward. Before proceeding to surgical treatment, repeated draughts of warm water should be poured down. If these measures do not succeed, the probang, if available, must be used.

It is a common practice in Spain, when cattle get choked with apples or other such substances, for two or three men to seize them and lay their neck over a log of wood, and then the



FIG. 449. — The probang.

operator feeling for the obstruction, strikes a smart blow immediately over it, with a mallet or billet of wood, sufficient to crush the apple to pieces, which instantly begins to be blown out, and the animal is relieved. The expedient appears to be practicable, where the obstruction can be felt externally and come at in this way.

WOUNDS.

(See Cuts and Wounds page 264, which read carefully).

From the horns of their companions, and from the brutal violence of those who look after them, cattle are often exposed to wounds. The treatment of them is generally simple.

The first thing is to clean the wound from all dirt and gravel, which would cause irritation, and prevent the healing of the part. A good fomentation with warm water will effect this, and at the same time will help to abate any inflammation which may probably have arisen.

Next is to be considered the state of the wound. Is it a lacerated or punctured one? If it is a lacerated wound, we must try how neatly we can bring the divided parts together. If there are any portions so torn as to prevent doing this completely, they should be removed with a knife or a sharp pair of scissors. Then when the edges are brought well together,

they should be retained by passing a needle and strong waxed twine deeply through them, making two, or three, or more stitches at the distance of half an inch from each other. A crooked needle (See Fig. 287), or a triangularly pointed needle, will be necessary for this purpose. Then dress and cover with cotton, as directed on page 265, and cover the whole by a bandage closely, but not too tightly applied.

If it is a punctured wound, its direction and depth must be carefully ascertained. If much inflammation, use fomentations until abated, and treat as directed, the whole to be covered by a bandage closely, but not too tightly applied.

DIARRHEA, OR "SCOURS."

This is rather an indication of disease than a malady itself, and is the result of numerous causes, among which may be named indigestible food, previous constipation, abuse of purgatives, worms, impure water and air, acidity of the contents of the alimentary canal, or the presence of irritants in it. It may result from disease of



FIG. 450. — Diarrhea, or scours.

the stomach, liver, or pancreas, and it accompanies many blood-poisons and constitutional maladies, as tuberculosis, typhoid fever, pleuro-pneumonia, etc. Cattle are liable to it when put on fresh, green pastures; and exposure to cold and damp may bring it on.

Symptoms. — There is a copious fluid discharge from the bowels, accompanied, sometimes, with severe straining, occasional colicky pains, and frequent and scanty urination. The milk dries up, there is great thirst, no rumination, and a feverish condition of the stomach and bowels. The belly is tucked up, and the back arched. From inactivity of the stomach, food may pass undigested.

In the treatment of this disease, it is most essential to learn its origin, or ascertain the conditions producing it, and remove them. If there are local irritants in the intestines, or blood-poisons in the system, which can be best thrown out by the

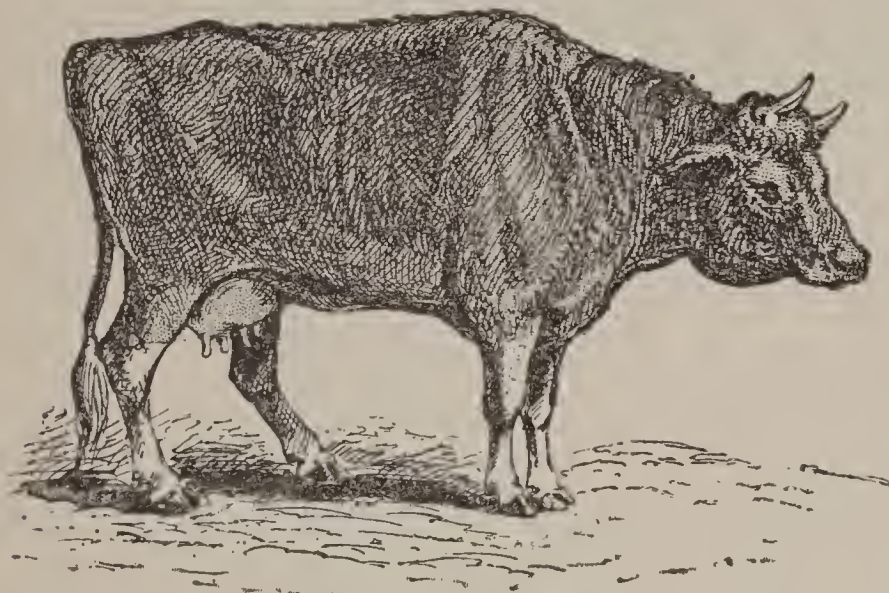


FIG. 451. — Chronic dysentery.

bowels, administer some of the milder cathartics, as castor oil or linseed oil in one and one half pint doses, or three fourths of a pound of Epsom salts in a quart of linseed mucilage, with one ounce of

ginger added. If griping and colic are manifested, one half to one ounce of laudanum may be added, or one dram of powdered opium. If worms are the cause, remove them at once. If it is due to cold, warm carminatives and astringents are indicated; if to debility, mineral acids, iron, and vegetable tonics and astringents, as follows:—

Pulverized angostura	
bark.....	1½ oz.
Sulphuric acid.....	1½ oz.
Water.....	24 oz.

Give two ounces (a wine-glass full) three or four times a day.

Or give the following in a pint of gruel:—

Sulphate of iron (copperas)	½ oz.
Powdered catechu.....	½ oz.
Powdered gentian.....	½ oz.

When the discharges are fetid and sour, the following in water, and given two or three times a day, is beneficial:—



FIG. 452. — Diarrhea.

Prepared chalk	1 oz.
Bisulphite of soda	1 oz.

In all cases, great attention should be given to warmth, cleanliness, and ventilation. Easily digested, non-irritating food should be supplied.

HÆMATURIA — BLOODY URINE.

This is usually the result of injury either of the spinal cord or of the structures near the kidneys.

Symptoms. — There is always considerable fever. Pressure on the spine shows the pain in the loins to be intense. If the animal can stand, it assumes the position shown in Fig. 453. When obliged to move, it walks with legs wide apart. The attack is sudden, and all symptoms are acute. The distinguishing sign of this disorder is the passage of blood with the urine, which not uncommonly separates after it has fallen, or is discharged in clots.



FIG. 453. — Traumatic hæmaturia.

Treatment. — Isolate the animal, and keep it quiet. Unload the rectum by injections of cold water, given at intervals of fifteen minutes. Purgatives are likely to aggravate the condition of the kidneys. Give one of the following astringents, as circumstances may require :—

Powdered nut-galls..	4 dr.
Infusion of quassia	$\frac{1}{2}$ pt.

Mix.

Or —

Solution of perchloride of iron.....	1 dr.
Infusion of quassia.....	$\frac{1}{2}$ pt.

Mix.

Or —

Powdered nut-galls.....	2 dr.
Powdered opium.....	1 dr.
Water or gruel.....	1 pt.

One of these may be taken, and repeated for several days, or they may be alternated with each other, if necessary. Let the diet be light. It is sometimes well to restrict the use of water, giving small quantities of linseed tea as a substitute.

NEPHRITIS — INFLAMMATION OF THE KIDNEYS.

The most common causes of this affection are blows and violent strains over the region of the loins. It is usually confined to one kidney.

Symptoms. — Abdominal pain, causing great uneasiness, is apparent. A small quantity of urine is discharged with great pain. Its color is deeper and its density greater than natural, and albumen is present. There is a variable pulse, and frequently high fever. The animal is dull, and stands with hind legs wide apart. (See Fig. 454.) As the skin and bowels are called upon to throw off the waste products usually expelled by the kidneys, the symptoms become worse. Blood-poisoning has begun; diarrhea ensues, and perspiration rolls from the body, owing to the increased action of the skin. Finally the urine is entirely suppressed, prostration and coma ensue, and the animal dies, generally within three or four days from the appearance of the symptoms.



FIG. 454. — Nephritis.

Treatment. — Avoid saline purgatives, and use regular injections of warm water. To reduce the inflammatory action, give —

Solution of acetate of ammonia.....	3 or 4 oz.
Tincture of aconite.....	30 drops.
Linseed tea.....	$\frac{1}{2}$ pt.

Repeat in four hours, reducing the aconite to 20 drops; repeat again in four hours more, with a reduction to 15 drops. In four hours more repeat with 10 drops, and continue this proportion every four hours until the circulation is affected. Sheep-skins are sometimes placed on the loins to promote warmth. Mustard poultices are beneficial when the pulse has been reduced. If the pain continues, give opium and astringents. Mucilaginous drinks should be allowed freely, and may be injected into the rectum.

Working oxen are apt to suffer from a recurrence of nephritis. When such have recovered from an attack, it is well to fatten them for the butcher.

HÆMATURIA, OR RED WATER,

prevails in low, swampy lands, where deficient and poor food indicate bad general management. Throughout the progress of the malady, asthenia is present. Cows are most commonly afflicted, which is probably to be explained by the demands made upon the system by lactation and gestation. It sometimes appears in from eight to fourteen days after parturition. The color of the urine is pale red, or dark or brownish red, and is increased in quantity. The disease may run for two or three weeks, without noticeable increase; then the eyes present a hollow, sunken appearance, the back is arched upwards, the abdomen is pendulous, the flanks hollow, and there is decided constipation. (See Fig. 455.) The anemic murmurs of the heart become loud and strong, the mucous membranes are pale, emaciation rapidly progresses, and death follows at variable intervals from the commencement of the attack.

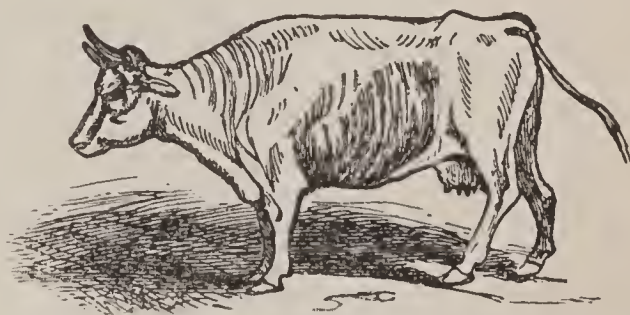


FIG. 455. — Hæmaturia, or red water.

Give a pint of linseed oil. Clysters of soap and water should be freely used, and give plenty of linseed tea to drink.

As soon as the bowels will admit, and the urine is corrected, give the following astringent tonic:—

Chlorate of potash.....	$\frac{1}{2}$ oz.
Tincture of chloride of iron.....	$\frac{1}{2}$ oz.

Mix in a pint of gruel, for a dose, and repeat twice a day. Or half an ounce of sulphate of iron (copperas) may be added to the sulphuric acid mixture. The animal should have a generous and healthful diet, clean water, a well-drained pasture for grazing, and dry, comfortable shelter in stable or shed.

ECZEMA.

The simple form of eczema is marked by the formation of vesicles, crowned with little blisters. These itch intolerably, and when broken, exude a bloody or straw-colored fluid, which leaves the skin and hair moist. As soon as the vesicles are rubbed off in one part, they form in another, thus keeping up the irritation.



FIG. 456. — Psoriasis.

Treatment. — Change the food if possible. Give a purgative once a week. Bathe the affected parts in a solution of carbolic acid, a half ounce in two quarts of water.

If eczema is neglected, it degenerates into the chronic form.

The skin thickens, and there are ugly cracks, from which there is a constant discharge of a semi-purulent fluid. This form is located chiefly on the legs. (See Fig. 456.) Apply hot fomentations, followed by hot poultices of linseed meal, until the inflammation disappears; then rub the affected part well with the carbolic acid solution, and bandage loosely. When the soreness and tenderness are gone, use the following ointment for a few days:—

Alum (powdered)	1 oz.
Carbolic acid	1 dr.
Lard	4 oz.

HERPES.

This is a mild form of eruption of the skin, in which the vesicles arrange themselves in a circular form, as shown in Fig.



FIG. 457. — Herpes. First form.

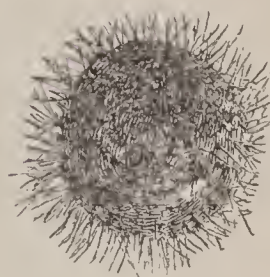


FIG. 458. — Second form.

457. Fig. 458 shows the bare surface as it appears after the vesicles have burst, and a thin crust or scab has formed. The treatment is the same as in simple eczema.

FOUL.

This is an inflamed condition of the part of the foot between the hoofs. The most frequent cause of this disorder is the presence of pebbles, dirt, or other foreign substances between the clefts. It is frequent in cattle kept on low, marshy pastures, and is occasioned by the accumulation and drying of mud. It has also been observed as the result of irritation from standing on reeking filth or manure.



FIG. 459. — Usual mode of drenching a cow.

Symptoms. — There is usually lameness. Handling the feet between the digits or in front of the coronet causes pain; an unusual degree of heat will be noticed; and there is frequently swelling of the pastern.

Treatment. — In cases of foul, if it be due to the presence of an irritant, treatment is not difficult. Clean the parts with



FIG. 460. — A herd of cattle attacked by gadflies.

warm water, and remove any foreign substance or ragged bits of horn. If there is much inflammation, apply a hot poultice of bran and linseed mixed with charcoal, for two or three days. If it is difficult to cleanse the hoof, mix the poultice with turpentine. Afterward dress with one of the following applications : —

Carbolic acid.....	1 dr.
Water	6 oz.

Apply with a brush, and cover the part with tow wet in the solution.

Or —

Powdered sulphate of copper (blue vitriol)	1 oz.
Spirits of turpentine	4 oz.
Lard	4 oz.

Melt the lard and turpentine together, and then add the copper.

The following dressing has been recommended in ordinary cases : —

Carbolic acid (crude)	1 part.
Tincture of myrrh.....	2 parts.
Tincture of arnica.....	2 parts.
Glycerine.....	4 parts.

Apply daily with bandage and tow.

FOREIGN SUBSTANCES IN THE EYE.

It not unfrequently happens that some foreign substance — a hay seed or a husk of grain — obtains lodgment in the eye, and perhaps becomes attached to the cornea by effusion from the surface of the latter. The offending substance must be promptly and carefully removed. A silk handkerchief wrapped over the point of a lead pencil may be used. In case the substance is imbedded in the mucous membrane, the forceps must be used.

THE GADFLY — WARBLER.

During the summer, cattle may sometimes be seen running about the pasture in a state of great excitement, with heads and necks extended, and tails erect and quivering, or rushing in

mad haste to the nearest pond or river. (See Fig. 460.) The cause of this unusual excitement is the gadfly. Young animals and those in good health are usually attacked by the gadfly;



FIG. 461. — Gadfly, (*oestrus bovis*), magnified.

for in them the skin is soft and more easily penetrated. The female punctures the skin of the beast by means of an ovipositor, and deposits in the subcutaneous tissue a drop of acrid fluid, and an egg, which is hatched out by the heat of

the animal. A small abscess results, upon the pus of which the larva feeds. Above each larva may be seen a tumor, which grows to a considerable size. The best way to treat this is to puncture the skin with a common pen-knife, and then press out the grub.

RINGWORM.

This affection (Fig. 462), an exceedingly troublesome one, is due to a fungus, or vegetable parasite, originating from a spore which has gained entrance to a hair-follicle. It is very contagious, being communicable from man to the lower animals, and *vice versa*.

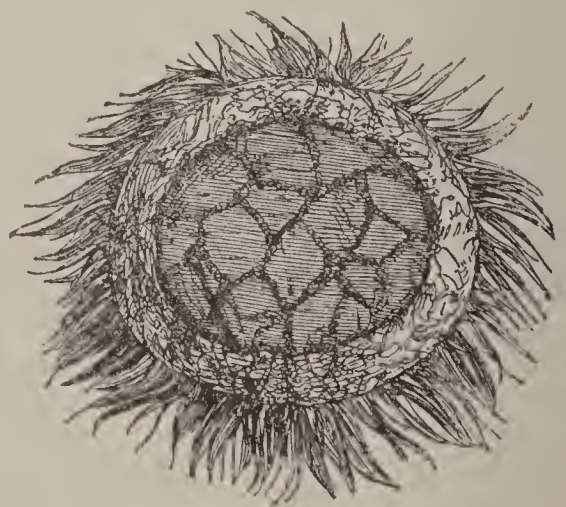


FIG. 462. — Ringworm.

Symptoms. — The most prominent symptom is the circular patch of scaly crusts, which at first adhere closely, but in time

become detached from the central point by a purulent fluid. The period of incubation is from eight to fourteen days.

Treatment. — Isolate all affected animals. The crusts must be removed and destroyed. First clean the parts with soap and water, and then apply a mild mercurial or iodine ointment. The following may be used every day : —

Iodine.....	$\frac{1}{2}$ dr.
Iodide of potash.....	1 “
Cosmoline.....	1 oz.

Mix for an ointment.

Or the part may be painted with the following mixture : —

Carbolic acid.....	1 part.
Acetic acid.....	20 “

LICE.

These troublesome insects abound among ill-cared-for cattle, and sometimes materially retard their growth and development. They worry the poor animals constantly, and should be attended

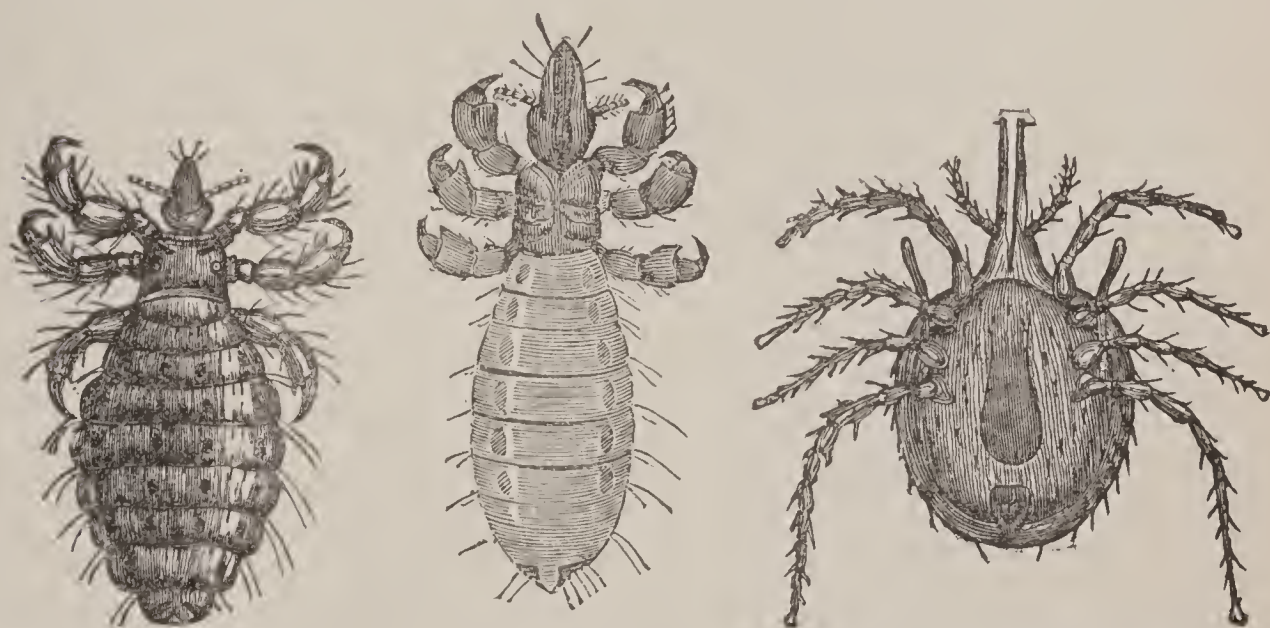


FIG. 463. — Ox-louse. FIG. 464. — Calf-louse.

FIG. 465. — Fodder parasite.

to promptly. Several different forms are described by helminthologists, but the species most commonly seen are four in number, which are shown in the above figures.

To remove these pests, a strong decoction of tobacco water may be used. The following formula is recommended as being both safe and destructive to the lice : —

Stavesacre seed.....	4 oz.
White hellebore.....	1 “
Water... ..	1 gal.

Boil until only two quarts remain, and apply with a brush.

MANGE.

This unpleasant disease, though more common in the horse and dog, is not rare among poorly-fed and neglected animals. The parts first affected are frequently the face, head, and neck. See Mange, in the Horse Department.



FIG. 466.—Mange parasites.

CHAPTER XXIII.

CALVING.

THE cow requires assistance in parturition more frequently than any other domestic animal. It is not unusual for a heifer to need assistance in her first delivery, and if high-bred and delicately reared, she is quite apt to require it. But no aid should be given in any case until it is absolutely necessary. Never interfere until the water-bags have burst. If after this has occurred, the pains continue for some time without any presentation, an examination should be made to ascertain the nature of the presentation and to determine the difficulty.

Sometimes a rigid condition of the neck of the womb causes delay. In such a case the neck may be smeared with extract of belladonna, which will often cause it to relax within a few hours. If there is no time for delay, a narrow-bladed, blunt-pointed knife should be passed up the vagina, and the neck cut to the depth of a quarter of an inch, at four points. It will soon give way, and the bagging of the water will cause the necessary dilatation.

The natural presentation of the foetus is with the head lying upon the fore legs. If in this position, nature will usually do all. But if the presentation is unnatural, and the labor has been long and ineffectual, some assistance is required. The hand, well greased, may be introduced, and the position of the calf changed ; and when in a proper position, a cord should be



FIG. 467. — Inversion of bladder.

tied around the fore legs just above the hoofs ; but no effort should be made to draw out the calf till the natural throes are repeated. After calving, the cow will require but little care if she is in the barn, and protected from changes of weather. A warm bran mash is usually given, and the state of the udder examined.

RETAINED AFTER-BIRTH.

If the after-birth is not expelled within forty-eight hours, it may be best to hasten its expulsion. The hand should be



FIG. 468. — One of the symptoms of milk fever.

passed into the uterus, and the connection of each cotyledon (see Fig. 470) — there are sixty or seventy in all — gently severed.

Great care is needed, as severe and dangerous hemorrhage might follow a violent separation.

FLOODING.

This may sometimes occur after a natural but rapid or difficult delivery. Vaginal hemorrhage is generally not serious. The blood is bright scarlet, showing that it comes from an artery. It can usually be checked by injections of cold water. Uterine hemorrhage may be of a serious nature. It may be caused by injury to the womb, inflicted during the extraction

of the calf, or when taking away the after-birth. It most commonly follows protracted labor or abortion. If injections of cold water do not check it, give two ounces of fresh ergot of rye. A piece of ice the size of a walnut may be placed in the womb and left there. Prof. Gamgee recommends, to be given internally,—



FIG. 469. — Inversion of the uterus.

Compound tincture of cinnamon.....	3 oz.
Diluted sulphuric acid.....	5 oz.

Give two tablespoonfuls in a quart of water every hour or two.

INVERSION OF THE UTERUS.

This is not fatal in the cow, and seldom occurs in the mare, in which, as a rule, it is fatal. The position of the cow in this ailment is shown in Fig. 469.



FIG. 470. — Uterus of cow, showing cotyledons.

Dr. B. C. McBeth, of Battle Creek, Mich., employs with decided success the following treatment in inversion of the uterus :—

First, cleanse thoroughly with hot water tinctured with carbolic acid in the proportion of three or four drams of the former to three or four gallons of

the latter, and having then replaced the organ in position, give the following as a drench :—

Tincture of opium.....	2 oz.
Chloroform.....	$\frac{1}{2}$ “
Sulphuric ether.....	1 “
Spirits camphor.....	1 “
Water.....	1 pt.

After giving this prescription a fair trial, without success, Dr. Mc B. advises a resort to the following treatment, the details of which he furnishes at our special request :—

At a point directly over the lumbar region, some three inches forward of the hip, and about three inches on each side

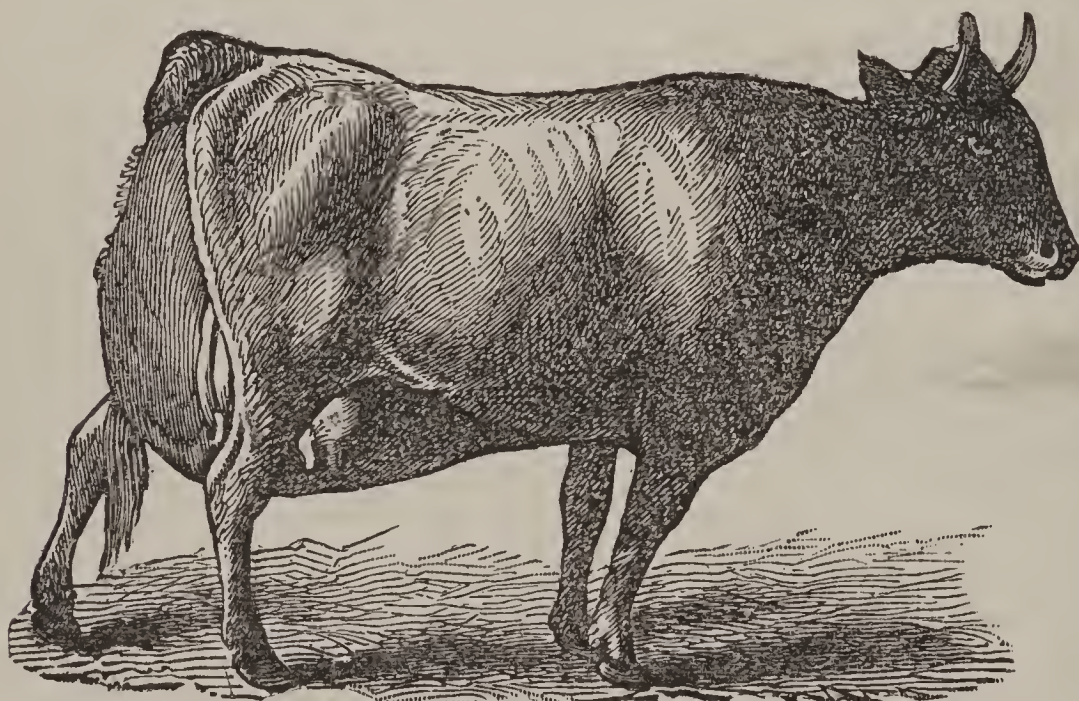


FIG. 471. — Hysterocele, or hernia of the uterus.

of the backbone, take up a fold of the skin between the thumb and finger, and run through it a needle with a waxed thread ; draw over the center of the back, and bring a sharp strain upon the string. This should be done when there is no curve to the back. Give doses of sulphite of soda, as follows :—

Nitrate of potash	1 dr.
Sulphite of soda.....	2 dr.

To be administered every fourth hour for twenty-four or thirty hours.

After the second day give the following :—

Nux vomica.....	$\frac{1}{2}$ dr.
-----------------	-------------------

Or —

Quinine $\frac{1}{2}$ dr.

This to be alternated every four hours with the previous remedy, and the bowels to be kept loose with Epsom salts in half-pound doses, with two or three drams of ginger or capsicum, according to size and condition, every twenty-four hours.

Have the string removed within forty-eight hours, or as soon as the animal ceases straining.

The main feature of the treatment thus employed (that of tying a string across the back) is so peculiar, and so far out of

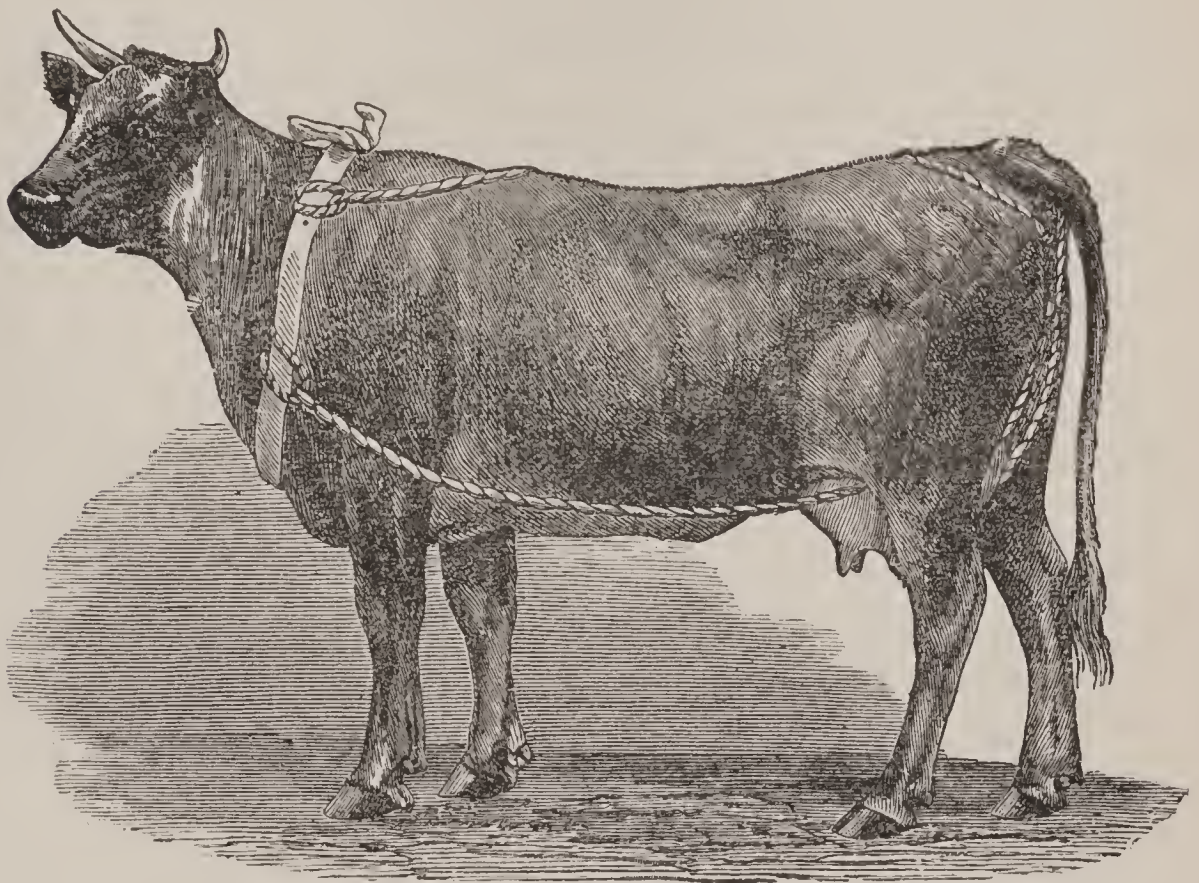


FIG. 472. — Delwart's truss.

the regular line, that we have given it in this connection as a matter of special interest.

To avoid a recurrence of the accident of the inversion of the uterus, it is a good expedient to fill the vagina with a ball of tow, which may be kept in place by the use of the Delwart Truss. (Fig. 472.) This truss, as will be seen, is so simple and easily put on, that we give it preference. It is formed by cords, united by a loop in the middle of each, in such a manner

that an oval space (*a*, Fig. 473) sufficient to inclose the vulva is formed, the lower commissure being left free for the escape of urine. The two ends of one cord (*b, b*) pass over the back, and are secured to a strap round the neck or chest. Those of the other cord (*c, c*) pass between the thighs, and are fastened to the upper part of the band. The loops should be wrapped in cloth, to prevent chafing the parts under the tail.

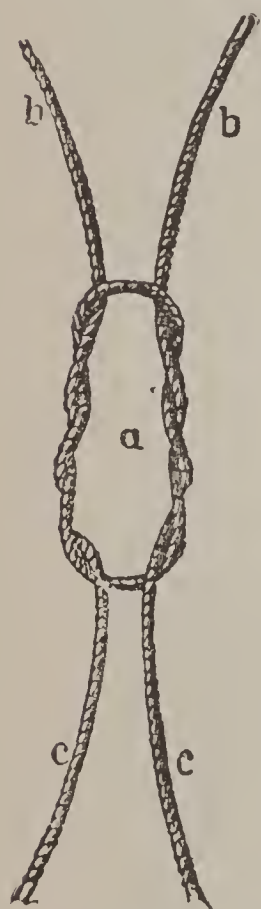


FIG. 473.
Loop of Delwart's
truss.

LEUCORRHEA, OR WHITES.

This sometimes follows parturition, as the result of violence or of retained after-birth ; but it may occur at other times. It is characterized by a discharge from the vulva of a white, glutinous, and sometimes ropy substance. It is usually inodorous, but if from retained after-birth, it is muco-purulent and offensive.

Treatment. — Syringe out the vagina with tepid water, and inject the following twice a day, until the discharge ceases : —

Carbolic acid	$\frac{1}{2}$ oz.
Water	2 qts.

Give a saline cathartic, as 12 oz. Epsom salts, and follow with a course of tonics. The following may be given daily in the feed : —

Sulphate of iron (copperas)	2 dr.
Gentian	$\frac{1}{2}$ oz.
Ginger	$\frac{1}{2}$ oz.

The favorite remedy of Dr. C. A. Meyer, of New York, is, —

Permanganate of potash	3 oz.
Water	1 gal.

ABORTION.

An idea of the extent to which this prevails may be gained from the fact that in the State of New York the annual loss by abortion among cattle has been for several years more than \$4,000,000. The malady frequently becomes epidemic, and

runs rapidly through a herd, the cows aborting one after another. The causes are numerous. It may be due to external violence or accident, to smutty, moldy, or ergoted food, to riding of animals in heat or teasing by the bull, to overfeeding, and to decaying animal refuse, especially the abortion discharges of other animals. The last is usually the immediate cause of its epidemic nature, though the causes that produced it in the original instance have doubtless rendered the herd peculiarly susceptible to it. For this reason it is of the greatest importance to isolate every instance of it, remove all vestiges



FIG. 474. — Nervous debility.

of the fetus and of the after-birth, and thoroughly disinfect and deodorize the premises. Smearing the parts of the cow with tar or stinking oil will help to destroy the smell. It is better to fatten her for the butcher than to risk another pregnancy.

Symptoms. — In the early period of pregnancy, abortion may occur without any premonitory signs, the first intimation of it being given by the animal's again being in heat. In later stages, the premonitory signs resemble those of an ordinary parturition, except that the change in the animal is sudden, and accompanied with great dejection. In some cases there is a muco-purulent discharge from the vulva.

Treatment. — Where abortion occurs in the early stages of gestation, there is usually little or no constitutional disturbance, hence little active treatment is called for. But under all circumstances the cow should be isolated, and kept from the herd for at least a month. A moderate saline cathartic, followed by mineral tonics and good food, will usually be all the treatment needed.

In later abortion the constitutional disturbance is greater, and frequently complications arise. If the after-birth has not been discharged, it must be removed with the hand, without delay. Fleming suggests the subsequent injection of a weak solution of carbolic acid. This may be done twice a day for a week or more. In the event of hemorrhage, it must be treated as prescribed for vaginal or uterine hemorrhage. The animal must be kept warm, and free from exposure to the weather, if it is damp or cold. Mineral tonics and nourishing food should be given.

Give daily doses of one-half ounce of chlorate of potash to every pregnant cow, and keep the animals completely isolated, and confined in sheds or stables that have been thoroughly disinfected. If premonitory symptoms appear, large and repeated doses of laudanum may be given to quiet the system and check the tendency; but if the symptoms increase, isolate the cow at once; for the abortion is probably inevitable. After recovery, a cow should not take the bull until she has run over several periods of heat. If she aborts the second time, there should be no hesitancy in fattening her, as she will be a constant source of danger to the herd.

SORE TEATS.

Sores, chaps, and cracks are frequently found on the teats of a cow. Continued sucking by the calf, or cold, wet, and filth at any time, may cause soreness. For simple tenderness or soreness, wash the teats with warm water, and anoint with the following ointment: —

Pulverized alum	1 dr.
Vaseline	2 oz.

Lard may be used as a substitute for the vaseline, but the latter is decidedly preferable.

Or —

Goulard's extract	2 oz.
Sulphate of zinc	2 oz.
Lard	2 oz.

Rub upon the parts a few times. This is a favorite remedy among dairymen for sore teats, cake in the bag, etc. This prescription I know to have been sold for fifteen dollars, and it is prized by dairymen in Northern New York, where the medicine is sold especially for their use.

Gentle milking with dry teats will prevent much soreness, and no treatment will prove effective without this care. In severe cases, where milking is very painful to the cow, the milk may be drawn off by aid of the teat syphon.



FIG. 475. — Section of cow's teat.

Dr. C. A. Meyer recommends as the best application for sore teats, equal parts of tannin and glycerine.

MAMMITIS, OR INFLAMMATION OF THE UDDER.

This affection, commonly called garget, frequently takes place soon after calving, but it as frequently occurs before or long after that period. It may be caused by external violence, insufficient and careless milking, overdriving with distended udder, sudden changes in temperature, as the hot days and cold nights of September, or cold contracted from lying out late in wet pastures or during frosts.

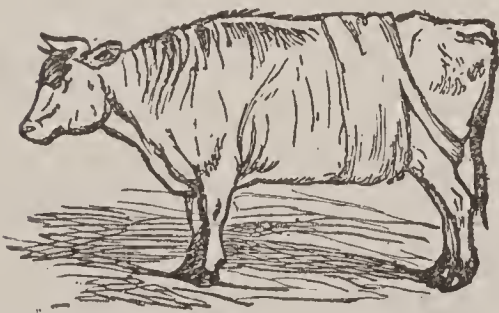


FIG. 476. — Method of supporting udder in mammitis.

Symptoms. — Enlargement of the udder, with heat, tenderness, and a hard feeling in the part more particularly affected. Instead of normal milk, a thin, yellowish fluid is drawn from the

teat. This becomes denser, and fetid and curdled lumps are drawn away with it. There is more or less constitutional disturbance, manifested in restlessness, diminished appetite, shivering, and disordered bowels. The milder type yields readily to treatment; the type found in connection with parturition sometimes terminates in suppuration, or induration or gangrenous sloughing.

In an essay on this subject, read by Dr. Meyer, of New York, before the veterinary association in that city, he claimed the treatment given below to be specific:—

In the spring of 1882, while pleuro-pneumonia was raging quite severely, I was again called into cattle practice, and came across odd cases of mammitis. I read more deeply, and thought still more strongly that there must be some relief for these animals, and finally came to the conclusion that there was a possibility that the disease might be erysipelas, *per se*. As ferri sesqui chloridum is a specific in human medicine, why should not a mineral tonic in cattle be a specific as well? I set about treating some cases, and gave directions to give one powder, dissolved in water, *ter in die*; to strip the cow every hour or two, to hand-rub the gland with soft soap, and to make a poultice of bran and soft soap, to be applied hot, and to keep changing every hour for six to eight hours; after this to bathe the gland with hot soap water three times a day, and during intervals to apply the soap to the affected parts. The question then arose, where to get the soft soap. I said, "Make it. Pearline powder will make the best I know of, and is easy of application." About thirty-six to forty-eight hours after the treatment had been used, orders came to my office: "Need not call; cows are all right."

My fee had not been paid, and I naturally thought: "Well, I will see who has the cases now." I called, was treated rather cool, when the first party said: "Well, the cows are all right." "Well," was my reply, "I called to satisfy myself; don't have any fear, this visit costs you nothing. I came to collect my fee, as it is not much, and to satisfy myself that the cows are well." I was shown into the shed, and, sure enough, my patients were nearly well, giving their full quantity of milk, and looking healthy. Since then, my success has been the same, and under this treatment have yet to see a case where failure is the reply, with this treatment.

The only other remedy used internally was and is the following:—

R

Cupri. sulph.	2 oz.
Nucis vomicæ	1½ oz.

M. ft. pulv. No. 12. Dissolved in water.

One to be given three times a day.

There are many forms of the disease spoken of, and it is very difficult to differentiate between them. I have used the same treatment before parturition ; and when the calf was born it did the stripping, and my results were always very satisfactory.





FIG. 477. — Hampshire-Downs breed.



FIG. 478. — Leicester ram.



FIG. 479. — Long-tailed Syrian sheep.



FIG. 480. — Afghan fat-tailed sheep.



FIG. 481. — Dishley ewe.



FIG. 482. — Romney Marsh ram.



FIG. 483. — Model Merino ram.



FIG. 484. — Old Norfolk ram.



FIG. 485. — Welsh sheep.



FIG. 486. — Lincolnshire ewe.



FIG. 487. — Aubrace sheep.



FIG. 488. — Black-faced Scotch sheep.

CHAPTER XXIV.

SHEEP-RAISING.

IN the very earliest times, sheep were raised simply for their pelts, and without regard to the wool. Later on, however, as civilization advanced, sheep were cultivated for their wool; and from the fleece of sheep and goats the finest of wool was woven in remote periods of ancient history. The shepherd's



FIG. 489. — Model head of ram.

occupation is a favored one in all sacred chronicles, and the produce of the sheep constituted the fabric of the richest of attire worn by God's chosen people. The Jewish maidens were arrayed on their holidays in woollen garments wrought of the finest and softest of fleeces. And it was to the shepherds,

while watching their flocks by night, that the angel came and announced the glad tidings that heralded the new era of peace on earth and good will to men.

The raising of sheep is a matter that interests the small farmer as well as the large one ; and when properly treated, they are the most profitable in their yield of all domestic animals. The diseases and ailments peculiar to sheep are easily cured when understood. This animal is the most tender



FIG. 490. — Cotswold ewe.

of all domestic ones, and none will more richly repay care and kindness in treatment.

To show what degree of perfection may be attained in the breeding and raising of sheep, it may be mentioned that single sheep have been sold in Vermont as high as \$10,000 to \$15,000.

It is only in modern times that mutton has come into demand as an article of food. In all these capacities the sheep now plays a very important part in the economy and luxury of civilized life.

CARE AND MANAGEMENT.

Land that is well drained, with a sandy loam or gravelly soil and subsoil, bearing spontaneously short, fine herbage, mixed to a large extent with white clover, is that which is best adapted to the raising of sheep. Rolling land is more desirable than flat, and if it be quite hilly, it is not a material objection. Sheep flourish best on sandstone or limestone soils. The



FIG. 491. — Merino sheep.

Leicester and Shropshire breeds in England are raised on sandstone soils; the Lincoln, on limestone, as also the Cotswold, the Southdown, and other famous breeds; while in our own country the American merino breed, the finest of all our sheep, is raised on the limestone hills of Vermont.

SELECTION OF PASTURAGE.

The grasses or other herbage upon which the sheep subsist must be such as will supply the special needs of the animal, or they must be supplemented by other food containing the con-



FIG. 492. — Arrangement for washing sheep.

stituent properties which they lack. The best kind of grasses for pasturing are timothy, tall oat grass, Kentucky blue-grass, red-top, false red-top, orchard grass, meadow fox-tail, white clover, narrow-leaved rib-grass, with some others indigenous to peculiar localities. The buffalo grass of the Western plains is

an admirable food for sheep. Bone-dust, salt, and sulphate of lime constitute an excellent occasional dressing for pasture-land.

A pasture should be closely cropped; otherwise the herbage becomes hard, unpalatable, and indigestible. The old adage familiar to farmers will well apply here: "Twenty-four hours' grass is best for a sheep, and eight days' grass for an ox." Experienced shepherds often divide the flock, putting lambs and yearlings on the best and tenderest pasture.

Additional foods should be constantly and promptly supplied whenever a shortage in the pasture-grass necessitates it; and the farmer should never fail to bear in mind that no domestic animal suffers as much in this respect as the sheep, and none so essentially requires the unremitting and watchful care of man.

The supply of water in a pasture is of the utmost importance. A spring of clear, flowing water is desirable by all means, and pools are to be avoided. Pond or marsh water is injurious, as is also running water with aquatic plants in it.

The exposure of the pasture is also important. Where possible, it should be broken from the prevailing winds by hills.

The washing of sheep should be done at least a week before shearing, and in the interval they should be kept in a clean field in the day-time and in a yard at night, so that the fleece may dry and regain sufficient yoke to recover a soft, mellow handling. Sheep are most advisably shorn when the spring weather has become warm and settled.

COLD STORMS,

if occurring soon after shearing, are liable to destroy sheep very quickly. One night's exposure, if the sheep are at all delicate, is liable to cause forty or fifty of a flock to perish at a time. In such cases, sheep should be housed, or protected in some way if possible. It is attention to these latter matters that in great part insures success.

MANAGEMENT OF EWES AND LAMBS.

From 150 to 153 days constitutes the period of gestation of the ewe. It is well to time the coupling of the ewes and rams

so that the lambs may be dropped at a convenient season. From thirty to fifty ewes may be apportioned to one ram, according to the strength and lustiness of the latter; but the larger figure given cannot safely be exceeded, except where the ram is exceptionably capable, when the extent may reach seventy or eighty. Upon this question, however, opinions widely vary, and a great deal must be left to the discretion of the intelligent and experienced farmer. When the ewes are in lamb, bran, crushed malt, and crushed oats and corn mixed, are the best kinds of food to give them. Any food that affects the bowels either way should be avoided. As the ewes near their time, they should be removed into a part of the stable or barn where each can have a pen by herself. The lamb once being dropped, and the ewe having owned and licked it, all danger is passed. If the lamb's first evacuations are not free, a teaspoonful of castor-oil, given in milk, will furnish a remedy. Should the ewe refuse to own the lamb, she may be placed in a hurdle, with her head confined so that she cannot butt the lamb.

The castration and docking of lambs may be performed within a week after they are dropped, the lamb at this age suffering little, and the wounds healing quickly.

Toward the weaning-time, lambs should be given some additional concentrated and nutritious food. Weaning should not be abruptly but gradually done, for the sake of both lamb and ewe. Dams in full flow of milk are by abrupt weaning made liable to engorgement of the udder, and lambs are thus subjected to a stinting of their growth. After weaning, lambs should have the first choice of pasture and the tenderest cutting of fodder, and they may be advantageously turned into a field of corn in the month of August, as the corn is then too far grown to be injured, and the suckers only, as well as the weeds, will be nibbled by the lambs. The ewes should at this period be carefully watched, and if their udders become too full, they should be milked by the hands; and if the udders are hard or heated, cathartics should be at once administered, to be followed by gradual doses of saltpeter, to increase the action of the kidneys.

DIPPING FOR TICKS.

Late in the spring, ticks appear on lambs, and are much more injurious to their constitution than is generally supposed.



FIG. 493. — Sheep tick.

The best remedy for this pest is to dip both sheep and lambs in the spring or early summer, and further on in the season if occasion requires, in a decoction of tobacco and sulphur — four pounds of plug tobacco and one pound of flowers of sulphur to twenty gallons of water, brought to a temperature of 120°. This operation of dipping is shown in Fig. 494. Of course, in the process on a very large farm, a much more capacious tank should be used.

CARE AND FEEDING IN WINTER.

The sheep, being the most tender and sensitive of all domestic animals, is naturally the most susceptible to the sharp



FIG. 494. — Dipping lambs.

changes in the seasons which characterize the climate of our country. But not only this, no animal is so easily affected

as the sheep by the requisite changing of food from summer pasturing to winter fodder. Sheep need safe and protecting shelter in winter; but they need something more strongly than shelter, and that is nutritious food. He who can feed sheep



FIG. 495. — A cosy shelter.

judiciously and economically in winter is entitled to call himself a good shepherd.

The barn in which sheep are fed must have a clean and thoroughly dry floor, and a roof that will keep out as well the rain as the snow, and must have abundant and proper ventilation. The building should if possible be on a side-hill, and if not, the location should be thoroughly drained.

TEETH OF THE SHEEP.

The teeth of the sheep consist of incisors, or cutters, and molars, or grinders. There are eight of the former, all in the

lower jaw, and twenty-four of the latter. On the upper jaw, in place of cutting teeth, the sheep has a cushion upon which

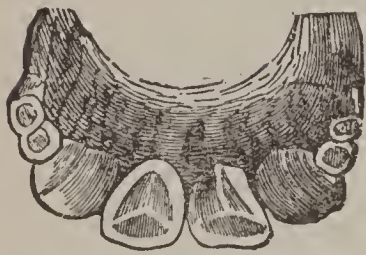


FIG. 496. — Incisors of two-year-old sheep.

the teeth of the lower jaw impinge when the mouth is closed. The sheep has no canine teeth, or tusks. In Fig. 496 are shown the incisors of a sheep two years old, in which the intermediate and corner incisors have not yet been replaced.

In the group of sets of teeth given in Fig. 497, are shown outside views of—1, the incisors at the age of fifteen months; 2, at the age of two years; 3, at the age of three years; 4, at the age of four years; 5, at the age

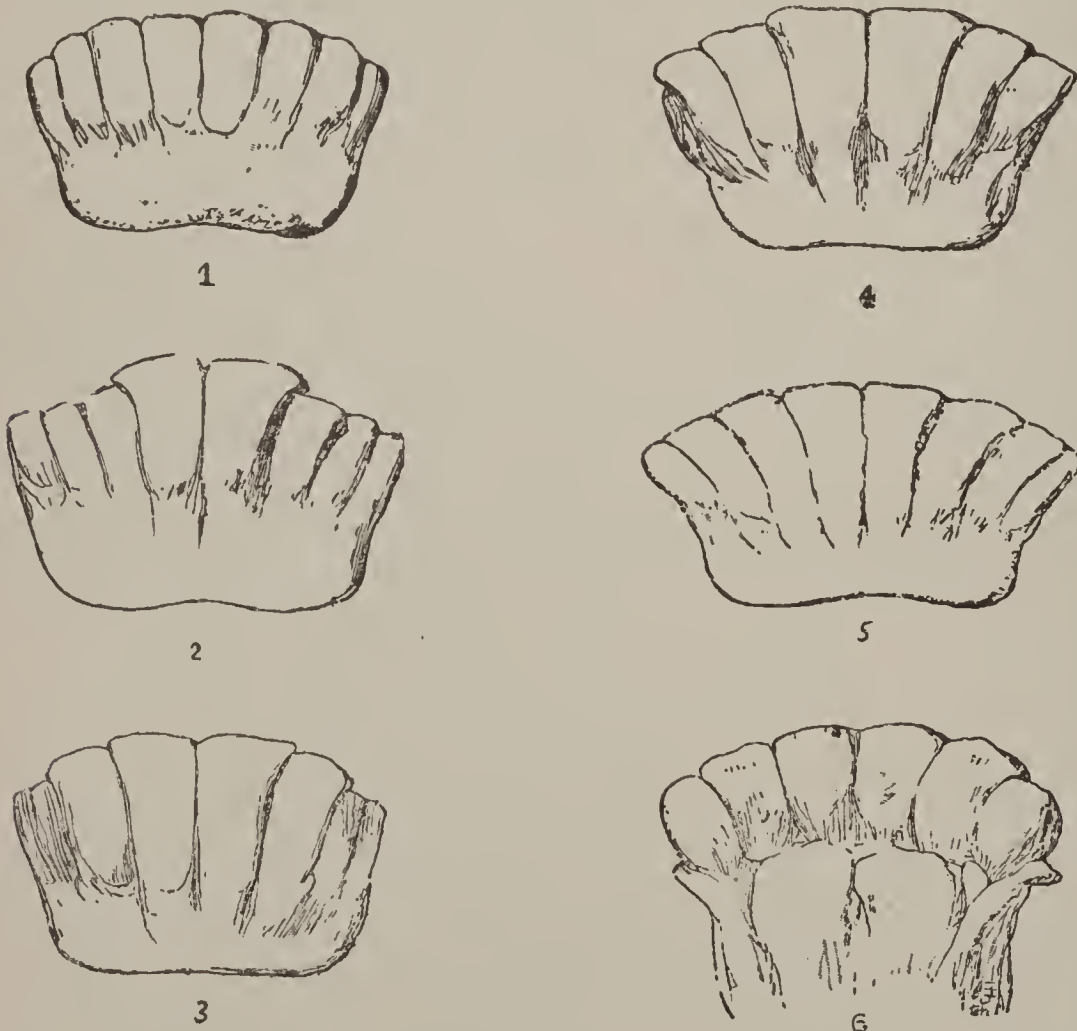


FIG. 497. — Teeth of sheep at different ages.

of five years; and 6, the deceptive appearance of teeth sometimes occurring in four-year-old sheep, when the animal may sometimes be taken for a five-year-old.

DISEASES OF THE RESPIRATORY ORGANS.

CATARRH is inflammation of the mucous membrane of the nasal cavities and the sinuses of the head. When long continued, the windpipe and the lungs may become involved. Overdriving by men or dogs, chilling rain-storms, damp nights, and blows on the head are among the common causes. Fresh air, ample ventilation, dry bedding, and warm mucilaginous drinks, such as oatmeal gruel, may be profitably employed. If fever ensues, and the nose and mouth are dry and hot, the following may be given:—

Epsom salts	1 oz.
Saltpeter	1 dr.
Ground ginger	1 dr.

Mix with molasses, and place on the back part of the tongue with a long wooden knife or spatula; hold up the head until all is swallowed; or the dose may be given in a small horn. Half a dram of chlorate of potash twice a day may be given afterward.

BRONCHITIS is inflammation of the bronchial tubes, and is exceedingly dangerous, because it causes anæmia. There is running at the nose of a viscous matter, and a painful, hoarse cough, which is sometimes convulsive. Rumination, or chewing, stops.

The treatment should be carried out in a dry and warm stable if possible. Fumigate with scalded and vegetable tar steam. Give ten to fifteen or even twenty grains of tartar emetic with honey twice or three times a day. Quiet, fresh air, a clean place, and fresh water are indispensable.

PNEUMONIA is not an infrequent disease, and is often firmly seated before the owner of the flock knows of its existence. Washing in streams of cold water, sudden chills from showers, or too close penning in warm or foul stables in cold weather, are common causes of pneumonia. The symptoms are a quick and plaintive breathing, heaving of the flanks, yellowish redness of the eyelids, discharge of thick yellow mucus from the nostrils, high fever, great thirst, quick pulse, grinding of the teeth, and lack of appetite. Death ensues, unless remedies avail, in from twenty-four to forty-eight hours.

Bleed in very acute cases. Two ounces of Epsom salts may be administered at first, as a laxative, if there is constipation; and then the following may be given twice or three times a day in oatmeal gruel, or better, in honey, on a spatula, and placed far back on the tongue:—

Powdered digitalis.....	10 to 15 gr.
Tartar emetic	10 to 15 gr.
Nitrate of potash	1 dr.

When improvement is shown, give a pint of gruel every three hours, with half a dram of powdered gentian.



FIG. 498. — Group of pets.

PLEURITIS, or pleurisy, an inflammation of the membrane lining the chest and covering the lungs, often accompanies pneumonia, and may arise independently from the same causes. The treatment is the same as for pneumonia, only adding nitrous ether, 2 dr. No bleeding. When recovery begins, this tonic may be given:—

Carbonate of iron	$\frac{1}{2}$ dr.
Ground ginger	$\frac{1}{2}$ dr.
Infusion of camomile	$\frac{1}{4}$ pt.

DISEASES OF THE DIGESTIVE ORGANS.

DIARRHEA, OR SCOURING. — This disease is only dangerous as it interferes with the process of nutrition, affecting the blood and superinducing dysentery. It should be taken in time, and then yields easily to proper treatment. It is best first to unload the bowels by raw linseed or castor oil, adding laudanum, and follow up by $\frac{1}{2}$ dram doses daily of nitrate of potash and of powdered cinchona. Some recommend, besides, linseed, gum-arabic, and slippery elm; and in chronic cases, astringents with tonics and carminatives may be profitably employed. The following mixture is a good one to keep on hand for general use:—

Prepared chalk.....	1 oz.
Powdered catechu.....	4 dr.
Powdered ginger.....	2 dr.
Powdered opium.....	1 dr.

To be mixed with $\frac{1}{2}$ pint of peppermint, and given in doses of one to two tablespoonfuls both night and morning.



FIG. 499.—Diarrhea in lamb.

DYSENTERY. — The symptoms of this disease are at first those of acute intestinal catarrh; the sheep dungs frequently and with straining, and the dung is fetid. Later it is quite liquid with mucus and blood, and is mixed with shreds sloughed off from the coating of the intestines, and increasingly offensive in smell. The sheep arches its back in the passages, and the rectum sometimes protrudes. This laxative may be effective in the first stages:—

Raw linseed or sweet oil.....	2 oz.
Opium (powdered).....	10 to 15 gr.

Give in rice-water, or oatmeal gruel. After the laxative has operated, give daily Dover's powder with ipecac, or catechu, oak bark, etc., with nux vomica (10 gr. doses), sulphate of iron, or similar tonics, rubbing the belly actively, and applying mustard or giving a warm bath.

DIARRHEA IN LAMBS, OR WHITE SCOURS. — This disease is caused by a change in the quality of the ewe's milk, food, etc. It is frequently the sequel of indigestion. The discharge is the

passage of undigested milk. The ration of the lamb should be regulated in such occurrences.

Until recovered, the lamb should receive the following daily : —

Magnesia.....	1 dr.
Essence of ginger.....	1 drop.
Water.....	1 glassful.

DISEASES OF THE BLOOD.

ANÆMIA, or “Pining,” is generally caused by excessive dampness, by the pasturage becoming rank and watery, insalubrity of stables, bad food, and marshy pastures, but sometimes also by deficient herbage in dry pastures. A change from a bad pasture to a good one, say a corn-field, is one remedy for sheep thus affected ; and, in fact, no better one perhaps can be prescribed for this disease than change of locality. Iron tonics may strengthen the system, and bitter tonics will increase the appetite.

ASCITES, or DROPSY, is the effusion of a watery fluid in the abdomen, the lining membrane of which is or has been inflamed. It may also be caused by bad circulation, or by feeding on rank, succulent, watery herbage, by which the blood is insufficiently nourished. In the latter case, a change to dry food will generally alleviate the disease, and a cure may sometimes be effected by the following : —

Nitrate of potash.....	$\frac{1}{2}$ dr.
Sulphate of soda.....	1 oz.
Ginger.....	1 dr.

Give in one dose.

If the animal be in low condition, linseed oil (2 oz.) may be substituted for sulphate of soda. Give daily afterward for a week, one dram of *scilla maritima*.

RED-WATER, or BLOODY URINE (sometimes called Water Braxy), is denoted by dullness, languor, pallor of the skin and mucous membranes, weakness, especially of the hind legs, trembling, surface coldness, staring coat, dry and hot mouth and horns, and diminution of the milk, which is watery and frothy, with loss of appetite, great thirst, weak pulse, and often

colicky pains. Later, the urine becomes bloody, and a more or less bloody discharge may come from the nostrils. The use of salt is strongly recommended as a preventive. If there be no abdominal pain, ordinary purgatives may be used; but with colic, sweet-oil and other mild materials should be employed in preference. The diet should consist of linseed decoctions, bran mashes, etc., with iron tonics, and wine or whisky.

CONTAGIOUS OR TRANSMISSIBLE DISEASES.

FOOT-ROT, FOOT-HALT, FOUL, LOO, or LOW mean the same affection, which is an ulcerous inflammation of the foot of the sheep. It is contagious, and supposed now to be due to a microscopic parasite. The first symptom is a slight lameness, which gradually increases in intensity. On examining the foot, we find the separation of the horny wall from the tissues underneath. About the sixth or seventh day, we notice the redness of the interdigital canal, commissure, cleft, or crease, at the junction of the two toes (Fig. 500); the lameness becomes more apparent. On removing the loose portion of the hoof, we find a little abscess, which is becoming ulcerous, and which secretes white, offensive matter. The disease keeps chiefly on the inner side of the toes. One or more feet may become affected. The ulceration gradually gains ground, and separates more horn from the foot, and secretes more offensive matter. Occasionally the disease disorganizes the tissues of the foot until it affects the bone and tendons. In the treatment of this disease, it is imperative that it should be taken in its first stage. This is the important point.

Treatment. — First of all, the foot should be thoroughly cleaned off, and the offensive matter entirely removed with tenderness and care, by means of a small knife or probe, and the hoof pared, after which the affected part may be touched or



FIG. 500. — Interdigital canal.

swathed with a feather or soft cloth dipped in the following, or a similar antiseptic solution :—

Chloride of zinc	1 dr.
Water	1 pt.

Or, if the case be malignant, in the following :—

Creosote	1 part.
Alcohol	4 parts.

A very successful preparation is—

Sulphate of copper (blue vitriol).....	1 lb.
Acetate of copper (verdigris).....	$\frac{1}{2}$ lb.
Linseed oil.....	1 pint.
Tar.....	1 qt.

Rub the vitriol and verdigris in very fine powder, with the oil, then add the tar, and mix thoroughly.

When the raw surfaces are extended over the foot, it may be wrapped in tow saturated in a solution of carbolic acid ; and when the interdigital space is affected, dressings may be applied by a bandage, as in Fig. 501.

The following solution will be found an effective preventive of the foot-rot :—

Arsenic ..	2 lbs
Washing soda.....	2 lbs.
Water . .	10 gals

Boil slowly to eight gallons, and fill up to ten, and sponge the hoofs with it thoroughly after cleaning.



FIG. 501. — Bandage for foot-rot

What we term lime-milk, or lime-water, is a good treatment as a preventive for this affection, and it can be administered easily. Put the liquid in a low and long box, which place in such a position in a chute, or in front of the stable door, as to force the sheep to pass through it when entering or leaving such places.

It is of the most importance in this disease to remove the sheep to other and dryer pastures. Where they are unavoidably kept on wet ground, the following ointment once or twice a week is said to be very beneficial as a protection to the feet :—

Barbadoes tar	1 lb.
Bergundy pitch.	1 lb.
Mutton suet	1 lb.

Melt the Bergundy pitch and suet over a slow fire ; then add tar, and mix thoroughly.

Mr. Randall, author of a valuable book on sheep, was very successful in curing foot-rot by the following treatment :—

He obtained about twelve pounds of blue vitrol for one hundred sheep. This was dissolved in a quantity of hot water, and placed in a washing-tub large enough to hold two sheep. The liquid was as hot as could be endured for a moment by the

hand, and was kept at this heat by frequent additions of the hot solution.

As soon as a sheep's feet were pared, it was placed in the tub, and held there by the neck by an assistant. A second one was prepared and placed beside it.

When the third one was ready, the first was taken out, and so on. Two sheep were thus constantly in the tub, and each remained in it about ten minutes. The cure was perfect.



FIG. 502. — Gadfly, greatly magnified.

PARASITIC DISEASES.

SHEEP-BOTS, OR GRUBS IN THE HEAD. — This disease is one of the most serious with which the farmer has to deal, and one which should be attended to promptly ; and it is of the utmost importance that the most thorough means should be resorted to for preventing it. It is caused by the gadfly, or breeze-fly (*æstrus ovis* or *cephalemia ovis*), which attacks the sheep in the nostrils and frontal sinuses, creating great dread of it on the



FIG. 503. — Flock of sheep attacked by gadfly.

part of the flock. When struck by the fly, they stamp the ground violently, and manifest every sign of great agony. Deposited at the entrance of the nostrils, the larvæ proceed upward to the farthest recesses.

The sheep gadfly lays its eggs on the edges of the sheep's nostrils, and the larvæ live in the frontal and maxillary sinuses. It is to avoid the attacks of the gadfly in hot days that the sheep will lie down with their nostrils buried in dusty ruts, or stand up with their heads lowered between their fore legs, and with their noses nearly in contact with the ground. When in the open fields, they gather with their nostrils against one another and near the ground, so that those on the outside are alone exposed.

The best means of prevention of and relief from the gadfly is to smear tar on the nose, around the nostrils, which will

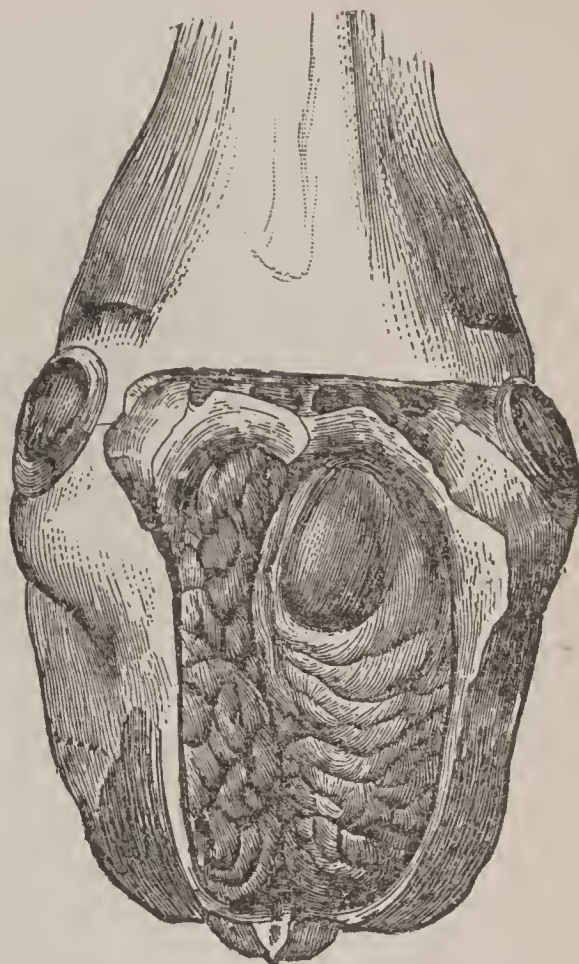


FIG. 504. — Head of sheep, hydatid in front lobe of brain.



FIG. 505. — Man-eating fly.



FIG. 506. — House fly.

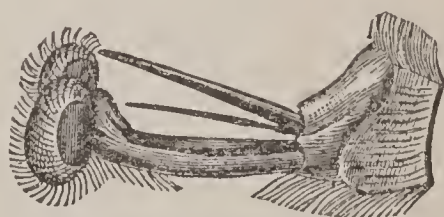


FIG. 507. — Lancet of the meat-fly.

prove both distasteful to the fly and fatal to the egg. Plow a strip entirely around or through the field where the sheep are pastured, so that they can place their nostrils in the soft earth,

in order to protect themselves against the insect in the way that instinct suggests to them. Another method is to blow snuff or tobacco-smoke up the nostrils from the stem of a pipe, which will cause the sheep to sneeze out the larvæ. Still another remedy is to inject tobacco-water into the nostrils with a syringe.



FIG. 508. — Blue-bottle fly magnified.

MAGGOTS. — One of the most common causes of trouble in sheep, and one that must be most carefully guarded against, is that arising from fly-blowing of the flesh in those places where it has been wounded, or where dirt has accumulated around the tail and other parts.

This trouble comes from the common house-fly, the meat-fly, and the blue-bottle fly, all of which deposit their eggs or living larvæ on decaying animal matter, or in wounds, or in foul places on the body of the sheep.

In the treatment of maggots, the sheep should be carefully looked after as regards cleanliness, in order to guard against fly-blowing. The application of spirits of turpentine is a sure remedy, as it kills the larvæ and maggots. Diluted carbolic acid and kerosene have been used with good effect.

Law gives the following treatment for maggots: Pick off the wool and filth, and all the maggots, and apply —

Oil of turpentine or of tar.....	5 oz.
Camphor.....	1 dr.
Asafetida.....	$\frac{1}{2}$ dr.



FIG. 509. — Spore-case of the liver fluke, greatly enlarged.

THE FLUKE DISEASE, ROT, OR LIVER ROT. — This malady is most insidious. The first symptoms are obscure; the sheep feeds, and, in fact, gains in flesh, but the spirits are dull, and

the skin, especially on the brisket, is of a pale-yellow tint. The eye secretes a yellow fluid; the muzzle becomes yellowish, and also the tongue, while the breath is intensely offensive. Sometimes excessive diarrhea prevails, while at other times constipation occurs. The wool generally falls off, or is easily pulled out. The head droops, the expression is haggard, the appetite poor, the thirst great, and the dung filled



FIG. 510. — Mature liver fluke.

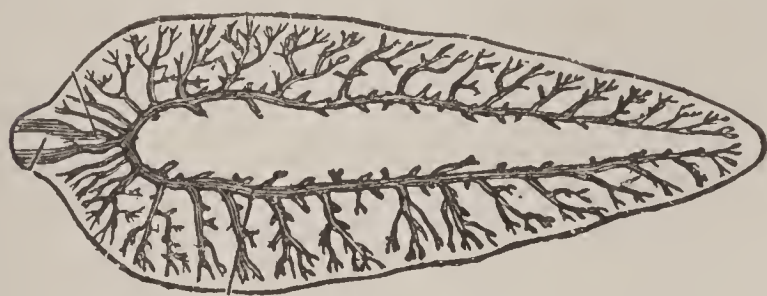


FIG. 511. — Liver fluke — its digestive organs.

with myriads of microscopic eggs.

An English writer, John Large, claims that the following will destroy fluke in the liver:—

Yellow resin.....	1½ dr.
Oil of turpentine.....	1½ oz.
Calomel.....	18 gr.
Tincture of iodine.....	30 drops.

For three doses, one every morning, for three days, in gruel. The sheep should be abundantly supplied with salt.

SCAB, OR MANGE. — The most formidable and annoying of the external parasites of the sheep is the scab insect, or *acarus scabiei*, which causes the scab, itch, or mange. It dwells on the skin, deriving its nourishment from sucking the fluids of the system. It is a minute mite, which attaches itself to the skin, and penetrates the surface, lodging itself in the tissues, and causing intense irritation or itching, and the secretion of a matter which dries on the surface and forms a scab. Scab may be of spontaneous origin, as well as the product of contagion. One female *acarus* can produce a million and a half



FIG. 512. — Liver rot.

of progeny in ninety days, and this explains the rapidity with which scab spreads in sheep. Of parasitic *scari*, there are three principal species: One that burrows in the scarf-skin,



FIG 513. — The scab.

one which lives on the surface among the scabs, and one which lives in the fatty glands of the skin in sheep and dogs. In scab, the animal shows its aggravation by moving its body, and by rubbing

against fences or other objects. The wool is often torn off from a good portion of the body.

In the treatment of scab, after nourishing food, cool, clear air, clean, dry buildings, and the avoidance of huddling the sheep together, oil should be applied, and the affected parts washed with soap-suds; then break up and remove the scabs and crusts; after which apply with a brush the following:—

Oil of tar	1 oz.
Whale oil	20 oz.

Or —

Tar	$\frac{1}{2}$ lb.
Sulphur	$\frac{1}{2}$ lb.
Soap	1 lb.
Alcohol	1 lb.

For sheep with heavy fleeces, baths are very efficient.

The following preparation will neither stain the wool nor materially endanger the sheep:—

Tobacco	16 lbs.
Oil of tar	3 pts.
Soda ash	20 lbs.
Soft soap	4 lbs.
Water	50 gal.



FIG. 514. — Sheep-louse.

A, natural size; B, greatly enlarged.

Boil the tobacco, and dissolve the other substances in a few gallons of boiling water, then add water to make up to fifty gallons, which will suffice for fifty sheep.

LAMBING AND ATTENDANT DISEASES.

The lambing season calls for the exercise of the utmost care. When the lambs begin to drop, it is easy to discover those ewes that will come in within twenty-four hours. The genital



FIG. 515. — Serious case of scab.

parts become red and swollen, and the udder swells and fills. At this point the ewe should be closely watched to see that nothing goes wrong.

If the lamb be presented in such a manner that it cannot be expelled, it should be gently replaced by an individual with a small hand smeared with sweet-oil, and then brought into such a position that the feet shall be presented first, with the head lying upon them, and not doubled back. If the hind parts are presented, the feet should be brought up after the lamb has been pushed back. If the ewe is weak, a little warm gruel, sweetened and flavored with ginger, may be given. When the pains are deficient, they can be stimulated with ergot, the following being a dose :—

Powdered ergot.....	30 gr.
Powdered ginger.	30 gr.

When the pains are excessive and exhausting, the following, given in gruel, will render them more regular, and keep up the strength : —

Spirits of camphor.....	1 dr.
Laudanum.....	$\frac{1}{2}$ oz.

If the womb becomes inverted, and hangs like a bag from the vagina, as may occur after lambing, it should be well washed with warm alum water, carefully replaced, and retained in position by a bandage, or, in severe cases, by loosely stitching the lips of the vulva.

PARTURIENT FEVER is uncommon in sheep in this country ; but as it sometimes occurs, we give the symptoms, which are loss of appetite, twitching of the hind legs and ears, dullness and weakness, staggering, and the discharge of a dark-colored and offensive fluid from the vagina. It generally occurs a few days before lambing, and the fetus is nearly always dead when delivered. The ewe should be separated from the flock, and given the following or a similar laxative : —

Nitrate of potash.....	1 dr.
Sulphate of magnesia	2 to 3 oz.
Molasses.....	3 oz.

Give in a pint of warm linseed gruel.

This may be repeated if not opening the bowels in ten hours, and thereafter continue only the niter and two or three



FIG. 516. — After-pains in ewes.

drops of carbolic acid and molasses while the fever lasts, the whole to be dissolved in a little water, and

well shaken before administering. Give carefully.

ABORTION. — This is by no means unfrequent in ewes, and is often caused by excessive eating of turnips or other roots, though it is sometimes occasioned by the sheep being chased by dogs. When abortion has occurred, the following may be given with nourishing food : —

Powdered camphor	$\frac{1}{2}$ dr.
Laudanum	1 dr.
Epsom salts	1 to 2 oz.

IRRITATION OF THE VAGINA (AFTER-PAINS IN EWES). — This ailment occurs the first, second, or third day, and is shown by panting, straining, heaving of the flanks, a staring coat, scanty, high-colored, and strong-smelling urine, costiveness, and swelling and redness of the external hinder parts, which at last turn very dark. A bran mash with fifteen grains of saltpeter should be given daily for a few days, and upon a recurrence of the pains, the following, mixed with molasses and given on the tongue, should be administered at once : —

Camphor.....	$\frac{1}{2}$ dr.
Laudanum.....	60 drops.

GARGET. — Though not a very prevalent disease among sheep, garget is one which, when it occurs, should be treated with promptness. It is an inflammation of the udder and milk glands. Its symptoms are enlargement of the udder, which becomes red, hot, and so sensitive that the ewe sometimes refuses the lamb. The udder should be fomented with warm water and a warm linseed-meal poultice applied for twelve hours or more, removing it to draw the milk. Bleeding to the extent of half a pint from the large vein which runs under the belly, if the inflammation is high, is beneficial. Mix for one dose, and administer internally —

Nitrate of potash.....	$\frac{1}{2}$ dr.
Bicarbonate of soda	1 oz.
Sulphate of magnesia.....	2 oz.
Water	8 oz.

Then give morning and night one half dram nitrate of potash and 10 to 20 grains of nux vomica, with, say, one half ounce bicarbonate of soda.



FIG. 517. — Microscopic view of wool magnified 150 times.
A, merino ; B, southdown ; C, common sheep.

CHAPTER XXV.

BREEDING AND CARE OF SWINE.

THE farmers of this country have so great an interest in hogs, that we have, at considerable trouble and large expense, not only obtained careful and correct illustrations of the best and most select varieties of breeds, but prepared the most



FIG. 518. — Head of wild boar.

approved and reliable methods of treatment of diseases of swine. To effect this object, the text has been compiled with the utmost care and thoroughness, and also been submitted to the criticism of several of our most eminent veterinary surgeons, for their revision and criticism. Hence, this part will be found particularly valuable for the many useful and excellent reme-

dies that have been employed with marked success in the cure of the prevalent fatal diseases to which the hog is so generally subject. Millions of dollars are annually lost from this cause, and in some parts of the country breeding of hogs is a precarious business, on account of their liability to disease.

The diseases of swine are usually caused by improper food or drink, or by undrained and filthy styes. If, therefore, pigs are properly housed, and the feeding and management are good, the liability to disease will be reduced to a minimum.



FIG. 519. — Middle white sow.

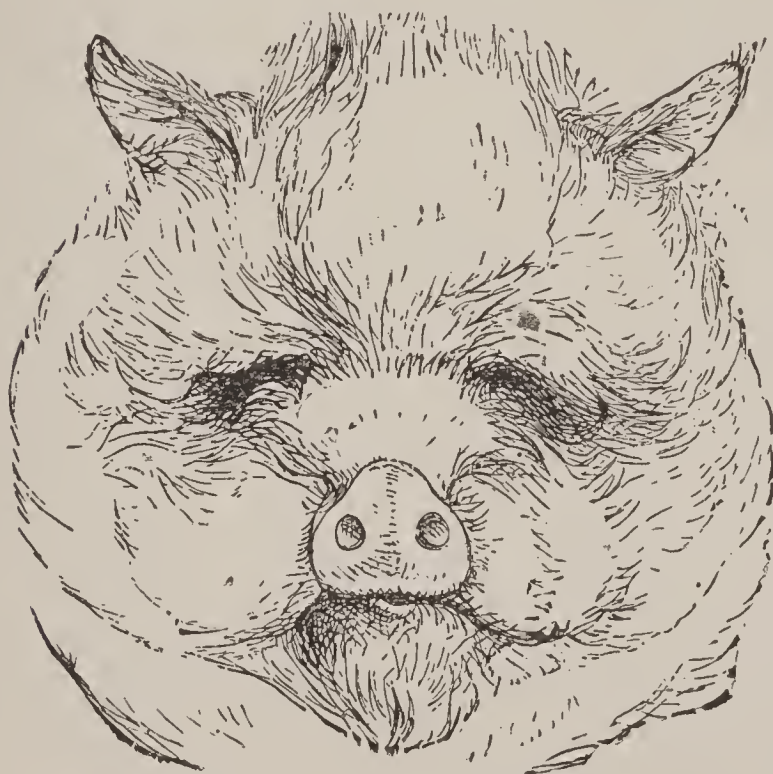


FIG. 520. — Head of small white pig.

On the other hand, if they are allowed to lie on the manure heap, to drink foul water, and are compelled to consume offal, disease must be expected; nor is it to be wondered at that the diseases which appear under such circumstances are sometimes of such severity that treatment is of no avail. "An ounce of prevention is worth a pound of cure; and in ail-

ments of the hog, prevention of disease is emphatically the rule of treatment.

In choosing the parents of your future stock, you must bear in mind the objects you may have in view, whether the rearing for pork or bacon ; and whether you desire to meet the earliest market, and thus realize a certain profit, with the least possible outlay of money or loss of time ; or whether you mean to be contented to meet a heavier although somewhat protracted return.



FIG. 521.—Jaw of three months' pig.

If bacon and the late market be your object, you will do well to select the large and heavy varieties, taking care to ascertain that the breed has the character of being at once possessed of those qualities most likely to ensure a heavy return ; viz., growth, and facility of taking fat.

If, on the other hand, your object be to produce pork, you will, of course, find your account in the smaller varieties, such as arrive with greatest rapidity at maturity, and which are likely to produce the most delicate flesh. In producing pork, it is not advisable that it should be too fat, without a corresponding proportion of lean.

In every case, whether your object be pork or bacon, the points to be looked for are, — in the sow, a small, lively head, a broad and deep chest, round ribs, capacious barrel, a haunch falling almost to the hough, deep and broad loin, ample hips, and considerable length of body in proportion to its height. Nor must the broad, flat, table-like back, the broad, thick shoulders and ham, be forgotten. The flesh should rise full and round behind the ears. One qualification should ever be kept in view, and, perhaps, should be the first point to which the attention should be directed ; viz., smallness of bone

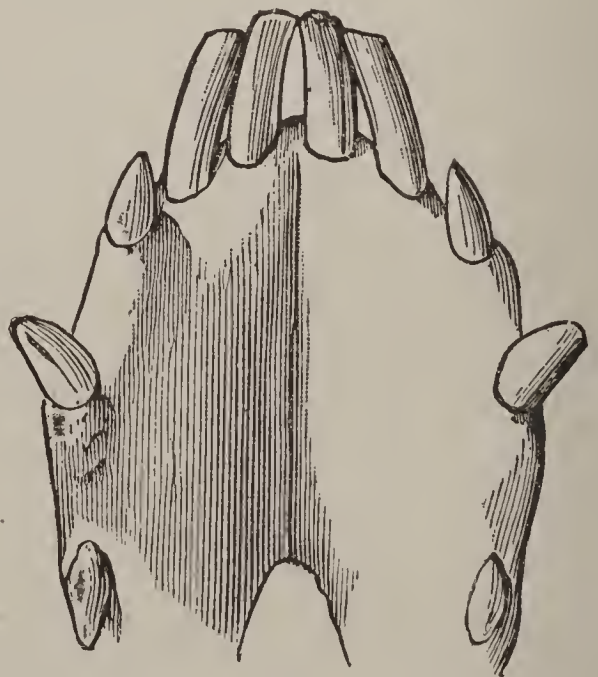


FIG. 522.—Jaw of six months' pig.

in proportion to the flesh, and fineness of the best parts, with lightness of offal.

Let the boar be less in size than the sow, shorter and more compact in form, with a raise and brawny neck, lively eye,

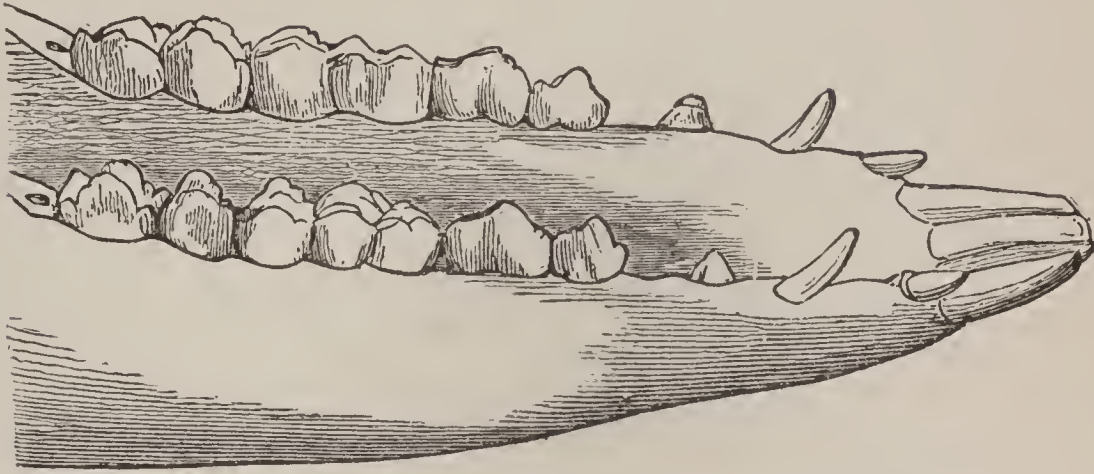


FIG. 523. — Jaw of six months' pig. Another view.

small head, firm, hard flesh, and, if of the large breed, his neck well furnished with bristles. In other respects, look for the same points as described in reference to the sow.

The best times for breeding swine are the months of April and July or August. A litter obtained later than August has much to contend with, and seldom proves profitable. It is of

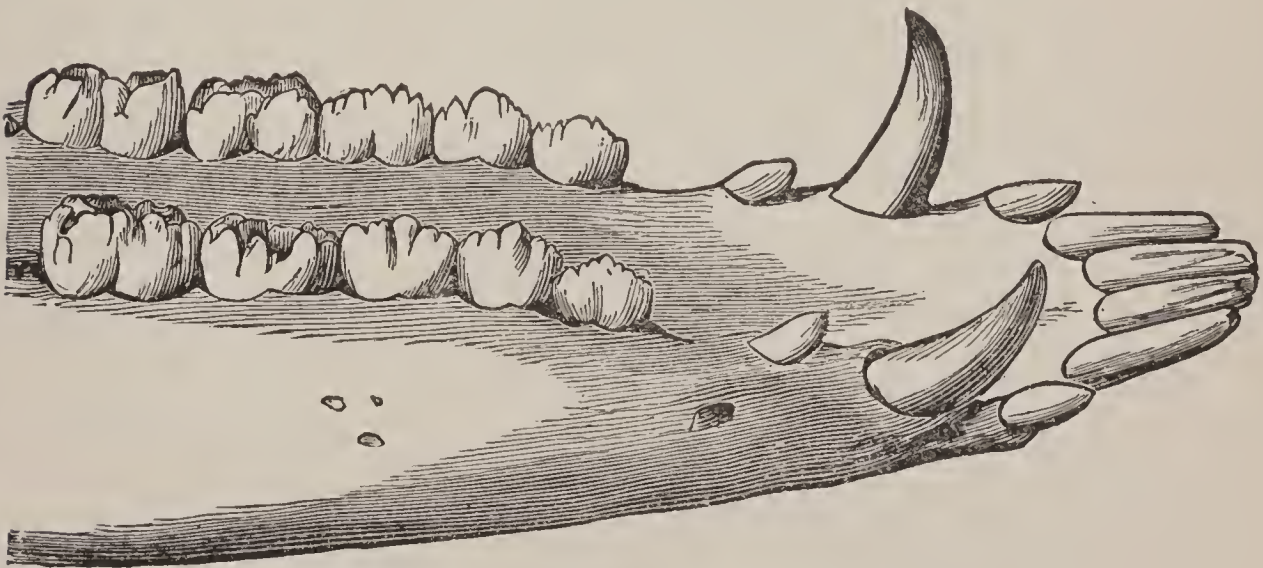


FIG. 524. — Lower jaw of nine months' pig.

little use however, to throw anything away. Should you at any time have a late litter, leave them with the sow, feed both her and them with warm and stimulating food, and you will thus have excellent pork, with which to meet the market when

that article is at once scarce and dear, and consequently profitable.

The period of gestation in the sow varies. The most usual period during which she carries her young is four lunar months, or sixteen weeks, or about one hundred and thirteen days.

The sow produces from eight to thirteen young ones at a litter, sometimes even more. A sow cannot give nourishment to more young than she has teats; and as the number of teats is twelve, when a thirteenth little one is littered, he does not fare very well, having to wait until some one of his more fortunate brothers or sisters shall have had their fill. The sufferer on these occasions is, of course, the smallest and weakest. A too numerous litter are all generally undersized and weakly, and seldom or never prove profitable. A litter not exceeding ten will usually be found to turn out most advantageously.

FEEDING.

So long as the sow is carrying her young, feed her abundantly, and increase the quantity until parturition approaches within a week or so, when it is as well to diminish both the quantity and quality, lest the acquisition of fat should be productive of danger; but while she is giving suck, you cannot feed too well. You may wean the young at eight weeks old, and should remove them for that purpose from the sow. Feed them well, frequently, abundantly, and sufficiently,—not more,—on moist, nutritious food, and pay particular attention to their lodgment. A warm, dry, comfortable bed is of fully as much consequence as feeding, if not even of more.

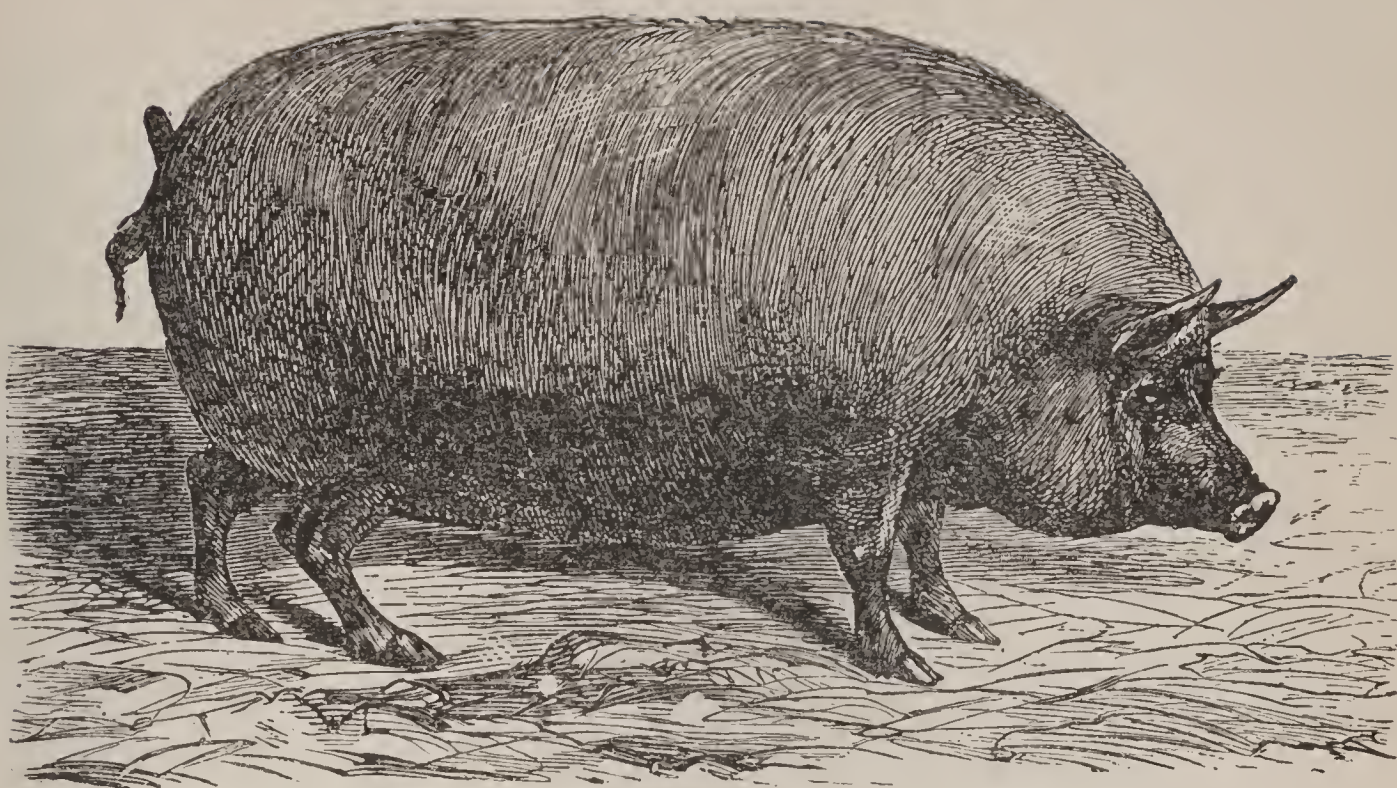


FIG. 525. — Black Dorsetshire pig.



FIG. 526. — Black Suffolk sow.

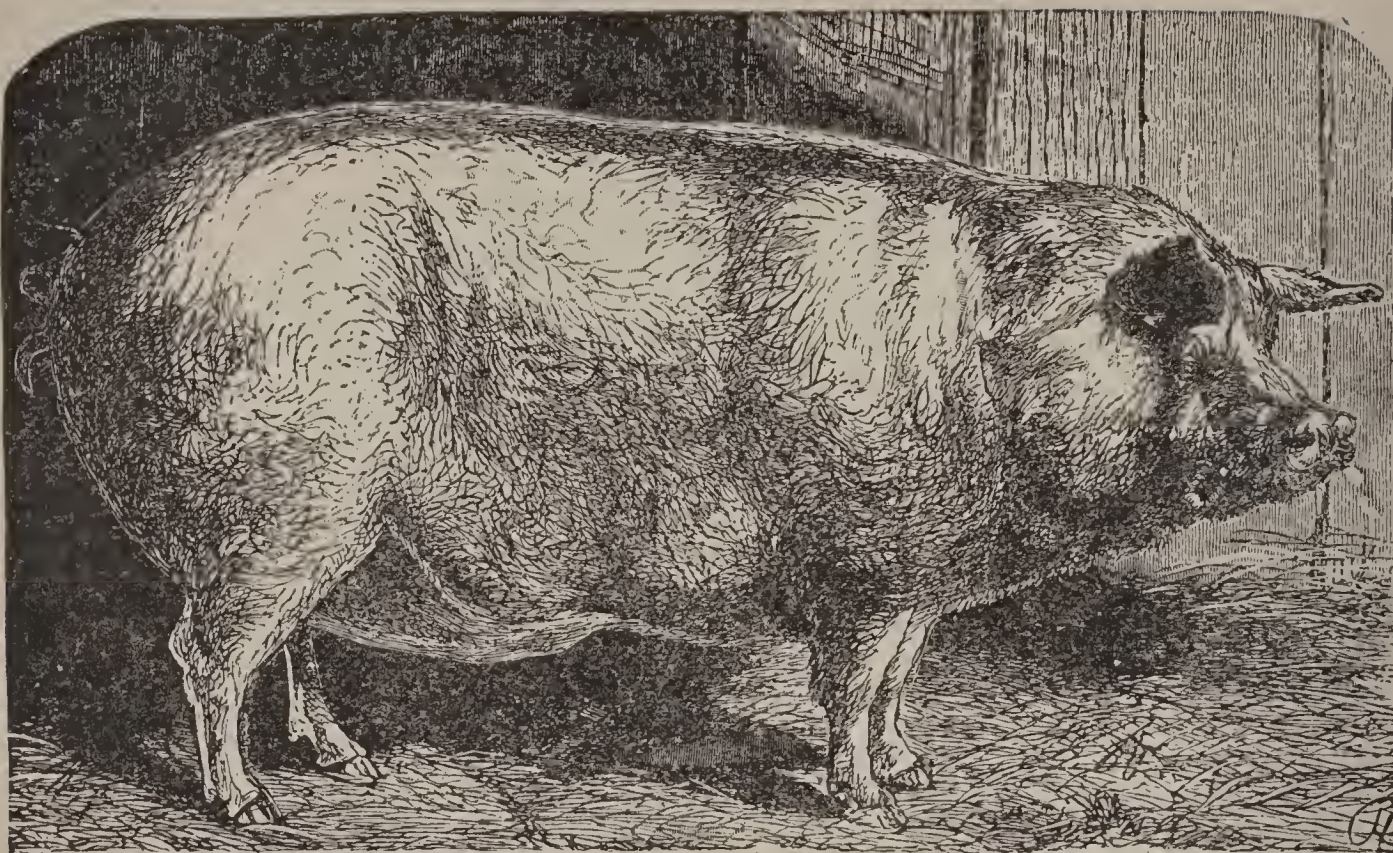


FIG. 527. — Yorkshire large breed.

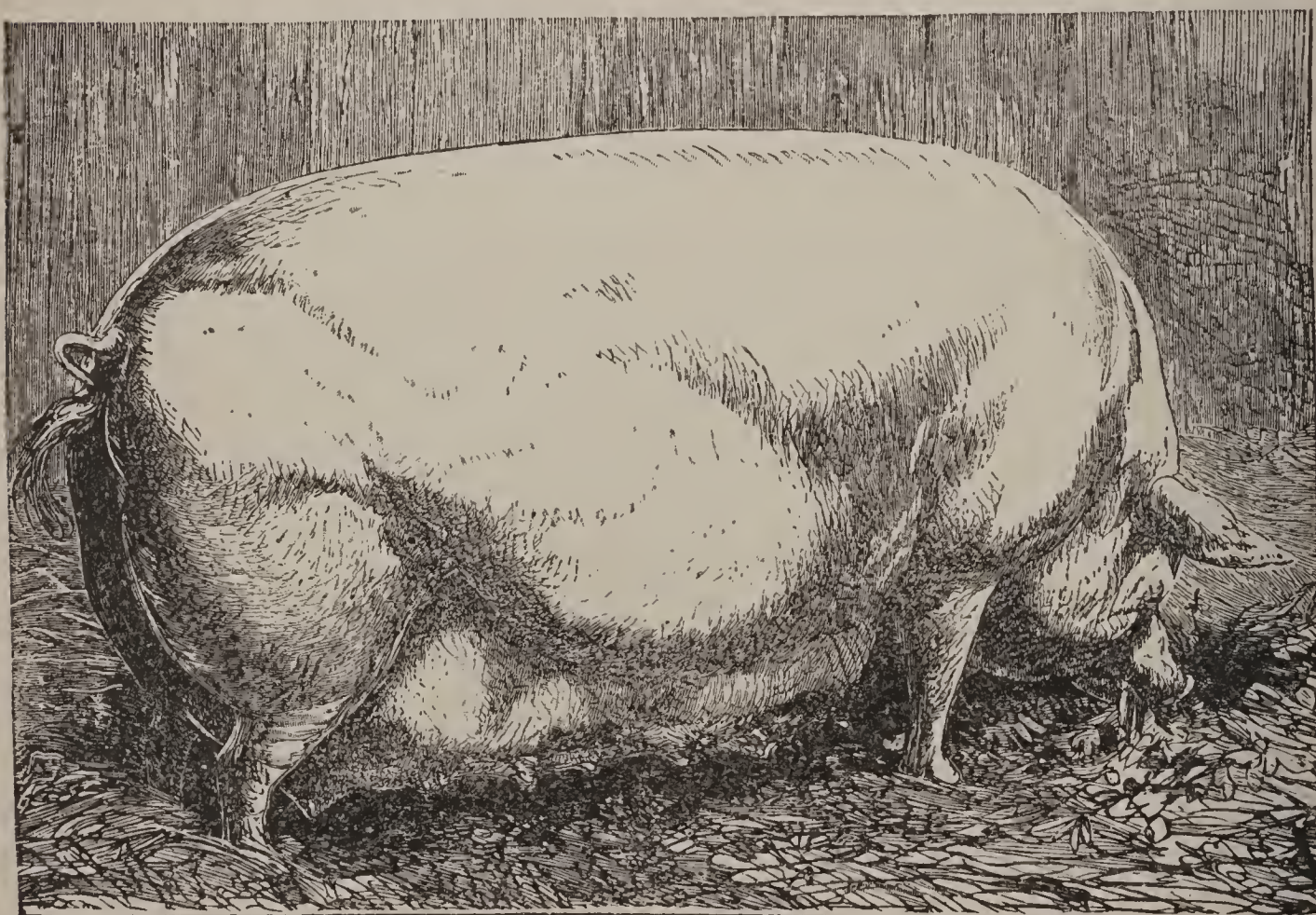


FIG. 528. — Yorkshire large breed.

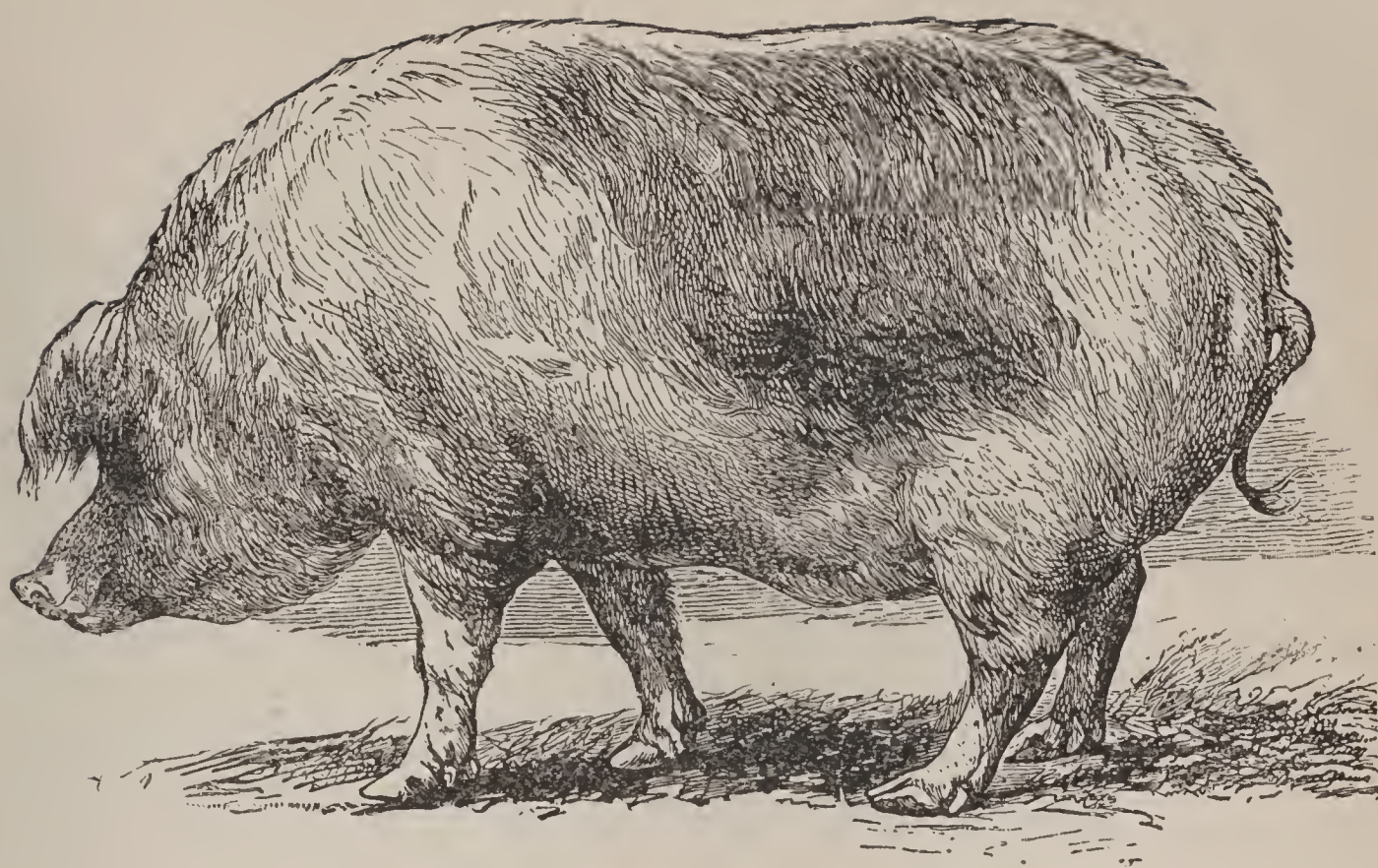


FIG. 529. — Tamworth pig.



FIG. 530. — The Peregourd (France).

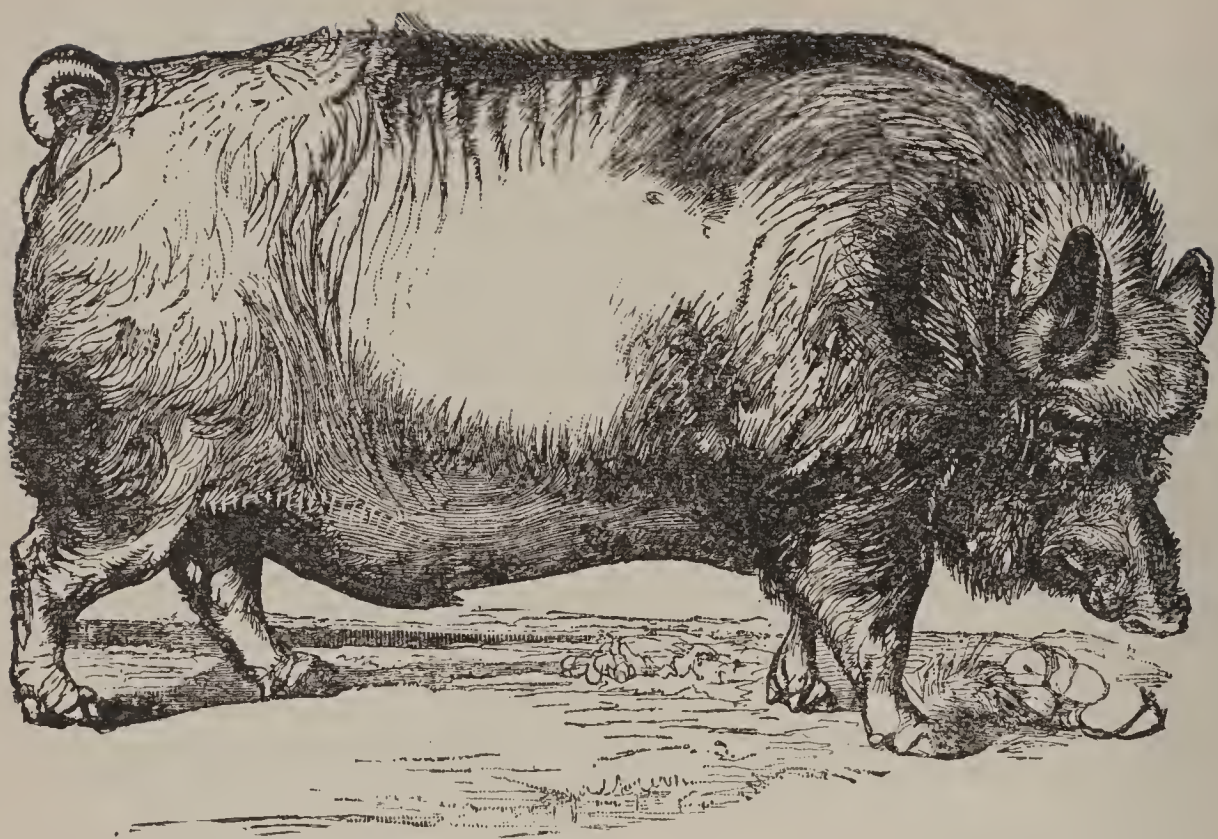


FIG. 531. — Chinese hog.

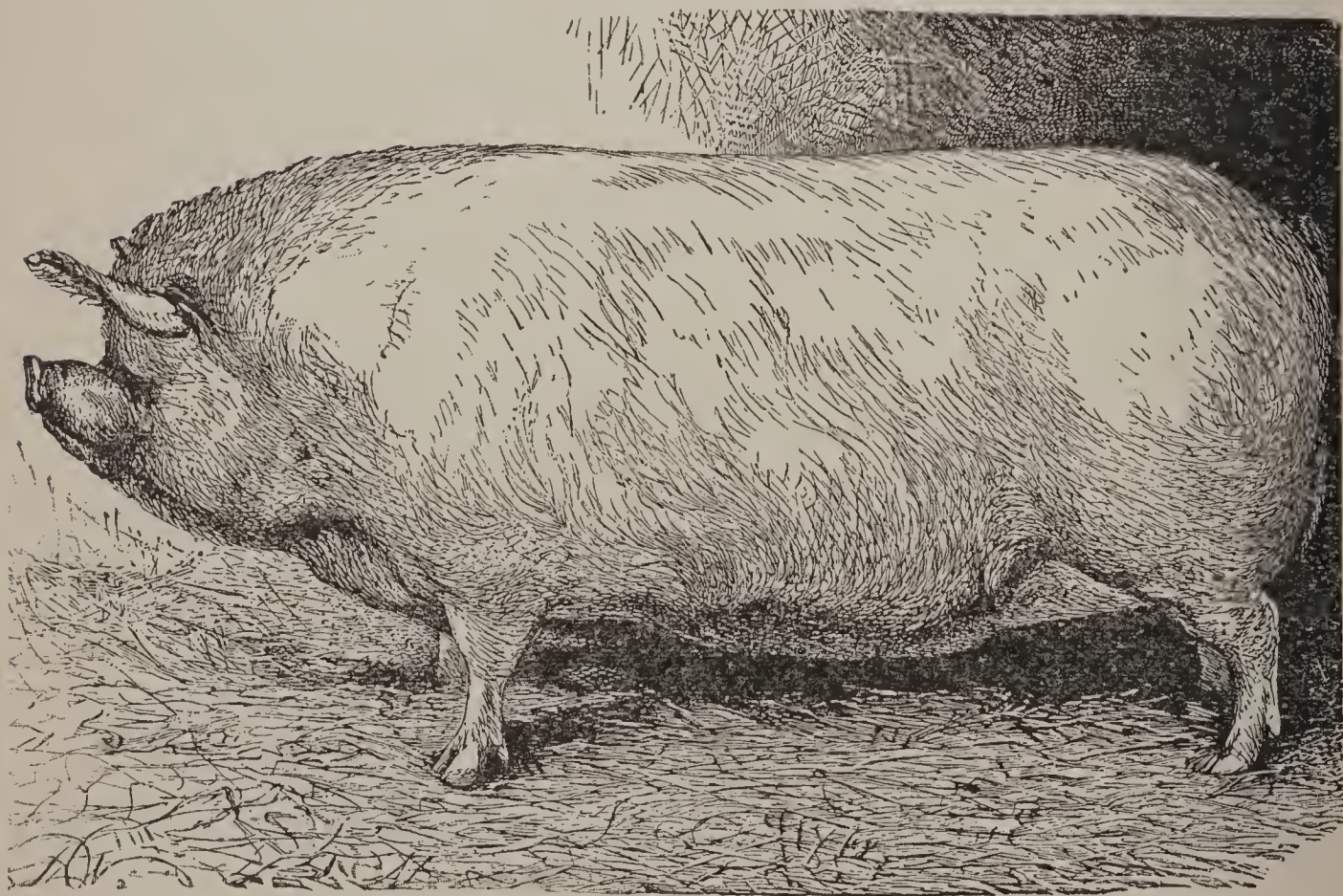


FIG. 532. — Large York boar.



FIG. 533. — Improved Essex boar.



FIG. 534. — The Augeron boar.

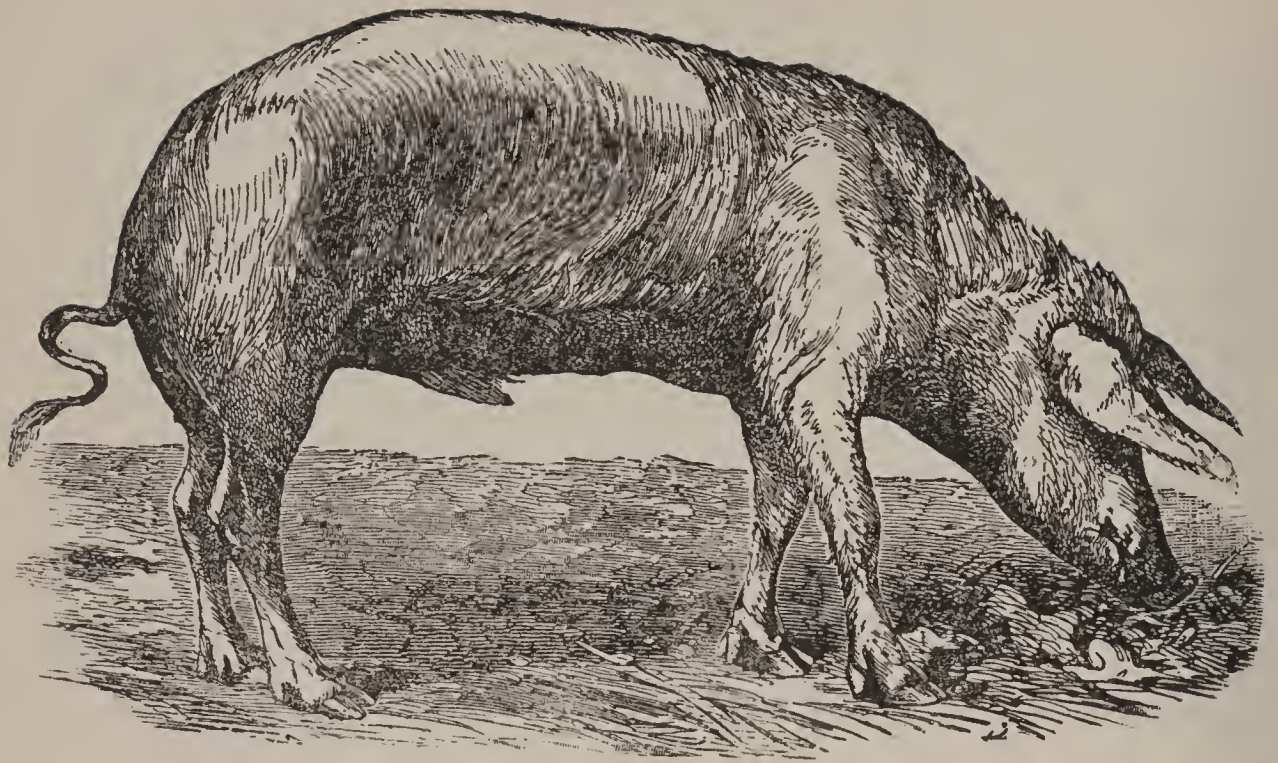


FIG. 535. — The common rail-splitter.



FIG. 536. — Wild boar of India.

CHAPTER XXVI.

DISEASES OF SWINE.

ANTHRAX, ETC. — SO-CALLED CHOLERA.

FOR many years the State of Illinois has suffered an annual loss of four or five millions of dollars' worth of hogs by the so-called "Hog-Cholera." In 1877 the loss in that one State alone from "cholera" amounted to eight millions of dollars, while the total loss in the United States in that year was estimated to be fully fifty millions of dollars. Many forms of malignant diseases among hogs are popularly designated cholera, and the use of this ill-chosen term has led to a wide misunderstanding of the nature of these diseases, and to many mistakes in treatment, as well as in the use of measures of prevention. The



FIG. 537. — Hog cholera. First stage.

malignant character of these kindred forms of disease, and the heavy loss occasioned by their wide-spread ravages, make a knowledge of the best preventive measures and methods of treatment a matter of unusual importance to the farmer and breeder. We present the result of an extensive and careful collation of the views of all the best authorities in the country, both veterinary physicians and breeders, with the latest methods of diagnosis and treatment. The preventive measures given are practical, and have again and again proved successful, and the methods of treatment prescribed will effect a cure, if used in season.

The term "Cholera" is made to include three well-defined forms of disease: Anthrax, contagious pleuro-enteritis, and epizootic catarrh.

CONTAGIOUS PLEURO-ENTERITIS.

This is a specific inflammation of the lungs and bowels, accompanied with red or purple blotches on the skin. These blotches have given it the name of "The Purples," or "The Blue Disease." This is the most common and dangerous of the epidemic diseases known under the designation of cholera.

When it once enters a herd, it attacks every age, sex, and condition, and there is little hope of cure.

The symptoms vary with the malignancy of the attack and the part of the animal affected. The fact should be carefully noted, otherwise



FIG. 538. — Method of using pig-holder and inserting champion ring.

the varying features of the complaint will be apt to confuse the observer. It appears in two forms—the erysipelatous form, and that of malignant sore throat.

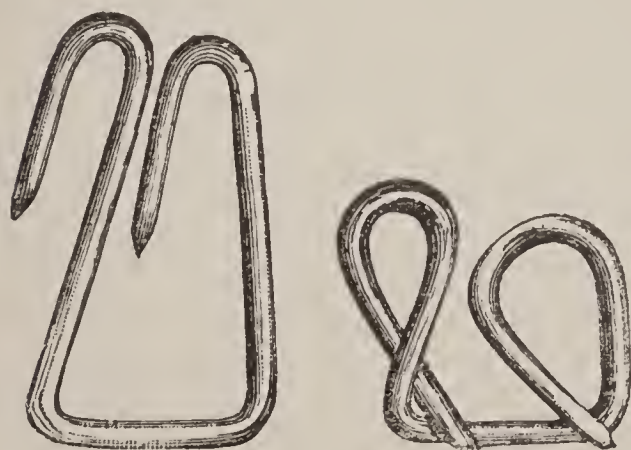
THE ERYSIPELATOUS FORM. — This is probably the most common form of the disease. The animal seems dull, loses appetite, hangs his head, and is unwilling to move, and sometimes tries to vomit. The bowels are usually constipated, the excrement hard and dark colored, while the urine is of a dark color and passed with difficulty. In a few hours the characteristic symptom of the disease appears in the form of dark-red or purple blotches, which pass into a bluish black color. These appear usually on the ears, throat, neck, and breast, and inside the fore legs. The discoloration is very apparent, and the blotches when once seen will not be mis-

taken. A dark-purple fluid sometimes discharges from the nose, the breathing soon becomes difficult, the hind quarters are paralyzed, and the animal reels along with head and hind legs drooping to the ground. A watery and fetid diarrhea sets in, and the animal dies in from one to three days.



FIG. 539. — Champion pig-holder.

MALIGNANT SORE THROAT. — This form occurs when the poison localizes itself in the tissues beneath the mucous membrane of the throat. At the beginning the general symptoms are the same as those of the erysipelatous form. The dark-red blotches appear on the throat, gradually changing to a dark-purple hue. The localization of the morbid process in the throat obstructs the operations of breathing and swallowing. This produces a train of characteristic symptoms peculiar to this form. The animal tries to vomit; there is from the outset difficulty in swallowing; the breathing is labored to such a degree that the animal sometimes sits on its haunches, gasping for breath, while the livid and swollen tongue protrudes from its open mouth. Sometimes the larynx swells so suddenly that the animal suffocates within an hour, and before the other symptoms are recognized by the unprofessional observer.



Open.

Closed.

FIG. 540. — Champion double ring.

Treatment. — If the symptoms are pronounced, there is not much hope of cure, but the progress of the contagion may be checked. There is positive testimony as to the value of sulphate of iron (copperas) and chlorate of potash for the purpose of checking the virus. The sulphate of iron is the

cheapest and most effective of the salts of iron used in veterinary practice. A remedy used largely among Illinois farmers, and highly praised by them, is the following: —

Sulphate of iron (copperas).....	1 lb.
Soft soap.....	1 gal.

Boil with four gallons of water, mix with the slop for twenty-five hogs, and when they begin to eat, add a solution of two pounds of soda, to make the slop foam well as they drink it. Repeat the dose every three days until three doses have been given.

Mr. J. S. Long, of Iowa, states that he has tried this remedy in thousands of cases, and never had a failure. He adds: “Be sure that every hog drinks. If one will not drink, put him in the hospital, and if you cannot get him to drink then, knock him in the head ; for he will give the cholera to the rest. The next day I go through with the same operation. After the

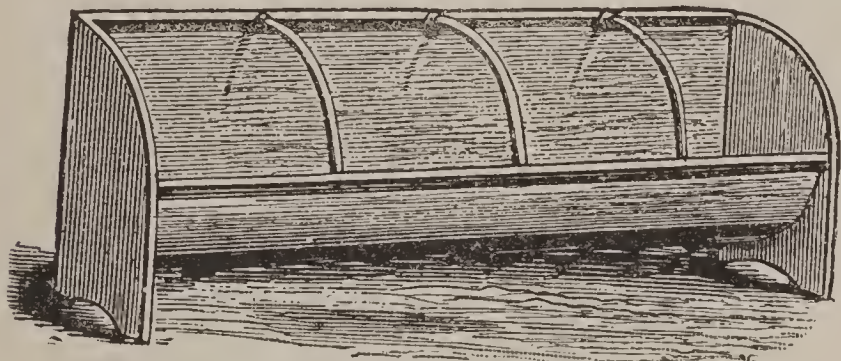


FIG. 541. — High-backed iron trough for four pigs.

second day skip a day, then give for two days, and you may turn them out cured. I generally give the same dose once a week to my hogs. An

important point is to make the hog drink ; and if he will not take it in any other way, add new milk or put in sugar.” Mr. Long, as evidence of his faith in this remedy, offered “to pay ten cents a pound for every hog he could not cure, provided the hog was not past drinking.”

Prof. Turner, of Illinois, gives two recipes, either of which, he says, will surely prevent the disease, if used before the hog is attacked. Given freely during the early stages of its progress, they will prove curative.

Sulphur	2 lb.
Sulphate of iron (copperas)	2 lb.
Madder	2 lb.
Black antimony	$\frac{1}{2}$ lb.
Nitrate of potash (saltpeter).....	$\frac{1}{2}$ lb.
Arsenic	2 oz.

Mix with 12 gallons of slop, and give a pint to each hog. The quantity is sufficient for 100 hogs.

An Illinois farmer, who had used this for several years, says: "Each time I tried this, I had about fifty head, and not one died that was able to walk to the trough, and had enough life left to drink."

Common salt.....	4 lb.
Black antimony.....	1 lb.
Sulphate of iron (copperas).....	1 lb.
Sulphur	1 lb.
Nitrate of potash (saltpeter).....	$\frac{1}{4}$ lb.
Wood ashes	1 peck.

Pound and mix thoroughly, moisten enough to prevent waste, and put in a trough in a dry place where the hogs can at all times have

access to it. If predisposed to cholera, they will eat it very freely; at other times they will eat less, or perhaps none at all. Prof. Turner himself says of this: "I know of no one who has had any hog-cholera of account from that day (1862), who has

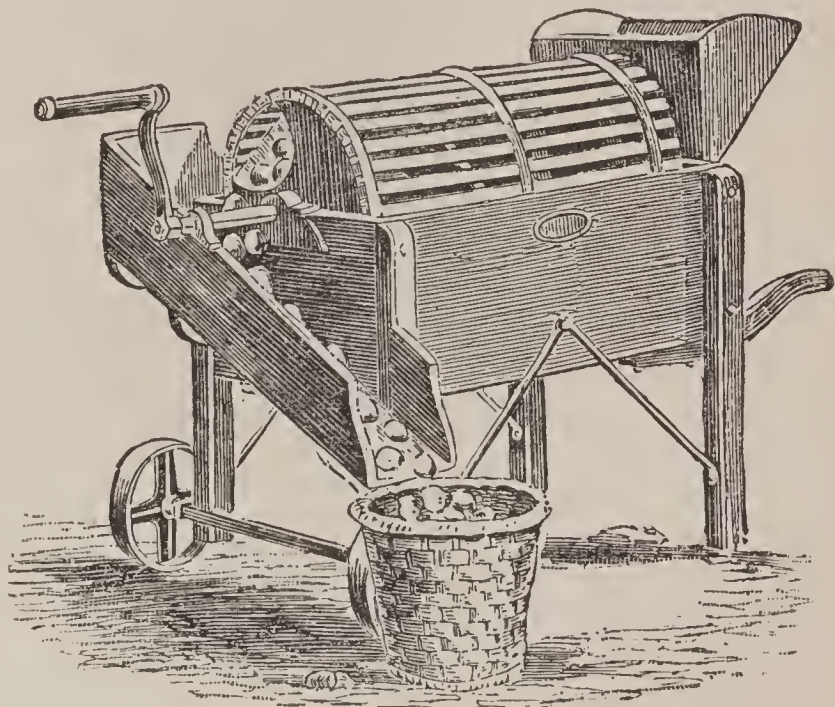


FIG. 542. — Potato-cleaner.

persistently made use of it in advance of the appearance of disease. Hogs should at all times be supplied with stone coal, as they will then eat less of the above mixture."

A Kentucky farmer gives the following as an "infallible" remedy:—

Sulphate of iron (copperas).....	1 lb.
Warm water	3 gal.

When dissolved, apply the wash about milk warm to the affected animal, by dipping him into the solution, or sponging until the skin is thoroughly wet. Whenever the skin begins to look rough and scaly, or of a dark-red color, apply the wash

immediately, every day, until the scales are removed. Do not wait until the more alarming symptoms (vomiting and purging) set in.

Mr. A. C. Moore, the well-known breeder of Poland Chinas, states that he has used the following mixture for many years, with uniform and marked benefit : —

Charcoal, in small pieces.....	1 bu.
Wood ashes.....	3 bu.
Slaked lime.....	$\frac{1}{2}$ bu.
Salt.....	$\frac{1}{4}$ bu.
Spanish brown.....	2 lb.
Sulphur.....	5 lb.
Nitrate of potash (saltpeter).....	$\frac{1}{4}$ lb.
Sulphate of iron (copperas).....	$\frac{1}{2}$ lb.



FIG. 543. — Portable swill barrel.

Pulverize the last two thoroughly ; mix all in a box or bin, and keep it where the hogs can have free access to it, in an open trough, well moistened with good swill or milk.

If your herd is not large, mix smaller amounts of each ingredient in the same proportion. You will soon see that the animal with which “there seems to be something the matter” will visit this trough when going to or returning from its feed.

Mr. Milton Briggs, of Iowa, the well-known breeder of hogs, says : “I supply all my hogs with compound bituminous coal, wood ashes, or lime and salt. I place it in a bin or box,

open, so that hogs can dig out at bottom, and not run upon their feed. I place this bin so that they can have access to it at all times. Five tons of what is called slack coal, with four or five bushels of lime, or three to four barrels of wood ashes and one barrel of salt, all mixed, — this quantity will feed 100 head of hogs about four months. All hogs having access to this feed will keep free from disease, even if exposed to hogs having the cholera. I have purchased hogs that were diseased, having cholera in its first stages, and turned in with well hogs where there were large numbers running together. All symptoms of disease would soon disappear under this mode of treatment. The cholera hogs would soon begin to cast off their mange or scales from the skin, and assume a healthy appearance. A composition of carbonate of soda, sulphur, sulphate of iron (copperas), and carbolic acid will arrest the spread of cholera in its worst stages.”

Common smart-weed has been highly praised as a preventive remedy. Messrs. R. Kimberly & Sons, of Illinois, the successful breeders of Chester Whites, speak in strong terms of its efficiency : —

“ ‘Common smart-weed tea’ has prevented, and we believe will prevent, if used judiciously and in season, not only cholera but the many diseases known by that name. In its green state we pound the smart-weed in an iron kettle, press out the juice, and mix it, in small quantities, with good swill. When we discover want of appetite in a hog (this is the first symptom in

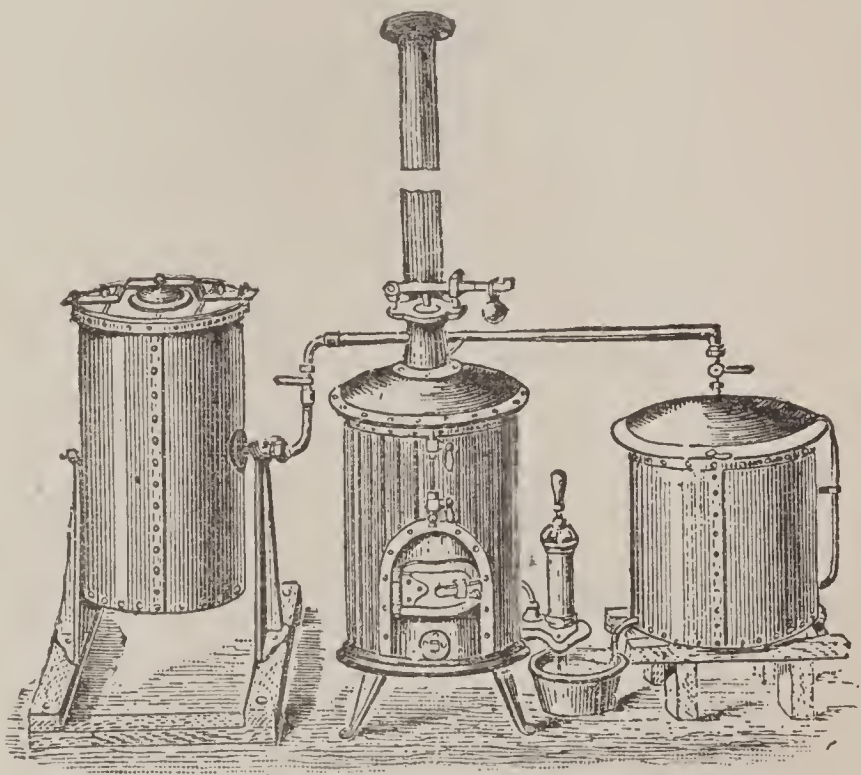


FIG. 544. — Apparatus for preparing steamed food.

nearly all diseases of swine), we feed them enough of this to make them cough and sneeze greatly, and it has never failed, with us, to bring them around all right. We most fully believe that this remedy will not only prevent all cholera, but promote health and thrift. For use through the year, the herb should be gathered when in bloom, tied in small bundles, and hung in a sheltered, dry place. When wanted for use, make a tea of it, by boiling."

Dr. Stitson thinks prevention the only hope. He says: "Disinfectants are the nearest approach to safety from crowd poison that we yet possess. The most valuable is carbolic acid, and since using this eight or ten years in my own herd, I have suffered no loss from this disease. The crude acid, a dark, tarry liquid, costing about one dollar per gallon, is used at the rate of a pint to a bucket of water, and with this the pens and wood-work about them are sprinkled at least once a week. An ounce of the acid is occasionally put in a barrel of swill or water for the hogs to drink."

In Western New York, a spoonful of turpentine is used every few days as a preventive.

Prof. Law advises the immediate separation from the herd of a hog that appears to be sick, and if the symptoms of "cholera" appear, to kill and bury him immediately. In the case of a valuable animal which is to be treated, he would begin by giving a purge of two or three ounces of castor-oil, or one or two drams of rhubarb. When this has operated, give—

Nitrate of potash (saltpeter).....	20 gr.
Bisulphite of soda	20 gr.

Mix, and give two or three times a day. Give charcoal in the food or drink, and if the bowels become swollen, twenty drops of turpentine from time to time.

Major Mellon, of St. Louis, attributes the disease to contagion, or a too exclusive diet of grain. He gives the following judicious rules:—

1. Separate the sick from the well.
2. Give both a free range in a woody pasture, if possible.
3. Place within reach of both, pulverized stone coal, or charcoal and salt.
4. Give

them free access to plenty of water, and clay to wallow in. 5. Feed all, particularly the sick, with plenty of turnips, or, if these cannot be had, with potatoes, artichokes, or any other roots they like. Do not feed corn. He believes that every hog thus treated, if not too sick to eat a full meal of turnips, will surely get well, and that no well hog thus treated and fed on turnips will take the disease, even by contagion. Major Mellon attributes the prevalence of "Cholera" in the Mississippi Valley to a too highly stimulating diet.

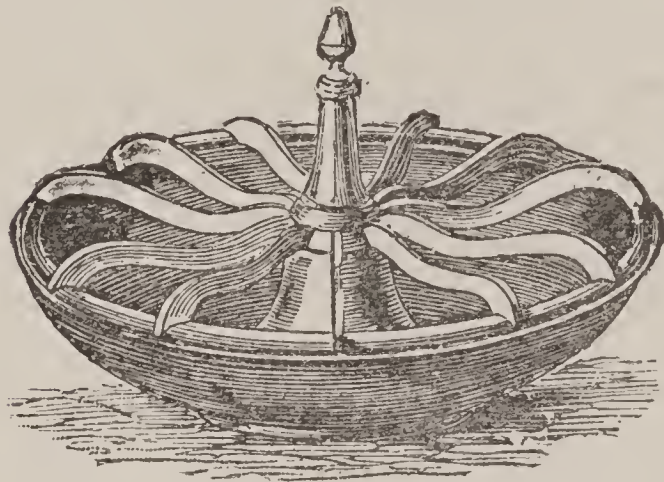


FIG. 545. — Circular iron pig-trough.

CHAPTER XXVII.

DISEASES OF SWINE.—CONTINUED.

MALIGNANT EPIZOOTIC CATARRH.

THIS form of “Cholera” is an extremely destructive one. In 1875 and 1876, it prevailed to an alarming extent in Missouri, Illinois, and the adjacent hog-producing States, sweeping off whole herds in its progress. In Missouri, the State Board of Agriculture assigned to Dr. Detmers the task of investigating the disease in order to determine its specific nature and causes. His investigations were made on living animals in the various forms and stages of the disease, as well as on dead animals. Post-mortem examinations were made of animals killed at different stages of illness, and the localities in which the disease prevailed were carefully inspected. The results of his labors were embodied in a full report to the Board, under date of Sept. 8, 1876.

The disease presents itself in different forms and with different symptoms, varying as the morbid process localizes itself in different parts of the body, there being two principal forms.

In the first, or catarrhal rheumatic form, the morbid process has its main seat in the respiratory organs. The mucous membrane of the nostrils, larynx, windpipe, and bronchial tubes, is the seat of the affection. The symptoms are a short, hoarse, hacking cough, and difficult breathing, with a panting motion of the flanks at each breath. The head is held in a peculiar, stretched, and somewhat drooping position, the gait is slow and undecided, and the squeal hoarse. Signs of fever are unmistakable. Some animals show a tendency to vomit, and have diarrhea, while others are constipated.

In the second, or gastric rheumatic form, the principal seat of the morbid process is in some of the abdominal organs, especially in the liver, spleen, kidneys, ureters, intestines, and almost always in the membrane lining the interior surface of the abdominal cavity. The symptoms differ slightly from those observed in the catarrhal form. The hacking cough is more or less wanting, and the difficulty of breathing is not so great; but the weakness in the hind quarters and the staggering or unsteady gait are more conspicuous, while the fever is as high in one form as in the other. In severe cases, in which the morbid process is localized in the kidneys and ureters, the animals arch their backs in the lumbar or loin region to a noticeable degree. There is more or less constipation, giving way, if the disease is

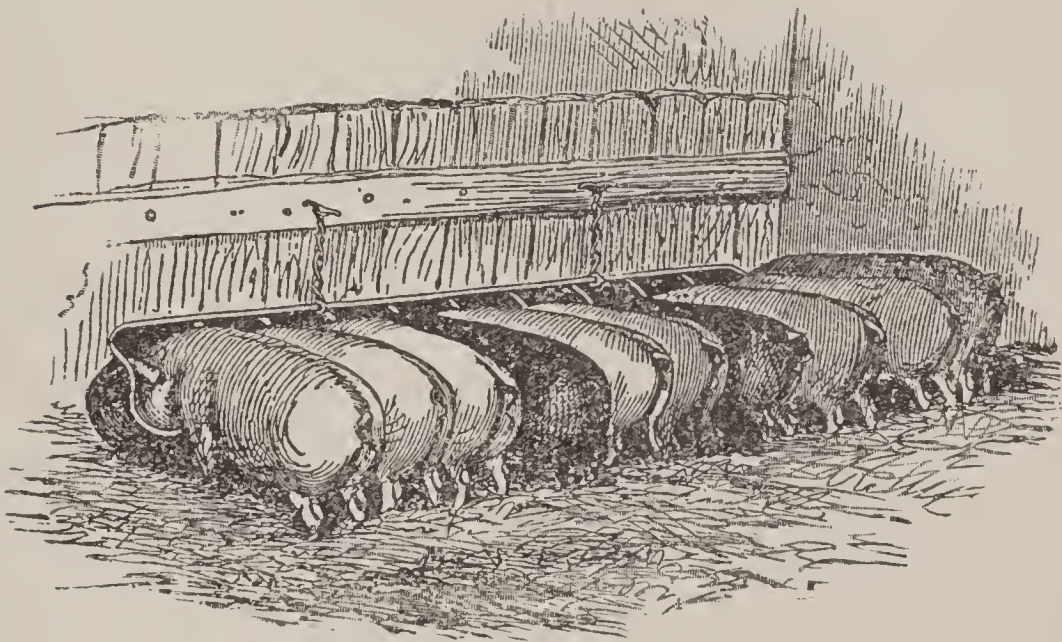


FIG. 546. — Iron trough for ten pigs.

approaching a fatal termination, to a profuse and fetid diarrhea. This may be always looked upon as a sign of death. The average duration of the disease is from five to fifteen days. Where animals have died within a few hours apparently after being taken ill, we are inclined to think that the earlier symptoms of illness, as is often the case in diseases of swine, have escaped notice.

The treatment should be both hygienic and medicinal. Separate the sick animal from the herd, and provide it with a clean, dry, well-ventilated resting place, which is not exposed

to drafts of air, and which will at the same time afford sufficient protection against heat, cold, and wet. The patient *must* have pure air to breathe, clean water to drink, and wholesome and easily digested food to eat. If these directions are faithfully observed, many sick animals can be saved by proper treatment, provided they are put under treatment at an early stage of the disease. Give to each patient, as soon as the symptoms appear, an emetic of white hellebore or of tartar emetic, 3 grains. After the medicine has taken effect, the animal will appear to be very sick, and try to hide itself in a dark corner; but in two or three hours it will appear, and will usually accept a little choice food, a boiled potato, or a little milk. It is best to give at this time another dose of medicine.

In the catarrhal form, give to a full-grown animal —

Tartar emetic..... 3 gr.

and a proportionate amount to a pig. Mix with a piece of boiled potato; or, if the appetite has not returned, mix it with a pinch of flour and a little water, in the form of small, round pills. In the gastric form, calomel in the same quantity is to be preferred. Continue either medicine, giving it two or three times a day, for several days in succession, or until a marked change for the better can be plainly seen. Apply externally on both sides of the chest in the catarrhal form, and to the abdomen in the gastric form, a counter-irritant composed of —

Olive-oil 4 oz.
Cantharides (powdered) 1 oz.

Boil together moderately for half an hour. Rub the oil thoroughly in. One application is generally enough, if the disease has not progressed too far. If no blister or swelling is produced, repeat the operation the next day. During convalescence give daily, for a few days, mixed with the food of the animal, five to twenty grains, according to the age and size, of sulphate of iron (copperas). Repeated small daily doses (from ten to fifty grains) of carbonate of potash will prove beneficial when the lungs have been severely affected.

Prof. Townsend, of Ohio, recommends the following where there are at the beginning of the attack copious and dark discharges from the bowels: —

Podophyllin.....	20 gr.
Bicarbonate of soda.....	2 dr.

To be given in boiled potato, or in milk.

If the bowels are constipated, he would give —

Castor-oil.....	1 oz.
Oil of turpentine	1 dr.

To be given in milk or gruel.

It must be remembered that the morbid changes which have been described in either form are seldom all found in a single animal or case. One or even more may be wanting, or but slightly developed. The two forms, also, are seldom found entirely distinct. Sometimes they are so blended and complicated with each other as to make it very difficult to decide which form predominates. The principal seat of the disease is in the serous membranes which line the interior of every large cavity of the body, and which also form the outer coat of almost every internal organ. Hence the disease may localize itself in many different parts of the body, and be marked by many different symptoms.

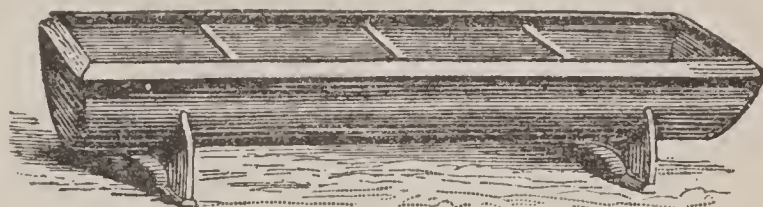


FIG. 547. — Common iron trough.

The Causes. — We place as the first cause those influences, of whatever nature, which interrupt the perspiratory action of the skin. Exposure to showers, sudden changes of temperature, and insufficient protection from the night air, are among these influences. If the functions of the skin are interrupted, additional work is thrown upon the lungs and kidneys. This fact is familiar to any one who has ever suffered from a severe common cold. Hence those organs with the mucous and serous membranes, are the first to be affected by the disease.

The custom of feeding almost exclusively with corn, a very prevalent custom in the West, is a hygienic mistake. No one article of food, and certainly not corn, contains all the elements necessary to produce healthy and vigorous animals. Hogs fed on such a diet are predisposed to disease, and fall victims to every prevailing epidemic.

We cannot emphasize too strongly the necessity of permitting the hog to keep himself clean.

APOPLEXY.

This occurs only in fat hogs. The animal moves stupidly for a few hours before the attack, when he drops suddenly, as if felled by a blow, the limbs straighten out, and the breathing is labored. Prompt treatment is demanded. Dash cold water freely over the animal, and especially upon the head. Give the following as an injection : —

Epsom salts.....	4 oz.
Oil of turpentine.....	2 dr.
Soap-suds.....	$\frac{1}{2}$ pt.

When the animal rallies, give a dose of Epsom salts (4 oz.), repeating it every three hours, until the bowels have been freely moved. Bleeding is of doubtful benefit, and external applications are useless. Feed lightly for a few days.

COLD AND COUGH.

The symptoms are a loss of appetite, severe cough, and heaving at the flanks. The animal should be carefully housed and fed. Mustard flour may be moistened and rubbed into the throat and chest, and a tonic of sulphate of iron (copperas) given.

Mr. A. C. Moore says : “My ordinary remedy is to place a small amount of tar, as much as could be held in an egg-shell, well down in the mouth by means of a wooden paddle for two or three successive mornings. If the disease does not yield to three doses, dissolve a pint of tar in a gallon of water, and give one quart, repeating the dose every morning, if required.”

Mr. E. W. Bryant, of Illinois, a large breeder of Poland Chinas, writes thus : “My remedy for cough in pigs is oats. Feed once or twice a week all they will eat. The cough is caused by costiveness ; the oats will loosen their bowels, and the cough will disappear.”

CONSTIPATION.

This indicates that a change of diet is needed. Sows, after parturition, and young pigs too highly fed, are often constipated. They eat little, but drink a great deal. In ordinary cases a little green food, a hot bran mash, or linseed tea may be found sufficient. In more difficult cases, give 1 or 2 oz. of Epsom salts. The use of charcoal will promote digestion, and sometimes remove constipation.

DIARRHEA, OR "SCOURS."

Suckling pigs, or those lately weaned, are chiefly liable to diarrhea. With the former the cause is to be found in the mother's milk, and it is often fatal if not attended to in time. If the sow is suffering from cold or catarrh, or if too much grass or clover has been given to her, change the food of the patient and let her out in the air; but let the little pigs remain in the pen, and keep them warm. It is important to keep the pen clean. Sprinkle dry earth about to absorb the offensive gases, and scald the troughs with boiling water. The disease is an evidence of carelessness or negligence. A common remedy is to give the sow $\frac{1}{4}$ oz. bicarbonate of soda, or potash, mixed with a little sulphur in her food. Dr. Mulford says: "I have never failed to cure this disease by giving the sow once a day as much sulphur of the third decimal trituration as will stand on a nickel five-cent piece, in a little sweet milk, or upon a small piece of bread, one hour before feeding."



FIG. 548. — Convenient trough for small pigs.

DIPHTHERIA.

This disease is much more prevalent than those people are aware who call nearly all epidemics "Cholera." Its symptoms are, sudden illness, with loss of appetite, dull, sunken eyes, sore throat, extreme weakness, and stiffness of back and loins. The pig moves slowly and crouchingly, with raised head and a hoarse nasal grunt. The mouth is open and dry, the tongue

livid, and the throat red and swollen, in which grayish white patches of false membrane appear. These increase until in a few hours they involve all the air passages and threaten suffocation. There is much swelling, and shreds of the false membrane are coughed up. The animal lies down, sits on its haunches, or leans against the fence, and usually dies in a paroxysm of coughing.

Treatment must be begun early in order to meet with success. See that the herd is put in dry yards and pens, and that the sick are separated from the well. Give each well hog a spoonful of chlorate of potash, daily, in a little milk.

Give each sick hog daily the following : —

Sulphate of soda	2 dr.
Castor beans (powdered)	1 dr.
Carbolic acid	5 drops.

This may be given with the swill to those able to eat. For those too sick to eat, add to it a little molasses, and place it on the back of the tongue. The following solution may be used to remove the false membrane : —

Chlorate of potash	1 oz.
Carbolic acid (solution)	2 dr.
Water	1 qt.

This may be applied with a small swab of sheepskin, with the wool on, attached to a stick. It is well to sprinkle the swab with sulphur before applying it to the throat. Great attention should be paid to the comfort of the animal, and warm, sloppy food given, to which chlorate of potash may be added in teaspoonful doses.

EPILEPSY, OR STAGGERS.

This is often confounded with apoplexy. The pig is very restless both by day and by night, has red and inflamed eyes, a quick pulse, and the bowels are often constipated. Sometimes it walks as though it were blind and ascending a number of steps. Prof. Law recommends the following : Dash bucketfuls of cold water over the body. Give as an injection, —

Glauber's salts	6 oz.
Spirits of turpentine	1 to 2 teaspoonfuls.
Water	10 oz.

Setons saturated with turpentine may be inserted under the skin behind the ears, or the back of the neck may be blistered by rubbing in the following mixture : —

Spirits of turpentine.....	1 oz.
Aqua ammonia.....	1 oz.
Cantharides (powdered).....	2 dr.

Mr. Colburn gives this method : Give at once a teaspoonful of calomel. Cut a slit in the skin on the head, above the eyes, clear to the skull. Into this cut put salt and pepper to get up a counter-irritation. If this does not succeed, make a liniment as follows : —

Spirits of turpentine	1 oz.
Capsicum	1 oz.
Aqua ammonia.....	1 oz.
Tincture of arnica.....	$\frac{1}{2}$ oz.
Chloroform.....	$\frac{1}{4}$ oz.

Shake well before using, and rub it on around the upper part of the head and between the base of the ears and around them.

Dr. Chase says : “Partial recovery will soon occur after securing a free evacuation of the bowels. A teaspoonful of sulphate of iron (copperas) may be given twice a day for two weeks, abating the food somewhat. Never bleed in this disease, as there is already a poverty of blood.”

INFLAMMATION OF THE LUNGS, OR PNEUMONIA.

This is a disease very likely to prove fatal if not promptly attended to. The symptoms are loss of appetite, shivering, quick and labored breathing, and severe cough. The animal should be removed to a warm pen, kept thoroughly clean, given an even, nutritious diet, and plenty of fresh water. The following may be given every morning, in a pint of gruel : —

Nitrate of potash (saltpeter)	2 dr.
Bisulphite of soda	2 dr.

Mustard, or a blister on the chest, is often beneficial.

Another method is, if the bowels are constipated, to give an injection of warm soap-suds, and at the same time take internally one half to two drams of saltpeter, according to size, and one to three ounces of Glauber's salts. After six hours, and

then, three times a day, give one of the following powders by throwing it on the tongue:—

Tartar emetic	12 gr.
Powdered opium.....	12 gr.
Nitrate of potash (saltpeter)	1½ oz.

Mix, and divide into eight powders. When the inflammation has abated, a half dram of sal-ammoniac, three times a day for several days, will prove beneficial.

Pneumonia is caused by exposure; it is much easier to prevent it by proper management than to cure it by medicine.

PARASITES OF SWINE.

KIDNEY WORMS.

The symptoms attributed to the presence of such worms are—imperfect use of hind legs, inclination to lie down, a seeming paralysis of the hind parts, and inability to rise on the hind feet.

A leading veterinary surgeon says the kidney-worm is not common among hogs, though occasionally one or two hogs in a



FIG. 549. — Bodkin-tailed round-worm, female. *a*, natural size; *b*, greatly enlarged.

herd may suffer from its presence. It is called the *strongylus gigas*, and is not found in the substance of the kidney, but in the hollow portion, in which the secretion of urine takes place. A tablespoonful of turpentine poured on across the loins or small of the back, daily for several days, is said to be a certain cure, even when the hogs have been down for weeks and unable to rise.

Another remedy is the following:—

Sulphate of iron (copperas).....	1 teaspoonful.
Sulphur	1 teaspoonful.

Mix, and feed in the night's meal for three days. Sometimes a longer treatment is necessary.

Corn soaked in lye made from wood ashes has been used with success at the first appearance of the complaint.

LICE.

The presence of these parasites indicates that the animal is out of condition. They cause excessive irritation and itching, that prevent an animal from doing well.

The following is given as the best treatment:—

Staves-acre seed.....	4 oz.
Water	1 gal.
White hellebore.....	1 oz.

Boil until only two quarts remain. Apply with a brush to all parts where lice and nits are found, and particularly behind the ears and the fore legs, and on the flank. It is there that the nits are deposited; and these, unless destroyed, will be hatched out in about five days. On a black hog the nits can be plainly seen. They are about the size of a timothy seed, and lie on the hair, close to the skin.

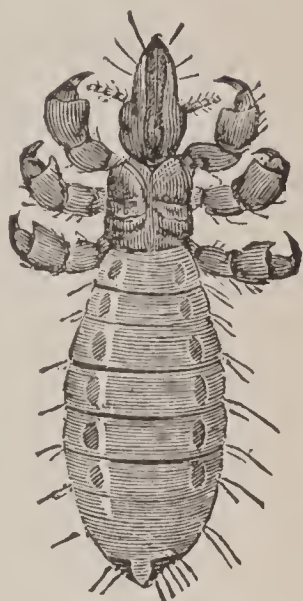


FIG. 550. — Hog-louse.

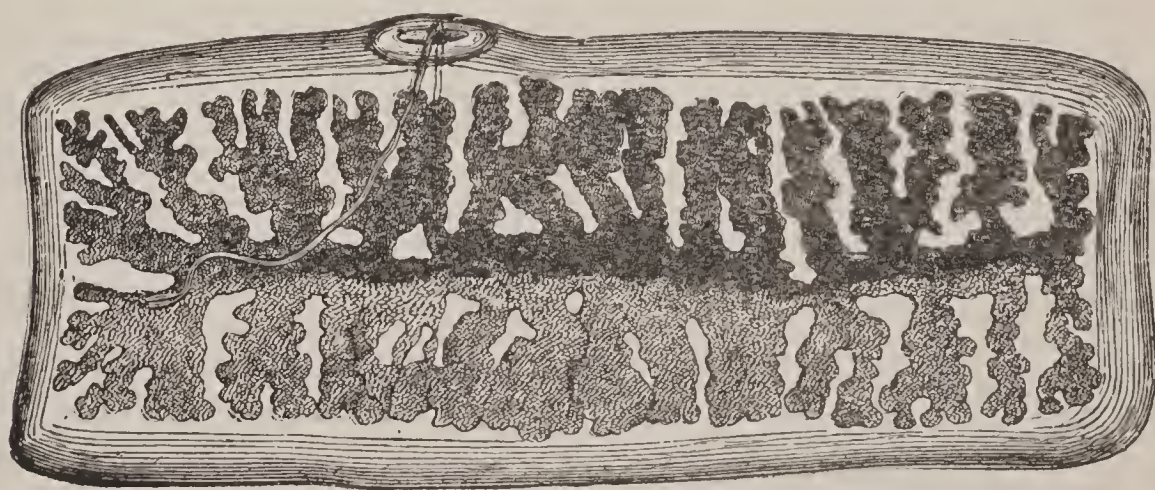


FIG. 551. — Segment of tænia, or tapeworm.

Another remedy is kerosene, which may be freely rubbed over the animal. Mr. A. C. Moore mixes it with lard-oil, in the proportion of two parts kerosene to one of the latter. A

simple remedy used in Tennessee is to pour buttermilk along the hog's back and neck a few times. Whatever remedy is used should be applied several times, as lice may be picked up again from the rubbing-places, or nits on the body may hatch out. If the herd is infested, a persistent fight may need to be waged for some time. It is well to whitewash the pens, and all wood-work with which the hogs come in contact, and to sprinkle the floors occasionally with ashes.

MANGE, ITCH, OR SCAB.

These names are given to diseases of the skin caused by parasites. The *sarcoptes suis*, common to dogs and swine, burrows in canals in the scarfskin, and is difficult to find and eradicate. Mange is due to this, and the only means of cure is to destroy the insect and its eggs. These may be found not only on the body of the pig, but on the wood-work of the pen, wherever the hog has rubbed against it. The mange usually appears on the skin, under the arm-pits and thighs, and inside the fore legs, in the form of small red blotches or pimples. Cover the body with soft soap, which should be washed off after an hour or two with warm water. When the pig is dry, cover the body with the following :—

Whale oil.....	1 qt.
Carbolic acid (crystals).....	$\frac{1}{2}$ dr.

The next day wash off with suds, and apply again. Repeat the application in three days, and wash thoroughly on the following day.

Or, instead of this, one of the following ointments may be rubbed in :—

Sulphur.....	4 oz.
Oil of turpentine.....	1 oz.
Lard	8 oz.

Mix thoroughly.

TRICHINOSIS.

We owe to Leuckart and Virchow our knowledge of the development of these worms in the body of the pig and in man.

Trichinæ are found in the flesh of nearly all the mammals.



FIG. 552. — Trichina, magnified.

If any of this trichinous flesh is eaten, the worms become free as digestion goes on. They develop with extreme rapidity. Each female lays a prodigious number of eggs. From each of them comes a little worm, which bores through the walls of the stomach or of the intestines, and buries itself in the flesh, where it lies hidden until it is introduced into another stomach. Leuckart counted 700,000 trichinæ in a pound of human flesh, and Zenker speaks of five million being found in a similiar quantity. The trichina produces about a hundred worms at the end of a week.

The duration of its life extends from four to five weeks. The number of

young in each mother-worm is at least from ten to fifteen thousand. The new-born young soon begin their wandering. They penetrate into the interior of the separate muscular bundles, and after fourteen days acquire their full size and organization.

Microscopic examination of flesh is the only reliable preventive against all danger. Pork should always be thoroughly cooked, the temperature of the whole mass being raised to not less than 167° F. In this way, the parasites will be destroyed, but it should ever be borne in mind that

danger lurks in all partially cooked or raw pork and sausage



FIG. 553. — Immature female trichina, magnified.

STRONGYLUS PARADOXUS.

Ascaris Lumbricoides is a large round-worm, which lives in the intestines of the pig. The same species is found in the stomach or small intestines of children, and was known in the time of Aristotle.

A common remedy for worms is a mixture of wood ashes and soap-suds, given every few days with the food. Santonin, the active principle of the plant called worm-seed, is an effectual remedy for the round-worm. It is in the form of small white crystals, and may be given in doses of one third



FIG. 554. — *Ascaris Lumbricoides*. *a*, Female ; *d*, Male, natural size.

of a teaspoonful morning and evening, followed by a brisk cathartic.

In the preparation of this department of our work we have consulted freely all the standard authorities on the treatment of hogs and their diseases, and taken pains to have all remedies presented by us verified from the best authorities. We desire in this connection to make special acknowledgments to a number of authors, among whom we may mention Clater, Armitage, Martin, Fleming, and Long, the latter being the most recent and finest work on the hog yet published, for which the Orange Judd Company, of New York City, are the agents.

CHAPTER XXVIII.

POULTRY AND THE EGG INTEREST.

IT may seem singular, but is nevertheless true, that the Egg and Poultry interest is really the largest single branch of production in this country.

We need only cite the fact that while, in 1883, the wheat product was officially estimated at \$488,000,000, the cotton

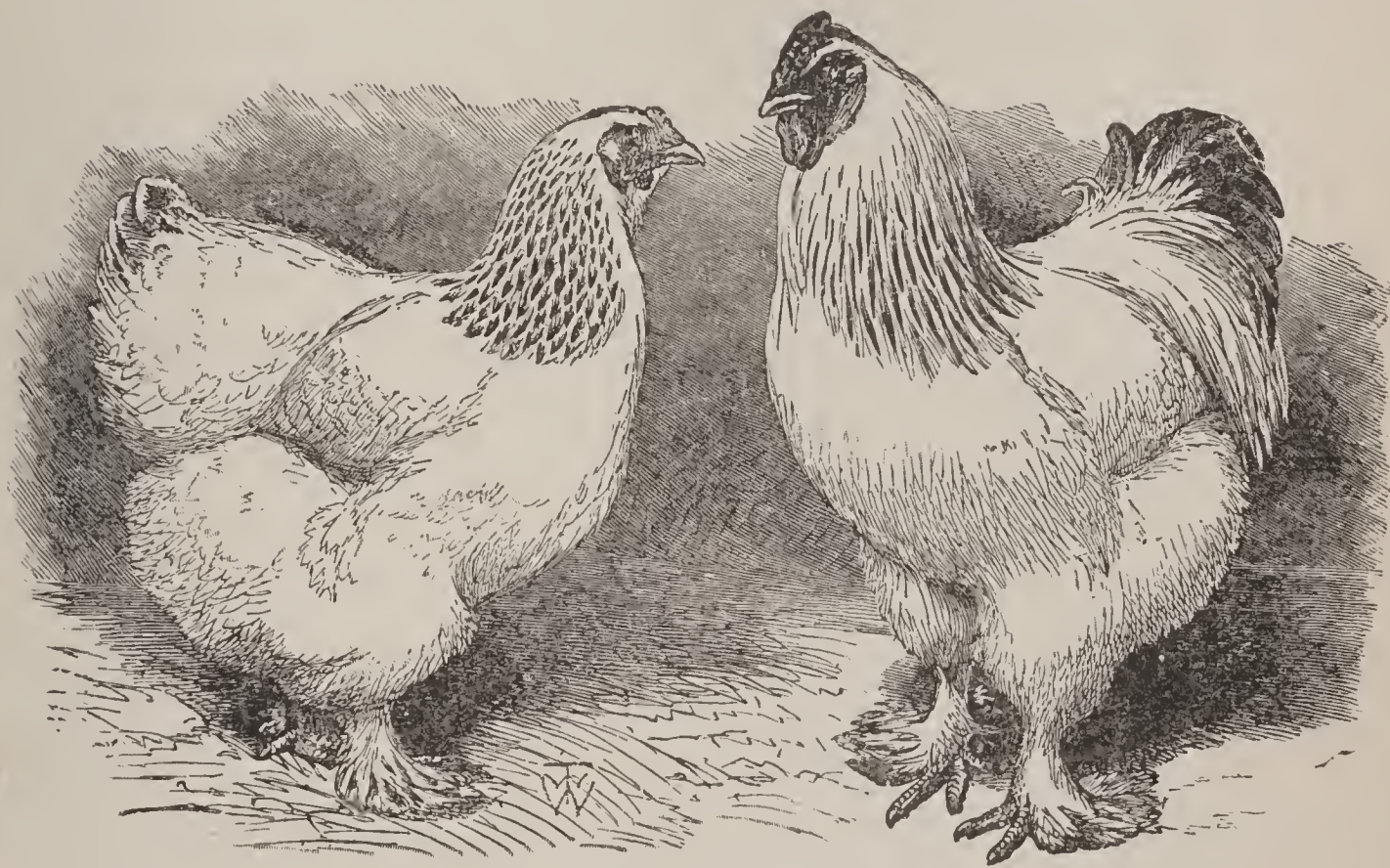


FIG. 555. — Light brahmas.

product at \$410,000,000, and the dairy product at \$254,000,000, the poultry product amounted to \$560,000,000, being almost half as large again as the cotton product, and larger, also, than the iron and steel products put together. The reason is to be found in the fact that it pays larger and safer net profits on investments than any other branch of farming industry.



FIG. 556. — Houdans.

DIFFERENT BREEDS OF FOWLS.

As to the most desirable breeds of fowls, there are so many accessible sources of information on the subject, that we do not think it desirable to employ space for such description. We refer merely to a few of the fancy breeds, with illustrations.

The more prominent breeds of fowls that have been introduced into this country, and have been successfully raised here, are the HOUDANS, a French breed of great beauty and the finest

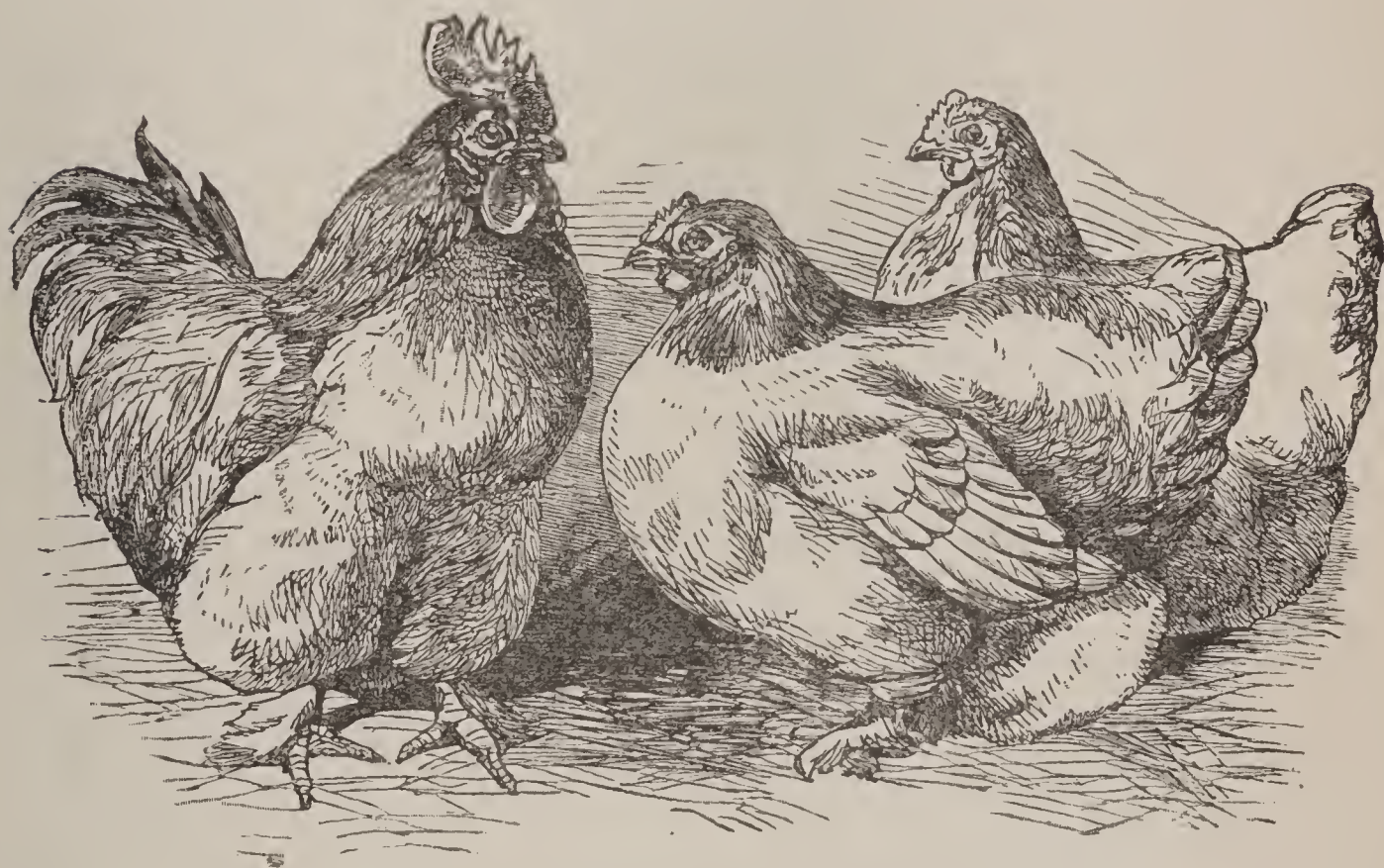


FIG. 557. — Pekin bantams.

of eating, while as layers they are unsurpassed. Besides the smallness of their bones and the fineness of their flesh, they are of an extraordinary precocity and fecundity. They lay large white eggs, and the chickens are fit for the table at four months old.

The PLYMOUTH ROCKS are a breed of New England origin. They have a cuckoo-like plumage, are large in body, and good layers, the eggs being, though small, rich in flavor. They are great favorites throughout the country.

The POLISH FOWLS (Fig. 558) are rather singularly named, as they have no possible connection with Poland, where they are no more common than any other fowl. The crest of this fowl is at once its characteristic and its pride. As a rule, the Polish hens are good layers, and do not sit.



FIG. 558. — Polish fowls.

The LIGHT BRAHMAS (Fig. 555) are by some considered the most valuable of all fowls. They stand very high with all poultry raisers. \$200 has been paid for a first-class bird of this

breed. They are admirable sitters and mothers, and, in fact, excel in every way.

FOOD, FEEDING, AND MARKETING.

Never stint nor ever overfeed. Stinting means a lack of enough material for the making of eggs, or flesh, or bone. Adequate food, with proper feeding, repairs the waste of the



FIG. 559 — Silky fowls.

vital forces, and gives a profit in warmth, or bone, or flesh, or eggs. If you give too little of some of the forms of lime to make bone, then just so far will the frame work of the fowl fall short of perfection. If you feed too little of that kind of food containing albumen and oil, then you cut off the egg supply. Feed for the purpose you have in view, according to the season, the weather, and the breed.

A well-balanced food must contain, in proper proportions, nitrogen, carbon, and mineral, or flesh-forming, warmth-giving, and bone-making elements. Oats finely ground, hull and all,

is the best balanced of the foods. Wheat screenings and corn are the best winter foods to give warmth. The latter is one of the best fat-making foods. Its exclusive use, however,



FIG. 560. — Plymouth Rock fowls.

checks laying, and induces apoplexy. It is a good food when fed with two or three times its bulk of other grain.

Give some form of lime for bone, and sand and gravel to aid digestion. Old, crumbly mortar serves both purposes to

perfection. Middlings and barley-meal, mixed with boiled potatoes or turnips, with skimmed milk, is one of the best general foods. Do not give soft or sloppy food; it induces diarrhea.

Give fresh water at all times, as stagnant fluids breed cholera and other diseases. Fill the vessels daily. Keep



FIG. 561. — Long-tailed Yokohama fowls.

them clean, and place them in the shade. In the moulting season, keep in a little sulphate of iron.

PACKING AND PRESERVING EGGS.

To keep eggs fresh four weeks, pack in egg-crates, with big end down.

To preserve eggs, make a pickle of 2 quarts of salt and 65 gallons of water and one bushel of pure stone lime. Slake the lime in a part of the water, then put in the balance of the water and the salt; stir well, let it settle, and then withdraw the clear pickle. When packing, put in about 18 inches of pickle and one foot of eggs. Use a large colander with handle

to put in the eggs. It is a good plan to pour on each layer a little of the milky sediment of the vessel holding the pickle. When near 3 or 4 inches of the top of the egg-vessel, put in 2 or 3 inches of the slaked lime sediment on top, first, however, placing a factory canvas over the top of the pickled eggs, and then keep it all constantly covered with pickle. When taken out for market, clean the eggs in cool water, wipe off the lime-specks if any, dry quickly, and pack.

POULTRY ARCHITECTURE.

The three essentials of successful poultry-keeping are breeding, housing, and feeding. Housing is the most easily

managed and most generally neglected. A common, profitable poultry-house should be clean, facing from east to south, well-ventilated, free from drafts, inexpensive, well-arranged, and screened by shrubbery, which adds to the appearance, gives summer shade, and affords protection from winter storms.

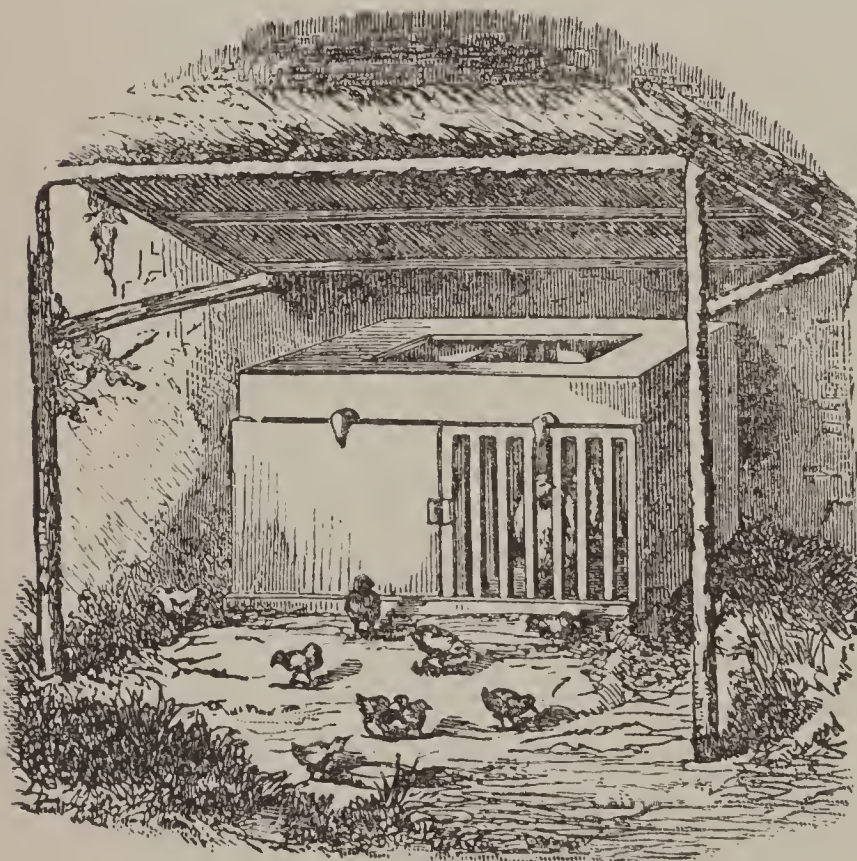


FIG. 562. — French coop.

Small flocks need small houses ; too large houses occasion roup and colds. Have high, dry floors, which will protect against cramp and rheumatism, and at the same time ward off diphtheria and catarrh. Have dust-bins, and empty them frequently, or heat the dust and kill the life-germs. Dust-bins sometimes spread vermin.

COOPS.

There are many kinds of coops for a hen and her chickens. The main idea in the construction of a coop should be to afford protection against storms and enemies. Any box will do if it is made so that there will be a dry, clean floor all the time, and the hen kept sheltered from the inclement weather.

In hen-houses, lice or other vermin should from the very first be guarded against, or they will be a great annoyance

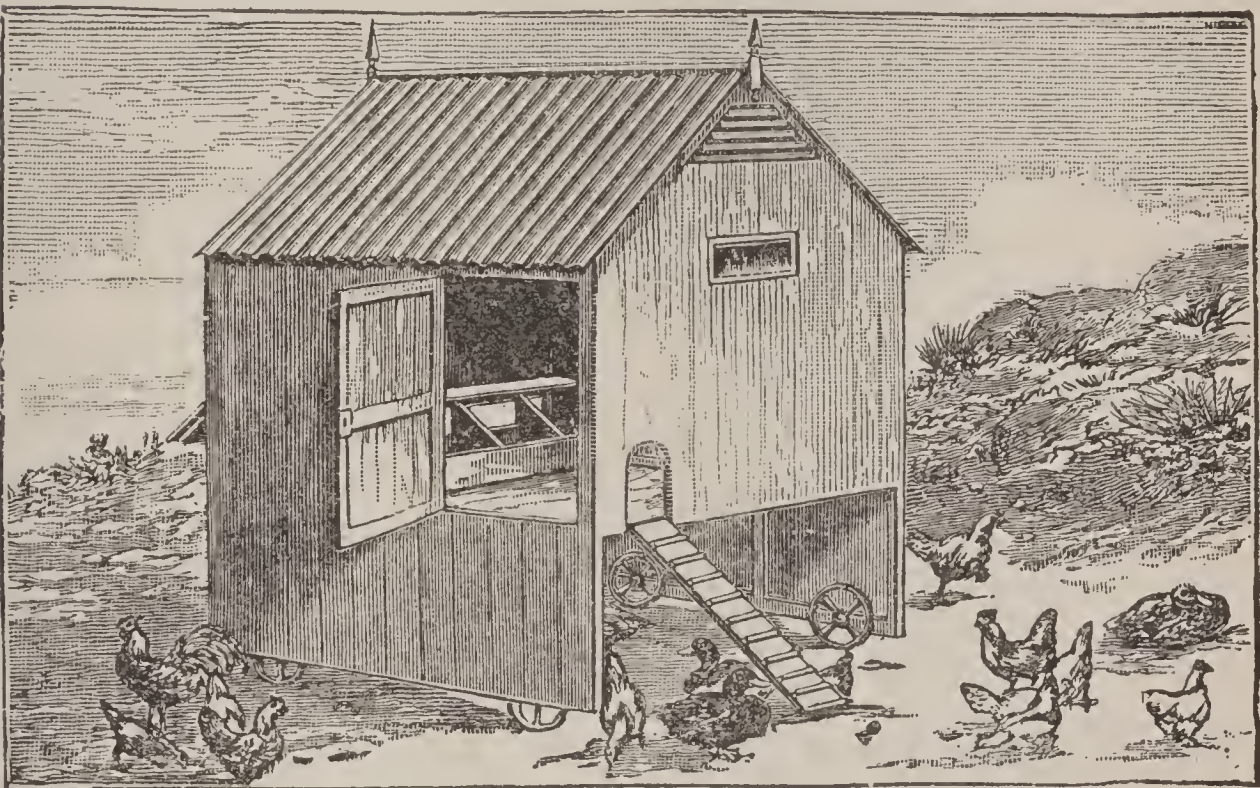


FIG. 563. — Poultry-house.

to both the fowls and their owner. They are, in fact, one of the greatest causes of trouble, and the utmost effort should be made to exterminate them. (See Mange in another department, where particulars are given; also Lice, page 496.) So important is this, that if the walls be built very rough or uneven, it is well worth while to give them a little plastering over to make the surface more even. In building wooden houses, a brush dipped in kerosene or paraffine should be passed along the tongued edges of all the boards as they are nailed in their places, the effect of which will last some time; but wooden walls also should be regularly lime-washed, and if

at any time vermin should get into them, they should be expelled by syringing all over, either with paraffine or a solution of carbolic acid. The last is certain death to nearly all insects,

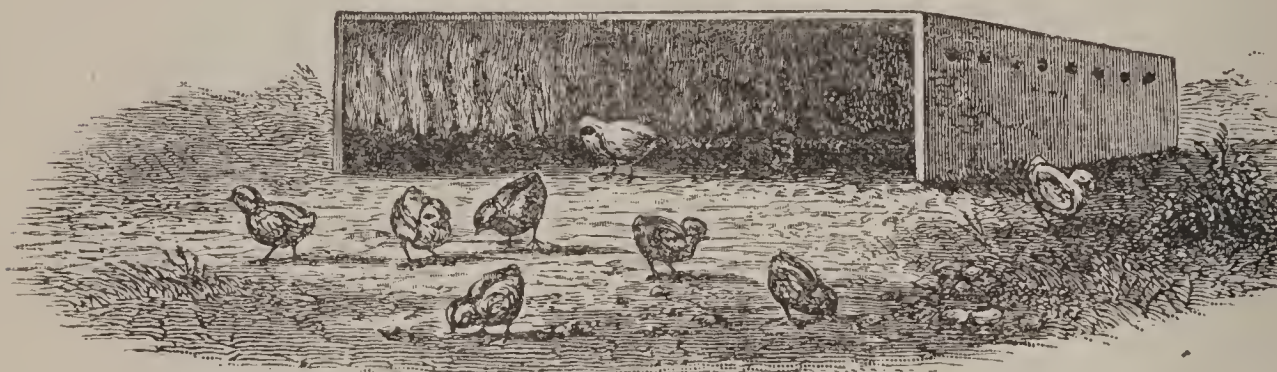


FIG. 564. — "Cold mother."

and is one of the most valuable additions to the resources of the poultry-keeper.

There should always be plenty of slacked lime, dry ashes,

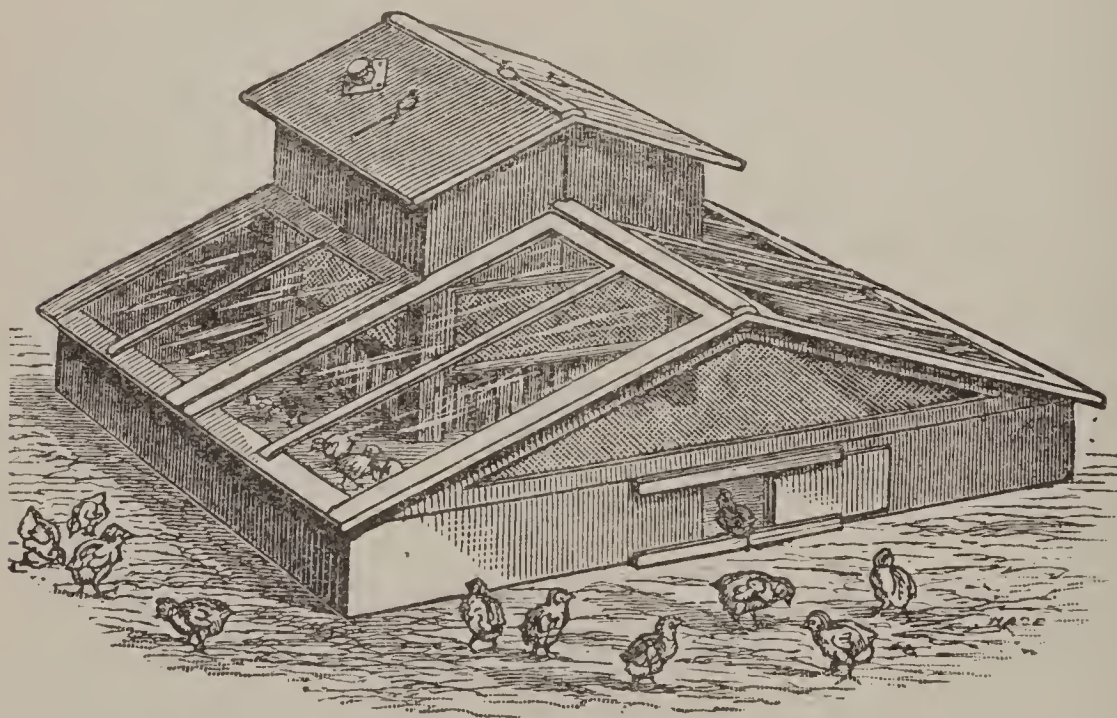


FIG. 565. — "Warm mother."

and sand easy of access to the fowls, in which they can roll and dust themselves.

EGGS AND INCUBATION.

The white of the egg is the principal food of the growing chick in the shell. It is a bad conductor of heat, and often

prevents fatal results to the germ from sudden changes in temperature. It also preserves the delicate egg-germ from concussions. There are two rather thick cords of albumen fastened to the under side of the egg to balance it, thus keeping the chick always in the upper part of the egg, where it can best receive warmth from the hen. The yolk is absorbed or drawn into the stomach through the navicular cord during the last twenty-four hours before the chick is hatched, and this is its food for a day after leaving the shell.



FIG. 566. — Ovary of hen.

During incubation, the small round spot in the yolk (that being the life-germ) becomes gradually larger, absorbing the white, and thus making room for itself. On about the nineteenth day the chick's beak breaks the air bubble at the end of the egg, and commences to breathe by the lungs. On the twenty-first day the horn on the tip of the bill fractures the shell, and its egg life is consummated.

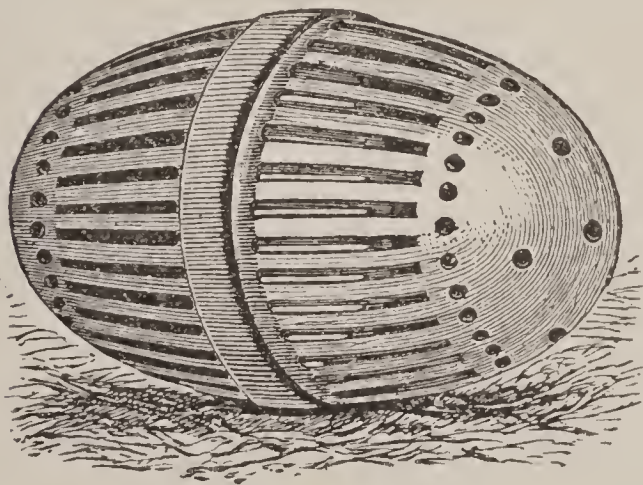


FIG. 567. — Egg protector.

NATURAL INCUBATION.

The time to hatch depends on the breed and also upon the purpose in view. Broilers bring

fancy prices when very early. The smaller breeds should be set later than those which are larger and hover better. Some people hatch chicks in the fall for winter and spring use. Early, common sitters should not have over seven or eight

eggs. Much depends on the season. If they have more, the outer ones become chilled in severe weather, and as the hen daily changes them, they all become addled. Larger breeds, like Plymouth Rocks, Wyandottes, Cochins, Brahmas, and others, can cover more and hover the chicks better.

Set the hen in a quiet, rather dark place, with grain food and water near. Do not assist hatching by breaking the shell. Moisten the eggs in dry weather, and give them a good soak in water of about 105° , on the 18th or 19th day. If the nest becomes befouled by broken eggs, etc., remove the eggs to water heated 105° , remake the nest, and replace eggs and hen. Take the young chicks as soon as hatched, wrap them warm, and return when the hen has completely finished her

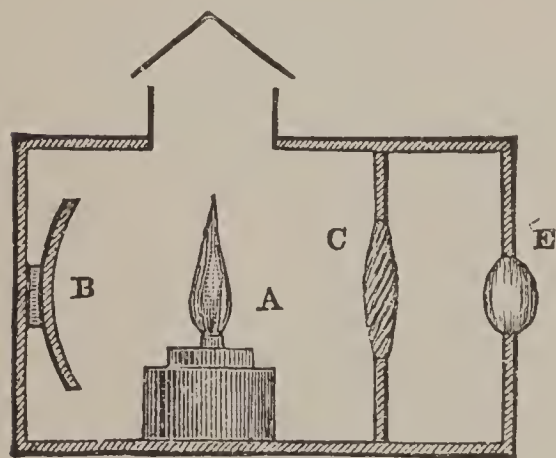


Fig. 27.

FIG. 568. — Egg-tester.

work. Thus she will not leave her nest too quickly, or trample upon the chicks. Do not feed the chicks the first day. The yolk of hard-boiled eggs is the proper food the first week. Feed them frequently. After awhile feed corn-meal dough and baked potatoes.

Do not give sloppy food to the hen or chicks at any time — diarrhea is the result. Give the brood liberty only when the dew is off. Dew is more fatal than the gapes. Always house before sunset, watch for lice, and thoroughly protect them from storms.

Eggs ordinarily require twenty-one days to hatch; but cold weather retards, and fine weather and an attentive mother hasten incubation. Hamburgs will hatch in twenty days, game bantams often in nineteen, turkeys in twenty-six to twenty-nine days, guinea-hens in twenty-five to twenty-six days, peafowls in twenty-eight to thirty days, ducks in twenty-eight days, geese in thirty days, swans in thirty-five to forty-two days.

FERTILITY AND EGG-TESTERS.

One common way to test the fertility of eggs is to hold the egg between the shaded eye and a candle, in a dark room, after the egg has been under the hen six or seven days. If fertile, it will be dark; if unfertile, translucent. A practiced eye soon becomes expert and reliable. The appearance of each is illustrated in Fig. 569.

ARTIFICIAL INCUBATION.

Artificial incubation has been practiced in Egypt and China for thousands of years. The profession was hereditary, and the secrets of the successful processes descended from father to son, and were guarded with religious sacredness.

The fertile eggs of all animals will produce their kind



FIG. 569. — Barren egg.

Fertile egg.

if they have the requisite amount of heat, moisture, and air. Some eggs are incubated in the water; others again are hatched in the body, and still others in the sun-heated sand, as in Egypt, or in the warm earth, as in other tropical countries.

One of the greatest difficulties to be overcome in artificial incubation in the temperate latitudes, is the regulation of the heat supply. Supply moisture, and preserve and regulate the temperature and state of the atmosphere so as to reproduce, as nearly as possible, the conditions of the process as carried on by nature herself. On the deserts of Africa, the Arabs hatch out eggs in the hot sand with great success, the heat being of just that even temperature required for the purpose.

In the process of investigation into the methods of producing artificial heat, there have been invented large numbers of

incubating machines. As we infer that but very few of our readers are interested in artificial incubators, and we can make much better use of the space available, we would refer those interested for details to any of the many authorities on the subject.

DISEASES OF POULTRY.

Fowls, naturally subject to but few diseases, have, by high feeding, poor housing, and bad breeding, been brought

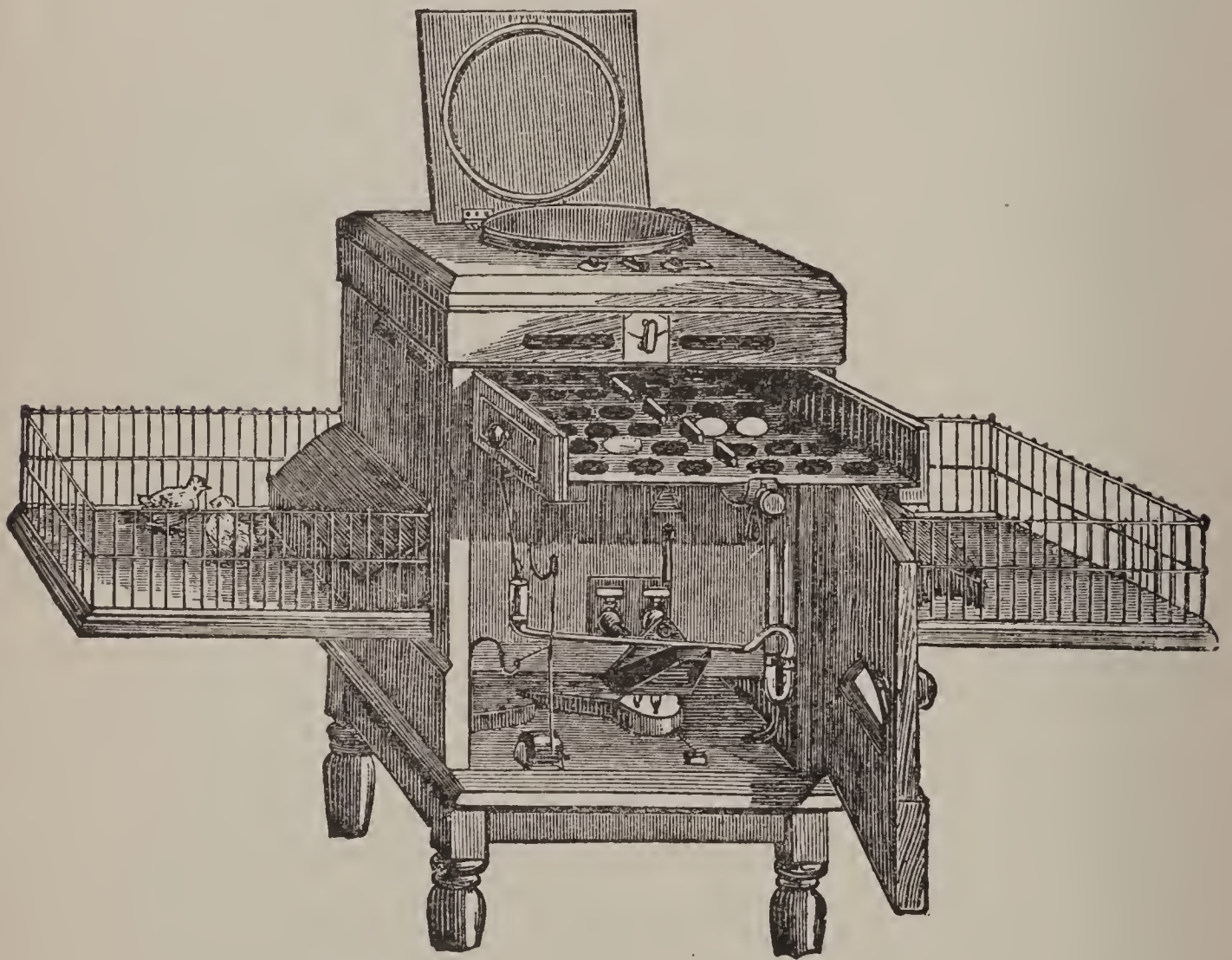


FIG. 570. — The Byle incubator. General view.

under subjection to many ailments. Prevention of diseases is better than cure, and contagion and infection are robbed of their terrors if taken in time. A sick fowl should always be separated from the rest, and in patience submitted to the effects of medicine.

CATARRH.

This is inflammation of the respiratory passages.

Symptoms. — Discharge from the nostrils and eyes of thin mucus ; often incipient roup ; no offensive smell.

Treatment. — Mix up —

Pulverized, fresh-burnt charcoal	3 parts.
New yeast.....	3 parts.
Flour	1 part.
Pulverized sulphur	2 parts.



FIG. 571.

with water sufficient to mix into boluses of the size of a hazelnut, and give three times a day. Infallible. (Dr. Bennett.)

CHOLERA.

This disease is thought to be caused by the cholera microbe, a minute organism in the blood.

Symptoms. — Specific, infectious, often epidemic. It affects the liver, poisons the blood, causes violent diarrhea, and terminates quickly. There is immoderate thirst ; the droppings, green at first, become thin and white ; there is great debility, and often cramps.

Treatment. — Give alum water in drink and food as soon as the fowl looks droopy ; also put in a day's feed for a dozen fowls a tablespoonful each of red pepper, gunpowder, and turpentine, well mixed through, and well-cooked corn-meal. (Lewis.)

Rhubarb.....	5 gr.
Cayenne pepper.....	2 gr.
Laudanum	10 drops.

Dose every three hours, giving between doses a teaspoonful of brandy diluted with its bulk of water, into which have been dropped three grains of calcine.

Here is a prescription for cholera pills, for which much is claimed : —

Sulphite of soda	1 dr.
Powdered red pepper.....	$\frac{1}{2}$ dr.
Powdered rhubarb	1 dr.
Powdered boracic acid	1 dr.

Mix to a paste with mucilage of acacia, and make 40 pills. Give one in a dose of salad oil twice daily to each fowl.

DIARRHEA.

Cause. — Sudden change of weather or food, or feeding sloppy or laxative food.

Treatment. — Well-boiled rice, thickly powdered over with chalk, is usually sufficient. If not, give six drops of camphorated spirit three times a day in a pill of barley meal, restricting diet to rice, barley, and a little cut grass.

Or —

Chalk.....	5 gr.
Rhubarb.....	5 gr.
Cayenne pepper.....	3 gr.

Make into pills.

The same author thinks thirst induces this disease, while Weld thinks lack of salt the cause. Idleness is also a provocation. Giving your fowls something to do, as scratching for buried corn, or plucking at a cabbage head hung just within their reach, has been suggested.

GAPES.

Cause. — A parasite in the wind-pipe of young chicks, — a small, reddish worm known as *Sclerostoma Syngamus*, which is the larva of an insect living on the skin.
(See Fig. 572.)

Symptoms. — Sneezing, continual gasping for breath, and suffocation.

Treatment. — Prevention ; anoint the head of the chick with —

Mercurial ointment.....	1 oz.
Lard.....	1 oz.
Flowers of sulphur.....	$\frac{1}{2}$ oz.
Crude petroleum.....	$\frac{1}{2}$ oz.

Immersing chicks in the fumes of carbolic acid till nearly suffocated is, though dangerous, unfailing. To withdraw the parasitical worms, insert two stiff horse-hairs in a loop, twist and pull ; also, strip a feather except the end tuft, dip in turpentine, insert, twist once, and withdraw. Be careful not to lacerate the throat.

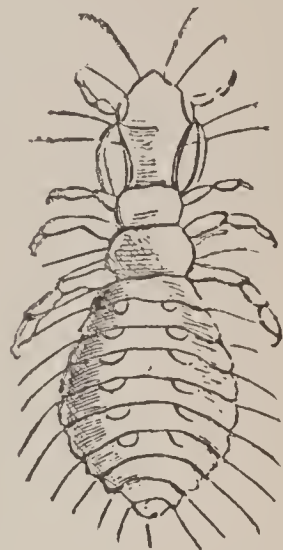


FIG. 572. — Insect which produces gape-worm.

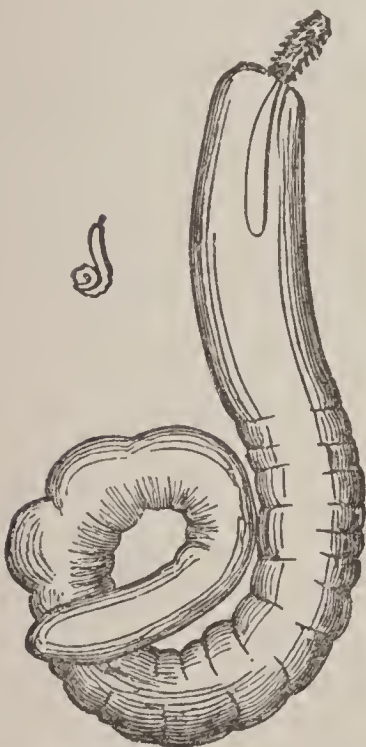


FIG. 573. — Form of gape-worm.

GIDDINESS, OR VERTIGO.

Cause. — Blood-pressure on the brain. Incipient apoplexy.

Symptoms. — Staggering, running in a circle, fluttering.

Treatment. — Holding the head in a jet of cold water will give immediate relief. Put on low diet, keep the fowl quiet, and give a dose of any aperient, as jalap, castor-oil, etc. ; or give two or three doses daily of three to six grains of bromide of potassium. If recovery does not follow, kill.

GOUT, OR SWELLED LEGS.

Treatment. — Rub legs daily with fresh grease for a week. Place the fowl in a warm, dry place, keep the bowels open, and give three drops of wine of colchicum twice a day.

LICE.

Treatment. — For prevention, sprinkle the nest, coop, etc., with a carbolic disinfecting powder. Also remove from the fowl-houses and coops all the old straw, hay, etc., and burn it. Then put the coops into the fowl-house, and fumigate two hours with burning brimstone. Wash everything with strong potash water (concentrated lye), and there will be a house as free from vermin as one can desire. If the chick is oiled on

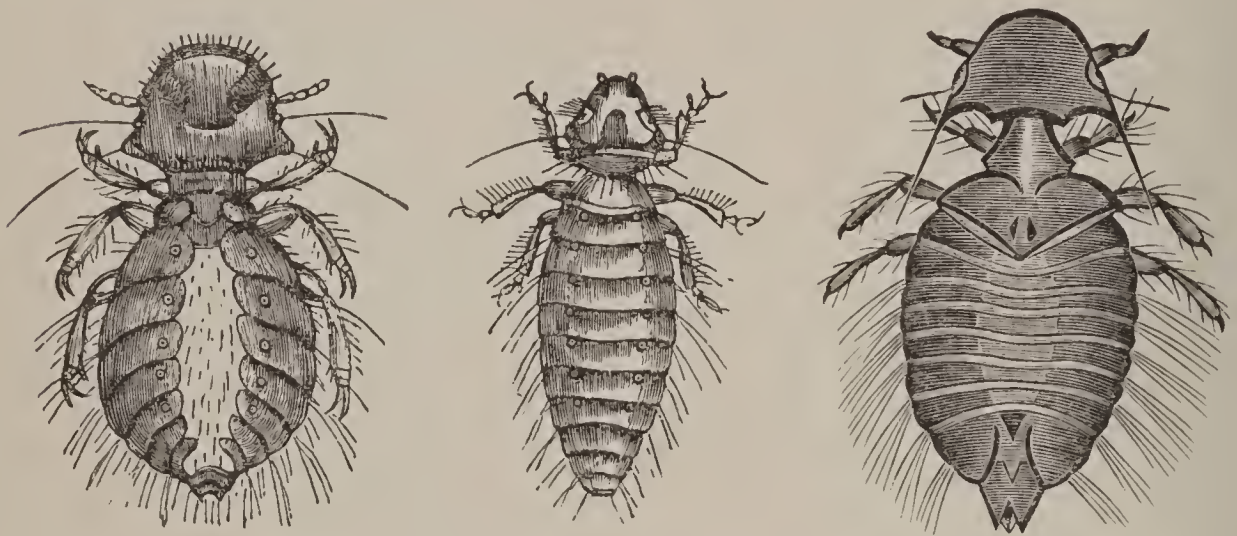


FIG. 574. — Wing-louse. FIG. 575. — Feather-louse. FIG. 576. — Turkey-louse.

the poll, under the wings, etc., and the hen touched in like manner with carbolic scouring soap-suds, they will soon be free from vermin. Do not wet the feathers more than can be helped. These remedies scarcely ever fail.

PIP.

Treatment. — Give the fowl three times a day, for a week, two or three grains of black pepper in butter. This treatment is efficient. (Lewis).

CHAPTER XXIX.

THE FAITHFUL DOG.

HIS INTELLIGENCE AND USEFULNESS.

THE dog is the playmate of childhood, the trusted confidant and associate of youth, the companion of the shepherd in his lonely hours on the moor, the attendant and assistant of the sportsman in his excursions in the field, the pet of the refined lady sitting in the lap of luxury, and a trusty member of the farmer's family circle. He is so faithful in his instincts of love and attachment when properly treated, in addition to being so useful and beneficial to the farmer, that he has been deemed worthy a place in this volume.

Of the intelligence of the dog in various climes and in all ages, stories the most wonderful, and not more wonderful than true, have come down to us from the most authentic sources. These faithful creatures which attend upon and go on errands of mercy for the monks of the great St. Bernard, have become endeared to the heart of Christendom; while the sagacity of the animal which drives a flock of sheep with more care and safety than the shepherd himself, or looks up a lost sheep from merely verbal directions given him, is proverbial. There are instances established by the best of evidence, which doubtless many readers of these pages can substantiate, of dogs rescuing persons from drowning, hunting up and returning to their homes lost children, and dying of grief upon their masters' or mistresses' graves.

A gentleman living in the suburb of a Western city, found one day a gigantic Newfoundland dog on his door-step, which was supposed to have lost its owner by death. The animal,

being taken in, at once formed an attachment for the gentleman's daughter, of five or six years. The child was accustomed to have her own way, and she assumed entire control of the dog, whipping him when she was dissatisfied with him, whereat he would whine and manifest contrition, never for once offering any resistance. The child sickened and died; and the dog,

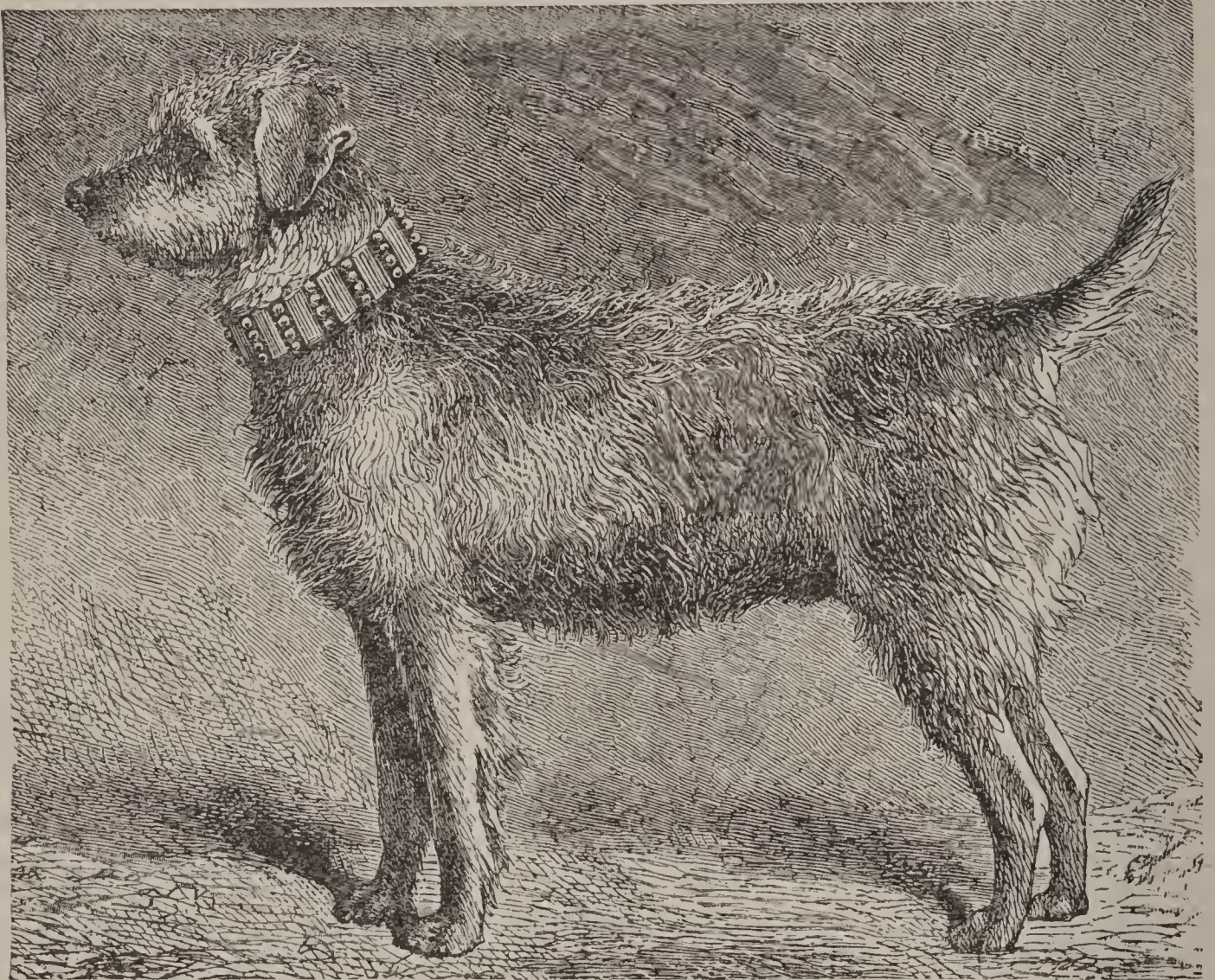


FIG. 577. — The pet terrier.

after watching her faithfully during her illness, lay down upon her grave and died of starvation. After the death of the dog, it was ascertained that he had formed an attachment to the girl while she was attending a kindergarten at some distance from her father's residence, and had left his master to follow her to her home and to the grave.

A Newfoundland dog, having been tormented beyond all endurance by a little mastiff, took the little tormentor in his mouth, and swimming some distance out into the sea, dropped

it, and then swam back again, leaving the offender to swim alone to shore, but carefully watching it to see that it did not drown, ready to assist it in case of danger.

A lady was once recounting to a friend the virtues of her Newfoundland dog Lion, which lay on the carpet at her feet; and when she told how he watched the baby, played with the children, and how high a price she set on him, Lion's tail would go up and down in delight at the praises bestowed upon him. "But Lion has one serious fault," said his mistress after awhile. The tail ceased to thump the floor, and Lion's face wore an expression of great concern. The lady continued: "He will come in with his dirty feet and lie down on the carpet, when I have told him time and again that he mustn't do it." Lion, with a dejected and humiliated air, arose and slunk out of the room, his tail hanging down, and completely crest-fallen.

At Eldred, Penn., recently, a hotel caught fire, and a large Newfoundland dog, which slept in the office, sprang to the room of the drunken porter, with whom he was a great favorite, jumped on the bed, and seized the pillow in his teeth. The man at last comprehended the situation, but rising from the bed (not being undressed), fell to the floor in a stupor, when the dog seized him by the collar and dragged him out into the hall, where he was rescued. The faithful animal then went from room to room, barking loudly and scratching on the doors to rouse the inmates. One lady with a child in her arms tripped on the stairs, while trying to escape, and fell to the bottom. The child was thrown upon the floor, some distance away. The dog, seeing the mishap, jumped through the smoke, and with its teeth seizing the child by its night-clothes, bore it safely out. The saddest part of the story is yet to relate. The mother, restored by the fresh air, and not seeing her child, cried out wildly that "Anna is burning up in the house!" and made a dash for the building as if to rush to her rescue. "Heck," though he had already brought out the child, sprang forward through the flames to complete his work by restoring her to her mother, but he was never seen again, and his remains were found in the ruins.

The monks of the celebrated monastery on the Great St. Bernard, in the Alps, have, through their faithful dogs, spread their benign fame throughout the world. Upon the occurrence of a snow-storm, the dogs are sent forth by the monks on their errands of relief and mercy. Through their wonderful instinct they traverse with safety the most dangerous paths; and when



FIG. 578. — Newfoundland dog. The children's friend.

they discover the belated or storm-overtaken sufferer, they give notice of the fact by their deep and powerful bay, and proceed, if he be buried in a snow-drift, to dig him out, bearing on their necks, in little casks or bundles, cordials or food for his restoration or nourishment. If these means are inefficient, they return in all speed to the Hospice, where they know how to make themselves understood. . . . The monks immediately set out, well provided with means of recovery.

HIS WONDERFUL POWERS.

As this matter is being put in type, the following from the *Chicago Tribune* of June 6, 1889, relative to the Johnstown disaster, is brought to the writer's notice, and is inserted as a striking instance of the intelligence and faithfulness of the dog:—

“Every day brings to light more of the remarkable experiences of survivors and victims of the flood. The family of



FIG. 579. — The famous St. Bernard dog.

C. Kress, the ale brewer, have reason to remember their four big St. Bernard dogs. Mr. Kress, his wife, and three children were tossed about by the angry waters. Their house turned over and over, and each time all the family but Kress were washed into the water. The dogs sprang into the water as each member of the family slipped in, and in an instant had

the unfortunate person on the house again. Over trees, heavy brush, and through dangers of every kind, the animals dashed to save their master's family. When the house approached the shore, one of the dogs towed Mrs. Kress ashore. The rest of the family also escaped with the assistance of the dogs. Mr. Kress says he lost \$100,000 in the flood, but he thinks far more of his dogs than of his wealth.

“Another circumstance he mentions in connection with his dogs is that one of the animals came back to his place of business after the water subsided a little, and kept guard over the safe until next day.”

The dog, with many of the lower animals, possesses some remarkable powers to a much greater degree than they are shown in man. By the acuteness of his scent, he points out and flushes the birds for the hunter, or follows unerringly the game in field and forest. He follows the track of his master, even hours behind him, no matter how many others have passed over it. By the mere scent of a bit of clothing worn by a criminal, the blood-hound will take up his track and follow it, and will pick him out from hundreds of others who have been his companions, and have worn the same kind of clothing.

And yet, for what they call sport, there are many men so brutal in their instincts as to enjoy the spectacle of seeing a



FIG. 580. — Effects of dog fighting.

couple of fine dogs tear and mangle each other to pieces. As a representation of what is common, we include a portrait, drawn from life, of a poor dog that in a dog-fight had been torn and mangled almost to death, making one of the most pitiful spectacles imaginable. The spots and shadings indicate the extent of lacerations and injuries. The poor beast was literally mangled to death. And yet this is not nearly so great a blot upon our civilization as the abuse and cruelty to which horses are subjected. The overdraw check alone, as now generally used throughout the country upon driving horses, is so serious a cause of discomfort and injury that it should call for the sympathy and earnest effort of every considerate man and woman in the land to condemn it and bring it into disrepute.

DISEASES OF DOGS.

DISTEMPER.

This, the most common disease of the dog, is a blood-poison, contagious, and often complicated with other diseases. It is marked by languor, loss of appetite, hot and dry nose, red eyes, offensive feces, and rapid pulse, followed by cough, high fever, and often diarrhea, with pustules along the inside of the legs and along the belly.

If the lungs are affected, apply a mustard paste to the sides, rub it in, and give the following : —

Tinct. aconite root.....	30 drops.
Sweet spirits of niter.....	$\frac{1}{2}$ oz.
Tinct. of gentian.....	$\frac{1}{2}$ oz.
Syrup of tolu.....	2 oz.

Mix with water to make four ounces.

If the bowels are affected, give a tablespoonful of buckthorn, and afterward this : —

Prepared chalk.....	2 dr.
Aromatic confection.....	1 dr.
Tinct. of opium.....	$\frac{1}{2}$ oz.
Gum arabic.....	2 dr.

Mix with water to make 8 oz.

If there is straining, an injection of nitrate of silver may be given.

When the fever is allayed, give the following tonic :—

Elixir calisaya, iron, and bismuth.....	2 oz.
Syrup of tolu.....	2 oz.
Chlorate of potash.....	3 oz.

Mix with water to make six ounces. Continue the quinine morning and night.

DIARRHEA AND DYSENTERY.

If not properly checked, diarrhea is liable to run into dysentery. For diarrhea, give a tablespoonful of castor-oil, and after a while give the preparation of laudanum and camphor last prescribed. Dysentery may be known by bloody evacuations, great straining, and redness of the rectum. Give castor-oil, with frequent injections of the following :—

Sulphuric ether.....	1 oz.
Laudanum.....	1 oz.
Water.....	2 oz.

Keep the dog quiet, and diet him on rice-water and arrow-root ; later on, boiled milk with crackers.

CONSTIPATION.

Give a half ounce of castor-oil, with injections of soap and water ; or, if a severe case, the following (continuing the injections) :—

Jalap.....	1 dr.
Ginger.....	1 dr.
Gentian.....	1 dr.

Syrup to make a pill.

INFLAMMATION OF THE BOWELS.

This is caused by eating acrid food, etc., and is accompanied by whining, uneasiness, rapid pulse, and constipation. Give half an ounce of castor-oil, and afterward a tablespoonful of the following every half hour :—

Aconite root.....	$\frac{1}{2}$ dr.
Water.....	4 oz.

THROAT AND LUNG DISEASES.

If a cold is neglected, the danger is that it will develop into pneumonia. If there is a discharge from the nose, rub the throat with mustard, and give the following :—

Tincture of aconite root.....	$\frac{1}{2}$ dr.
Syrup of squills.....	1 dr.
Syrup of ipecac.....	2 dr.
Spirits of niter.....	3 dr.

Mix with water to make four ounces.

Sponge off with tepid water, and when fever is broken, give the calisaya, iron, and bismuth preparation prescribed under Distemper, and continue the quinine throughout. Diet and management mainly as in Distemper.

PARASITES.

The parasites common to dogs are —

THE BLOOD-SUCKER AND THE BIRD-LOUSE. — These are two prolific sources of mange in the dog.



FIG. 581. — Ear-louse.

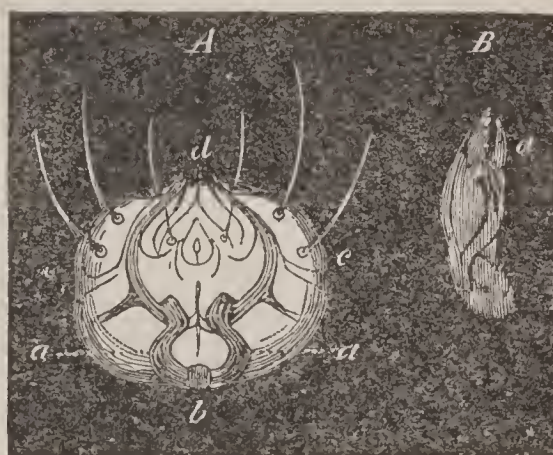


FIG. 582. — Mange parasite.

THE HYPODERM. — Another is an insect which is called a *Hypoderm* (French, *hypoderme du lapin*, or *cutérèble nuisible*), which lays its eggs beneath the skin, and causes subcutaneous abscesses.

The EAR-LOUSE (Fig. 581) is a very troublesome, though not dangerous insect.

The CAT-FLEA (Fig. 584) annoys dogs to a considerable extent, but yields readily to Persian insect powder, which has been thoroughly tested, and is approved by the best authorities.

LICE may be destroyed by washing the skin with tobacco juice, after effusing it with whale oil, or by sifting wood ashes into the hair.

For MANGE the rational treatment is first to wash the animal thoroughly and remove all scabs; then an ointment like the following may be applied : —



FIG. 583. — Dog-flea, greatly magnified.

Sulphur 2 oz.
Lard 2 oz.

If it be a protracted case, use —

Oil of tar.... 1 oz.
Whale oil ... 20 oz.

Scald all the rugs and blankets that have been used, and wash the kennel with boiling water, sponging it, when dry, with this lotion : —

Corrosive sublimate..... 1 oz.
Water 1 gal.

For RED MANGE, which is simply a red irritation of the skin, giving a red tinge to the hair, apply the following : —

Oil of juniper..... 1 oz.
Glycerine..... 7 oz.

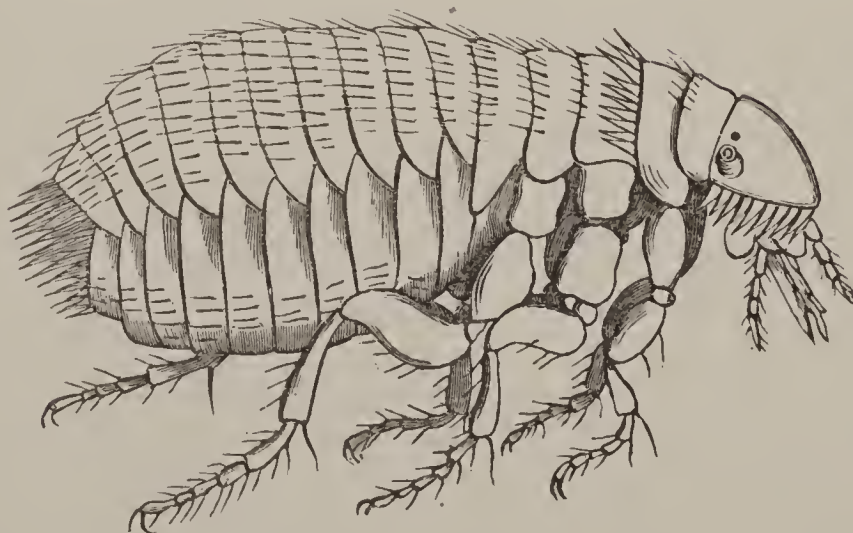


FIG. 584. — Cat-flea, magnified.

CHAPTER XXX.

BEE CULTURE.

THE United States imports annually about \$100,000,000 worth of honey; and notwithstanding we have in this country all the facilities for the successful raising and management of bees, and this with a sure market at liberal prices for all the honey and wax that could be made, we have but about 3,000,000 swarms of bees, with a capacity to supply only \$18,000,000 worth of product. These facts led us to look into this subject, and it appeared to us to be so important to the farmers of the country, that we have been led to make a special effort to include as short and concise an explanation of the subject for their reference as we could give in the limited space we have at our disposal.*



FIG. 585. — Bee-hive.

* We are specially indebted to Mr. A. I. Root, of Medina, Ohio, author of the most valuable work on the subject we have seen, not only for the main facts given in this part, but for the use of the fine engravings taken from his book. Those wishing full details of this subject will do well to obtain Mr. Root's valuable work. Paper covers, \$1.00; cloth, \$1.25.

Bees were originally kept in very simple hives of straw, and in order to get the honey for use, the bees were smothered by burning sulphur and in other ways, thereby losing the value of the colony, a necessarily great and serious loss; and when the bees increased in the colony, they had to swarm, and were liable to fly away, which became a serious objection; for in the

process they were frequently lost.

It has not been till within the last generation that such an intelligent and successful study has been made of this subject, as not only to enable removing the honey, as desired, without injury to the swarm, but also to either retain or control the swarms with but very little trouble or possible loss.

BEES.

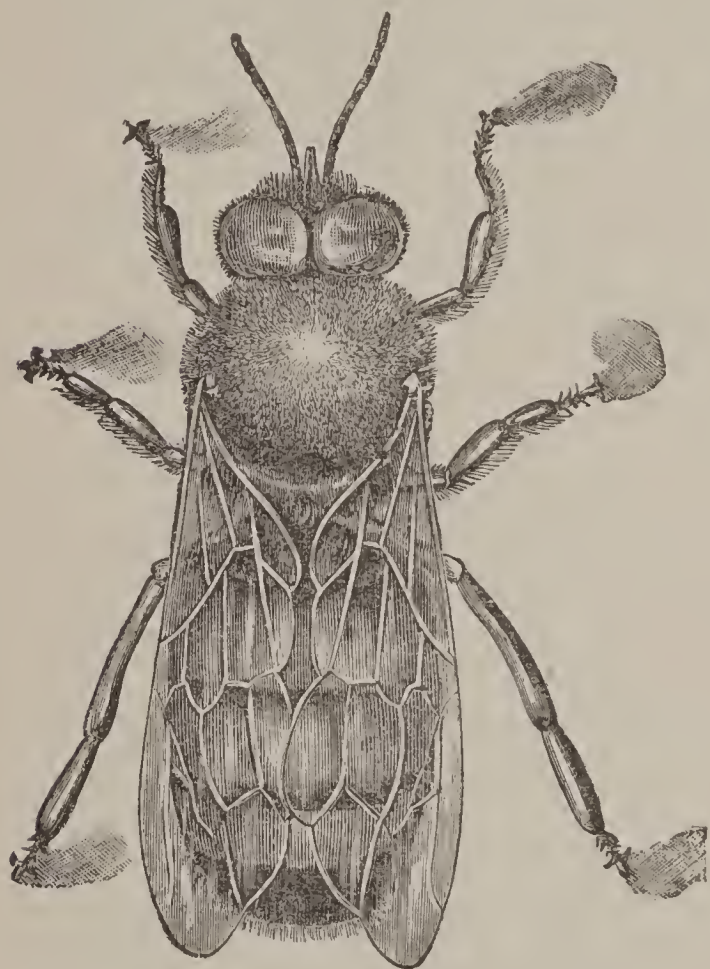


FIG. 586. — Drone bee.

workers. The drone's business seems to be to impregnate the queen; the queen confines herself to laying eggs; and the workers, which are undeveloped females, make the honey. There are four distinct stages in the existence and development of bees; these are the egg condition or state; the larva, or grub; the pupa, or chrysalis; and the imago, or complete form of the insect. Two kinds of eggs are laid by the queen-bee, — drone-eggs and worker-eggs. Every hive has two kinds of cells, — the larger size constituting the drone-comb, which is designed to receive the drone-eggs, and the smaller size constituting the worker-comb, and designed to receive the worker-eggs. The queen-bee is guided by instinct in laying her eggs

There are three kinds of bees in a swarm, or colony, — drones, queen, and

in the respective cells for which they are intended. In order to rear a queen, one of the worker cells, containing an egg freshly laid, is enlarged to somewhat the size and shape of a peanut.

It requires some three days to hatch a worker-egg into the larva form; in six days thereafter the worker-bees have capped over its cell; after this a silken cocoon is spun by the larva, and it assumes the chrysalis state; and in twenty-one days there emerges from the cell a fully organized worker-bee, ready to begin its life-work. A queen-bee develops in sixteen days, and a drone-bee reaches full development in twenty-four days.



FIG. 587. — Worker.



FIG. 588. — Virgin queen upon the wing.

It is a singular and interesting fact that after impregnation, which takes place as the queen meets a drone on the wing, the queen, having returned to the hive, never leaves it unless when the entire swarm takes flight. About two days after impregnation, she begins to lay worker-eggs. Another singular fact is

that she can lay drone-eggs before impregnation. When the queen drops the tiny egg in the proper cell, a viscid fluid which surrounds the egg makes it adhere to the bottom of the cell.

From 2,000 to 3,000 eggs per day will be laid by an ordinarily prolific queen. While the average existence of the queen-bee lasts about three years, the workers generally live but a few weeks; therefore nature has wisely provided for a replenishment of the stock. Drones are usually killed off by the workers early in the summer.

Bees begin along in the middle of April to bring in honey from fruit-bloom. For a few weeks at first, large quantities of

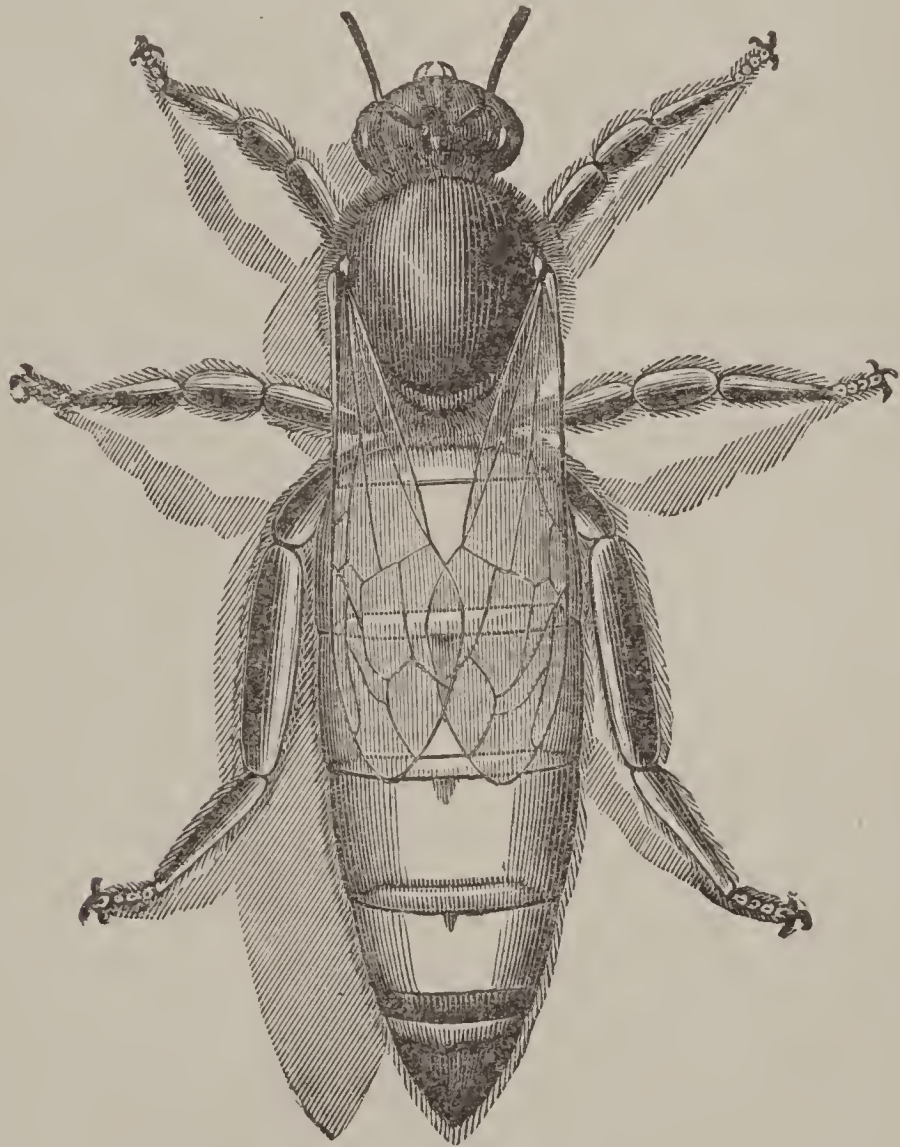


FIG. 589. — Queen.

honey and pollen will be needed to feed the brood still filling the hives, until they are all hatched out, and not until then should commence the storing of honey; for the bees should have every facility for brood-rearing.

The honey which fills the store cells is intended for daily consumption, and also as a reserve for the period when the flowers furnish no more. The empty cells are left open, the

workers making use of them when they want them, particularly during rainy days, which keep them at home. But the cells which contain the honey put by in reserve are closed. "They are," says Réaumur, "like so many pots of jam or jelly, each one of which has its covering, and a very solid covering it is, too." This covering, composed of wax, hermetically seals the pots containing this reserve of honey. The object of this is to keep the honey in a state of liquidity, by preventing the evaporation of the water it contains. It is a remarkable fact that it does not run out of the cells which are open.

SWARMING.

When the bees have the hive well filled with honey, a portion of its population, taking along with it a queen-bee, wings its flight for other quarters, sometimes flying to the woods, but oftener alighting and clustering upon some neighboring tree. The new swarm at once begins work upon a new home, and if left undisturbed there, would at once go to work again in the process of gathering and storing honey. One of the leading features of the business of bee-culture is the successful hiving of bee-swarms. To capture an escaped colony of bees and get them safely back to the apiary, is the mark of an experienced bee-keeper.

Various expedients are resorted to in order to prevent swarming, as, if this could be effectually accomplished, and all the bees kept at home storing honey during the whole season, the largest crops would be obtained from a single hive.

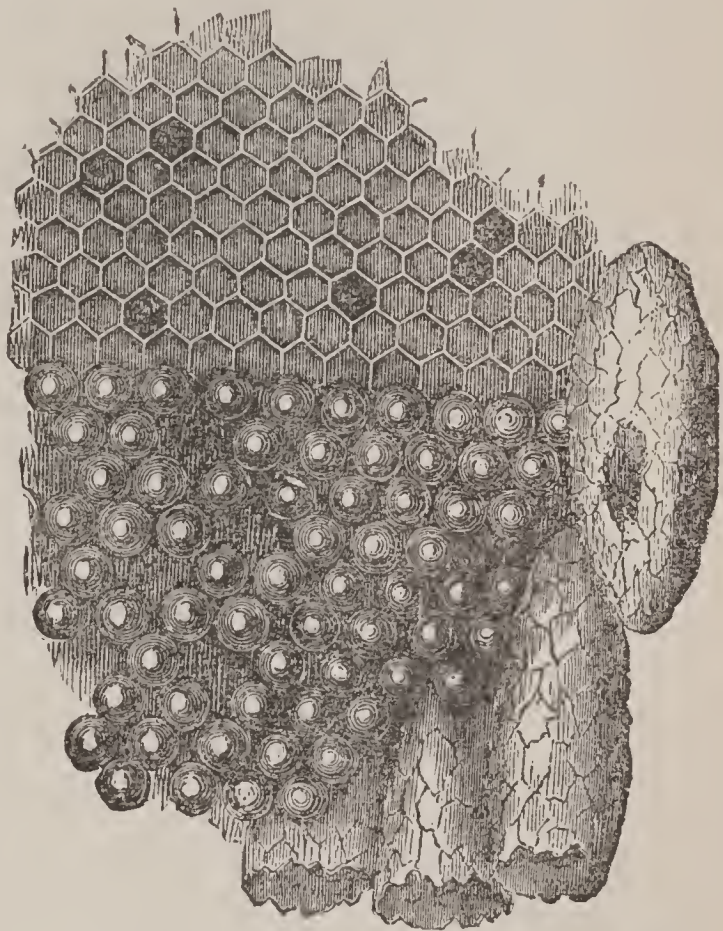


FIG. 590. — Portion of honey-comb, with eggs occupying cells.

Swarming can very often be prevented by simply giving abundance of room in the surplus receptacles, just as fast as more is needed, but no faster. This plan is, in fact, the one generally in use. If the bee-keeper carefully looks after his bees, there will be no trouble. But if he cannot give close attention to them, he can clip the wings of the queen, which will then hop out on the ground, and may stay near the



FIG. 591. - Three varieties of goldenrod.



FIG. 592. — Buckbush.

entrance until the swarm begins to come back, when she will be attracted by their humming, and go in with them.

June is the main swarming-time of bees in the United States; yet in favorable weather they swarm occasionally as early as the middle of May, while, again, it may not commence until July. The earlier the swarming takes place, however, the better. It is better to swarm bees artificially, and not to wait for natural swarming.

In the artificial swarming of bees, the movable frame hives enable artificial swarming to take the place of natural swarming; and while under the old system the bee-master had to

await the convenience and caprice of the bees, and at the same time to watch the hives incessantly, under the new system he can consult his own convenience, divide overpopulated colonies, and avoid loss of swarms.

But as natural swarming will constantly occur, notwithstanding the sharpest precautions, and however carefully the apiary be managed, and as bee-keepers are often unable to give attention to them before they swarm, it is important to understand the indications of swarming and the modes of hiving swarms. Bees are not apt to swarm before the hive is strong in numbers, nor until the young bees are hatching and the drones flying, nor while the weather is unpleasant. The first warm, clear day is generally improved, when the mass of workers, after hastily filling their sacs with provisions for their journey, rush pell-mell

from the hive, accompanied by the queen. Hives should be kept in readiness for their reception when secured, as success depends greatly upon promptness in hiving swarms as they issue; for if left hanging upon a tree in the heat of the sun, they soon become impatient, and often fly off and become lost in consequence.

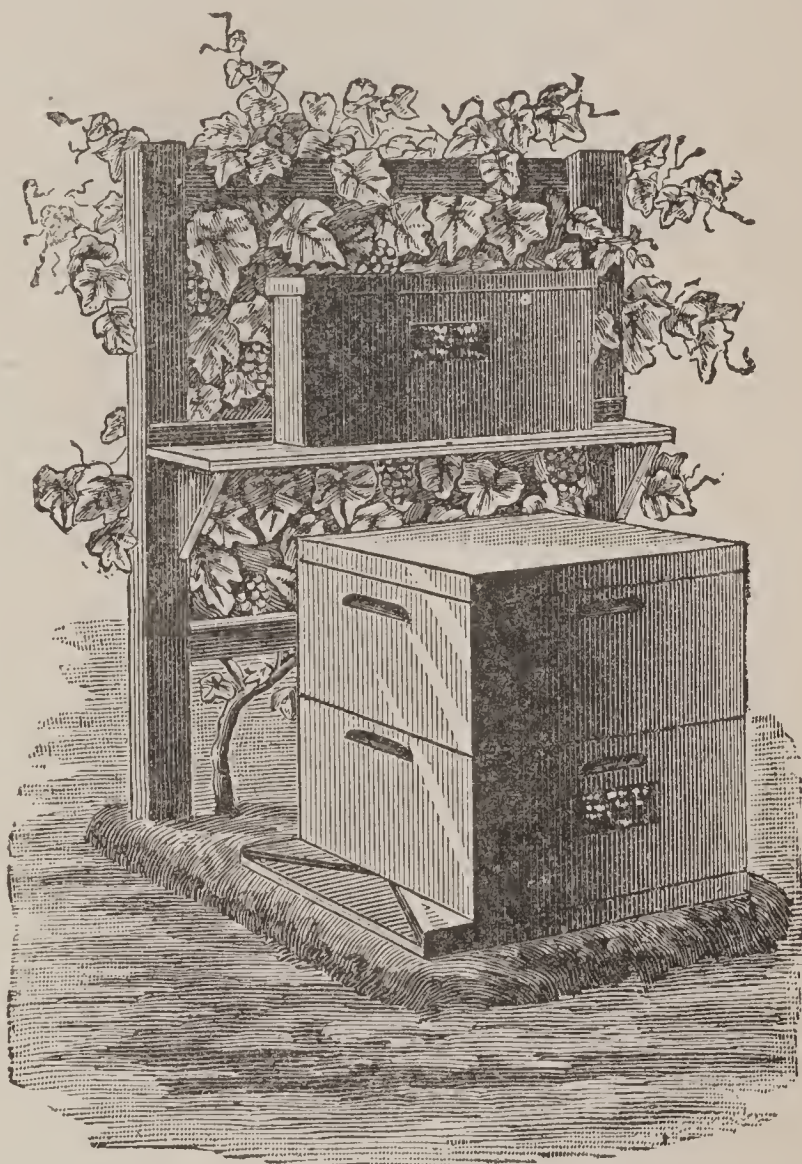


FIG. 593. — Two-story simplicity hive.

LIQUID AND COMB HONEY.

As soon as honey begins to come in rapidly, so as to fill the hives, it is important to decide whether the market calls for liquid honey or honey in the comb. Most markets call for both kinds.

If liquid honey is to be produced, a honey extractor must be called into requisition, which is now almost universally used, and which has greatly simplified the raising of honey within the past few years. This machine, by the simple application of centrifugal force, empties the combs most thoroughly of the honey, and upon being removed and emptied, the bees can proceed to fill them again.



FIG. 594. — Cluster of bees hanging from top of hive.

If comb honey is demanded for the market, it should be stored by the bees in section frames instead of boxes, because the former are clean and neat to handle, and can be retailed without troublesome daubing, and because it will bring a much higher price in that shape. The sections should be small and made to fit inside the regular hive frame, or, rather, in a wide frame made of the same dimensions. This simplifies the work greatly, because a frame of sections can then be

hung in any hive, and in either the upper or lower story, as there may be occasion. If the bees have been kept in a small space, so that every comb is occupied with brood and pollen at the approach of the honey season, they will start in the sections almost at once, if the latter are given them just as soon as they begin to be crowded for room. Give them a single frame at first; and

when they are well at work in this, give them another. Do not put on an upper story until they are ready to go into it in large numbers. Do not by any means let the bees get to clustering on the outside of the hives. They will seldom do this when honey is to be had in the fields; but if a strong colony gets to hanging out preparatory to swarming, they must be got into the boxes at all hazards.

When sections are filled, the comb honey can be removed either by taking off a whole upper story and letting the bees leave it and go back into the hive before the sections are taken out, or the filled sections picked out as fast as completed, and replaced with empty ones.

Hives are subjected to robbery by such invaders as grubs, slugs, bee-moths, robber bees, and other insects. The method of defense on the part of bees against these enemies is generally to sting them to death; but they should be assisted by careful attention to these matters on the part of the keeper.



FIG. 595. — *Galleria cerrella*, a parasite of the bee.

HIVES.

Nearly all modern hives are good, and there is a great variety, from the most simple to the most complex, each having more or less excellent points of advantage, with some features of disadvantage. This

question comprises, in all its ramifications, a subject of considerable importance, upon which we have not time to dwell, more than to say, if you wish to secure an improved hive, and know its special advantages, consult the makers or those interested in their manufacture.

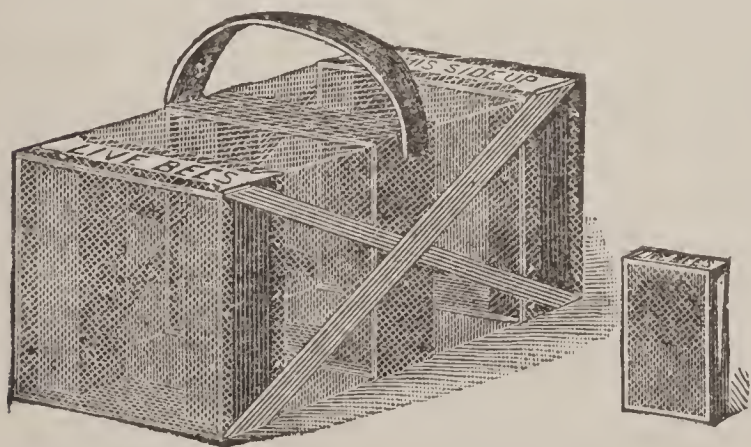


FIG. 596. — Cage for one pound of live bees.

A few years since, it was customary to have bee-hives placed upon benches or “legs,” with grass and weeds allowed to grow

so thick and rank on the ground below that if a heavily laden bee missed the hive, it was a chance if it picked its way out in the course of half an hour. At the present day, under more intelligent management, the hives are placed so near the ground that those heavily laden with pollen or honey may go in on foot if they find it more convenient to do so, while the ground is now kept clean before the hives, so as to furnish no obstacle to the entrance of the honey-laden bee.

Bee-hives should always be put in shady places, facing the south. As stated, such are the improvements in hives that they are now built in compartments, to enable the taking out of extra honey, yet leaving enough for the winter's subsistence.

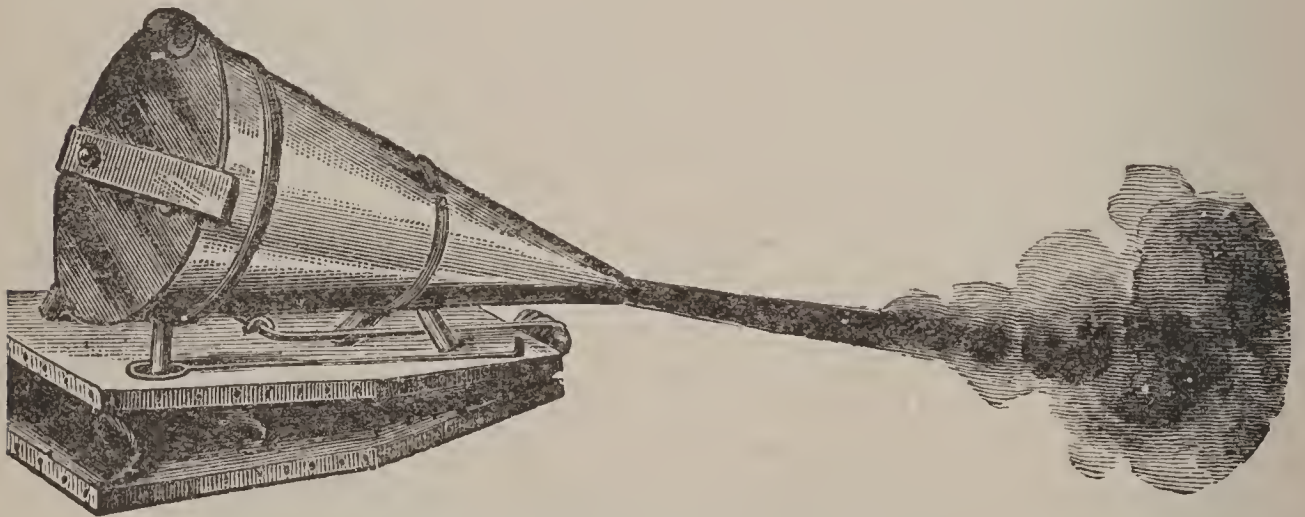


FIG. 597. — Clark's cold-blast smoker.

A point also of great importance is that the entrances of the hives should not be larger than is necessary for the throngs of workers to pass in and out; but care should be taken that every bee has room, so that there is not too much jostling, crowding, and waiting for one another.

PREPARING BEES FOR WINTER.

In preparing bees for winter, the first thing is to be sure that there are bees enough in each hive to winter. If there are not, unite swarms until every one is strong. If the swarm has not as many as four good combs, they must be supplied with comb foundation, and made to build them out. If they are to do it in September, it must be attended to in time. Let

the spaces be closed by chaff division boards until there is just easy room for the four frames, put in the foundation where the combs are lacking, and feed the bees every night from half a pint to a pint of food. When the hive is opened, which should be done every day or two, the bees should be found rearing brood, building comb, and getting full of bees, precisely as they do in

June. Granulated sugar is advisable for winter food — about half a pound every night until the combs are full. When the combs are all covered, they are ready to winter, by simply

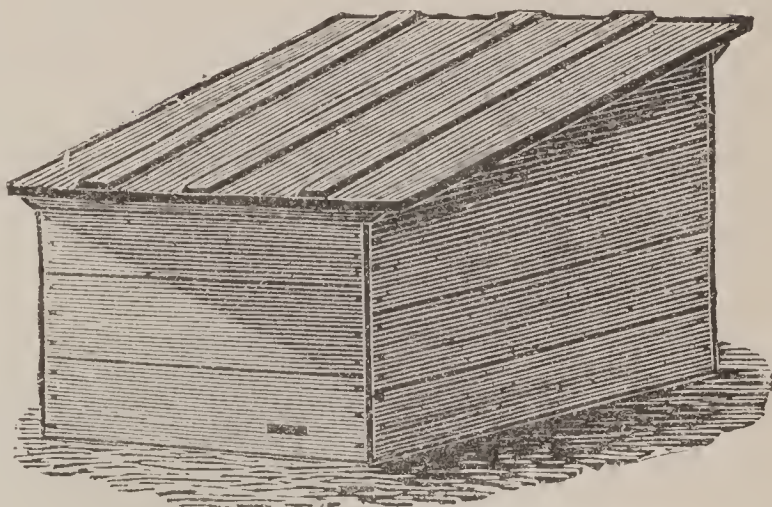


FIG. 598. — Clark's rustic chaff hive.

putting a thick chaff cushion over them. This cushion is made by taking two pieces of burlap, 20 inches wide, and the other way clear across the roll (40 inches); sew these together so as to make a single endless seam, and leave the last corner open until the chaff is put in. Do not pack it tight, but loosely. Six inches of chaff over the bees will be sufficient.



FIG. 599. — Old English hive.

If the winter is very severe, a swarm which would densely cover five or six combs would be much safer than a smaller one.

Straw mats to put over the bees have been in use many years, with excellent results; but it has been found a difficult matter to have them fit as

closely over the cluster as do the chaff cushions, and they are not as neat and tidy.

STORING AND MARKETING COMB HONEY.

For marketing comb honey, the greatest care should be exercised in the preparation of packing or shipping cases.

Honey should be kept clean and free from stickiness. Pasteboard boxes for one-pound sections of comb honey are very convenient.

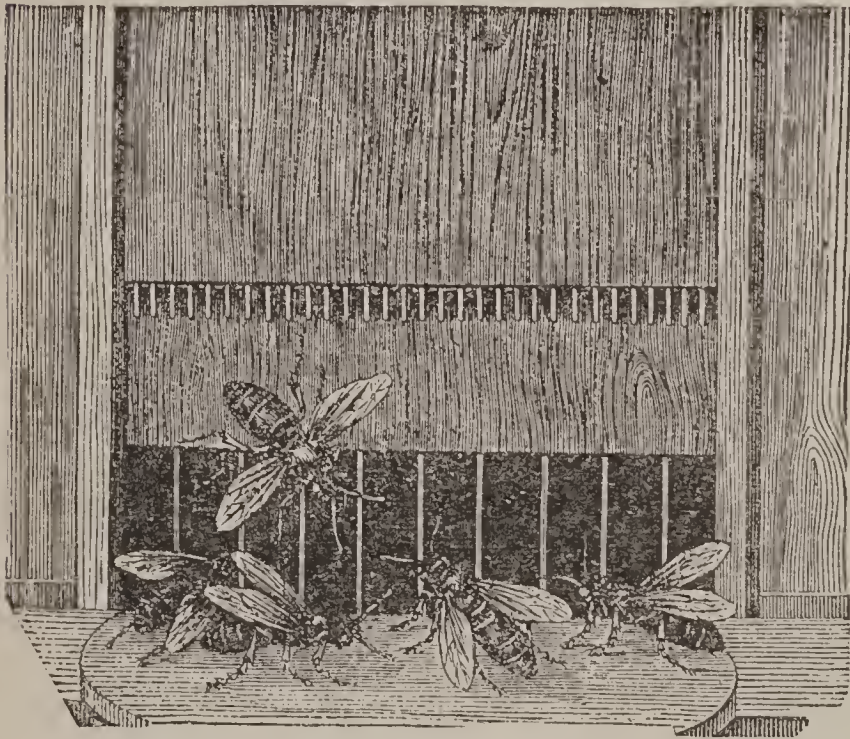


FIG. 600. — Sentinel bees guarding entrance to hive.

In order to preserve comb honey when it is desired to hold it for better market, it should be kept free from dampness. If water condenses on the surface of the comb, it soon dilutes the honey, which then sours. On this account the honey should never be put into

a cellar or other damp room. During damp and rainy weather, the doors and windows to the honey-room or honey-house should be closed, and opened again when the air is dry. Comb honey should also be stored where it is not likely to freeze, as freezing contracts the wax so as to break the combs and let the honey run.

All honey, as a general thing, candies at the approach of cold weather. It has been suggested that thin honey candies quicker than thick, and such may be the case; for honey that has been perfectly ripened in the hive, that is, has been allowed to remain in the hive several weeks after being sealed over, will sometimes not candy at all, even if exposed to zero temperature. As some honey candies at the very first approach of cold weather, and other samples not until we have severe,

freezing weather, we cannot always be sure that perfect ripening will prove a preventive.

In conclusion, it may be remarked that the management of bees is like the management of any other business ; it must be watched, and the small details attended to with the greatest care. Where there is failure, it is the result of neglect of these minor matters of detail. If properly pursued, there is no feature of the industry of the farm that is more profitable than bee-keeping ; and this feature may be made ornamental as well as useful, and be a constant source of pleasure no less than of gain.



FIG. 601. — Ambrosial hives.

CHAPTER XXXI.

VALUABLE SECRETS KNOWN TO GOOD COOKS.

“Bad cooking is waste—waste of money and loss of comfort. Whom God has joined in matrimony, ill-cooked joints and ill-boiled potatoes have very often put asunder.” — SMILES.

THERE is no subject of more importance to the family than that of good, healthful cooking. Any one traveling through the country for a short time will notice the prevalence of bad cooking. My own experience of over thirty years on the road made me painfully conscious of this, all the result, of course, of ignorance; and I determined that so far as possible I would make available to farmers' wives generally, instructions from the best known authorities on this subject. With this object, I have made a special effort to get the formulas used by the best practical cooks, which I include as a special chapter in this work.

In the sanitarium where I have been for the past seven years, they give special attention to cooking for health; and their methods of making bread are especially good. I made a special request for the methods used by this sanitarium, particularly for their breads.*

In addition, I give the methods used by other high authorities on general cooking.

There has been a particular effort to have the methods of making different kinds of bread, and of cooking meats, entirely plain, so as to be easily followed by any ordinary cook.

Aiming to give only such formulas as would be desirable and practical for the farmer's family, anything like the extended

* The Sanitarium makes all kinds of health foods and crackers. Full particulars on application. Address, Sanitarium Food Co., Battle Creek, Mich.

rubbish of which the ordinary cook books are made, and which is seldom if ever used by the average farmer's family, is discarded.

The formulas used by the sanitarium are copied from advance sheets of a new work, "Science in the Kitchen," by Mrs. E. E. Kellogg, who is high authority on cooking.

There are next given favorite recipes from "Eating for Strength," by Dr. M. L. Holbrook, the well-known editor of the *Herald of Health*, New York City.

Formulas are given from Marion Harland's new book, "Common Sense in the Household," (Chas. Scribner & Sons, New York.)

There is also included the original formula, never before accessible to the public, for making the famous Centennial Vienna bread, with such other instructions as would be important to house-keepers generally, making this chapter especially valuable.

YEAST AND SANITARIUM BREAD.

The following are two excellent and simple methods of preparing home-made yeast:—

No. 1. — Put a small handful of dried hop blossoms, or an eighth of an ounce of the pressed hops (put up by the Shakers and sold by druggists), into a stew-pan; pour over them a quart of boiling water, and let them simmer about five minutes. Meanwhile stir to a smooth paste in a tin basin or another saucepan, a cup of flour and a little cold water. Line a colander with a thin cloth, and strain the boiling infusion of hops through it on to the paste, stirring continually. Boil this thin starch a few minutes, until it thickens, stirring constantly that no lumps be formed, and that all portions may be of the same consistency. Turn it into a large earthen bowl, add a tablespoonful of salt and two spoonfuls of white sugar, and when it has cooled to blood heat, add a half tea-cup of lively yeast, stirring all well together. Place it in a moderately warm temperature, or cover very closely with several folds of flannel blanket, and leave it to ferment. Examine it every few hours, and as it becomes light, give it a good stirring. Continue to do this for twenty-four hours, when it should be "quiet" enough to cover and put away in a cool place till needed.

No. 2. — Peel four large potatoes, and put them to boil in two quarts of cold water. Tie two handfuls of hops securely in a piece of muslin, and place in the water to boil with the potatoes. When the potatoes are tender, remove them with a perforated skimmer, leaving the water still boiling. Mash them, and work in four tablespoonfuls of flour and two of sugar. Over this mixture pour gradually the boiling hop infusion, stirring constantly that it may form a smooth paste, and set it aside to cool. When lukewarm, add a gill of lively yeast, and proceed as in the preceding recipe.

If started with good yeast, that made by either of the above recipes should keep good for a fortnight in summer, and longer in winter. Compressed yeast, a half cake dissolved in a little warm water, is sometimes recommended for use in starting a new yeast; but we have found in our own experience that yeast thus started does not retain its activity so long as when other yeast is used.

Yeast should always be kept in a clean, tightly-covered jar; glass is best, since it is less porous than stone, and more easily cleansed. The jar should always be cleansed and scalded with scrupulous care every time new yeast is put into it, since even the smallest particle of sour or spoiled yeast will destroy good yeast. Yeast should be kept in a cool place — the cellar or refrigerator is best. Even a half hour in a hot kitchen may spoil it.

The first step in the process of bread-making is the preparation of a “rising,” or “ferment.” For preparing a ferment, scald a quart of whole-wheat flour with an equal quantity of boiling water, pouring the water on very gradually that no lumps be formed. When this has cooled to lukewarm, add a half cup of home-made yeast, or a half cake of compressed yeast dissolved in a little lukewarm water, and leave it to rise. The time required for it to grow light will vary according to the strength of the yeast and the amount of warmth supplied. Great care must be taken to keep it of an equable temperature, not lower than 70° nor higher than 90° F. An occasional chill followed by a warming up process will be quite as depressing to bread as are chills and fever to a person’s health. For this reason the bowl should be wrapped very closely in several folds of woollen blanket, and left in a warm room or placed in a warming oven of equable temperature. The more elevated the temperature between the limits named, the more rapid the fermentation. At a temperature below 30° fermentation will be arrested, and will proceed slowly at 50°. These facts are very important ones for the housewife, since by arranging to

keep her ferment at a temperature of about 50° , she can set her bread in the evening, and find it light and ready for further attention in the morning.

When the ferment is light, which will be shown by its being a mass of white substance like sea-foam, rather than by its having greatly risen, add to it sufficient warm sifted flour to make a very thick batter; and having beaten it well, leave it to rise again. Some cooks recommend adding only small quantities of flour at a time, and allowing the sponge to rise several times, beating it back and adding new flour each time till it becomes thick enough to be molded. Flour should always be warm when added to bread, in order that it may not arrest the fermentation.

When thick batter or sponge is well risen and cracked over the top like "crazed" china, sufficient flour to make it of the proper consistency must be added, and the dough thoroughly kneaded. The exact amount of flour* necessary cannot be stated, since the quantity varies with the quality of the flour; but three quarts of flour to one of wetting will usually be sufficient for the entire process of bread-making. When the dough clings together, and works away from the side of the bowl, enough flour has been added. Bread should always be kneaded as soft as it can be handled, and only sufficient flour added to prevent its sticking to the board. Stiff bread is close in texture, and after a day or two becomes dry and hard. Bread should be kneaded till it works clean of the board. Its elasticity is the surest test of its goodness; and when perfectly developed, it can be molded into any shape, rolled, twisted, or braided with perfect ease. When molded, it should be divided into loaves, and placed in sheet-iron bread pans, — those about twice the size of a brick are the most desirable, — and put in a warm place to rise. It rises much more evenly, and does not have a stiff, dried surface, if covered closely with a blanket to keep it of the necessary temperature, rather than if placed in a warming oven, or some other warm place where it will be exposed to air.

The most important point in the whole preparation of the bread is to decide when it is sufficiently light after having been placed in the pans. The length of time cannot be given, be-

* The Sanitarium Bread is made of Chester Whole Wheat Flour (Address, Chester Whole Wheat Flour, Loekport, N. Y., or Buffalo, N. Y.), two thirds spring wheat and one third winter wheat (graham flour). By whole wheat flour is meant wheat that has the outside ground off or made into pearl wheat, then ground. They use Fleischmann's Compressed Yeast. The author obtained these facts direct from the head baker.

cause it will vary with the temperature, the quality of the flour, and the quantity added during the kneading. At a temperature of 75° , an hour or an hour and a half is about the average length of time. A loaf should nearly double its size after being placed in the pan before being put into the oven, although it is better to begin the baking before it has perfectly risen than to wait until it has become so light as to have begun to fall. Lightness is by no means the only property required in good bread ; and if the fermentation proceeds too far, the sweetness of the grain will be destroyed, and the bread will be tasteless and innutritious.

For the baking of bread the oven should not be too hot. It should be hot enough to arrest fermentation, but not hot enough to brown the crust within ten or fifteen minutes. Though the heat should not be greatest when the bread is first put into the oven, it should increase for the first fifteen minutes. After the bread is half baked, it may gradually decrease during the remainder of the baking. If the heat is too great, the bread will bake on the outside before it has risen properly, and consequently the center will be heavy. Be careful that no draught reaches the bread while baking ; open the oven door very seldom, and not at all for the first ten minutes. From three fourths to an hour is usually a sufficient length of time for an ordinary-sized loaf to bake. The common test for well-baked bread is to tap it on the bottom with the finger ; if it sounds hollow, it is well done. A thoroughly baked loaf, when removed from the pan and lifted in the hand, will not burn it.

When done, remove the loaves from the tins, and tilt them upon their edge so that the air may reach all sides of them and prevent "sweating." When perfectly cold, wrap in a clean, thick cloth, and put into a tin bread-box.

Probably nothing published on the subject of bread-making is more clear, comprehensive, and practical than the following directions, taken from Marion Harland's new work on "*Common Sense in the Household*," published by Charles Scribner's Sons, New York. She says :—

"Chiefest among the conditions to good bread, I place good 'family' flour—dry, elastic, and odorless. Next in importance to the quality of the flour is that of the yeast. This should be light in color and lively, effervescing easily when shaken, and emitting an odor like weak ammonia. If dull or sour, it is bad. In cities it is easiest, perhaps cheapest, to buy yeast from a brewery or bakery, exercising your discrimination as to quality. Unless you can satisfy yourself in this respect, you had better make your own from the following recipe for

HOP YEAST.

“Four large potatoes, or six small.

Two quarts cold water.

Double handful hops, tied in a coarse muslin bag.

Four tablespoonfuls flour.

Two tablespoonfuls white sugar.

Peel the potatoes, and put them, with the hop-bag, into a saucepan containing two quarts cold water. Cover and boil until the potatoes break and fall apart. Take these out with a perforated skimmer, leaving the water still boiling. Mash them fine with a potato-beetle, and work in the flour and sugar. Moisten this gradually with the *boiling* hop tea, stirring it to a smooth paste. When all the tea has been mixed in, set it aside to cool. While still warm, add four tablespoonfuls of lively yeast, and turn all into a large open vessel to “work.” Keep this in a warm place until it ceases to bubble up, or until next day. In summer it will work well in a few hours. When quite light, put into earthen jars with small mouths, in which fit corks, or bottle it, and remove to ice-house or cellar. It will keep good for a fortnight—longer in winter. When you wish to use it for baking, send a small vessel to the cellar for the desired quantity, and recork at once. A half-hour in a hot kitchen may spoil it.

“Having set your sponge over night,—or, if you bake late in the afternoon, early in the morning,—sift dry flour into a deep bread tray, and strew a few spoonfuls of fine salt over it. The question of the quantity of flour is a delicate one, requiring judgment and experience. Various brands of flour are so unequal with respect to the quantity of gluten they contain, that it is impossible to give any invariable rule on this subject. It will be safe, however, to sift two quarts and a pint, if you have set the potato sponge; two quarts for the plain. This will make two good-sized loaves. Make a hole in the middle of the heap, pour in the risen sponge (which should be very light, and seamed in many places on the top), and work down the flour into it with your hands. If too soft, add more flour. If you can mold it at all, it is not too soft. If stiff, rinse out the bowl in which the sponge was set with a little lukewarm water, and work this in. When you have it in manageable shape, begin to knead. Work the mass into a ball—your hands having been well floured from the first; detach it from the tray, and lift it in your left hand, while you sprinkle flour with the right thickly over the bottom and sides of the tray. Toss back the ball into this, and knead hard—*always towards the center of the mass*, which should be repeatedly turned over and around, that every portion may be manipulated. Brisk and long kneading makes the pores fine and regular. Gaping holes of divers sizes are an unerring telltale of a careless cook. Spend at least twenty minutes—half an hour is better—in this kind of useful gymnastics. It is grand exercise for arms and chest. This done, work the dough into a shapely ball in the center of the tray, sprinkle flour over the top; throw a cloth over all, and leave it on the kitchen table to rise, taking care it is not in a draught of cold air. In summer it will rise in four or five hours—in winter, six are often necessary. It should come up steadily until it at least trebles its original bulk, and the floured surface cracks all over. Knead again for ten or fifteen minutes. Then divide it into as many parts as you wish loaves, and put these in well-greased pans for the final rising.

“In a large household baking, it is customary to mold the dough into oblong rolls, three or four, according to the number of loaves you desire.

and to lay these close together in one large pan. The second kneading is done upon a floured board, and should be thorough as the first, the dough being continually shifted and turned. Set the pans in a warm place for an hour longer, with a cloth thrown over them to keep out the air and dust. Then bake, heeding the directions set down in the article upon bread in general. If your ovens are in good condition, one hour should bake the above quantity of bread. But here again experience must be your guide. Note carefully for yourself how long a time is required for your first successful baking, as also how much dry flour you have worked into your sponge, and let these data regulate future action. I have known a variation of two quarts, in a large baking, over the usual measure of flour. I need not tell you that you had better shun a brand that requires such an excessive quantity to bring the dough to the right consistency. It is neither nutritious nor economical. When you make out the loaves, prick the top with a fork.

“Novices in bread-making, and many who should have learned better by long experience, fall into a sad mistake in the consistency of the dough. It should be mixed as soft as it can be handled. Bread will rise sooner and higher, be lighter and more digestible, and keep fresh much longer, if this rule be followed. Stiff bread is close in texture, often waxy to the teeth, and after a day or so becomes very hard. Set the dough to rise in a moderately warm place, and keep it at an even temperature. There is force in the old lament, “My bread took cold last night.” Cold arrests the process of fermentation. There is a chance, should this occur, that a removal to a more genial atmosphere and careful nursing may cure the congestion, should it be only partial. Too much heat carries forward the work too rapidly. In this case, you will find your dough puffy and sour. Correct the latter evil by dissolving a little soda or saleratus in hot water, and working it well in.

“Knead your bread faithfully, and from all sides, until it rebounds like India-rubber after a smart blow of the fist upon the center of the mass. The oven shou’d not be too hot. If you cannot hold your bare arm in it while you count thirty, it is too quick. Keep the heat steady after the bread goes in. Too much fire at first, and rapid cooling, produce the effect upon the bread which is technically called “slack-baked,” *i. e.*, the inside of the loaf is never properly done. Practice and intelligent observation will, in time, make you an adept in the management of your ovens. If the bread rises rapidly while baking, and the crust begins to form before the lower part of the loaf is baked, cover the top with clean paper, until you are ready to brown it.”

Miss Leslie recommends, as soon as the bread is quite done, to wrap each loaf lightly in a clean coarse cloth, damped by sprinkling it with water, and *stand it on its edge*. This will prevent the crust from becoming too hard. Keep the loaves wrapped up after they are deposited in the bread box, which should be of *tin*.

POTATO YEAST.

“Six potatoes, two quarts cold water, four tablespoonfuls of flour, two of white sugar. Peel and boil the potatoes until they break. Leaving the water on the fire, take them out and mash fine with the flour and sugar, wetting gradually with the hot water, until it is all used. When lukewarm, add a gill of good yeast, and set aside in an open vessel and warm place to ferment. When it ceases to effervesce, bottle and set in ice-house. This yeast is very nice and white, and is preferred by many who dislike the bitter taste of hops. It is also convenient to make when hops cannot be obtained.

POTATO BREAD SPONGE.

“Six potatoes, boiled and mashed while hot; six tablespoonfuls baker’s yeast, two of white sugar, two of lard, one teaspoonful soda, one quart of warm (not hot) water, three cups of flour.

Mash the potatoes, and work in the lard and sugar. Stir to a cream, mixing in gradually a quart of the water in which the potatoes were boiled, which should have been poured out to cool down to a blood warmth. *Beat* in the flour, already wet up with a little potato-water to prevent lumping, then the yeast, lastly the soda. Cover lightly, if the weather is warm; more closely in winter; and set to rise over night in a warm place.

BREAD SPONGE (PLAIN).

“One quart of warm water, six tablespoonfuls baker’s yeast, two of lard, two of white sugar, one teaspoonful of soda, and flour to make a soft batter. Melt the lard in the warm water, add the sugar, then the flour by degrees, stirring in smoothly. A quart and a pint of flour will usually be sufficient, if the quality is good. Next comes the yeast, lastly the soda. Beat up hard for several minutes, and set to rise as above. Bread mixed with potato sponge is more nutritious, keeps fresh longer, and is sweeter than that made with the plainer sponge. But there are certain seasons of the year when good *old* potatoes cannot be procured, and new ones will not do for this purpose. The potato sponge is safer, because surer, for beginners in the important art of bread-making. After using it for fifteen years, I regard it as almost infallible—given the conditions of good flour, yeast, kneading, and baking.

DR. HEALD’S FAVORITE BREAD.

Stir the best white wheat meal into cold water, until the batter so formed can no longer be worked with the spoon. Then sprinkle meal upon your bread-board, and knead the dough *thoroughly* for ten, fifteen, or twenty minutes, as you have time, and desire the bread softer or harder. Work in all the meal you can while kneading. The more you knead it and incorporate air with it, the lighter and better it will be. When sufficiently kneaded, roll out with the hands on the board into a cylindrical form two inches in diameter; cut into pieces three inches long, and roll these into rolls a little shorter than your oven grate, and one inch in diameter; place them on the *hot* grate, just from the range or stove, and bake in an oven, not quite so hot as for “gems,” twelve to twenty minutes. *Break* into pieces three inches long for table. We think this the best and sweetest bread that can be made.

THE FAMOUS VIENNA BREAD.

This bread, which was made at Philadelphia during the Centennial Exhibition, had such great demand that it was with great trouble they could supply it. You will find the recipe below, which can be made in *small or large quantities*. I will say for this bread that, without a doubt, it will be the bread of the future, as any baker making it will soon find out by the falling off of the old style of bread. This is not a bread that will

have a run for a short time only, but it will surely be the bread, and the reason why is simply that it is the best, — which the baker will admit, — containing milk instead of water, is more nutritious, whiter and better tasting, which the consumer will find out by eating of it but once. Bread bakers, if your trade is small, and you wish to increase it, then I advise you to try this. It is of no interest to me to speak in this way, but I only speak from experience. In the hotel where I board, the boarders will not eat of any other if this is on the table, and as for myself, I would say the same. The bread is made the same as any other, I mean in the same way; no new process, no new machinery, but in the plain way as other bread, only adding milk instead of water.*

To make one barrel of flour into dough, take one and one half pails of milk (ten-quart pail), one and one half pails of water, and mix one and one quarter pounds compressed yeast, or a necessary quantity of slack yeast (I prefer compressed yeast); set your sponge with the same thickness as any ordinary bread; it will be ready in about three hours. When the sponge is ready, add one more pail of milk and one pail of water, two and one quarter pounds salt to the water, mix in the rest of the flour, and it should be stiffer than bread dough; when it is ready, scale off, and it may be baked in any shape most common, as that of sour bread, long loaves, small at the ends; when putting into the oven, it should be cut with a sharp knife, the same as sour bread; cut deep gashes crosswise of it. You will find this bread to have a nice color, as though it was washed with the yolks of eggs. The quantity of yeast may vary, according to the weather; when very hot, one pound will do, and in winter one and one half pounds may be used. The same with salt; in hot weather use more salt, and in cold a little less. This bread, if made into long round loaves, say about two feet long and six inches in diameter, cuts very well, and makes splendid tongue, ham, or beef sandwiches. The bread made in this way has a crust all around, and it will cut well without the least waste.

NOTE.—The above recipe was obtained from Mr. B. Speidel, 641 Michigan Street, Buffalo, N. Y., who has gained a great reputation in the making of this bread.

BUTTERMILK BREAD.

Put three or four pints of *fresh* buttermilk into a saucepan and boil it. Stir it pretty constantly while it is heating, to keep it from separating into whey and curd. Have a quart of flour sifted into a suitable vessel, pour the boiling buttermilk on to the flour, and scald it thoroughly. Stir until all the flour is mixed, and set to cool. When sufficiently cool, add a teacupful of good yeast, and let it rise over night; in the morning sift and mix into the sponge enough flour to make a *stiff* dough; knead well, and set to rise for two hours, then divide into loaves and knead slightly. At this time use as little flour as possible. Set to rise again, and bake as soon as light enough. Bake in a steady oven three quarters of an hour. This is a good sponge for a dark or runny flour. The bread will be white and moist.

*J. D. Hounihan, author of Hounihan's Baker's Guide, the standard authority among bakers on bread-making.

Graham flour, prepared with scalded buttermilk, mixed a little stiffer than where sweet milk or water is used, is very sweet and good. Do not put soda into the milk or sponge. It will be perfectly sweet when it is baked if the yeast is fresh, and if the whole process is carefully attended to in the right time.

THE \$100 PREMIUM BREAD.

The "unleavened bread" of the Bible; the water biscuit used by pedestrians and pugilists while training. This prize was awarded by the National Health Association. Mix fresh unbolted wheat flour with soft cold water; work it well, and make the dough very stiff; form into loaves; bake in a quick oven; it may be formed into rolls or thin crackers; milk or cream may be used instead of water, if desired.

GRAHAM MUFFINS.

Dissolve a half cake of yeast in a little warm water, scald a quart of milk and pour it into two quarts of Graham flour, stir well, and let it cool sufficiently, then put in the yeast and a spoonful of brown sugar; make a very thick batter, which will heap on the spoon; set to rise over night. In the morning have a good hot oven, butter your rings and the pan well with cold butter, fill the rings two thirds full, let them stand a few minutes in a warm place, then put into a brisk oven and bake half an hour.

WHEAT MEAL UNLEAVENED GEMS.

To one quart of soft, cold water, add, by degrees, three pints of coarsely ground wheat meal. Stir rapidly, with a large spoon, three or four minutes, so as to incorporate a large amount of atmosphere. Dip out into iron baking molds, which have been heated hot and oiled. Bake immediately in an oven as hot as it can be and not burn, for twenty or twenty-five minutes. Diminish the heat after fifteen minutes. Iron molds are better than tin. The small size, about three inches in length, and one and a half in width, is better than the larger sizes. The proportions of water and meal in this formula are for white wheat. For red wheat a little more meal is necessary. One sixth corn meal is an improvement, in which case it needs a heaping measure of meal to the water.

WHEAT MEAL ROLLS.

Pour boiling water on unbolted wheat meal, stirring rapidly with a strong spoon or stick. The dough should be scarcely

stiff enough to retain its shape. Of this take portions about the size of a hen's egg, and roll it into a round form three or four inches in length ; a plenty of dry flour to prevent sticking. Bake at once. The coating of flour also prevents the *escape of air* from the dough, as the sudden heat of baking expands it, thus making the rolls much lighter. Bake in a very hot oven.

BREAKFAST ROLLS.

Sift a pint and a half of good whole-wheat flour into a bowl, and mix with it a cup of rich milk which has been set on ice for half an hour, or made very cool in some other way. Pour the milk into the flour very slowly, a few spoonfuls at a time, mixing it with the flour as fast as poured in, allowing no pools to form to make the dough sticky. A little salt may be added to the milk before mixing it with the flour, if the bread cannot be relished without it. Mix the dough stiff enough so that it will not adhere to the kneading-board, and knead it very thoroughly for at least a half hour, or until it becomes sufficiently elastic to resent a poke of the fist, and readily springs back to its original shape. The dough should be mixed quite stiff ; if too soft, it will be moist and clammy. The amount of flour necessary will vary with the quality, but three times the amount of liquid used will usually be quite sufficient for mixing and dusting the board. When thoroughly kneaded, divide into two pieces, and roll each over and over with the hands, until a long roll is formed of about one inch in diameter ; cut this into two-inch lengths, prick with a fork, and place at once in tins far enough apart so they will not touch each other when baking. Each roll should be as smooth and perfect as possible, and with no dry flour adhering. The rolls must not be allowed to stand after being molded ; but as a tinful is formed, they should be placed at once into the oven, which should be all ready and of the proper temperature. About twenty-five minutes will be required to bake well. When done, spread on the table to cool, but do not pile one on top of another.

Very nice rolls are made in the same manner, using ice-cold water instead of milk. They are more crisp than milk rolls, and are preferred by some. Soft water only should be used in making them, as hard water is apt to make them tough.

BREAKFAST PUFFS, OR GEMS.

To one and a half cups of cold milk, add one well-beaten egg, salt if desired, and two cups of whole-wheat or graham flour, or sufficient to make a batter thick enough not to settle

flat when put into the irons. The lightness of the puffs depends upon the quantity of air incorporated into them; and in order to get in as large an amount as possible, the flour should be added very slowly, only a little at a time, and the mixture beaten very thoroughly and continuously, not by stirring round and round, but by dipping the spoon in and partially lifting it out very swiftly and quickly, making as many bubbles of air as possible. It should take from five to ten minutes' constant beating thus before the last of the flour is added, then the mixture should be turned at once into hot gem-irons, and baked in a quick oven. The beating must be continuous from the beginning in order not to allow any of the air to escape, and the flour should be measured, the egg well beaten, the oven hot, and the gem-irons heating before commencing to put the mixture together. Unless the irons are hot, so much air will escape before they are heated enough to form a crust on the bottom and sides of the cakes that they will not be light, but the irons should not be hot enough to burn the batter.

ANGER'S METHOD OF MAKING GEMS.

The flour is the principal ingredient, and on it depends chiefly the success of the baker; it must necessarily be of the very best kind, made of the best winter wheat, and be possessed of the qualities commonly known as "dry and strong." The treatment varies according to the qualities of the flour. If the flour is of the kind described above, the dough can be baked immediately; but if the flour be moist, the dough must be allowed to stand in a warm place for at least four hours, in order to obtain a palatable article. The German hygienists allow the dough for their unleavened bread to stand six hours, in every case; this is, however, unnecessary, provided the flour is of good quality. The next in order is a good baking oven, one that is capable of baking equally as well from the top as from the bottom; it is difficult to state the exact amount of heating required, as some ovens are more easily heated than others; suffice it to say that a quick oven is necessary, and that the glaring heat, which always accompanies a freshly-heated oven, be allowed to pass away before baking the gems, as they are very apt to blister on the top, especially the water gems. In mixing the dough, take blood-warm milk or water, adding the flour and beating thoroughly for at least five minutes. It is better to retain some of the milk or water one intends to use, making the dough slightly thicker; beat it well, and then add the remaining milk. By this method the dough becomes more thoroughly mixed, and is entirely freed of the small lumps that are so difficult to get rid of. If milk is used, make the dough thick enough so that it can be spooned out comfortably; but for water gems it must be made somewhat thicker.

"The pans used in baking the gems are of oval shape, measuring two and a half by one and a half inches; eight of these unite in making one pan; there are also some pans made of tin, but as the cast iron pan retains the heat longer, it is the best.

"If the dough is ready, and the oven heated, then put some of the pans into the oven, and allow them to become quite hot; take one out, grease it with a clean rag dipped in butter, and drop the dough into the pan with a

large spoon ; return the pan quickly to the oven. If the pan is too hot, so that when greased the butter is burned, allow it to cool before using it, as the gems will be apt to stick to the pan and be burned. After eight or ten minutes they must be looked after, and if they are getting too brown, must be put in a cooler place, and allowed to bake for another ten or fifteen minutes. They ought not to be taken out before they are thoroughly baked, as they will become wet and doughy if taken out too soon, and no amount of after baking can undo this. They may be eaten hot with impunity, a quality not possessed by any other form of bread.

WHOLE-WHEAT MUFFINS.

Dissolve a half cake of compressed yeast in half a pint of milk, and add a sufficient quantity of rich milk to make a pint. Stir into it three cups of whole-wheat flour, and set in a warm place to rise. When light as a foam, stir in two well-beaten eggs, and turn into gem irons or muffin rings, filling them only half full. Let them rise till very light, and bake in a quick oven.

CURRENT MUFFINS.

Prepare the muffins in accordance with the above recipe, and when well risen, add with the eggs two tablespoonfuls sugar and a handful of Zante currants. Turn into the irons to rise, and when light, bake in a quick oven.

ROLLS.

Make a stiff batter with cold water, work in as much flour as will knead well, and then knead for twenty minutes or half an hour. Make into rolls one-half inch to two inches in thickness, and bake in a hot oven on a grate or baking pan dusted with flour, laying them a little distance apart. Excellent rolls may be made by kneading flour into cold graham, cornmeal, or oatmeal pudding.

The rolls now made by the Sanitarium are mixed with cream instead of water, which makes them far better.

FRENCH ROLLS.

Into one pound of flour rub two ounces of butter and the whites of three eggs well-beaten ; add a tablespoonful of good yeast, a little salt, and milk enough to make a stiff dough ; cover and set in a warm place till light ; cut into rolls, dip the edges into melted butter to keep them from sticking together, and bake in a quick oven.

TREMONT HOUSE ROLLS.

Take two quarts of flour, add one teaspoonful salt ; make a hole in the middle, and put into it one tablespoonful of sugar,

butter about the size of an egg, one pint of boiled milk, and one teacupful of yeast. Do not stir, but put them together at night, and set in a cool place till morning. Then mix all together, and knead fifteen minutes. Set in a cool place again for six hours, and roll out about one-half an inch thick, and cut with a biscuit cutter; moisten one edge with butter, and fold together like rolls; lay in the pan so that they will not touch, set for half an hour in a warm place to rise, and bake in a quick oven.

SOUTHERN CORN BREAD.

Take one pint of corn meal, pour half pint boiling water over it, then add a little salt, and with cold water reduce it to the consistency of muffin batter; place in a cool, dry cellar for twenty-four hours to lighten, for if kept in a warm place, it will sour.

Then beat three eggs, melt a piece of butter the size of a walnut, then lard the size of an egg, a cup of sweet cream, then a tablespoonful of flour; grease the pan thoroughly, bake a half hour. White corn is far preferable to yellow, and in the South is expressly cultivated for table use, and ground by water, not by steam power, as the latter mode destroys the sweetness and vitality of the grain.

The same batter may be used in rings, which will give you corn muffins, or on the griddle, which are the genuine corn cookies. This is the best recipe known for corn bread, and next to the old Virginia Corn Pone, stands unrivalled.

VIRGINIA CORN PONE.

Quadruple the quantities above. The material difference is in the baking, as the pone requires a longer time, and then must stand, after baking, *eight to ten* hours in the oven (moderately warm). *Wood embers* and a Dutch oven are requisites to a perfect Virginia pone.

THE FAMOUS ST. CHARLES INDIAN BREAD.

Beat two eggs very light, mix alternately with them one pint of sour milk or buttermilk, one pint of fine Indian meal; melt one tablespoonful of butter, and add to the mixture; dissolve one tablespoonful of soda or saleratus in a small portion of the milk, and add to the mixture; beat all hard, and bake in a quick oven.

VIENNA ROLLS.

Take two ounces compressed yeast, two quarts milk; mix yeast in milk; set sponge as for bread; when the sponge is

ready, add two quarts more milk, one and one half pounds butter, and make the dough; let it get well proof, roll out and cut out with a square cutter; then double one corner over, and roll up loose as you would paper; make the end fast and bend into half-moon shape.

GRAHAM BREAD.

This is only for family use. It is known as dyspepsia bread. Make a sponge at night of one pint warm water, one and one fourth pints white flour, one half pint of yeast, pinch of salt; add in the morning one half pint Indian meal, one half pound white sugar, one teaspoonful soda; dissolve in one half gill boiling water; scald in gradually as much graham flour as you can stir in; put the dough in a pan and let it raise until very light; then bake. This bread will not keep fresh long, but it is very good bread.

BUCKWHEAT CAKES.

Take two quarts water, blood warm, one half pint brewer's yeast, make a thin batter, let them rise as far as they will come, then add three fourths of a teaspoonful of carbonate of soda, dissolved in a little water, then fry them as quick as you like.

PANCAKES.

Add enough flour to one quart of sour milk to make a rather thick batter. Let it stand over night, and in the morning add two wellbeaten eggs, salt, and half a teaspoonful of soda dissolved in one tablespoonful of warm water. Bake immediately.

BUCKWHEAT CAKES.

One quart of buckwheat flour and half a pint of Graham meal. Mix with lukewarm water into a batter; stir in a teacupful of good yeast sponge or a half cent's worth of baker's yeast; mix in an earthen or stone vessel, and set over night in a warm place to rise. If the temperature and yeast have been just right, the batter will be light and sweet, and not need soda. It should be considered a mistake when the ferment needs neutralizing, and care taken to set cooler, or correct the yeast.

GRAHAM GRIDDLE CAKES.

Into one pint of Graham flour and a half pint of Indian meal, mix thoroughly two teaspoonfuls of cream yeast and a half teaspoonful of salt; beat up well one egg, and mix with

one pint cold water, into which mix thoroughly the flour as prepared, and fry at once.

HOW TO BOIL, FRY, ROAST, ETC.

All the essential operations in cookery are comprised in *baking*, *boiling*, *broiling*, *frying*, *roasting*, *stewing*, *simmering*, and *seasoning*; the rest are all fancy, though the French have what they call *braising*, in which they have a fire both above and under the braising-pan; and *sautéing*, which is frying in a very small quantity of butter or fat.

In *baking* meats or fish, it is important not only to keep the bottom of the pan covered with broth or water, but to place a piece of buttered paper over the object in the pan, which keeps the top moist and juicy, and acts as a self-baster. Soyer recommends in using dishes for the oven, if of metal, that they may be made of galvanized iron, and to have separate ones for meat and fish.

In *boiling* meats it is the general practice to put all, whether fresh or salted, into nearly boiling water, and from those that are very salty, careful cooks throw off the first water, and fill up again with boiling water. But the modern theory is that fresh meat, if intended for soup, should be put into cold water, and if not intended for soup, into boiling water; and that salt meat should be put into warm, or, if very salt, into cold water, in order that by its slow cooking the salt may be extracted. After the water has boiled up rapidly, the pot should be drawn back, and its contents allowed to simmer gently. Simmering is simply slow boiling.

Always boil cabbages in two waters, and to prevent the disagreeable odor which arises from boiling cabbages, cut the head in half, and pour boiling water on it before cooking.

In boiling peas and potatoes do not bury them in water, nor allow them to remain in water after they are done.

In *broiling*, it is important to grease the bars of the grid-iron first, and have the fire brisk and clear. A layer of coke or charcoal over a pretty strong fire is a good plan. There is a great difference of opinion among professional cooks, whether in broiling a beefsteak it should be turned only once, or often; but the weight of authority is in favor of frequent turning. Soyer says, "My plan is to turn it often, and my reason is, that, if turned but once, the albumen and fibrine of the meat get charred, and the heat throws out the osmazome, or gravy, on the upper side, which, when turned over, goes into the fire; by turning it often, so as at first only to set the outside,

the gravy goes into the center, and it becomes evenly done throughout. As regards the thickness of the meat to be broiled, that depends on the intensity of the fire (three-quarters of an inch is a good thickness for rump steak), but the quicker the better, and also the sooner it is eaten after taken from the fire the better."

Broiling and roasting are essentially the same, though, properly, roasting is done before the fire, and broiling over the fire.

Frying, as understood by professional cooks, is to immerse the article in boiling grease; in other words, they take a pan, say six inches deep, nearly fill it with fat, and when boiling, insert in this the article to be fried, so that it is completely covered with the fat. "Those articles to be fried," says Soyer, "are generally those that have a coating of materials (such as bread crumbs and batter), which are quickly carbonized, and thus form a crust, which prevents the grease penetrating, concentrates the liquids, and preserves the flavor of the article; the carbonization once effected, the fire should be immediately moderated, particularly if the article is large, in order that the interior may become properly solidified. All articles properly fried are generally much liked, as they are agreeable to the eye, and afford a pleasing variety."

Cooks in this country, however, understand by frying what the French call *sautéing*; that is, cooking an article in a shallow pan, with a small quantity of fat, one side at a time. The secret of doing this well consists in doing it quickly, to keep the gravy and succulence in the meat, which a slow process would nullify, and is of course confined to small articles of food.

It is important in frying that the pan be perfectly clean, that the oil or drippings be sweet and fresh, and that the fat be boiling before the meat or fish is put into it. A good way to test the heat of your fat is to throw a little bit of bread into the pan: if it fries crisp, the fat is of the right heat; if it burns the bread, it is too hot. When the articles are done, care must be taken to drain all the fat from them most thoroughly.

The grand point in frying is to get the boiling fat to *seize the article fried, i. e.*, to form a brown crust all over its surface at the very instant of immersion. The *seizing* cannot take place unless the fat has been over a sharp fire a sufficient time. When once the seizing is properly effected, the pan may be raised or withdrawn a little, to let the article cook

through without burning outside. Articles properly fried are not greasy, while badly fried things are the reverse. A well-fried fish will hardly soil a napkin; potatoes properly fried may be eaten like a biscuit, without soiling the fingers.

Careful cooks save their frying fat and use it repeatedly, keeping that used for meats and fish in separate jars. Economical cooks seldom buy fat; generally there is enough left from skimming broth, sauces, and gravies for every purpose. When they do make it, they use beef suet, the part around the kidneys, or any kind of fat, raw or cooked; chop it fine, boil for fifteen minutes, skim well, strain, and put into stone jars. This fat, for frying, it is claimed, is better than lard, and it does not fly over the pan like lard.

In *roasting* meats, slow roasting, like slow boiling, is the best. The more meat is basted, the less time it will require to roast. When the meat is half done, the fire should be stirred to burn brightly and clearly for browning. Nearly all the writers on cookery think fifteen minutes for each pound is a proper time to allow in roasting, but a great deal depends upon the nature of the fire and the meat. A good cook will be particular to place a pan so as to catch the dripping.

Veal, fowls, and rabbits, when roasted, should always be covered with bacon fat, and then be well floured before putting to the fire; by so doing, all the juices of the meat or poultry are kept in, and it does not become dry. One of the secrets of the excellence of French cookery is to cut up shreds of bacon, and tie them around the article to be roasted.

In *stewing*, it is necessary to have a moderate fire, and as even as possible. A brisk fire causes the steam to evaporate, and this steam is the flavor of the article stewed. Soyer says stewing should be done slowly, the pan partly uncovered and frequently skimmed.

In *seasoning*, the senses of tasting and smelling must be employed, and the art consists in so proportioning the flavors that no one may predominate or be tasted more than another. Consult, in seasoning, the tastes of those for whom you cook rather than your own. Be moderate in the use of salt; for it is easy to add salt to a dish which is too fresh, but if once made too salt, it cannot be remedied.

Beef and mutton are best when rather underdone; but pork, veal, poultry, beef's tongue, tripe, and young meats generally, must be thoroughly well cooked. Vegetables, when not sufficiently cooked, are exceedingly unwholesome and indigestible.

Wash greens carefully, first in warm water, to remove dirt and insects, and then plunge them into cold water, which will immediately restore their crispness.

For all vegetables, have *plenty of boiling water* and salt. Make them boil up *very quickly*. Take all greens out of the water the instant they are done. Mash all vegetables with a wooden spoon.

HOW TO BOIL POTATOES.

To be able to boil a potato perfectly is one of the tests of a good cook, there being nothing in the whole range of vegetables which is apparently so difficult to accomplish. Like the making of good bread, nothing is simpler when once learned. A good boiled potato should be white, mealy, and be served very hot. If the potatoes are old, peel thinly with a sharp knife; cut out all spots, and let them lie in cold water some hours before using. It is more economical to boil before peeling, as the best part of the potato lies next the skin; but most prefer them peeled. Put on in boiling water, allowing a teaspoonful of salt to every quart of water. Medium sized potatoes will boil in half an hour. Let them be as nearly of a size as possible, and, if small and large are cooked at the same time, put on the large ones ten or fifteen minutes before the small. When done, pour off every drop of water; cover with a clean towel, and set on the back of the range to dry for a few minutes before serving. The poorest potato can be made tolerable by this treatment. Never let them wait for other things, but time the preparation of dinner so that they will be ready at the moment needed. New potatoes require no peeling, but should merely be well washed and rubbed.

IRISH METHOD OF BOILING POTATOES.

An English attorney used to say that a woman who could boil potatoes and melt butter *well* was a good cook, and he never required any other proof of the capabilities of a cook.

The Irish, with whom potatoes are the national diet, may reasonably be supposed to know the best method of cooking them. This is their process:—

The potatoes, after being washed, are put into a cast-iron pot of cold water, slightly salted, which is placed on the fire. When the water boils, a small quantity of cold water is added to check the boiling; this is once or twice repeated. When the potatoes are done, or nearly done, the water is poured away from the potatoes, which are subjected to the

fire to let the steam evaporate and make them mealy. They are served up in the usual way. During the meal only a portion of the potatoes are put on the table at a time, and before it is finished, you will have two or three supplies of hot potatoes, the last being better than the first, for those at the bottom of the pot become partially roasted.

Potatoes should be boiled with just enough water to cover them. Old potatoes are best steamed ; new ones boiled.

BAKED POTATOES.

Potatoes are either baked in their jackets, or peeled ; in either case they should not be exposed to a fierce heat, which is wasteful, inasmuch as thereby a great deal of the vegetable is scorched and rendered uneatable. They should be frequently turned while being baked, and kept from touching each other in the oven or dish. When done in their skins, be particular to wash and brush them before baking them. If convenient, they may be baked in wood-ashes, or in a Dutch oven in front of the fire ; serve them in a damask napkin. When pared, they should be baked in a dish, and fat of some kind added to prevent their outsides from becoming burnt ; they are ordinarily baked thus as an accessory to baked meat.

BAKED POTATOES IN HASTE.

Well wash some medium-sized potatoes, but do not peel them ; put them into plenty of boiling water, boil them quickly for a quarter of an hour, drain them, and put them into a pretty hot oven till their skins are perfectly well browned ; if the oven be of the right heat, five minutes' baking will be enough ; press them a little so as to make them as mealy as possible inside, envelop them in a damask napkin, and serve hot. When baked potatoes are ordered upon a short notice for supper, this expeditious manner of doing them may be resorted to, and the result be a dish of potatoes dressed in one third of the time required in the usual way.

HOW TO COOK PORK AND BEANS.

Pork and beans have long been a favorite article of food in New England. This dish is made, according to Professor Blot, as follows :—

Soak a quart of beans, if old, for twenty-four hours in cold water, then boil gently till tender. Never put any salt to boil dry beans, but as soon as boiled tender, drain them. Cut in

dice about half a pound of bacon, and put it into a saucepan on the fire ; when about half fried, add the beans, mix and stir for one minute, then put into a warm oven for twenty minutes, stirring occasionally ; when done, sprinkle over it some parsley chopped fine, pepper and salt to taste if not salt enough.

Another Method. — Two quarts of middling-sized white beans, two pounds of salt pork, and one spoonful of molasses. Pick the beans over carefully, wash, and add a gallon of boiling hot soft water ; let them soak in it over night. In the morning put them into fresh water, and boil them gently till the skin is very tender and about to break. Take up dry and put them into your dish ; stir in your molasses, gash the pork, and put it down into the dish, so as to have the beans cover all but the upper surface ; turn in boiling water till the top is just covered ; bake with a steady fire four or five hours. Watch them, and add more water from time to time as it dries away. The molasses may be omitted.

HOW TO FRY HAM AND EGGS.

Cut thin slices, and take off the rind ; if very salt, pour hot water upon them, but do not suffer them to lie long in it, as the juices of the meat will be lost. Wipe them in a cloth ; have the spider ready hot, lay in the pieces, and turn them in a minute or two. They will cook in a very short time. The secret of having good fried ham is in cooking it quick, and not too much. The practice of cutting thick slices, and laying them in a cold spider and frying a long time, makes ham black and hard. It needs nothing added, but to be laid upon a hot covered dish.

OMELETTE.

Six eggs, one tablespoonful of flour, one cup of milk, a pinch of salt ; beat the whites and yolks separately ; mix the flour, milk, and salt, add the yolks, then add beaten whites. Have a buttered spider very hot ; put in. Bake in a quick oven five minutes.

HOW TO BOIL EGGS.

The ordinary way is to put them into a cup or saucepan of boiling water and boil steadily for three minutes, if you want them soft, and ten, if hard. But gourmands like them best if put into *cold* water, and left until it comes to a boil, which will be in about ten minutes. The inside, both white and yolk, will then be of the consistency of custard.

Always drop hard-boiled eggs into cold water as soon as they are done, to prevent the yolks from turning black.

FRIED RASHERS OF BACON AND POACHED EGGS.

Cut the bacon into thin slices ; trim and cut off the rind. Put it into a *cold* frying-pan — that is to say, do not place the pan on the fire before the bacon is in it. Turn it two or three times, and dish it on a very hot dish. Poach the eggs, and slip them on to the bacon without breaking the yolks, and serve quickly. Time, three or four minutes. Allow six eggs for three persons.

BEEF STEW.

Take a pound and a half of nice beef, and cut it into small pieces. Place in the bottom of your saucepan a layer of sliced potatoes, a few slices of onion, a pinch of pepper, one of salt ; then a layer of meat, another layer of potatoes, onions, salt, and pepper, with a layer of meat, and continue in this way till you have disposed of all your meat ; let the top layer be of potatoes, onions, and seasoning. Cover all with water, and let it stew for an hour and a half.

CHICKEN PIE.

Cut the chicken in pieces, and parboil for three quarters of an hour. Remove the chicken, and add to the water in which it is boiled a little salt, pepper, and a teacup of milk thickened with a tablespoonful of flour. Line a deep dish with nice paste, put in the chicken, and turn over it the gravy which you have prepared. Cover it with paste immediately, make a small hole in the center, ornament with strips of paste, and bake for forty-five minutes.

SOYER'S RECIPE FOR GOOSE STUFFING.

Take four apples, peeled and cored, four onions, four leaves of sage, and four leaves of lemon thyme not broken, and boil them in a stewpan with sufficient water to cover them ; when done, pulp them through a sieve, removing the sage and thyme ; then add sufficient pulp of mealy potatoes to cause it to be sufficiently dry without sticking to the hand ; add pepper and salt, and stuff the bird.

A FARMER'S DAINTY DISH.

Peel and slice thin potatoes and onions (five potatoes to one small onion), take half a pound of sweet salt pork in thin slices to a pound of beef, mutton, or veal ; cut the meat in small pieces, take some nice bread dough and shorten a little, and line the bottom of the stewpan with slices of pork, then a layer

of meat, potatoes, and onions, dust over a little pepper, and cover with a layer of crust ; repeat this until the stewpot is full — the size of the pot will depend on the number in the family ; pour in sufficient water to cover, finish with crust. Let it simmer till meat, vegetables, etc., are done, but do not let it boil hard. Serve hot. This, we are assured by one who knows, is a dish fit to set before a king, or his peer — a farmer.

GREEN CORN FRITTERS OR CAKES.

Grate green corn from the cob, and allow an egg and a half for every cupful, with a tablespoonful of milk or cream ; beat the eggs well, add the corn by degrees, beating very hard, salt to taste, put a tablespoonful of melted butter to every pint of corn, stir in the milk, and thicken with just enough flour to hold them together — say a tablespoonful for every two eggs. You may fry in hot lard, as you would fritters, or cook upon a griddle, like batter cakes. Eaten at dinner or breakfast, these always meet with a cordial welcome.

A CLAM-CHOWDER.

Clam-chowder is made in a hundred different ways, but it is generally admitted that the boatmen on the Harlem River make the best : —

Put into a pot some small slices of fat salt pork, enough to line the bottom of it ; on that a layer of potatoes, cut in small pieces ; on the potatoes a layer of chopped onions ; on the onions a layer of tomatoes in slices, or canned tomatoes ; on these a layer of clams, whole or chopped (they are generally chopped), then a layer of crackers. Season with salt and pepper, and other spices if desired. Then repeat this process, layer after layer, in above order, seasoning each, until the pot is nearly full. When the whole is in, cover with water, set on a slow fire, and when nearly done, stir gently, finish cooking, and serve.

When done, if found too thin, boil a little longer ; if found too thick, add a little water, give one boil, and serve.

Fish-chowder is made exactly as clam-chowder, using fish instead of clams.

CLAM-BAKE.

The experienced Harlem River clam-baker, Tom Riley, is the authority for the following recipe : —

Lay the clams on a *rock*, edge downward, and forming a circle ; cover them with fine brush ; cover the brush with dry

sage ; cover the sage with larger brush ; set the whole on fire, and when a little more than half burnt (brush and sage), look at the clams by pulling some out, and if done enough, brush off the fire, cinders, etc. ; mix some tomato or cauliflower sauce or catsup with the clams, minus their shells ; add butter and spices to taste, and serve.

Done in sand, the clams, on opening, naturally allow the sand to get in, and it is anything but pleasant for the teeth while eating them.

TO COOK ONIONS WITHOUT SMELL.

Select those that are alike in size and not very large. Boil half an hour, and pour off the water. The offensive oil is thus liberated by the heat, and most of it goes with the water. Now make a dressing by adding a lump of butter the size of an egg to a pint of milk ; put in a little chopped parsley and a bit of mace. When it boils, put in the onions, and let them steam slowly until done. When you take them up, open the top of each, and drop in a small lump of butter ; eat while warm, and you need have no misgivings about your breath ; for thus dressed, they are as mild as baked apples, and far more nutritious.

MRS. LYMAN'S METHOD OF COOKING SALT MACKEREL.

Soak for two days, after coming out of the brine, in cold water. Lay in a small tub, *with the flesh side down*, and change the water several times. Just before cooking, lay it in a shallow vessel, and cover with hot milk. The effect of the milk is to remove the strong taste so unpleasant when this dish is carelessly cooked. Take out of the milk, pour water over it to rinse, and wipe dry with a napkin. Then lay in a wire gridiron and broil in the same manner as fresh shad or fresh mackerel, and eat with lemon juice for sauce.

HOW TO PRESERVE FRUITS AND VEGETABLES.

Potatoes should be put into the cellar or a cool, dark place as soon as they are dug. They are injured by being exposed to the sun or air or frost. Some housekeepers keep them in barrels, and have sods laid over them. Others lay them in heaps in the cellar, and cover them with mats, or bury them in sand or earth. Others, again, dip them for a minute or two into boiling water, and after they are dried, put them into sacks. This is to destroy the germs, and is a valuable discovery. To

prevent them from sprouting in the spring, turn them out on the cellar floor. To thaw frozen potatoes, put them into *hot* water.

Cabbages may be kept by burying them in sand, with the roots upward. But the best way to keep them through a severe winter is to leave about ten inches of the stem attached to them, and scoop out the pith to the extent of an inch. Suspend the cabbages by means of a cord tied around the stem, so that the portion from which the pith was taken remains uppermost, which regularly fill every morning with fresh water.

Celery should be buried in sand, and *turnips* and *beets* should be put in a dry part of the cellar.

Apples should remain out-of-doors, in barrels, until the weather becomes cold. They should not be headed up immediately after having been gathered, as a moisture accumulates upon them, which causes decay. When brought in, set them in a back room until the weather requires that they shall be put into the cellar. A linen cloth laid over them will suffice until very cold weather. Many good housekeepers prefer not to have apples headed up at all. There is an advantage in being able to pick them over several times during the winter, as one decayed apple may injure all its neighbors. If they are moist, wipe them. If frosted, put them into *cold* water.

Onions keep best spread out over the floor.

Parsnips should be buried in a pit in the garden, and in very cold climates not opened until March or April.

Squashes should be kept in a dry place, and as cold as may be without freezing.

Herbs should be gathered on a dry day, and when they are just beginning to bloom, as they are then in their perfection.

Medicinal herbs should be dried, put up in paper bags, and labelled. The leaves of those used in cooking should be pounded, sifted, and put into labelled boxes or stoppered bottles.

Herbs retain their virtue best if dried by artificial heat. The warmth of an oven, a few hours after the bread has been taken out of it, is sufficient.

TO NEUTRALIZE THE ACID IN FRUITS.

A large quantity of the free acid which exists in rhubarb, gooseberries, currants, and other fruits, may be judiciously corrected by the use of a small quantity of *carbonate of soda*, without the least affecting their flavor. To an ordinary-sized pie or pudding take as much soda as, piled up, will cover

a shilling, or even twice such quantity, if the fruit be very sour. If this little hint is attended to, many a stomach-ache will be prevented, and a vast quantity of sugar saved, because, when the acid is neutralized by the soda, it will not require so much sugar to render the pie sweet.

AN IMPROVED APPLE SAUCE.

Take sweet cider, as soon as it comes from the press, boil it down nearly one half, then pare and quarter as many of the best sour apples as you wish to "do up," cover them with the cider when boiling hot, and cook until well done, but not so as to lose their shape. Most of the cider will be absorbed by the apples; what remains can be bottled for future use. When done, put into jars, and cover or cement. This makes not only a most delicious sauce, but it is also very healthful, as all the nourishment of the apples from which the cider is made is retained, while we lose the sharp, biting taste of the old *apple butter* made from boiled cider.

APPLE SAUCE.

Pare, core, and cut up a quart of apples; add half a cup of water, boil them till tender, then add sugar and nutmeg to taste.

PUDDINGS.

For boiled puddings a regular pudding-boiler, holding from three pints to two quarts, is best, a tin pail with a very tight-fitting cover answering instead, though not as good. For large dumplings a thick pudding-cloth—the best being of Canton flannel, used with the nap-side out—should be dipped into hot water, and rung out, dredged evenly and thickly with flour, and laid over a large bowl. From half to three-quarters of a yard square is a good size. In filling this, pile the fruit or berries on the rolled-out crust, which has been laid in the middle of the cloth, and gather the edges of the paste evenly over it. Then gather the cloth up, leaving room for the dumpling to swell, and tie very tightly. In turning out, lift to a dish; press all the water from the ends of the cloth; untie and turn away from the pudding, and lay a hot dish upon it, turning over the pudding into it, and serving at once, as it darkens or falls by standing.

In using a boiler, butter well, and fill only two thirds full that the mixture may have room to swell. Set it in boiling water, and see that it is kept at the same height, about an inch from the top. Cover the outer kettle that the steam may be

kept in. Small dumplings, with a single apple or peach in each, can be cooked in a steamer. Puddings are not only much more wholesome, but less expensive than pies

APPLE DUMPLINGS.

Make a crust, as for biscuit, or a potato-crust, as follows : Three large potatoes, boiled and mashed while hot. Add to them two cupfuls of sifted flour and one teaspoonful of salt, and mix thoroughly. Now chop or cut into it one small cupful of butter, and mix into a paste with about a teacupful of cold water. Dredge the board thick with flour, and roll out, thick in the middle, and thin at the edges. Fill, as directed, with apples pared and quartered, eight or ten good-sized ones being enough for this amount of crust. Boil for three hours. Turn out as directed, and eat with butter and syrup or with made sauce. Peaches pared and halved, or canned ones drained from the syrup, can be used. In this case, prepare the syrup for sauce. Blueberries are excellent in the same way.

A RECIPE FOR INDIAN PUDDING.

Three and a half pounds of corn (Indian) meal and a handful of salt, one teaspoonful or not, we would prefer not, of carbonate of soda. Mix well, and pour over it a sufficient amount of *boiling* water to soften the whole, then pour on a quart of cold water ; sprinkle over it three quarters of a pound of dry flour, and stir it well. Divide into five puddings ; put each into a floured cloth, tie tight, put in boiling water, and boil three hours ; eat it hot, or cold, or fried. It is said that this will give a family of twelve persons two hearty meals, at a cost of twenty-five cents. It is eaten with syrup.

BOILED RICE.

No. 1. — Select good, plump, unbroken grains ; after washing, pour into about eight parts of water. Let it boil rapidly until the kernels are thoroughly softened. Then strain off the water through a colander. This is the method commonly employed in India, where this article of food is called *bhat*. The water may be saved, and used for all purposes for which rice water is serviceable.

No. 2. — Some recommend soaking the rice an hour or two in cold water before boiling. Then boil twenty minutes, stirring very little ; and afterward place it where it will simmer for a half hour longer. When this method is followed, as lit-

the water as possible should be employed, so that the rice may merely steam at the last.

Raisins previously soaked in cold water for several hours are a great addition to boiled rice.

TO MAKE A RICE PUDDING WITHOUT EGGS.

Wash a half pound of rice, and put it into a broad, shallow tin pan holding four quarts, with a large teacupful of sugar and a half teaspoonful of salt. Fill the pan up with milk, fresh from the cow is best, and set in the oven or stove to bake, stirring it occasionally, and trying the rice. When the latter is soft, and begins to thicken the milk, the pudding is done. If it boils too long, or there is too much rice in it, it will be too thick to be good.

FARMER'S RICE.

Take a quart of milk, and put it on to boil in a pot of sufficient size. Mix two eggs thoroughly in a pint of flour, and when the milk has begun to boil, sprinkle this into the milk, and stir constantly. When well boiled, transfer to a deep dish, and make it very sweet with brown sugar. Grate some nutmeg over the surface.

OATMEAL.

Take one part rolled oatmeal and three parts water; set inside a double boiler, and let boil from three to four hours. At the Sanitarium, oatmeal is usually allowed to cook all night.*

CRACKED WHEAT.

For a quart of the cracked grain have two quarts of water boiling in a smooth iron pot over a quick fire; stir in the wheat slowly; boil fast and stir constantly for the first half hour of cooking, or until it begins to thicken and "pop up;" then lift from the *quick* fire, and place the pot where the wheat will cook slowly for an hour longer. Keep it covered closely, stir now and then, and be careful not to let it burn at the bottom.

POVERTY PUDDING.

Soak your bread in milk the night before using; when ready, butter your pudding dish, and place in a layer of the bread. Have a dozen apples pared and sliced, and place a

* By far the best oatmeal for table use is made by a new process of rolling or crushing, manufactured by the Shumacher Milling Co., Akron, O.

layer of apples on the bread, another layer of bread, then of apples, and so on, till your dish is filled ; let the last layer be bread, and bake it an hour. To be eaten with sauce.

BAKED APPLE PUDDING.

Six apples well stewed, quarter of a pound of butter, half of it stirred into the apple while hot, and sugar to your taste. When cold, add six eggs, well beaten, to the apple.

Pound and sift six crackers, butter your dish, and put in a layer of cracker, and a layer of your prepared apple, and thus until you have filled your dish ; let the cracker be the upper layer, and put the remainder of your butter in small bits upon it. Bake in two shallow dishes for half an hour.

MRS. KNIGHT'S BAKED INDIAN PUDDING.

Place a quart of milk to boil, butter a deep earthen dish, and on the bottom place a teaspoonful of salt. Have your meal ready sifted, and when your milk boils, turn it into the dish, and stir one way, as fast as possible, a large cup of meal into it, then add a tablespoonful of butter, one of cinnamon, a cup of molasses, and after stirring well, let it stand till perfectly cold. When you place it in the oven, turn a half pint of milk on the top of the pudding without stirring it, and let it bake three or four hours, moderate fire. It should be taken from the oven two hours before it is used, that the whey may cool, which makes a most delicious jelly. It is best to be made over night, and put into the oven the first thing in the morning.

TAPIOCA PUDDING.

To one quart of milk add eight tablespoonfuls of tapioca ; place it in a deep dish or pail, and set it in a kettle of boiling water till it thickens ; then stir in two tablespoonfuls of butter till it has melted, and put the whole to cool. When cool enough, add four eggs, a little cinnamon, four tablespoonfuls of sugar, white, and a glass of wine. Turn the whole into a pudding dish that has a lining of pastry, and bake immediately.

MRS. EATON'S APPLE PUDDING.

Pare and chop fine some of the best cooking apples ; butter a pudding dish, cover the bottom and sides half an inch thick with grated bread and small lumps of butter, then add a layer of apple, with sugar sprinkled and nutmeg grated over, another layer of crumbs and butter, and a layer of apples, until the

dish is filled, and pour over the whole a cup of milk, and bake it. Eaten with sauce.

BREAD PUDDING.

To one loaf of bread, well grated, pour two quarts of boiled milk or cream ; four eggs ; a quarter of a pound of white sugar ; flavor to the taste (mace is a very good flavor), and bake an hour. If the boiled milk is poured upon pieces of stale bread and left standing two hours, they can be mashed and freed from lumps with the hand before putting in the eggs. Dried currants, that have been well washed and swelled in lukewarm water, or raisins, will be a good addition to this pudding. If made with crackers, it will be still more delicate. Cold sauce may be eaten with it, or fruit sauce, if no fruit is put into the pudding.

GRAHAM BIRD'S-NEST PUDDING.

Is made by laying in a deep dish nice quartered apples, and pouring over them a thin batter made of flour ; one tea-cup of sour milk, and about one third of a teaspoonful of soda. Bake in a moderate oven till the apples are thoroughly cooked.

DELMONICO PUDDING.

Three tablespoonfuls cornstarch ; one quart boiling milk ; three eggs, whites and yolks separated. Mix yolks with cornstarch and add milk gradually. Let it boil. Beat whites to stiff froth, sweeten. Put cornstarch into pudding-dish, cover with frosting and set into an oven to brown. To be eaten cold.

SAGO PUDDING.

One dozen tart apples ; one and a half cups of sago ; soak the sago till soft ; peel and core the apples, and place in a dish ; fill the apples with sugar ; pour the sago over, and bake till the apples are cooked.

INDIAN PUDDING.

Two tea-cups of cornmeal ; half a cup of superfine flour ; one cup of syrup ; half a teaspoonful of salt. Scald three quarts of milk, and stir into the above. Let it stand half an hour—stir it again. Bake quickly until it boils, then slowly about two hours. *Extra good.*

GREEN CORN PUDDING.

A most delicious accompaniment to a meat course. Take one quart of milk, five eggs, two tablespoonfuls melted butter,

one tablespoonful white sugar, and a dozen large ears green corn; grate the corn from the cob; beat the whites and the yolks of the eggs separately; put the corn and yolks together, stir hard and add the butter, then the milk gradually, beating all the while, next the sugar, and a little salt, lastly the whites. Bake slowly at first, covering the dish for an hour; remove the cover, and brown nicely.

APPLE PUDDING.

A loaf of stale bread, steamed twenty minutes before dinner, sliced, spread with stewed apple and a little butter, strewn with sugar and browned lightly in a quick oven, makes as good a pudding as any one would like, with either hard or liquid sauce.

APPLE DUMPLINGS.

No. 1. — Make a crust of graham flour and cornmeal, two parts of the former to one part of the latter. Roll one fourth of an inch thick. Select, and pare and core without dividing, a number of nice, ripe, sub-acid apples. Fill the center with chopped dates or raisins, and envelop in the crust. Bake until both fruit and crust are well cooked. They require a quick oven at first, but the heat should be moderated after the crust is browned.

No. 2. — Make a batter as for gems, and with it cover the bottom of a patty pan to the depth of a quarter of an inch or a little more. Lay in half of a ripe, sub-acid apple which has been previously pared and cored. Cover with batter, and bake as directed in the preceding recipe.

THE QUEEN OF PUDDINGS.

One and a half cups of white sugar, two cups fine dry bread-crumbs, five eggs, one tablespoonful of butter, vanilla, rose-water, or lemon flavoring, one quart fresh rich milk, and one half cup jelly or jam.

Rub the butter into a cup of sugar, beat the yolks very light, and stir these together to a cream. The bread-crumbs, soaked in milk, come next, then the flavoring. Bake in a buttered pudding dish — a large one and but two thirds full — until the custard is “set.” Draw to the mouth of the oven, spread over with jam or other nice fruit conserve. Cover this with a meringue made of the whipped whites and half a cup of sugar. Shut the oven, and bake until the meringue begins to color. Eat cold, with cream. You may, in strawberry

season, substitute the fresh fruit for preserves. It is then truly delightful.

AN ELEGANT BREAD PUDDING.

Take light white bread, and cut it in thin slices. Put into a pudding mold a layer of any sort of preserve, then a slice of bread, and repeat until the mold is almost full. Pour over all a pint of warm milk in which four beaten eggs have been mixed; cover the mold with a piece of linen, place it in a saucepan with a little boiling water, let it boil twenty minutes, and serve with pudding sauce.

PASTE FOR PIES.

Sift together equal parts of graham grits and white flour (graham flour will do if the grits are not obtainable, but the grits will produce a more crisp and tender crust), and wet with *very cold*, thin sweet cream or rich milk. Have the cream and flour both as cold as possible,—the colder the material the more crisp the paste,—and mix together very quickly and lightly into a stiff dough. Do not knead at all, but gather the fragments lightly together, roll out at once, fill and bake as quickly as possible, since much of the lightness of the crust depends upon the dispatch with which the pie is gotten into the oven after the materials for the crust are thrown together. The filling should always be in readiness before beginning the preparation of the crust. If for any reason it is necessary to defer the baking after the crust is made, place it at once in the ice chest till needed.

PIE FOR DYSPEPTICS.

Four tablespoonfuls of oatmeal, one pint of water; let stand a few hours, or till the meal is well swelled. Then add two large apples, pared and sliced, a little salt, one cup of sugar, one tablespoonful of flour. Mix all well together and bake in a buttered pie-dish; and you have a most delicious pie, which may be eaten with safety by the sick or well.

PUMPKIN OR SQUASH PIE.

Cut the pumpkin into small pieces; take out the seeds and inside, but do not pare it. It must be a well-grown and thoroughly ripened pumpkin, and not watery. Put the pieces into a sauce-pan with only a few spoonfuls of water, not more than four; cover close and let it cook gently so as not to scorch, until the water has all evaporated, and the pumpkin has cooked

quite dry, and of a rich, dark, orange color. While hot, sift it through a coarse sieve. Season only as much as you are needing for the day. For one large pie, one egg, one tablespoonful of molasses, four tablespoonfuls of condensed milk, or enough of new milk to make it as thin as you wish; or, if you have it, half milk and half cream, instead of condensed milk. Sugar to suit the taste.

APPLE PIE (VERY NICE).

Stew a dozen good-sized greenings; when done, add a tablespoonful of butter, a cup of white sugar (more if you like them sweet), half a glass of rose water, and a grated nutmeg. Make and bake your paste as for cream pie, and fill with apple instead of cream.

THE NICEST PIE EVER EATEN.

Peel sour apples, and stew until soft and not much water left in them, then rub them through a colander; beat three eggs for each pie to be baked, and put in at the rate of one cup of butter and one of sugar for three pies; flavor with nutmeg. Bake as pumpkin pies, which they resemble.

STRAWBERRY SHORT-CAKE.

Rub into a pint and a half of prepared flour one teacup of butter; beat one egg very light; add milk to make a soft dough; divide into three parts; roll out lightly, lay one portion on a pie plate or tin, sprinkle a little flour on the top, then add the second cake, a little flour on the top of that, and cover with the third. Bake quickly, but not too brown. Let the berries stand with sugar sprinkled over them till the cake is baked, then pull the thin portions of cake apart; spread half of the berries over the bottom cake, adding more sugar and a little butter; lay the second over them, and put on the remainder of the berries, with more sugar and butter, placing the top cake over all. Put it into the oven for a few minutes to heat through, and send to the table.

STRAWBERRY SHORT-CAKE.

Take five pounds flour, two and one half pounds butter, three pints cream or milk; cream is best; add three ounces baking powder; roll about one half inch thick, and bake; when baked, cut in any shape desired; then split open, have the strawberries prepared with plenty of sugar and cream on, and fill the cake between the slices as thick as desired.

A very rich and fine strawberry short-cake may be made by using the following and the above. Put on your strawberries and sugar, then put on a thin sheet of sponge cake; then on that put a layer of strawberries and sprinkle sugar on them, cover over with a batter of snow-ball, spread nice; set in a cold oven to let the snow-ball batter get a little hard.

POOR MAN'S POUND CAKE.

Two cups of bread dough, one cup of sugar, one cup of butter, one egg, a teaspoonful of pearlash, with rose-water according to taste.

GINGER POUND CAKE.

One pint molasses, one half pound lard, one ounce soda, one half pound sugar, one half pint water, six eggs, one fourth ounce ginger, one sixth ounce cloves, two pounds and six ounces flour; this makes a very fine small cake.

SOFT GINGERBREAD.

One quart molasses, one pound sugar, brown; eight eggs, two ounces soda, one quart water; put soda in water; one half ounce ginger, one ounce allspice, five pounds flour. Put paper on a pan, and put this in the pan even all over.

POUND CAKE NO. 1.

The finest pound cake is made as follows: One pound butter (don't have it too soft); one pound sugar; rub light, adding ten eggs, two at a time; then you must have it very light, which cannot be done unless you rub it well; the longer you rub it, is not the best; it must be worked light. While working in summer, it is best to mix it in some large tin pan; set on some broken ice; when done, add one half teaspoonful ground mace and one pound flour. This is the best recipe for pound cake known; but it can be spoiled by not rubbing light.

DELICATE CAKE.

Beat together the yolk of one egg, one cup of sugar, and one cup of thin sweet cream, until all of a foam; add a little grated lemon rind for flavoring; stir in slowly, beating briskly all the time, two cups of gluten flour. This cake contains no soda or baking powder, and to make it light it requires the incorporation of as much air as possible. In order to do this, the beating must be continuous (any cessation will be likely to

spoil the cake), not stirring round and round, but lifting the spoon in and out swiftly so as to make as many bubbles of air as possible. When all the flour is added, add lastly the well-beaten whites of two eggs, stirring only just sufficiently to mix them thoroughly through the whole, no more; turn at once into small sheet-iron tins, which have been previously oiled and warmed, and bake in a moderately quick oven. This cake, if made according to directions, will be very light and delicate. It will not puff up much above its first proportions, but will be light throughout.

A nice cake may be prepared in the same manner with common graham or even white flour, by the addition of a heaping tablespoonful of corn-starch sifted into the flour in the way in which baking-powder is ordinarily mixed with flour before using. This may be baked in a loaf, but is best baked in hot gem irons.

RAISED JELLY CAKE.

Warm a cup of thin cream to blood heat; add one and a half cups of flour, a little salt if desired, one fourth of a cup of sugar, and one half a small cake of compressed yeast dissolved in a gill of thin cream, or a gill of liquid yeast. Set in a warm place, and let it rise till perfectly light. When well risen, add one half cup of sugar, mixed with one half cup of warm flour. Beat well, and set in a warm place to rise again. When risen a second time, add two eggs, whites and yolks beaten separately, and about one tablespoonful of flour. Turn the whole into three round baking tins which have been previously oiled and warmed, and placed where it will rise again for an hour, or until it is all of a foam. Bake quickly in a moderately hot oven. Spread with fruit jelly.

This cake may be varied in innumerable ways. A gold and silver cake may be made of it by taking out one third of it when risen the second time, adding the yolks of the eggs to the one third, and the whites with some pulverized cocoanut to the other two thirds. Make two sheets of the white and one of the yellow. Allow them to become perfectly light before baking.

When baked, place the yellow portion between the two white sheets, binding them together with a little frosting. This cake may be varied also by adding a half cup of Zante currants to the yellow portion, with the yolks of the eggs.

COFFEE.

Grind moderately fine a large cup of coffee; break into it one egg with shell; mix well, adding just enough cold water to

thoroughly wet the grounds; upon this pour one pint boiling water; let it boil slowly for ten or fifteen minutes, and then stand three minutes to settle; pour through a fine wire sieve into coffee-pot, which should be first rinsed with hot water. Coffee should be served as soon as made. At table, first rinse the cup with hot water, put in the sugar, then fill half full of hot milk, add your coffee, and you have a delicious beverage that will be a revelation to many poor mortals who have an indistinct remembrance of and an intense longing for an ideal cup of coffee. If you have cream, so much the better; and in that case, boiling water can be added either in the pot or cup to make up for the space occupied by milk, as above; or condensed milk will be found a good substitute for cream.

HYGIENIC COFFEE.

What is called hygienic coffee may be made from rye, corn, sweet potatoes, peas, beans, etc. It may be made by roasting these articles and treating them in about the same way that coffee is treated. As an occasional drink they are wholesome, and if well made, an agreeable beverage.

NOVEL MODE OF MAKING COFFEE.

Soyer strongly advises his readers to give a trial to coffee made in this way:—

Put two ounces of ground coffee into a stewpan, which set upon the fire, stirring the powder round with a spoon until quite hot, when pour over a pint of boiling water; cover over closely for five minutes, when strain it through a cloth, rinse out the stewpan, pour the coffee, which will be quite clear, back into it, place it on the fire, and when nearly boiling, serve with hot milk.

It is well known that the Turks excel in making coffee. They never grind the berry, but beat or crush it with wooden pestles in mortars. When the pestles have been long used, they become precious, and are sold at high prices.

Brillat Savarin says he determined to examine and test the question whether grinding or beating in a mortar produced the best coffee; and having taken equal weights of each, and treated them precisely alike, he found that the coffee that had been beaten in a mortar was far better than that which had been ground. Any one may repeat the experiment for his own satisfaction.

Professor Blot says the following is the best method of making tea:—

Warm the tea-pot, either by pouring boiling water in and emptying it, or by placing it on a corner of the range. Then put good tea into it (the quantity to be according to the strength and the quantity you want), and pour boiling water on the leaves, just enough to wet them; leave thus about one minute, then pour on all the water you want.

Let it steep no longer *than six minutes, and not less than four minutes*, before drawing it. If allowed to steep longer than six minutes, all the astringency of the tea is extracted, and it acts with bad effect on the nervous system, besides losing most of the aroma.

HOW TO MAKE TEA.

The first thing needed is a clean tea-pot; it is useless to try to make good tea in a rusty pot, or in one in which the leaves have been allowed to remain all night. The water should be boiling, but the tea itself should never boil. I wish these words could be painted on the wall of every hotel and restaurant kitchen in the United States. After the boiling water has been poured over the tea, set the tea-pot on an extra griddle on the back of the stove. All that is good in the tea will be gradually extracted from it; then when brought to the table, one may well echo De Quincey's wish for an "eternal tea-pot," though not inclined to follow his example of drinking it from eight o'clock in the evening until four o'clock in the morning.

The most satisfactory steeper I ever used is an old-fashioned brown earthen tea-pot. This may be kept perfectly clean with almost no trouble. Whatever may be said of the hurtfulness of tea when immoderately used, a cup of the afternoon tea so frequently mentioned in novels and essays is an unpurchasable luxury.

THE USE OF A RAW EGG.

How often we hear women who do their own work say that by the time they have prepared a meal, and it is ready for the table, they are too tired to eat! One way to mitigate this evil is to take, about half an hour before dinner, a raw egg, beat it until light, put in a little sugar, flavor it, and drink it down. It will remove the faint, tired-out feeling, and will not spoil your appetite for dinner. Plenty of fresh air in the kitchen does a good deal to relieve this trouble, and you do not then take your dinner in "at the pores," as Dickens's old Joey declared he took in the wine.

TO CHOOSE EGGS.

In fresh eggs, when held to the light, the white will look clear, and the yellow distinct; if not good, they will have a clouded appearance.

When eggs are stale, the white will be thin and watery, and the yolk will not be a uniform color when broken; if there is no mustiness, or disagreeable smell, eggs in this state are not unfit for making cakes, puddings, etc.

Eggs for boiling should be as fresh as possible; a new laid egg will generally recommend itself, by the delicate transparency of its shell.

BEEF TEA.

Cut all the fat from a pound of fresh beef, then cut the lean meat into small dice-like pieces; add one pint of cold water to draw out the juices; boil twenty or thirty minutes, skimming it carefully, then strain, and salt to taste.

SOUP FOR AN INVALID.

Cut in small pieces one pound of beef or mutton, or a part of both; boil it gently in two quarts of water; take off the scum, and, when reduced to a pint, strain it. Season with a little salt, and take a teacupful at a time.

GRUEL.

Mix a tablespoonful of cornmeal with a little cold water; add a small pinch of salt, and stir it smoothly into a pint of boiling water, and let it boil, being constantly stirred for six or eight minutes. If sugar is desired, put it in with the cold meal and water, but add any flavor, as nutmeg or cinnamon, after removing it from the stove. Gruel should be very smooth, and should not have the faintest suspicion of scorch about it. Always serve it neatly.

SPLIT-PEA SOUP.

Take one eighth as many peas as the quantity of soup required. Boil gently in a small quantity of water until soft enough to be rubbed through a coarse sieve or colander, or until they fall to pieces. Strain, add sufficient water to make the requisite amount of soup, and boil again. Thicken with graham flour, and boil again a few minutes. Either split or whole peas may be used if they are strained. The white marrowfat is the best, but the blue pea is also excellent. Some scald the latter, and turn off the water before cooking.

Dry beans may be made into soup in the same manner, but double the quantity is required for the same amount of soup.

CHICKEN BROTH.

In one quart of water boil the dark meat of half a chicken, with a tablespoonful of rice or barley ; skim off the fat ; use as soon as the rice is well done. When taken up, add a few narrow strips of bread toasted — not too brown.

TOMATO SOUP.

Put one pint of canned or fresh tomatoes and one quart of water into a granite stew-pan. When boiling, thicken with three tablespoonfuls of graham flour mixed with cold water. Add one quart of milk, and stir until it boils ; this prevents curdling. Season to taste. Can be made in ten minutes.

TOMATO SOUP.

Scald and peel good, ripe tomatoes, add a little water, stew them one hour, and strain through a coarse sieve ; stir in a little flour, or crumb in toasted biscuit, and then boil five minutes.

HOW TO MAKE GOOD BUTTERED TOAST.

Take remnants of a loaf that have become too dry to be eaten as bread, dip them in warm water, place a slice of the bread upon the toasting-fork, about an inch from the sides, hold it a minute before the fire, then turn it, hold it before the fire another minute, by which time the bread will be thoroughly hot ; then begin to move it gradually to and fro until the whole surface has assumed a yellowish-brown color, when again turn it, toasting the other side in the same manner ; then lay it upon a hot plate, spread a piece of butter, rather less than an ounce, over it, and cut into four or six pieces. Cut each slice into pieces as soon as buttered, and pile them lightly upon the plate or dish you intend to serve it on.

This way you will find a great improvement upon the old system, as often, in cutting through four or five slices with a bad knife, you squeeze all the butter out of the upper one, and discover the under one, at the peril of its life, swimming in an ocean of butter at the bottom of the dish.

CAUTIONS REGARDING THE USE OF MILK.

While good milk is an excellent article of food for the young, the aged, and many invalids, it may be the means of

spreading dangerous diseases. That which is sent to cities may have received infection from the air of the dairy-house, and in this way scarlet and typhoid fevers sometimes be propagated. But a greater source of danger is in the water that the dairyman mixes with it. If the water is pure, of course the injury lies only in the less amount of nourishment it contains; but if water is used from wells or springs not pure, then the danger is very great. In England numerous instances have come to light where a large number of families supplied by the same milkman have had typhoid fever, and on careful investigation it was found that the dairyman had in these cases watered his milk from a well-pump in the yard, into which there was a slight leakage from a drain. Through this leak had oozed the poisonous germs that poisoned the milk, and carried that most dangerous malady into forty-seven families, destroying one hundred and sixty-five persons. Thanks to the spirit of investigation which sought and found the source of the contagion. Still another source of danger in the use of milk is where the child is nursed by a diseased mother, or one subject to fits of passion, or where the mother has been poisoned by food or medicine. We mention these things that all may be on their guard, and be able to avoid causes of disease that lurk in unsuspected and hidden places.

A MILK DIET.

Within a few years a milk diet has become a very popular prescription among physicians, they ordering patients to subsist on it for days or weeks at a time. In cases where the patient needs a good sustaining food without the risk of inflammatory action or excitement succeeding its use, a milk diet is perhaps the best regimen that can be chosen. This is especially true in all diseases affecting the respiratory organs, inflammation of the stomach, bowels, kidneys, or bladder. It is of benefit in cases of hemorrhage, gout, and diarrhea. In fevers it is much used. In convalescence from smallpox, scarlet fever, measles, typhoid fever, milk is often very serviceable. I have found gems and milk very excellent after scarlet fever. Indeed, good home-made brown bread and milk is almost a perfect food, especially for feeble children suffering with scrofulous habit of body, mesenteric diseases, spinal affections, fits, taint of the blood. I even go so far as to say that all children would be the better for taking one meal of brown bread and milk daily, and feeble ones should use it three times a day.

HOT MILK.

Take nine parts of milk and one part of water, and heat to 110° F. in a milk boiler. Sipping this slowly, the saliva combines with the milk, and this, with the added water, will prevent coagulation in the stomach; hence will be taken up at once by the absorbents. This is valuable food in morning sickness of

pregnancy and for nursing women. It is also good in low fevers and nervous dyspepsia.

The *Medical Record*, speaking of hot milk as a beverage, says: "Milk heated to much above 100° F. loses for the time a degree of its sweetness and density. No one who, fatigued by over-exertion of body or mind, has ever experienced the reviving influence of a tumblerful of this beverage, heated as hot as it can be sipped, will willingly forego a resort to it because of its having been rendered somewhat less acceptable to the palate. The promptness with which its cordial influence is felt is surprising. Some portion of it seems to be digested and appropriated almost immediately; and many who now fancy they need alcoholic stimulants when exhausted by fatigue, will find in this simple draught an equivalent that shall be abundantly satisfying, and far more enduring in its effects."

OATMEAL MILK.

I cannot help in this connection printing the following letter from one of my correspondents, regarding oatmeal milk for young children, which I am sure will help some mother to rear to health a child when she might otherwise fail. I may add, however, that it should not be used before the babe is three or four months old, and then a gradual substitute for the breast. She says:—

"When my baby was five months old, for the sake of my own health I weaned him from the breast. I gave him cream and water, with a little sugar. In two weeks' time his bowels were so constipated that I fully realized that some change must be made in the food. I therefore made oatmeal gruel by boiling oatmeal in about twice the usual quantity of water for an hour and a half or two hours. When properly cooked, I poured it through a fine sieve. The part which passed through was, when cold, of the consistency of jelly. Then, in a quart cup, I mixed one half pint of thin cream and oatmeal gruel—about one gill of each—added one teaspoonful of white sugar, and filled the measure nearly full of boiling water. This food he relished, and in every way it agreed with him; and if there ever was a child that grew any faster than mine did when fed with oatmeal and milk, I think it would be a wonder. People would say: "How your baby grows," and in the same breath (when I told what his food was) would say: "Why, you'll starve him!" But by putting in less water I found it was too hearty, causing him to vomit; and once in possession of the key to my child's health, nothing turned me aside.

“My child is now a year and a half old, his food is three parts milk and one part gruel. He is very large, strong, and active, has twelve teeth, weighs thirty pounds, and in all the time has not lost an ounce of flesh, even at the most trying time — warm weather.

“That I am enthusiastic in regard to oatmeal milk should not seem strange, and I wish that, of the many mothers throughout the land, those who find it necessary to provide other than the natural food for their children would try my recipe. They would find doctors’ visits few and far between.”

MILK PORRIDGE.

Place over the fire equal parts of milk and water. Just before it boils, add a small quantity of graham flour, oatmeal, or cornmeal, previously rubbed with water, and boil a minute longer. This recipe is not recommended as hygienic.

RECIPE FOR GRUEL.

One teacup oatmeal, two quarts of hot water. Boil two and a half hours. Strain through a fine sieve.

I prefer this way to the plan of soaking the oatmeal in cold water, which I have tried, but find that the taste is not so pleasant.

BUTTERMILK.

Buttermilk, when sweet and fresh from the churn, is nutritious and wholesome. It contains about 88 per cent of water, 4 of nitrogenous food, 3 of sugar, only a trifle of fat, and considerable mineral matter, by some estimated at over 5 per cent. There is also a small amount of lactic acid. As a heat-producing food, it is poor. There are many forms of dyspepsia in which it will “set on the stomach” when hardly anything else will. Often in fevers this organ becomes rebellious from the effects of large amounts of medicine, and it is then a serious question how to nourish the patient. In such cases, buttermilk is sometimes found to be the best food that can be given.

In diabetes it may be employed as a chief article of diet to great advantage. Corpulent people who will not adopt the bread and fruit regimen and take much exercise, may use buttermilk in preference to milk. It may be put into clean bottles and canned or sealed, as in preserving fruit, and kept for a long time. After a little, one becomes fond of the taste, and relishes it. It ought not to be allowed to stand till it is bitter before using. — *Dr. Holbrook.*

CHAPTER XXXII.

INVALID COOKERY.

RULES TO BE OBSERVED IN COOKING FOR INVALIDS.

LET all the kitchen utensils used in the preparation of invalids' cookery be delicately and *scrupulously clean*; if this is not the case, a disagreeable flavor may be imparted to the preparation, which flavor may disgust and prevent the patient from partaking of the refreshment when brought to him.

For invalids, never make a large quantity of *one thing*, as they seldom require much at a time, and it is desirable that variety be provided for them.

Always have something in readiness, — a little beef-tea, nicely made and nicely skimmed, a few spoonfuls of jelly, etc., — that it may be administered as soon, almost, as the invalid wishes for it. If obliged to wait a long time, the patient loses the desire to eat, and often turns against the food when brought to him.

In sending dishes or preparations up to invalids, let everything look as tempting as possible. Have a clean tray-cloth laid smoothly over the tray; let the spoons, tumblers, cups and saucers, etc., be very clean and bright. Gruel served in a tumbler is more appetizing than when served in a basin or cup and saucer.

As milk is an important article of food for the sick, in warm weather let it be kept on ice, to prevent its turning sour. Many other delicacies may also be preserved good in the same manner for some little time.

If the patient be allowed to eat vegetables, never send them up under-cooked or half raw; and let a small quantity only be temptingly arranged on a dish. This rule will apply to every preparation, as an invalid is much more likely to enjoy his food if small, delicate pieces are served to him.

Never leave food about a sick room; if the patient cannot eat it when brought to him, take it away, and bring it to him

in an hour or two's time. Miss Nightingale says: "To leave the patient's untasted food by his side from meal to meal, in the hope that he will eat it in the interval, is simply to prevent him from taking any food at all. I have known patients literally incapacitated from taking one article of food after another by this piece of ignorance. Let the food come at the right time, and be taken away, eaten or uneaten, at the right time; but never let a patient have 'something always standing' by him, if you don't wish to disgust him with everything."

Never serve beef-tea or broth with the *smallest particle* of fat or grease on the surface. It is better, after making either of these, to allow them to get perfectly cold, when *all the fat* may be easily removed; then warm up as much as may be required. Two or three pieces of clean whitey-brown paper laid on the broth will absorb any greasy particles that may be floating at the top, as the grease will cling to the paper.

Roast mutton, chickens, rabbits, calves' feet or head, game, fish (simply dressed), and simple puddings, are all light food, and easily digested. Of course, these things are only partaken of supposing the patient is recovering.

A mutton chop, nicely cut, trimmed, and broiled to a turn, is a dish to be recommended for invalids; but it must not be served *with all the fat* at the end, nor must it be too thickly cut. Let it be cooked over a fire free from smoke, and sent up with the gravy in it, between two very hot plates. Nothing is more disagreeable to an invalid than *smoked* food.

In making toast-and-water, never blacken the bread, but toast it only a nice brown. Never leave toast-and-water to make until the moment it is required, as it cannot then be properly prepared, — at least, the patient will be obliged to drink it warm, which is anything but agreeable.

In boiling eggs for invalids, let the white be just set; if boiled hard, they will be likely to disagree with the patient.

In Miss Nightingale's admirable "Notes on Nursing," she says: "You cannot be too careful as to quality in sick diet. A nurse should never put before a patient milk that is sour, meat or soup that is turned, an egg that is bad, or vegetables underdone." Yet often, she says, she has seen these things brought in to the sick, in a state perfectly perceptible to every nose or eye except the nurse's. It is here that the clever nurse appears, — she will not bring in the peccant article; but, not to disappoint the patient, she will whip up something else in a few minutes. Remember that sick cookery should half do the work of your poor patient's weak digestion.

TO MAKE ARROWROOT.

Two teaspoonfuls of arrowroot, a tablespoonful of cold water, one half pint of boiling water.

Mix the arrowroot smoothly in a basin with the cold water, then pour on it *boiling* water, *stirring* all the time. The water must be *boiling* at the time it is poured on the mixture, or it will not thicken; if mixed with hot water only, it must be put into a clean saucepan, and boiled until it thickens; but this is more trouble, and quite unnecessary if the water is boiling at first. Put the arrowroot into a tumbler, sweeten it with lump sugar, and flavor it with grated nutmeg or cinnamon, or a piece of lemon-peel, or, when allowed, three tablespoonfuls of port or sherry. As arrowroot is in itself flavorless and insipid, it is almost necessary to add the wine to make it palatable. Arrowroot made with milk instead of water is far nicer, but is not so easily digested. It should be mixed in the same manner, with three tablespoonfuls of cold water, the boiling milk then poured on it, and well stirred. When made in this manner, no wine should be added, but merely sugar, and a little grated nutmeg or lemon-peel.

If obliged to be boiled, two minutes is necessary.

Sufficient to make one half pint of arrowroot.

Miss Nightingale says, in her "Notes on Nursing," that arrowroot is a grand dependence of the nurse. As a vehicle for wine, and as a restorative quickly prepared, it is all very well, but it is nothing but starch and water; flour is both more nutritive and less liable to ferment, and is preferable wherever it can be used.

BARLEY GRUEL.

Two ounces of Scotch or pearl barley, one half pint of port wine, the rind of one lemon, one quart and one half pint of water, sugar to taste.

After well washing the barley, boil it in one half pint of water for one fourth hour; then pour this water away; put to the barley the quart of fresh boiling water, and let it boil until the liquid is reduced to half; then strain it off. Add the wine, sugar, and lemon-peel; simmer for five minutes, and put it away in a clean jug. It can be warmed from time to time, as required.

To be boiled until reduced to half.

Sufficient, with the wine, to make one and one half pints of gruel.

TO MAKE BARLEY-WATER.

Two ounces of pearl barley, two quarts of boiling water, one pint of cold water.

Wash the barley in cold water ; put it into a saucepan with the above proportion of cold water, and when it has boiled for about one fourth hour, strain off the water, and add the two quarts of fresh boiling water. Boil it until the liquid is reduced one half ; strain it, and it will be ready for use. It may be flavored with lemon-peel, after being sweetened, or a small piece may be simmered with the barley. When the invalid can take it, a little lemon-juice gives this pleasant drink in illness a very nice flavor.

To boil until the liquid is reduced one half.

Sufficient to make one quart of barley-water.

TO MAKE BEEF-TEA.

One pound of lean gravy-beef, one quart of water, one salt-spoonful of salt.

Have the meat cut without fat and bone, and choose a nice fleshy piece. Cut it into small pieces about the size of dice, and put it into a clean saucepan. Add the water *cold* to it ; put it on the fire, and bring it to the boiling-point ; then skim well. Put in the salt when the water boils, and *simmer* the beef-tea *gently* from one half to three fourths of an hour, removing any more scum should it appear on the surface. Strain the tea through a hair sieve, and set it by in a cool place. When wanted for use, remove every particle of fat from the top ; warm up as much as may be required, adding, if necessary, a little more salt. This preparation is simple beef-tea, and is to be administered to those invalids to whom flavorings and seasonings are not allowed. When the patient is very low, use double the quantity of meat to the same proportion of water. Should the invalid be able to take the tea prepared in a more palatable manner, it is easy to make it so by following the directions in the next recipe, which is an admirable one for making savory beef-tea. Beef-tea is always better when made the day before it is wanted, and then warmed up. It is a good plan to put the tea into a small cup or basin, and to place this basin in a saucepan of boiling water. When the tea is warm, it is ready to serve.

Time. — One half to three fourths of an hour.

Allow one pound of meat for a pint of good beef-tea.

Miss Nightingale says one of the most common errors among nurses, with respect to sick diet, is the belief that beef-tea is the most nutritive of all articles. She says, “Just try to boil down a pound of beef into beef-tea ; evaporate your beef-tea, and see what is left of your beef ; you will find that there is barely a teaspoonful of solid nourishment to half a pint of water in beef-tea. Nevertheless, there is a certain reparative quality in it, — we do not know what, — as there is in tea ; but it may be safely given

in almost any inflammatory disease, and is as little to be depended upon with the healthy or convalescent, where much nourishment is required."

SAVORY BEEF-TEA.

A Recipe of Soyer, a famous English cook.

One pound of solid beef, one ounce of butter, one clove, two button onions or one half large one, one saltspoonful of salt, one quart of water.

Cut the beef into very small dice ; put it into a stew-pan with the butter, clove, onion, and salt ; stir the meat round over the fire for a few minutes, until it produces a thin gravy ; then add the water, and let it simmer gently from one half to three fourths of an hour, skimming off every particle of fat. When done, strain it through a sieve, and put it by in a cool place until required. The same, if wanted quite plain, is done by merely omitting the vegetables, salt, and clove ; the butter cannot be objectionable, as it is taken out in skimming.

Time. — One half to three fourths of an hour.

Allow one pound of beef to make one pint of good beef-tea.

Dr. Christison says that "every one will be struck with the readiness with which certain classes of patients will often take diluted meat-juice, or beef-tea, repeatedly, when they refuse all other kinds of food." This is particularly remarkable in cases of gastric fever, in which, he says, little or nothing else besides beef-tea, or diluted meat-juice, has been taken for weeks, or even months ; and yet a pint of beef-tea contains scarcely one fourth of an ounce of anything but water. The result is so striking that he asks : "What is its mode of action ? Not simple nutriment ; one fourth of an ounce of the most nutritive material cannot nearly replace the daily wear and tear of the tissue in any circumstances." Possibly, he says, it belongs to a new denomination of remedies.

BEEF-TEA IN HASTE.

One pound of lean beef, one pint of water.

With a sharp knife, scrape the beef into *fibers* ; this should be done on a board. Place the scraped meat into a delicately clean saucepan, and pour one half pint of boiling water on it ; cover closely, and set by the side of the fire for ten minutes ; strain into a teacup, place it in a basin of ice-cold water, remove all fat from the surface, pour into a warmed cup, and put into another basin of hot water ; warm again, and serve.

Time. — One fourth of an hour.

When required of greater strength, use half the above quantity of water ; or even less, when the patient is able to take a spoonful only at a time.

BAKED OR STEWED CALF'S FOOT.

One calf's foot, one pint of milk, one pint of water, one blade of mace, the rind of one half lemon, pepper and salt to taste.

Well clean the foot, and either stew or bake it in the milk and water with the other ingredients from three to four hours. To enhance the flavor, an onion and a small quantity of celery may be added, if approved; one half a teacupful of cream, stirred in just before serving, is also a great improvement to this dish.

Time. — Three to four hours.

CALF'S FOOT BROTH.

One calf's foot, three pints of water, one large lump of sugar, nutmeg to taste, the yolk of one egg, a piece of butter the size of a nut.

Stew the foot in the water, with the lemon-peel, *very gently*, until the liquid is half wasted, removing any scum should it rise to the surface. Set it by in a basin until quite cold, then take off every particle of fat. Warm up about one half pint of the broth, adding the butter, sugar, and a very small quantity of grated nutmeg; take it off the fire for a minute or two, then add the beaten yolk of the egg; keep stirring over the fire until the mixture thickens, but do not allow it to boil again after the egg is added, or it will curdle, and the broth will be spoiled.

Boil until the liquid is reduced one half.

CHICKEN BROTH.

One half fowl, or the inferior joints of a whole one, one quart of water, one blade of mace, one half onion, a small bunch of sweet herbs, salt to taste, ten pepper-corns.

If a young one be used for this broth, the inferior joints may be put into the broth, and the best pieces reserved for dressing in some other manner. Put the fowl into a saucepan; with all the ingredients, and simmer gently for one and one half hours, carefully skimming the broth well. When done, strain, and put by in a cool place until wanted; then take all the fat off the top, warm up as much as may be required, and serve. This broth is, of course, only for those invalids whose stomachs are strong enough to digest it, with a flavoring of herbs, etc. It may be made in the same manner as beef-tea, with water and salt only; but the preparation will be but tasteless and insipid. When the invalid cannot digest this chicken broth with the flavoring, we would recommend plain beef-tea in preference to plain chicken tea, which it would be without the addition of herbs, onions, etc.

Time. — One and one half hours.

Sufficient to make rather more than one pint of broth.

A stronger "chicken flavor" is obtained by previously roasting the fowl for twenty minutes before placing in the saucepan.

NUTRITIOUS COFFEE.

One half ounce of ground coffee, one pint of milk.

Let the coffee be freshly ground; put it into a saucepan with the milk, which should be made nearly boiling before the coffee is put in, and boil both together for three minutes; clear it by pouring some of it into a cup, and then back again, and leave it on the hob for a few minutes to settle thoroughly. This coffee may be made still more nutritious by the addition of an egg well beaten, and put into the coffee-cup.

THE INVALID'S CUTLET.

One nice cutlet from a loin or neck of mutton, two teacupfuls of water, one very small stick of celery, pepper and salt to taste.

Have the cutlet cut from a very nice loin or neck of mutton; take off all the fat; put it into a stew-pan, with the other ingredients; stew *very gently* indeed for nearly two hours, and skim off every particle of fat that may rise to the surface from time to time. The celery should be cut into thin slices before it is added to the meat, and care must be taken not to put in too much of this ingredient, or the dish will not be good. If the water is allowed to boil fast, the cutlet will be hard.

Time. — Two hours' very gentle stewing.

EGG WINE.

One egg, one tablespoonful and one half glass of cold water, one glass of sherry, sugar and grated nutmeg to taste.

Beat the egg, mixing with it a tablespoonful of cold water; make the wine and water hot, but not boiling; pour it on the egg, stirring all the time. Add sufficient lump sugar to sweeten the mixture, and a little grated nutmeg; put all into a very clean saucepan, set it on a gentle fire, and stir the contents one way until they thicken, but *do not allow them to boil*. Serve in a glass with sippets of toasted bread or plain crisp biscuits. When the egg is not warmed, the mixture will be found easier of digestion, but it is not so pleasant a drink.

TO MAKE GRUEL.

One tablespoonful of Robinson's patent groats, two tablespoonfuls of cold water, one pint of boiling water.

Mix the prepared groats smoothly with the cold water in a basin; pour over them the boiling water, stirring it all the

time. Put it into a very clean saucepan ; boil the gruel for ten minutes, keeping it well stirred ; sweeten to taste, and serve. It may be flavored with a small piece of lemon-peel, by boiling it in the gruel, or a little grated nutmeg may be put in ; but in these matters the taste of the patient should be consulted. Pour the gruel into a tumbler and serve. When wine is allowed to the invalid, two tablespoonfuls of sherry or port make this preparation very nice. In cases of colds, the same quantity of spirits is sometimes added instead of wine.

Time. — Ten minutes.

Sufficient to make a pint of gruel.

INVALID'S JELLY.

Twelve shanks of mutton, three quarts of water, a bunch of sweet herbs, pepper and salt to taste, three blades of mace, one onion, one pound of lean beef, a crust of bread toasted brown.

Soak the shanks in plenty of water for some hours, and scrub them well ; put them, with the beef and other ingredients, into a saucepan with the water, and let them simmer very gently for five hours. Strain the broth, and when cold, take off all the fat. It may be eaten either warmed up, or cold as a jelly.

Time. — Five hours.

Sufficient to make from one and one half to two pints of jelly.

LEMONADE FOR INVALIDS.

One half lemon, lump sugar to taste, one pint of boiling water.

Pare off the rind of the lemon thinly ; cut the lemon into two or three thick slices, and remove as much as possible of the white outside pith, and all the pips. Put the slices of lemon, the peel, and lump sugar into a jug ; pour over the boiling water ; cover it closely, and in two hours it will be fit to drink. It should either be strained or poured off from the sediment.

Time. — Two hours.

Sufficient to make one pint of lemonade.

NOURISHING LEMONADE.

One and one half pints of boiling water, the juice of four lemons, the rinds of two, one half pint of sherry, four eggs, six ounces of loaf sugar.

Pare off the lemon-rind thinly, put it into a jug with the sugar, and pour over the boiling water. Let it cool, then

strain it ; add the wine, lemon-juice, and eggs, previously well beaten, and also strained, and the beverage will be ready for use. If thought desirable, the quantity of sherry and water could be lessened, and milk substituted for them. To obtain the flavor of the lemon-rind properly, a few lumps of the sugar should be rubbed over it, until some of the yellow is absorbed.

STEWED RABBITS IN MILK.

Two very young rabbits, not nearly half grown ; one and one half pints of milk, one blade of mace, one dessertspoonful of flour, a little salt and cayenne.

Mix the flour very smoothly with four tablespoonfuls of the milk, and when this is well mixed, add the remainder. Cut up the rabbits into joints, put them into a stew-pan, with the milk and other ingredients, and simmer them *very gently* until quite tender. Stir the contents from time to time, to keep the milk smooth and prevent it from burning. Half an hour will be sufficient for the cooking of this dish.

RICE-MILK.

Three tablespoonfuls of rice, one quart of milk, sugar to taste ; when liked, a little grated nutmeg.

Well wash the rice, put it into a saucepan with the milk, and simmer gently until the rice is tender, stirring it from time to time to prevent the milk from burning ; sweeten it, add a little grated nutmeg, and serve. This dish is also very suitable and wholesome for children ; it may be flavored with a little lemon-peel, and a little finely-minced suet may be boiled with it, which renders it more strengthening and more wholesome. Tapioca, semolina, vermicelli, and macaroni may all be dressed in the same manner.

Time. — From three fourths to one hour.

TO MAKE TOAST-AND-WATER.

A slice of bread, one quart of boiling water.

Cut a slice from a stale loaf (a piece of hard crust is better than anything else for the purpose), toast it of a nice brown on every side, but *do not allow it to burn or blacken*. Put it into a jug, pour the boiling water over it, cover it closely, and let it remain until cold. When strained, it will be ready for use. Toast-and-water should always be made a short time before it is required, to enable it to get cold ; if drunk in a tepid or lukewarm state, it is an exceedingly disagreeable beverage. If, as is sometimes the case, this drink is wanted in a hurry, put the

toasted bread into a jug, and only just cover it with the boiling water; when this is cool, cold water may be added in the proportion required, — the toast-and-water strained; it will then be ready for use, and is more expeditiously prepared than by the above method.

NUTRINA, OR BRAN JELLY.

1st. Go to the mill *yourself*, and watch the miller while he gives you clean wheat bran.

2d. Have a kettle of boiling soft water on the stove. Sift in with one hand, stirring briskly all the while with a paddle or wooden spoon held in the other, until the mass is about the consistency of a thick gruel. Let this boil slowly two hours. Place a sieve over the top of a pan, and pour this gruel into it to drain. When well drained, place the pan on the stove, and allow it to come to a boil. Mix with cold water a spoonful or so of sifted graham flour, enough to bring the boiling gruel to about the consistence of a smooth gravy or thick gruel.

Dip into molds — coffee cups are nice for this — and allow to become cold, when, if right, it will be a trembling, delicate jelly. Perhaps it will be necessary to experiment a little, as the first trial may not be entirely successful; but depend upon it, the outcome is well worth painstaking.

Nutrina accompanied with various sauces makes a welcome dessert. People who use milk or cream would like nutrina with a cream sauce. Nutrina cannot be too highly recommended, for it suits so wide a range of conditions. — *Dr. M. Augusta Fairchild.*

Nutrina contains the phosphates of the grain, hence is a valuable nerve nutritive. Is especially excellent for nursing mothers, and children when first weaned.

FLAXSEED LEMONADE.

Two tablespoonfuls of whole flaxseed to a pint of boiling water; let it stand until cool, then strain and add the juice of two lemons and two tablespoonfuls honey. Invaluable for coughs and suppression of urine.

FRESH EGG FOR AN INVALID.

Break an egg into a tumbler, add two teaspoonfuls of white sugar, and whip briskly; then add a glass of wine, and fill up the tumbler with milk.

Besides the recipes contained in this chapter, there are in the previous chapter on cookery many others suitable for invalids, which it would be useless to repeat here.

CHAPTER XXXIII.

DISEASES, ETC.

SPECIAL NOTICE.—*In the preparation of this department, the aim has been to include only such treatment of DISEASES and INJURIES as are most common in the family,—those that require simple but prompt attention, and that can be easily treated without the aid of A PHYSICIAN, or before one can be called. The selection of PURE WATER, a knowledge of the GERM SCIENCE, etc., how to detect impurities, and how to prevent such dangerous consequences to health, is of first importance in PREVENTING SICKNESS. Next is given the treatment of diseases in themselves dangerous, but easily controlled. This treatment is that used by the BEST MEDICAL AUTHORITIES OF BOTH THIS COUNTRY AND EUROPE. This article has been submitted to a regular physician, a graduate from one of the first universities in the land, who has made additions and corrections. Therefore the utmost confidence can be felt that it is the most reliable, complete, and definite in its instructions of any ever published, and will do an untold amount of good.*

IN a chance conversation with one of the house physicians of the Sanitarium (Dr. Belknap) who has made a special study of germs, and is probably one of the best bacteriologists in the State, he explained to me the importance of destroying germs in surgical cases (particulars of which are given under “Cuts and Wounds,” page 264), and said that there were specific germs for various diseases, and that these germs were common in impure water. He stated particularly that if water became infected with the germs of typhoid or other fevers, it would produce the same diseases; that he had in the laboratory a great variety of germs from water sent him for examination; that he had propagated these germs, and could produce in animals the same diseases in nearly every instance; that he could show me germs of consumption, diphtheria, etc. I became much interested, and went into the laboratory, where this was fully demonstrated to me. Feeling that this knowledge would be of great benefit to people generally, I made a special request of the doctor that he would give me the facts in relation to this interesting subject, for the benefit of my readers, and I give below an extract of the conversation. I need not tell you how important it is that you look to the matter of having PURE WATER, and of guarding against all avoidable causes of sickness; that it is a great deal better to prevent disease than to try to cure it. If possible, use running spring water; if well water, see that it is not contaminated. If doubtful, examine it as directed; and if impure, take all necessary precautions. I have added, also, the simplest and best form of filter.



PLATE I. — Showing a variety of germs peculiar to typhoid, malarial, and other fevers and diseases, magnified five hundred to one thousand diameters.

WATER AND GERMS.

DANGER OF USING IMPURE WATER—GERMS OF TYPHOID, MALARIAL, AND OTHER FEVERS—HOW TO TEST THE PURITY OF WATER.

Late investigation has shown that a very large majority of diseases are produced by germs found in impure water, each disease having a germ peculiar to itself. This is particularly the case in typhoid fever, malarial fever, diphtheria, and many others.

It is found that these germs can be cultivated on nutrient gelatine, beef broth, etc., and when introduced into the system of animals, will produce the same disease; after which the germ can be again obtained, cultivated, and on again introducing it into an animal, will produce the same result, which I have demonstrated in the laboratory many times.

In the past, as at the present time, people looked upon water as harmless, never considering its source or possible impurity. It is now a known fact that there is no source by which disease is so readily and easily contracted as through the use of impure water; and when we understand that all water taken into the stomach is absorbed into the general circulation, we can very readily see how easily the body becomes a prey to these disease germs.

When there is a weak and debilitated condition of the system, it is more susceptible to disease. In a state of health the white blood corpuscles destroy the germs, when they are not present in too great numbers, and the system discards them in various ways. You will note, by referring to Plate I, page 573, the description of typhoid and other germs.

This, the greatest discovery of modern science, has not only revealed the cause of diseases, but it has greatly simplified or modified the treatment and care of patients suffering from them, and has also shown how to avoid these diseases.

These germs grow and develop in the system, under proper conditions, as we have found by experience with typhoid fever. Take, for example, a suspected case of this fever. Knowing that the alimentary canal is full of effete matter upon which the germs grow and rapidly develop, and from which source they are carried to all parts of the system through the circulation, we can modify, cut short, and even abort many cases by prompt measures in clearing out the effete matter from the alimentary canal. We do this best by the use of saline laxatives, such as common salts, or any quickly acting cathartic, aided, if necessary, by an enema. Then by careful diet, as described in "Typhoid Fever," page 584, we keep the system as clear as possible from useless material.

We have learned to look with particular care to the purity of drinking-water, which can be easily determined by the following test:—

TEST FOR WATER.

Three grains permanganate of potash and twelve grains of caustic potash to one ounce distilled water. Add one or two drops of the solution to

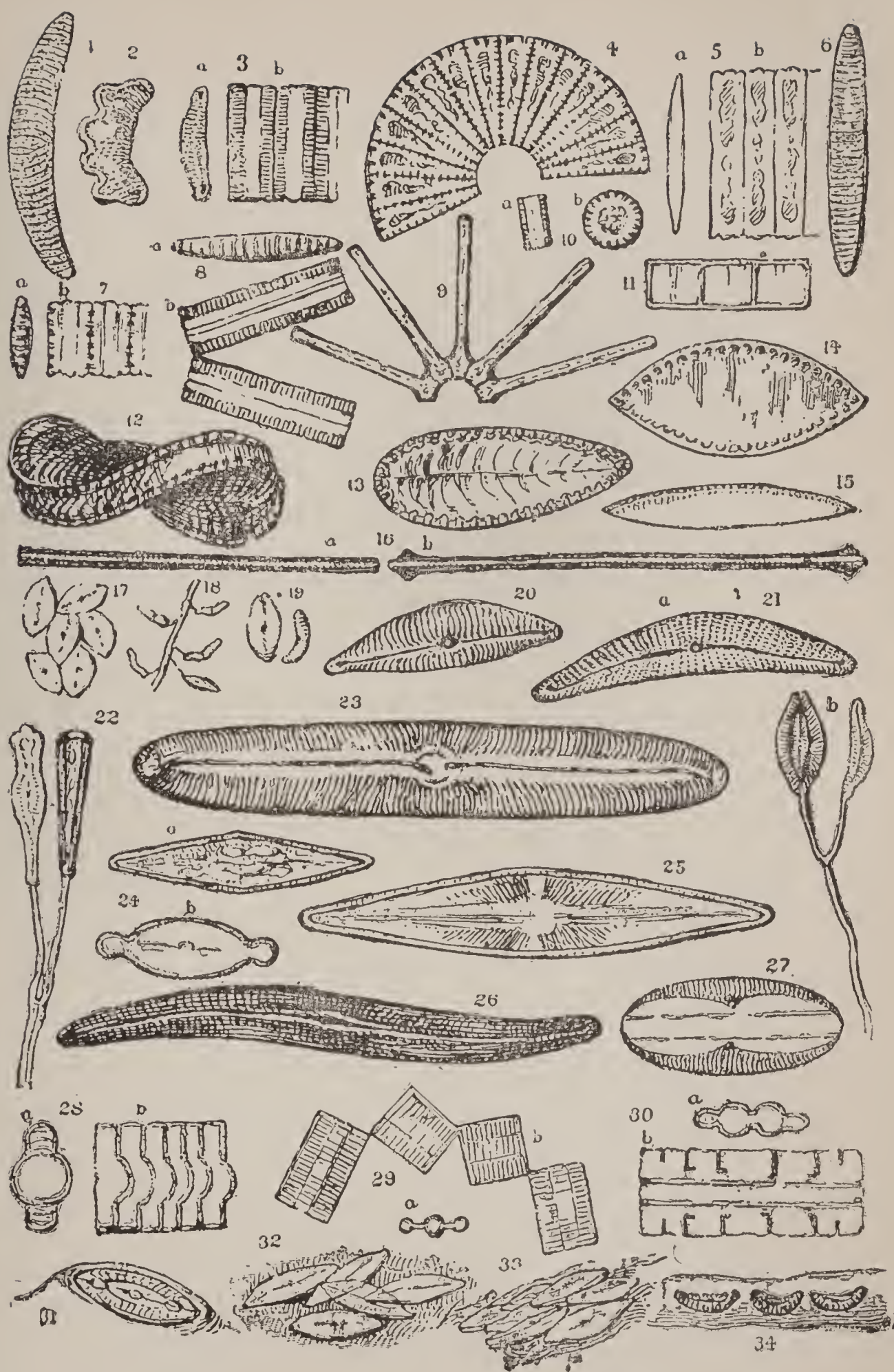


PLATE II. — Types of fresh-water plants, or germs, largely magnified.

a glass of water, and stir. If the water turns a bright pink color, remaining for a few minutes, it is fit to drink ; while if the color becomes a dirty brown, and disappears after a few minutes, the water is impure, and should not be used. The more of the solution needed to produce a permanent color -- the brown color -- the more impure the water.



FIG. 602. — Sediment from sluggish, impure river water, showing a mass of spores of animal and vegetable matter, magnified one thousand diameters.

The above test applies only to organic impurities, and not to mineral.

By referring to Plate I, page 573, a good representation will be found of many of the various forms of disease germs, such as cocci (Nos. 1-7), showing those of a round or oval form, appearing in clusters, or groups; next the bacteria (Nos. 8-10), dumb-bell form ; also the bacillus (Nos. 11-

15), or rod form, in which we find the bacillus of malaria (Fig. 14). Fig. 15 shows the typhoid bacillus ; Fig. 12 shows the bacillus of tuberculosis, or consumption.

The next species is spirillum (Nos. 16-19), in which we find the cholera



FIG. 603. — Sediment of ditch water magnified one thousand diameters. The technical description of spores of animal and vegetable matter as shown, not advisable to give in a general work of this character.

germ (No. 18) ; No. 20, spirochete ; No. 21, vibrio ; Nos. 22 and 23, cladothrix ; Nos. 24 and 25, monas ; No. 26, rhabdomonas. The remainder (Nos. 27-39) represent the above species in different forms of cultivation. These germs are vegetable growths of a low order.

FILTERS.

No family should be without a filter unless the water supply be unquestionable. By this means, foul gases, organic and all suspended matter, are filtered out. Rain-water should never be used for drinking without first filtering, as during a rain storm, foul gases and germs are absorbed and collected from the air, making it unfit for use.

There are a great variety of filters on the market ; but none should be used except those that can be easily and readily taken apart for the purpose of cleansing. They should be made with coarse and fine gravel, sand, and charcoal, using either wood or animal charcoal, the latter being preferable. Spongy iron and other articles that are used should be avoided, as they are of little value. Those self-cleaning filters offered to the public are useless ; for in any filter whatever, the composition must, to be relied upon, be cleansed from every three to six months, according to the amount of water used.



* FIG. 604.

Select a simple filter, or make one yourself by constructing a water-tight box or barrel, and closely packing a few inches (12 to 18) of charcoal in the bottom, which should be elevated a few inches in order to allow a space for the water beneath. Upon the charcoal pack a few inches of coarse sand and gravel. Provide a metal cover, coneave on the top, that will hold one or two pails of water. Perforate this cover with small holes, allowing the water to run

in slowly. The accompanying cut will illustrate the different parts.

HOW TO CLEANSE A FILTER.

Remove the cover, which should be of the size of the vessel used as a filter ; then take out the gravel, sand, and charcoal, keeping each separate. The charcoal should be heated to redness in a covered dish, if new coal is not at hand. The sand and gravel should be boiled for one half hour, and then thoroughly washed, until the water is clear that comes from it ; dry in the open air, and repack. The tighter the packing, the

* FIG. 604 represents what is accepted as one of the best patent filters, manufactured by The Stevens Filter Co., Toledo, O. ; B. Salisbury & Co., special agents, Battle Creek, Mich., by whose courtesy we are indebted for the accompanying cut. Prices range from \$6 to \$50 each.

better, as the water passes through more slowly, thus extracting more material. The above process should be done once in six months, at least.

All filters should be allowed to stand empty from one to three hours, once in 24 or 48 hours, for the purpose of allowing the charcoal to take up oxygen from the air ; for it is the oxygen that destroys the organic matter. By applying the water test, as given on page 574, you can readily determine whether the filter is doing good work or not.

Avoid stationary filters, as those used in cisterns, where they cannot be cleansed ; for after a year's use, they make matters worse by breeding germs.

WATER—ITS USE IN DISEASE.

Notwithstanding the example set by our forefathers, people of a few years since so lost sight of the value of water in disease, that its use was thought detrimental to all fevers, and it was not allowed even for drinking purposes, other than just sufficient to keep the patient from dying of thirst. But happily for the human race, that time of ignorance and superstition is passed, and the value of water in disease is fast coming to the front, and displacing many of the drugs which are so deleterious to the system. As an antiphlogistic, or agent in the relief of inflammation, there is no drug that can equal water, applied in the form of hot fomentations frequently changed and long continued ; or cold applied continuously for an hour at a time, and then alternated by heat, will subdue the worst cases.

As a tonic, water has no equal ; and let me say here that there is no class of remedies so abused in all materia medica as tonics ; for almost every ailment, charlatans advertise tonics, and people call for them, when the better course would be the plentiful use of hot and cold water, taken both internally and externally, for the purpose of cleansing and purifying the system, by dissolving and washing out the refuse material and purifying. Who would think of cleaning house by using a little soap and no water ? It is equally absurd to think of cleansing our house we live in, the body, with teaspoonful doses of the various nostrums.

People as a whole drink too little water, as is acknowledged by all of the general profession ; and this is one great source of disease ; for the system becomes clogged up, and this brings on fevers, and especially rheumatism, by a collection of uric acid and urates in the system. One who is subject to rheumatism should form a habit of taking plenty of water daily, for the purpose of keeping in solution and passing off the deleterious elements.

What about tonics in the spring of the year and at other times when we have no appetite ? This is a question frequently asked ; and in answer we would say, Nature is the best judge. We have just passed the winter, when it was necessary to take more food to keep up animal heat and warm the body ; and as warm weather approaches, and the sun warms the atmosphere, there ceases to be a need for so large a quantity of food.

Then how foolish it seems to dose the system with tonics ; it is better by far to drink two or three pints of water during the twenty-four hours, and thus aid nature in carrying out the desired result by use of her own abundant and great tonic, pure water.

The tonic effect of water applied externally is equally as efficacious as when taken internally, but one cannot take the place of the other. Many times, in weak and debilitated persons, a daily bath in cool water, either with a sponge or otherwise, will, by its stimulating and tonic effect, set nature to rights much quicker than by the use of any other remedy ; also hot and cold applications to the spine, as follows :—

Take a heavy flannel cloth (or flannel underwear will do), fold up and put into boiling water all but the two ends, which should be kept dry for the purpose of wringing the cloth. As soon as it is removed from the water, fold it the size required.* Wrap up in one or two thicknesses of dry flannel to protect the person and retain the heat, and apply to spine as hot as can be borne by the skin and not scald. Let it remain two or three minutes, remove, and rub the spine with ice or cold water a few times, then immediately apply the heat ; repeat this process three or four times, and let the patient lie down and keep quiet for an hour or more thereafter. The above will be found excellent for nervous people. The use of the hot-water bag† for the spine will act equally well applied for one hour or more daily ; it beats all other nervines known.

AS A SEDATIVE.

The powerful sedative effect of water is unquestionable. In cases of inflamed joints or bruises, it should be applied cold for an hour at a time, alternating for a few minutes each hour with a hot fomentation ; or hot fomentations may be used instead of the cold, with equal or better results. This should be repeated several times a day.

AS AN ANTISPASMODIC.

When the patient is in a cramp or convulsion, cold water may be used to relieve the immediate difficulty, after which hot fomentations may be applied to the affected parts. Afterward such parts should receive fomentations three times a week, and fomentations should also be given to spine three times a week.

AS A DISSOLVENT OR ABSORBENT.

In cases of *swelling or enlargement of joints, liver, spleen, etc.*, fomentations should be kept up from three times a week to several times a day, according to the severity of the case. In using fomentations for jaundice,

* At the Sanitarium, the cloth is folded four or five inches wide and the length of the back. For ordinary cases it is kept on only two or three minutes. Then ice or cold water is applied quickly, and the fomentation repeated. This repeated two or three times.

† There are rubber water-bags now made specially for this purpose ; they are about 20 inches long by 5 or 6 inches wide.

or in cases of enlarged liver, apply the heat over the stomach and right side, keeping the cloth well up, as the lower edge of the liver, in the normal condition, only reaches to the lower border of the ribs. In many of the above affections, heat and cold will greatly reduce nearly all the difficulties. In jaundice, bile is absorbed into the system, giving the yellow hue to the whites of the eyes and the skin ; hence, to eliminate, drink large quantities of hot water or hot lemonade at the same time the fomentations are given, which will cause perspiration, and thus remove the poison from the system. Packs are also good.

Other enlarged glands may be treated in a similar way.

AS A DIURETIC,

that is, to increase the flow of urine by acting on the kidneys, WATER is the BEST KNOWN REMEDY, and is harmless. Many people have pain in the small of the back, and a burning sensation when they urinate, and think they must have Bright's disease of the kidneys ; but there is not one case in one thousand thus affected that really has any kidney affection whatever. The feeling of scalding or burning of the urine when passed, is due to irritation of the urethra, from excessive acidity of the urine in the form of uric acid and urates. Many times you can discover this sediment by passing the water into a clean vessel and letting it stand a few hours. Urates appear as a cloudy deposit, usually light in color, although it may be dark. Uric acid will be found as fine red sand in the bottom and about the sides of the vessel. If these are allowed to remain in the system, and become a chronic affection, they may after a long time set up disease of the kidneys, by irritation of those organs. They are also largely the cause of rheumatism. But get rid of them, and thus obviate any further trouble.

These substances, uric acid and urates, should be further oxidized and made use of by the system ; therefore, in such cases, drink plenty of water, three pints to two quarts per day. A glass or two of hot water in the morning, an hour before breakfast, is an excellent remedy. It not only aids greatly in washing these poisons out of the system, but causes contraction of the walls of the stomach, and washes it out, and thus prepares it for digesting breakfast.

Fomentations should be kept up for an hour over the stomach and liver, every day. The hot-water bag will be found almost indispensable for this purpose. It can be had at almost any drug store. Plenty of outdoor exercise should also be taken.

DYSPEPSIA.

The treatment that has just been given for the elimination of poisons from the system, should be followed in cases of dyspepsia. In severe cases the hot-water bag should be applied over the stomach for half an hour to an hour after each meal.

The diet should be simple and nutritious; all kinds of vegetables should be discarded, also starchy food to a large extent. Cream toast made of well toasted graham bread, eggs, meat in moderate quantities, ripe fruits well cooked that are found to agree with digestion, and milk in small quantities, may be used; if agreeable, milk with a little gruel added may be used largely as diet, adding other articles as the stomach will bear it.

Great care is necessary in dyspepsia not to overeat, as more food taken into the stomach than is digested only makes matters worse, because it ferments.

Pepsin may be used in any form. Lime juice and pepsin form a very palatable and good preparation. But these aids are not always curative, and if kept up too long, will weaken digestion rather than strengthen it.

Horsford's acid phosphate acts well in some cases, a teaspoonful being taken in half a glass of cold water, one half hour after meals. But any medicine should only be used for a *short* time, as it is only palliative. The best results are obtained by the hot fomentations, care in selecting the diet, etc. Electricity, where a battery is accessible, passed through the region of liver, stomach, and bowels, is good.

MALARIAL FEVER,

Also known as mountain fever, jungle fever, chills, fever and ague, and biliousness.

Symptoms. — The disease is ushered in, for a few days, by indefinite malaise, such as slight feverishness, and a feeling of fatigue and debility. On these premonitory symptoms there follows somewhat suddenly the cold stage, in which the patient becomes cold, pale, and “goosey,” the teeth chatter, severe headache occurs, the pulse is rapid, and breathing hurried. The cold stage continues for a period varying up to two or three hours, and then gives way to the hot stage, in which the headache becomes more severe; the whole surface of the body is flushed, hot, and dry, the features appear swollen, the eyes bloodshot, the pulse full and strong; thirst is very urgent, appetite lost, the urine scanty and high-colored. The febrile excitement is so great that sometimes delirium occurs in this stage, and may mislead as to the real nature of the fever. The hot stage may last for six hours or upward, and is then replaced by the sweating stage, in which relief comes by, at first, a moisture appearing on the forehead and face, gradually increasing until it breaks out all over the body as a profuse sweat, followed by a general relief of symptoms, and, with the exception of a feeling of exhaustion, the patient is apparently quite well, until another paroxysm occurs, which it is very prone to do. A degree of sallowness of the complexion, however, usually remains, sometimes even after the entire subsidence of the disease. The preceding set of symptoms constitute an “attack” of intermittent fever, or ague, but their subsidence, unfortunately, is not always the complete restoration of health. The subjects of ague, in marshy districts, may almost always be recognized

by their muddy or sallow complexion, indicative of a "cachectic" or impaired state of general health. The extent to which this depreciation of health and vigor may reach depends upon the length of the duration of the fever and the severity of the paroxysms. When these are severe and long continued, serious congestion and disorders of the internal organs are very prone to follow. The spleen is more especially obnoxious to this congested condition, with consequent enlargement known as "ague cake." The enlarged condition of the organ may even be perceptible to pressure beneath the lower border of the ribs on the left side.

Treatment. — Upon first discovering the above affection, put the patient in bed, and if the chill has already begun, apply hot applications to spine and about the body and feet, and if possible, produce a sweat. During the hot stage, use cool compresses to bowels, and also give sponge bath once in fifteen or thirty minutes, according to severity of case. If the chill is over, commence general treatment by giving a saline laxative, such as common salts, or any quickly acting laxative at hand, after, however, giving a five-grain dose of quinine, if an adult person; if a child, give a dose corresponding to the age. Repeat the dose once in one and one half to two hours, until twenty-five to thirty grains have been given.

If the laxative does not act promptly, repeat the dose, or give a warm water enemata. Repeat the quinine the third day if there is any further appearance of the chills or fever. In the meantime, let the patient have plenty of water or lemonade to drink, and every day, or alternate day, give the patient a blanket pack, as follows:—

BLANKET PACK.

Wring a flannel sheet or blanket out of hot water, after getting ready three or four blankets and quilts in which to wrap the patient up. Then after stripping the patient of all clothing, spread the hot wet blanket upon the quilts and blankets, which should be previously prepared on the bed, and let the patient get on to it as hot as he can bear it, when the blanket should be immediately wrapped closely around the patient, followed by the blankets and quilts underneath it, care being taken to tuck them closely around the neck and feet to keep in all the heat possible. Allow the patient to drink two or three glasses of hot water or hot lemonade, also apply to the feet hot bricks, a jug filled with hot water, or fruit cans filled with hot water. The water should be taken through a bent glass tube, or a straw will do, so that the patient may not rise up and thus disturb the clothing.

Keep the patient in this condition from three fourths to one hour; and if you do not produce a profuse sweat the first time, do not give up discouraged; for you will not be the first one who has failed, as it is a difficult and nice point to be able to give a good pack. After you have given it a few times, and learned how, you will find you are master of a powerful weapon for treating many ailments, such as rheumatism and

other diseases requiring the elimination of poisons. In giving the pack, you should always remember you have a patient to think of as well as a disease to combat. As simple as it may seem, a pack properly given is severe treatment; therefore a frail person should not be subjected to the treatment too often, not more than once in two or three days; while a robust person may have it repeated every day.

Diet. — The diet of a patient suffering with malaria, and, in fact, all the common fevers produced by germs, should receive careful attention, not only for the reason that very little food is digested during fevers, but because when more is taken than can be made use of, it not only taxes the system, but furnishes food for the development of more germs, just the thing we should always avoid. The food should consist almost wholly of milk, to which has been added a tablespoonful or two of barley water, thin gruel well cooked, or bran or crust coffee, to prevent the coagulation of the milk. We should not lose sight of the fact that we can get too much of a good thing. The food, whatever it may be, must be given sparingly during the fever. For an adult, it should not exceed one half to two pints in twenty-four hours. In weak patients needing stimulants, use beef tea, made by placing in cold water fresh lean beef chopped or cut fine, and allowing it gradually to heat to a boiling point and remain at this point from one to several hours, when it may be poured off and used. Do not use too much water, and thus spoil the tea by diluting it.

TYPHOID FEVER.

Symptoms. — This fever generally begins with slight premonitory symptoms, such as chilliness, loss of appetite, and heat of skin; sometimes vomiting, and generally diarrhea, which seems to defy remedies. The patient becomes weaker, and from about the seventh to the tenth day from the seizure, there appear on different parts of the body — generally on the back and front of the chest and abdomen — rose-colored spots, which are slightly raised above the surface, but which disappear on pressure, and quickly return when the finger is removed. At first, only two or three make their appearance, and are liable to be overlooked. More come out, but they are very variable in number; in ordinary cases, about a dozen. In forty-eight hours these spots fade out, and are replaced by fresh ones; this crop also fades as the former, and is replaced by another, and so on. The probable severity and danger bear some relation to the number of the spots; the abdomen feels hard, and is tender, but more particularly just above the right groin. The tongue is furred in the center and red at the tip, as the diarrhea continues, the motions being loose, sometimes quite black, at other times light-colored. If this continues, the tongue becomes ulcerated, brown, and dry. The teeth become caked over with a brown matter called “sordes,” and there is great thirst. The pulse ranges between 90 and 120. The temperature will reach 102 to 104 degrees. The patient may become delirious, but this does not always denote that the dis-

ease will assume a serious form. In favorable cases the improvement is generally slow.

Typhoid fever is a self-limited, specific disease, proven beyond a doubt a germ disease. As you see by the symptoms, it is difficult, and sometimes impossible, to diagnose it in the early stages. It is therefore necessary to be guarded whenever there is any suspicion of the malady, and carry out disinfection of all the excretions as follows: Procure a couple of quarts of a saturate solution of bichloride of mercury, and place about a tablespoonful or a little more into an earthen vessel to be used by the patient, together with a pint of water. After the patient has used the vessel, stir the contents, and let stand out-of-doors, well covered, for one hour, to be sure that the germs and spores are all killed.

It may seem unnecessary to some to carry out such precautions; but when we have abundant evidence of whole villages, neighborhoods, and families afflicted with suffering and death from lack of careful precautionary efforts in the first few cases, it is proof enough of the necessity for the small effort required to be thorough in these matters.

The disease is both infectious and contagious. The germs thrive in water, may be carried long distances in the spore form, through the water of the soil into wells or brooks, and perhaps months after, effect their deadly work. They may also be carried in ice taken from impure sources. Sometimes wells or springs become contaminated with the germs, and whole families, or perhaps a whole ward in city or village, is subjected to the dread disease. In all cases of such outbreak of fever, of whatever character, close and immediate investigation should be made both of water, milk, and food, as disease germs may be found in any or all of the above. It will cost but little to bottle up some water, and send to the nearest bacteriologist for investigation.

At Iron Mountain, Mich., a few months since, there was an outbreak of typhoid fever, where a large number of inhabitants came down at nearly the same time. When it was found they all used water from the same well, a specimen was sent away for examination, a sample being sent to the Medical and Surgical Sanitarium at Battle Creek. On cultivation, it was found to be alive with the germs. The source was traced to an unknown man who came into town, and died of fever on an elevation some distance above the town. The excretions, not being disinfected, were thrown out on top of the ground, where they were washed down the slope, and finally found their way into the well above referred to.

The above is but one instance. There are hundreds of like character that might be cited, where many thousands have been carried away, when a little care on the start by way of disinfection would confine the disease to a very limited number.

And what is true of typhoid fever is equally true of any or all of the so-called zymotic or germ diseases, as diphtheria, small-pox, scarlet fever, measles, etc. The source of these dread diseases is not only found in

water, ice, milk, etc., but also in improper sewerage, foul outhouses, swill barrels set in the ground, filthy cellars, etc. Hence the proper way to avoid these pestilences is to carry out proper hygienic precautions.

Treatment. — First of all, as this disease cannot be diagnosed from malaria and some other diseases in the early stages, commence by giving a laxative and quinine, which will be the proper thing to do whatever the case may be, as in nearly all fevers the bowels should be kept free, unless looseness of the bowels be one of the symptoms or complications. If you find the fever yields readily to quinine, you may be pretty sure it is not typhoid fever, as quinine will not reduce the fever in the latter disease. Then you must judge from the symptoms what you have to deal with.

Perhaps by vigorous effort in the early stages the disease may be aborted, or its force lessened. But as it is a self-limited disease, and, when once started thoroughly, yields to no known remedy, all that can be done is to give the patient good nursing, and treat complications as they rise.

The principal feature to combat is the high temperature. This should be held in subjection by sponge baths, with cool water, not ice cold, repeated once in fifteen to thirty minutes or an hour; also by cool enemata of one to one and a half pints water. Let the water pass in slowly, retain a few minutes, and then pass off, using bed-pan. If the injection refuses to come away after a few minutes, use a pint more of water. You need not fear any damage to the bowels in carrying out the above method if done properly. Hang the can about two feet above the patient, and if it causes any pain in passing in, constrict the tube with the finger, so the water may run slowly. Also keep cold compresses on bowels, which should not remain longer than three minutes without changing. When fever is down, keep the compress off, as it acts as a fomentation if allowed to remain.

Remove all clothing from the body of the patient, all through the fever, so the treatment may be given without too much exertion on the part of the patient in changing clothes. Also remove from the bed or next to the patient any flannel blankets, keeping the sheets clean and changed often, avoiding wrinkles. By all means avoid feather-beds, mattresses being the best.

There is no danger of bed sores if care be taken to keep the bed entirely clean, and not to allow the patient to lie too long in one position.

It is very necessary to keep the room well ventilated. Remove all sofas, rugs, etc., making the room as tidy and pleasant as possible.

At times when the temperature gets well up, and the skin dry, a hot fomentation to the spine will many times start the perspiration and lower the fever, by action of the heat upon the heat centers. The same thing will be found of value in case of subnormal temperature, where there is profuse sweating. An alcohol sponge bath is good also; dilute the alcohol with two thirds water. In giving the above fomentations, sponge baths, etc., be careful to keep the clothing about the patient dry. There is no reason for wetting the clothing. Take a limb at a time, and not expose the

whole person at any one time Dip the sponge into the water, and squeeze it until the water ceases to drop; then moisten the surface of the body, allowing the moisture to evaporate. Never wipe off with a towel, as the friction thus produced would cause more heat, instead of lessening it. Good nursing, with careful treatment as above described, will do more than doctors and medicine.

In case of hemorrhage from the bowels, do not get frightened, as many cases make a change for the better at such times. If the patient has a chill, or sudden drop of temperature, which is usually the case in hemorrhage, apply heat to spine, and ice-cold compresses to bowels, giving a teaspoonful or two of turpentine emulsion.

When stimulants are needed, use beef tea, not alcohol, as is so often prescribed, as it is not stimulating in any degree whatever, while beef-tea properly made is a true nerve stimulant.

There is no benefit derived from anti-pyrine, or anti-febrine, and the whole list of drugs which are many times used, the fact being admitted by the general profession. Mercury in the form of calomel in two or three grain doses two or three times a week is sometimes beneficial to act on the liver. When the mouth and tongue are dry, cracked, and coated, a teaspoonful dose of turpentine emulsion acts well, given three times a day.

The diet is of great importance in typhoid fever, as the specific germ lives and thrives in the alimentary canal, and the principal lesions are produced there by a ptomain, an acid substance generated by the germs. Hence if we allow the patient more food than can be made use of, it decomposes, makes food for the germs, and adds to the severity of the disease.

It has been found by experiment that milk (always given with thin gruel, barley water, or crust coffee) and fruit juice form by far the best diet. The fruit juice can be had from canned fruit; or let the patient have ripe grapes and oranges, avoiding the seeds and skin.

The milk and the fruit juice need not necessarily be given at the same time. If the patient becomes low and weak, use beef tea in place of or in addition to the above, as a stimulant; or if milk does not relish, avoid giving too much, for an adult not to exceed two pints for twenty-four hours. Give no solid food during fever. When the appetite comes on during convalescence, use solid food with care, as fatal hemorrhages have occurred two or three weeks after the patient was up.

A few persons should care for the patient, no outsiders being allowed. Do not sit and whisper, or even talk aloud more than is necessary, as all such unnecessary things annoy the patient. Always make the patient as cheerful as possible, never showing by any act or word to the patient that he is in danger.

After the case is over, it is necessary to disinfect the room thoroughly, washing the walls and furniture with 1-2000 solution bichloride of mercury. All clothing, etc., used in the room should be boiled for an hour before

they can be used with safety. It should also be added that during the sickness of the patient, no food or water should be allowed to stand in the room for any length of time, and afterward used ; also the hands of any one caring for the sick should be dipped into 1-4000 bichloride solution every time the patient is handled, or the nurse leaves the room. Many nurses take the disease by neglecting the above precaution, and allowing their hands or fingers to come in contact with their mouth or lips.

MEASLES AND SCARLET FEVER, WITH TREATMENT FOR BOTH.

MEASLES.

This much dreaded infantile disease entails more evils on the health of childhood than any other description of physical suffering to which that age of life is subject. It is dangerous because it is so common.

Measles is an eruptive fever with catarrhal symptoms, referable to the bronchi-pulmonary mucous membrane, self-limited, and terminating in about two weeks. The majority of cases need nothing more than good nursing, with plenty of fresh air, avoiding sudden drafts, to prevent taking cold.

The unfavorable symptoms in measles are a high degree of fever, the excessive heat and dryness of the skin, hurried and short breathing, and a particularly hard pulse. The after consequences of measles are, croup, bronchitis, mesenteric disease, abscesses behind the ear, ophthalmia, and glandular swellings in other parts of the body.

Treatment. —The old method of confining the patient to a close room and covering him with quilts, etc., is found to be detrimental. The impure air should be replaced by fresh air, and nature thus aided in eliminating the poison from the system. The eyes should be protected from bright light, but it is not necessary to keep the patient in a darkened room.

In cases of lung complications, which are common, the difficulty should be treated the same as uncomplicated cases by use of fomentations over the chest, and hot steam inhalations by use of a steam atomizer ; and in severe cases a physician should be called. In cases where the eruption does not appear as soon or as thoroughly as it should, give the patient a good pack, as described in the treatment of typhoid fever, or give fomentations to the spine.

Great care should be given the eyes for some time after the disease is over, not subjecting them to any strain whatever, as they are very liable to be left in a weak condition, which takes some time fully to recover from. The food should be simple and nutritious,—milk, gruel, ripe fruit, and fruit juices.

SCARLATINA, OR SCARLET FEVER.

Though professional accuracy has divided this disease into several forms, we shall keep to the one disease most generally met with, the com-

mon or simple scarlet fever, which, in all cases, is characterized by an excessive heat on the skin, sore throat, and a peculiar speckled appearance of the tongue.

Symptoms. — This is a highly infectious eruptive fever, common to all ages, but more especially to the young. It makes its appearance sometimes almost suddenly, but generally after a day or two of general indisposition, in which vomiting almost always occurs. The rash consists of minute scarlet spots, which are scattered over the entire body. They are not raised above the surface of the skin, over which a diffuse redness commonly prevails. The characteristic appearance is presented by the tongue, which is of a bright scarlet color round the edges, the middle being furred with the papillæ of a bright scarlet color, standing out, and giving it the appearance of a strawberry. The throat is sore and scarlet, with difficulty in swallowing. On examining the throat, it will be found that the tonsils are often swollen and ulcerated. The glands in the neck are swollen also. The pulse is rapid and small. There is great thirst, with entire loss of appetite for food. The rash lasts from five to seven days, when it gradually fades away. The skin, after a variable period, begins to peel off as fine dust or scales ; sometimes large flakes come off. The entire skin of the fingers or toes sometimes comes off in one piece, like the finger of a glove. The itching caused by the eruption is sometimes a source of great irritation and sleeplessness. In the active febrile stage of the disease it often happens that delirium occurs during the night, and subsides with the fever.

In order to be thorough, we repeat the symptoms : Cold chills, shivering, nausea, thirst, hot skin, quick pulse, with difficulty of swallowing ; the tongue is coated, presenting through its fur innumerable specks, the elevated papillæ of the tongue, which gives it the speckled character, that, if not the invariable sign of scarlet fever, is only met with in cases closely analogous to that disease. Between the *second* and *third* day, but most frequently on the *third*, a bright red efflorescence breaks out in patches on the face, neck, and back, from which it extends over the trunk and extremities, always showing thicker and deeper in color wherever there is any pressure, such as the elbows, back, and hips ; when the eruption is well out, the skin presents the appearance of a boiled lobster-shell. At first the skin is smooth ; but as the disease advances, perceptible roughness is apparent, from the elevation of the rash, or, more properly, the pores of the skin. On the *fifth* and *sixth* days the eruption begins to decline, and by the *eighth* has generally entirely disappeared. During the whole of this period, there is, more or less, constant sore throat. Sometimes a sore throat is all that is complained of ; yet with only that symptom showing, this person may give scarlet fever to another, of the most virulent form. The sore throats that people talk of as “catching” are chiefly none other than those occurring in scarlet fever of a mild type. Scarlet fever is not a dangerous disease in itself, usually, as compared with some other eruptive fevers. The mortality at the London Fever Hospital is, according

to Dr. Murchison, a high authority in this country, in scarlet fever only six or seven per cent, and the cases sent there are the worst from out of all London.

 *Points of special caution. Danger of relapse to be prevented.* — In this hospital, too, rarely is seen any of those dreaded consequences of the fever which are ushered in about the third week, and serve to mount up the mortality of cases in private life, or injure the health of many others. How are these avoided there? By keeping the patients strictly in bed for three weeks, however slight the case may seem. During the course of the disease, the kidneys are more or less affected. After the rash of scarlet fever has subsided, and about the seventh day from the date of the attack, the skin begins to peel more or less off, and takes about a fortnight thus to shed. This new skin is delicate, and its action easily suppressed. If the patient with it in that condition receive a chill, that is just what happens. The functions which ought to be carried on by the skin are thus thrust inward to be performed by the kidneys,—a work they are unable to fulfill from their already impaired condition; and hence follows acute inflammation of these organs, and death after that is often rapid. If not, then is seen dropsy, rheumatism, swollen glands, diseased joints, and other serious complications, which all tend, in ordinary life, to raise either the mortality to an undue height, or permanently to injure the constitution of numbers. Speaking generally, these are not the results of the fever, for they are avoidable. They are grave complications, most common after slight cases, in those very cases of so-called “scarlatina” which people wrongly think is not scarlet fever.

Treatment. — Scarlet fever is a self-limited disease, running a definite course; hence good nursing is very essential. The apparently very light cases should receive prompt and careful attention; for very often these are the cases that prove the most severe in the after results, as Bright’s disease of the kidneys may result some years after.

In the present stage of our knowledge, the most reliable and certain prophylaxis is the isolation of patient and nurses, and the thorough and judicious employment of disinfectants upon their persons and in the apartments; applications to the patient should be 1-7000 of bichloride solution. (See also *Germs*, pages 574-577.)

All furniture and articles not absolutely required should be removed from the sick room, and no one should be allowed to enter it except the medical attendant and nurses. Constant ventilation should be insisted on by lowering the upper sash of the window two or three inches in mild weather. Even in stormy weather this ventilation should be carried out, avoiding drafts upon the patient. Since the exhalations from the body, the various excretions, and the epidermic cells shed so abundantly in the desquamative period contain the scarlatinous poison, measures should be employed to disinfect them, in so far as the comfort and well-being of

the patient will allow. All excretions should be disinfected, as given in the article on Typhoid Fever. By the frequent application of disinfecting washes to the nostrils and fauces, the secretions from these surfaces are to a great extent deprived of their contagiousness. If suppuration of the ear takes place, it should be syringed out with saturated solution of boracic acid. Even as late as the fourth week after the disappearance of the rash, children experience relief from unction of the surface with corbolated vaseline, which can be had at any drug store. The application should be made twice daily over the entire surface; contamination of the air through the exfoliations and exhalations from the skin is thus greatly prevented.

A convalescent child should not be allowed to mingle with other children till three or four weeks have elapsed, and desquamation has ceased; and all who are liable to take the malady should be excluded from the room in which a case has appeared, for a longer period, and until it has been thoroughly disinfected by burning sulphur after the room has been corked about the windows and doors. Three pounds are needed for a room 12x12, and a corresponding amount for larger rooms. The room should remain closed for twelve hours, and then opened and ventilated. A more thorough method is to wash the walls and furniture with 1-200 bichloride solution of mercury. All clothing, bedding, or other articles not absolutely necessary for the use of the patient should be removed from the sick room. Articles used about the patient, such as sheets, pillow-cases, blankets, or clothes, must not be removed from the sick room until they have been disinfected, by boiling for one hour; all straw beds should be burned. By such measures of prevention there can be no doubt that the number of cases of scarlet fever can be greatly reduced. The room of a scarlet fever patient can be so carefully handled that there need be but one case in a family, even in large houses.

These precautions should be as thoroughly carried out in cases of typhoid fever, measles, small-pox, diphtheria, etc., and thus save much suffering and many lives.

CROUP.

This is by far the most formidable and fatal of all the diseases to which infancy and childhood are liable, and is purely an inflammatory affection, attacking that portion of the mucous membrane lining the windpipe and bronchial tubes, and from the effect of which a false or loose membrane is formed along the windpipe, resembling in appearance the finger of a glove suspended in the passage, and, consequently, terminating the life of the patient by suffocation; for, as the lower end grows together and becomes closed, no air can enter the lungs, and the child dies choked. Croup is always sudden in its attack, and rapid in its career, usually proving fatal within three days; most frequently commences in the night, and generally attacking children between the ages of three and ten years. Mothers

who have children predisposed to this disease, should, therefore, be on their guard, and immediately resort to the means hereafter advised.

Symptoms. — The following is generally the course of the disease: A child is put to bed in its ordinary health, apparently, or it may have a slight cold, and a cough a trifle rough, but not enough to excite attention to it. After a variable time the child wakes up with a hoarse, ringing, rasping cough and difficulty in breathing, and a countenance expressive of its trouble, each inspiration and expiration being attended with a rough, metallic, tubular sound, and the voice masked or obliterated by a harsh, hoarse, croaking vocalization. The cough is dry, harassing, and unattended with expectoration in the outset, but after awhile some portions of a membrane-like mucus may be coughed up. The pulse becomes rapid, the skin hot, the countenance more and more distressed; and if relief be not afforded, the patient becomes drowsy, the complexion becomes blue, and the little patient may die from suffocation within forty-eight hours. Happily, however, this is not the most common course of the disease, if the treatment be prompt and active.

Treatment. — The means employed in the treatment of membranous laryngitis, or croup, are naturally divided into two classes, — local and systemic.

An almost infinite variety of remedies have been applied to the throat. We mention only those that are really useful. Caustic applications, as nitrate of silver, the mineral acids, etc., are injurious; for although they may remove the false membrane, they cannot prevent its re-formation, and the extension of the exudation is invited to the healthy tissues corroded by the caustic.

Solvents that are not irritating are the most useful. The first and most important one is lime water, which may be applied with a swab, a brush, or an atomizer. The spray from the atomizer should be almost continuous; the application of the swab or brush, very frequent. The inhalation of the steam made by dropping small chunks of quick lime (fresh burned) into a wide-mouthed bottle, and inhaling while the lime is slacking, is excellent. Repeat often. Next to lime water as a dissolvent is lactic acid. Use by adding enough of the acid to water to produce a distinctly sour solution. Apply as above.

Chlorate of potash, a saturate solution, is used by many with good results. Apply same as lime water. Bromide of potassium and ammonium may be used in the same way.

The air of the apartment should be kept moist with the vapors of eucalyptus and turpentine oils, which can be accomplished by boiling in a vessel some eucalyptus leaves with spirits of turpentine. This latter has been found to be exceedingly useful in children's hospitals. In addition to the above, ice should be applied to the throat by using a rubber ice-bag, which can be had at any drug store. It will both ease the pain and congestion, and retard the growth of the membrane.

The internal remedies are equally numerous. There are three objects to be kept in view in the treatment of true croup : 1. To detach, remove, and prevent the formation of false membrane ; 2. To prevent the attacks of laryngeal spasm ; and 3. To maintain the strength.

Quinine and bromide of ammonium seem to do the best work in the majority of cases. As an emetic, alum given in one half to one teaspoonful doses, powdered fine, is the best. It should be given in some sirup or sugar, avoiding the teeth as much as possible, as it attacks the enamel. This, given when the throat seems to fill up, will aid in removing the obstruction by producing vomiting ; lukewarm water will sometimes do the work.

Care should be used in diet, giving nutritious and easily digested food, as milk and gruel ; also give good beef tea as a tonic.

WHOOPIING COUGH.

Symptoms. — A contagious or infectious disease, beginning as a common cold, and, after a few days, when the febrile symptoms have disappeared, showing a spasmodic or paroxysmal character. The cough comes in distinct fits, each of which consists of a series of forcible expirations or cough noises, followed by an inspiration, or hard drawing in of the breath, with a sound almost exactly like the word “whoop,” hence the name. The fits are accompanied with great distress to the patient — the face becomes red, the eyes bloodshot, and at times bleeding from the nose and mouth takes place. These fits are terminated generally by vomiting. During an attack, a child will exhibit great fear, and will run to its nurse or mother, to whom it will cling tightly for protection, as it were, against the cough.

Treatment. — As whooping cough runs a definite course, little can be done but to meet the symptoms as they arise. If too much irritation of the throat occurs, apply fomentations to the upper part of the chest. In cases of nausea and vomiting, use some expectorant remedy, as white pine expectorant, to which add one to three drops to the dose of ipecac, fluid extract or tincture ; or the sirup of ipecac may be used alone. In such cases, avoid overloading the stomach, also avoid greasy articles of diet.

Mild cases of whooping cough need no treatment other than to keep the body warm, avoiding colds, and allowing plenty of outdoor exercise.

DIPHTHERIA.

Treatment. — All the necessary precautions laid down in the case of scarlet fever should be followed out closely in diphtheria. It is found that many of these diseases are self-infectious, that is, the disease is kept up by inhaling and taking into the body the specific poison generated by the disease. This poison is thrown off from the surface of the body and exhaled ; and if allowed to remain about the patient for lack of ventilation, or collect upon the clothing, it is inhaled, and intensifies the disease. This subject is receiving great attention among the medical profession at

the present time, and there is no doubt that many relapses in case of the various diseases are due solely to lack of proper effort on the part of the nurse in caring for the patient, and in the future it should receive the closest attention. Good ventilation should be kept up, and daily changing of the bed clothing and any article worn by the patient.

Another point that should receive careful attention is the source of the poison or germs that produce these diseases. The privies should be looked to, the cellars should be overhauled, sewers examined, the swill barrel or place of disposing of slops should be investigated, as the majority of these diseases, especially diphtheria and typhoid fever, originate in some of these places. Unless the source of the disease be destroyed, who can say where it will stop? The best and cheapest way to disinfect these places is by the use of sulphate of iron (copperas) one and one half pounds to a gallon of water, used plentifully; and in case of a foul privy, several pounds of the crystals should be thrown into it.

A physician should be called at once in a suspected case of diphtheria. Gargles of saturated solution of chlorate of potash should be kept up almost constantly, and once in fifteen minutes gargling a solution of permanganate of potash, three grains to the ounce, forty-eight grains to the pint of water. This should be used once in fifteen minutes as a disinfectant. In cases of high temperature, sponging the surface with cool water should be kept up at intervals of fifteen to thirty minutes. Ice packs should be used about the throat in case of too much inflammation.

Care should be taken in using it, especially upon young children; the pack should not be allowed to remain too long at a time, or it will produce pain.

There are many things made use of in these cases; however, there is no specific, different cases needing to be treated differently. In all cases, however, plenty of moisture should be kept constantly in the room. This can be done by burning an alcohol lamp in summer, or by use of a stove in cool weather. Adding sufficient spirits of turpentine to the water to keep a strong odor in the room is good. By use of the water vapor the throat is kept moist in it, and aided in throwing off the membrane. A spray to the throat by use of an atomizer is good, using the chlorate of potash, permanganate of potash as above, and also lime water, made of quick lime 1-800 part, or stronger in adult patients.

FOR CURE OF DIPHTHERIA.

Given by Mrs. J. Ogden Doremus, wife of the eminent chemist of New York City.

Lime-water and carbolic acid. Spray the throat with it once an hour.

PNEUMONIA.

Treatment. — By the symptoms, we see that pneumonia comes on with a sudden and usually severe chill; hence, when such symptoms appear,

especially when accompanied by a cold, great effort should be made at once, for the purpose of throwing off the attack, if possible. This should be done by applying hot fomentations to the spine and chest; a hot leg bath should be given in a large pail, with a tablespoonful of mustard flour added to the water if at hand; if not, use the water clear. At the same time the foot-bath is given, the patient should use a steam inhaler as hot as can be borne; this soothes the air passages, and aids in expectoration if to the water in the atomizer is added fifteen to thirty drops compound tincture benzoin. Then have the bed warm, and put the patient into it, keeping the feet warm at all times.*

When an attack of pneumonia is once established, fomentations to the chest should be kept up at intervals over the region of pain, being careful not to wet the clothing about the patient, which is unnecessary if the fomentations are given as follows:—

FOMENTATIONS.

Take heavy flannel cloths (underwear will do if nothing else is at hand), and wring them out of boiling water by keeping the ends dry to handle with; have a dry cloth (flannel) spread out ready, and upon taking the hot cloths from the water, fold them the desired size, lay them upon the dry cloth, and immediately wrap up and apply to patient. The dry cloth not only protects the clothing from getting wet, but confines the heat. The process should be repeated every three minutes for an hour or so; then, with a cloth or sponge wet in cold water, cool off the part fomented, and dry, after which rub the part over with a little vaseline or soft oil, to protect against more cold.

All through the attack, as long as the patient is able to use it, the inhaler should be used three or four times a day, from fifteen minutes to half an hour at a time. This can be used while the patient is lying down.

With the beginning treatment, or at the onset of the disease, a saline laxative or warm enema should be given, followed by twenty to thirty grains of quinine, in divided doses; five grains every two or three hours act best in adults; children should be given a corresponding dose.

If the above directions are carefully followed out, giving attention to the diet, using milk and gruel, fruit juice, fruit, and beef tea as a stimulant, almost any case of simple, uncomplicated pneumonia can be successfully treated.

In severe cases, a physician should be called at once.

* Every family should be possessed of an atomizer, as they are very useful in common colds, sore throats, etc. They can be had at 60 cents each by addressing the Medical and Surgical Sanitarium, Battle Creek, Mich., full directions accompanying them. They are sent by mail to any address.

ATHSMATIC BRONCHITIS.

The following treatment effected a cure in the case of a girl sixteen years of age, who was afflicted with this trouble. She was otherwise healthy. She had had the bronchitis for three years, and had doctored with leading practitioners for nearly that length of time with no benefit. She had to sleep in an almost upright position, and she could not walk up an ordinary pair of stairs without resting. In two months' time she was permanently cured by inhaling twice daily the vapor of compound tincture of benzoin, prepared as follows :—

Procure a common tin quart-pail with cover, having a spout something like a kerosene can, on which attach a short piece of rubber tubing four to six inches long, and insert a piece of glass tubing into the rubber for a mouth-piece. Fill the can from one third to one half full of hot water. Drop into the water fifteen to twenty drops of compound tincture of benzoin. Now, sitting in an erect position to give the greatest freedom to the lungs, inhale the vapor, then gradually exhale through the nostrils. Repeat this about ten minutes twice a day. If necessary, repeat in four or five hours.

In connection with this, a breathing exercise should be conducted three or four times a day, by raising the arms over the head slowly, at the same time taking in a deep breath of air; this exercise to be continued five minutes.

This can method of benzoin inhalation will be found one of the best remedies for common colds and sore throats that can be used, especially for colds settled on the lungs. If you cannot get the benzoin tincture, use the steam of hot water alone.

RHEUMATISM.

Treatment.—In rheumatism of whatever form, there is an excess of acid in the system, in the form of uric acid, etc., also an excess of urates. To a large extent these can be eliminated from the system by copious water-drinking and eliminative treatment, as packs and steam baths. A good steam bath can be given by placing the patient in a chair, and putting one or two quilts around both patient and chair, allowing the quilts to reach the floor, being careful to draw them close about the neck, so that no steam may escape. Now place underneath the chair a dish of hot water; and by keeping small hot stones the size of the double fist, or pieces of brick, and dropping them into the water, which should cause the water to boil vigorously, you can thoroughly steam the patient. Keep the process up for one half to one hour, then carefully sponge the patient off with cool water, and dry; avoid taking cold. In giving this bath, or any other hot treatment, it is always best, when there is any liability of taking cold, to rub the patient over with some soft oil, as cocoanut oil; or vaseline will do. Afterward

wipe with a towel, to avoid greasing the clothing. There is very little risk to run, if this method is followed.

While in the bath, the patient should drink plenty of hot water. The treatment should be repeated as often as once a day, in strong patients, who are able to stand it ; or two or three times a week in less able patients.

Electricity and massage are also useful agents. (See Rheumatism, p. 607.)

FOR DIARRHEA.

THE BEST EXPERT TREATMENT.

Tannate of glycerine made by dissolving one drachm of tannic acid in one ounce of glycerine ; starch-water made by stirring a little starch in water until it is about the consistency of thin mucilage when heated. Mix from one to two drachms of the tannate of glycerine with two or three tablespoonfuls of starch-water, and give as an enema. For a child, use one eighth to one fourth of the above dose, according to age.

CONSTIPATION.

There is no disease flesh is heir to that gives the human family so much trouble as constipation, nor is it simple to manage. It is usually a chronic affection, brought on by using laxative and cathartic pills, which everybody should avoid excepting in urgent cases ; for after long-continued use of these helps, the bowels refuse to act without this or some other aid. Another great source of this evil lies in our food.

The intestines are muscular organs, and by their contractions force the food along the alimentary tract. These contractions are brought about by stimulation from the waste material in the food we eat ; hence if we partake largely of a class of food that gives little waste, as fine flour bread and delicacies, the muscular tissue will waste and become weak, as an arm would if tied up in a sling for six months. Therefore we should avoid this difficulty by using coarser food, as graham bread, fruits, grains, vegetables, etc., thus keeping in healthy action the muscles of the bowels.

A glass of cold water taken in the morning on rising and also on going to bed, is an aid ; also kneading the bowels gently and persistently, and by the use of electricity, by passing a current through from one side to the other, by placing one electrode on the spine and the other at different places over the bowels.

In extreme cases, a physician should be consulted, although the above treatment acts well in the most severe cases.

Horse-back riding is excellent, also riding in a hard-riding buggy or wagon daily.*

*Eat plentifully of well-cooked, rolled oatmeal, baked apples, graham bread and graham mush, Florida oranges, stewed prunes, strawberries, etc. If the bowels will not move, obtain a good syringe, and use an enema of warm water, not hot, using more or less as may be necessary. This is the treatment used for immediate relief in all sanitariums.

As great care is needed in the use of laxatives in cases of constipation, the enema should be employed only in cases of extreme necessity ; for all such aids are but doing Nature's work. It is far better to use rolled oats, cracked wheat, and other grains, with ripe fruit, grapes, oranges, etc., and thus give Nature a chance to do her own work. Usually, however, there are chronic cases that are stubborn to yield to any simple method. In such extreme cases, we may resort to pills or laxatives, such as cascara, sagrada, or the "anti-constipation pills" made by the Upjohn Pill & Granule Mfg. Co., at Kalamazoo, Mich., which can be obtained by mail.

In using these articles, the best results are obtained by taking a sufficient dose to produce one evacuation of the bowels in twenty-four hours. Take one or two pills to start on, and then keep it up from six to eight weeks, and in extreme cases three months, by taking a dose every night at bed-time, gradually lessening the dose until none is taken. If one pill be sufficient on the start, after a few days take three fourths of a pill by dividing one ; in a few days take one half, and so on, thus acquiring a habit. At the same time, plenty of water should be taken and proper diet, avoiding too concentrated food.

COLIC.

This affection often accompanies diarrhea, and usually disappears upon the removal of the latter. In uncomplicated cases, hot fomentations applied to the bowels are excellent. Dry heat applied by heating thick earthen plates or dishes, wrapping them in cloth and applying, is good. Hot enemas and a glass or two of hot water may also be used to advantage. One-half to one ounce of the tincture of assafetida given by enema in a little warm water, will often check the pain when other remedies fail. In giving the hot applications, do not expect relief too soon, but keep them up vigorously for hours if need be, and as hot as the patient can bear them.

NEURALGIA.

Neuralgia, or nerve pain, as the word implies, is a very common affection, and there are a great variety of remedies ; but we shall give here those which produce the best results in the majority of cases.

In the first place, all morbid or depressing conditions of the system should be altered by improving the general health by plenty of outdoor exercise, especially in the sunshine. Let the sun shine into your houses ; if in an office on the north side of the house, remove by all means where the sun can beam into your room. Sunshine has great curative effect in neuralgia. Go to a dentist, if facial neuralgia be the form, and have all decaying teeth removed, as many times much suffering may be put to an end by removing some old and decaying tooth.

Many cases will yield to heat, either in the form of fomentation, or dry heat, by heating a flat-iron, wrapping it up in a woolen cloth, and lay-

ing it close to the seat of pain. Massaging is excellent ; pressing the heat between the hands is also good. Electricity acts well in many cases, galvanism being preferred.

DISEASES PECULIAR TO WOMEN.

Dysmenorrhœa, Menorrhagia, Amenorrhœa, and Metrorrhagia. — These terms all apply to the menstrual period, or flow, and are defined respectively as follows : Painful menstruation, excessive menstrual flow, non-appearance or cessation of flow, and flow at other times rather than the regular period. These are not diseases of themselves, but signs or symptoms of disease, and occur from various causes. The most common, excepting amenorrhœa, are displacements of the uterus, abortion, sexual excesses, self-abuse, abnormal growths in or about the pelvic organs, such as fungus and fibroid growths.

Amenorrhœa has two meanings : 1. Where the flow does not appear in early life at the proper age and time ; 2. A cessation of flow after it has been once established. In the latter case, it may cease from various causes, as from consumption, from pregnancy, from taking cold at the menstrual period, or from the menopause, or change of life, which occurs between the ages of forty-five and fifty-five, although it may vary either way. Cases are recorded where the menopause took place at as early an age as thirty years, and children have been born to women at seventy-five ; the average age, however, is fifty-two and one half years.

Since these are but the signs of disease, and point, many times, to grave disorders, they should not be allowed to run from month to month, but a reliable physician should be consulted at once, avoiding by all means, if your life is worth anything, all advertising quacks and advertised drugs.

If these warnings were only heeded, it would save the women of the world much suffering and death. Just think for a moment of the absurdity of expecting to put in place a misplaced organ by use of drugs, or to remove abnormal growths by drugs, or, in fact, to remove any of the causes by aid of such nostrums ! There are certain aids that can be used until a physician can be called, such as applying fomentations to lower part of bowels, hip pack, etc., in cases of painful menstruation.

In excessive flow, elevate the foot of the bed four inches or more by use of bricks or blocks, which will, if the patient keeps quiet, give almost immediate relief. Hot vaginal douches long continued are good. Go to bed upon the appearance or approach of the period ; this will have a curative effect in simple cases. Sudden cessation of the flow, which occurs often upon taking cold at or just before the menstrual period, can many times be obviated and the flow brought on by putting the patient into a warm bed, applying hot bottles or fruit cans filled with hot water to the hips and lower extremities, getting up a good sweat. This should be kept up for some time. But all such cases should receive medical aid as soon as possible.

BROKEN BONES OR LUXATIONS.

By the latter term we mean displacement of joints.

In either of the above accidents, a physician should be called as quickly as possible. In the meantime, the limb should be fomented vigorously, both for the relief of pain, and to avoid swelling, in order that the physician may be able to set the limb on arrival. Many cases, if left to themselves, will in a few hours become so swollen that the physician can do little with them.

Fomentations will be found equally as efficacious after the fracture is reduced.

HEMORRHAGE.

In cases of severe hemorrhage, resulting from a cut or injury, the first thing to do is to apply pressure upon the heart side of an injury. If not acquainted with the course of the blood vessels, constrict the whole limb above the wound, by tying a handkerchief about the limb, and twisting in a stick to tighten it. If the wound be upon the body, apply pressure with a piece of cloth, if at hand; if nothing else, use the hand until relief be had; if from the nose, hold both hands of the patient above the head for some time.

HICCOUGH.

Hiccough can be relieved many times by swallowing small bits of ice, or a drink of cold or hot water. Heat or cold applied over the stomach is good. Holding the breath will often act well.

NERVOUS PROSTRATION.

A WARNING FROM THE AUTHOR'S EXPERIENCE.

Nervous prostration, or breaking down of the nervous system, is becoming so common that, with the hope of being able to benefit persons who may by overwork or other causes be breaking themselves down in this way, I am induced from my own experience, and the advantages of extensive observation, to give here such hints as I think most valuable for their benefit.

When I first took the road, I was as tough and rugged as a man could be. It would seem as if I could endure the most severe trials and exertion with impunity. But though of the most strictly temperate habits, the long-continued strain of nearly twenty years, to which my arduous duties and position subjected me, in time so seriously affected me that for years it was only with the greatest difficulty I was able to continue my work; and finally I became so prostrated that I could do no more.

Ignorant myself of the real causes of my derangement, and notwithstanding my consulting many eminent physicians, not one warned me or pointed

out the true cause of my trouble, namely, that I was breaking myself down by overwork, and that it should be desisted from. They prescribed tonic and other treatment, and so I drifted along, pushing myself constantly to the greatest effort, until I reached the limit of my strength.

At first this trouble was noticeable by severe nervous headaches, with great sense of prostration ; these effects were gradually intensified, followed by heat in the head, irritability of temper, and extreme tired feeling, especially in the morning, great sensibility to slightly disturbing causes difficulty at times to sleep, and general disturbance of the nervous system. These symptoms increased until I could do no more, and was compelled to leave the road.

In my travels through the country, and since then, I have noted a great many who have been, and are, breaking themselves down through ignorance of the conditions and causes of trouble, and who, I am sure, would gladly avoid such consequences if they were only pointed out to them in a way they could understand. This being intended more particularly for a farmers' book, I would state this for their especial benefit.

Through the country, I found, in many instances, farmers' wives, perhaps not in robust health, who often, in addition to doing all the cooking, washing, and mending for a large family, attended to the dairying and other household duties. The result would be headaches, irritableness, and increased sensibility, which compelled them to take rest. These symptoms would be gradually intensified until there was a severe fit of sickness, or a complete breaking down of the vital forces, with other peculiar symptoms showing great general weakness.

The following are also common to this difficulty : In very severe cases, pain and heat in the head, this perhaps extending down the spine, being at times very severe, at others hardly perceptible ; sometimes a sense of coldness and pressure in the head ; tenderness of the scalp and spine, either or both ; cold feet ; great sensitiveness to the least chill or current of air, especially across the shoulders. One of the peculiar symptoms in extreme cases is an utter sense of prostration ; at times it would seem as if one would suffocate, yet be able to breathe all right ; one is unable to read or bear the light ; and talking much, especially to certain persons, proves exceedingly prostrating. The digestion is usually greatly impaired. The husband is generally a jolly, robust fellow, able to bear any excitement, and cannot see why his wife should be so sensitive and nervous to causes that others do not notice, believing that it is only a matter of idle fancy she should learn to control.

My experience in sanitariums since leaving the road has brought to my notice thousands of men and women who have become completely ruined in health by these and other causes of excessive nervous strain, until they were thoroughly prostrated, and had come to feel the greatest sense of misery. Had their friends and families known the causes and the sufferings which were sure to ensue, they would naturally have been

among the first to guard them from it. Very few of them have the remotest idea of the real cause of trouble, and still less of the proper course of treatment. The results, in an aggravated form, produce frequently extreme prostration and pain. I have known many who could not even stand up, or bear the conversation of others.

In my own case, after leaving the road, I could not for years go into a lighted room, or bear the strain of conversation for more than a few minutes, without causing the most serious feeling of prostration. I could not write a letter, or even a postal, without affecting me for days ; I could not get any sleep ; the whole nervous system was, as it were, torn to pieces with an impression of the most utter misery. All these symptoms, with many others that I might mention, are indications that must be heeded promptly.

Now as to treatment. Medicine will here do practically nothing. Physicians will usually prescribe freely tonics and other stimulating medical treatment, but it is like whipping up a horse that is already tired and overworked, until there is no reaction of the nervous system, and he can go no farther ; instead of putting him into a stable, feeding him generously, and taking the nicest care of him until he regains his strength. This is the only true principle and key to recovery, — simply taking the nicest possible care of the health, watching every little point of derangement and guarding it, taking the best and most nourishing food, such as the system can most successfully appropriate, diverting the mind without fatigue, giving freedom from all annoyance and care, with plenty of sleep, avoiding all causes of disturbance, and waiting for nature to recuperate. There is no patent way of getting out of these troubles. Any man or combination of men who promise to do so by giving medicine, and especially by any of the advertised patent medicines, you may put down as either ignorant of the true conditions of recovery, or deceiving you for mercenary purposes, and therefore not worthy of confidence. Certain stimulants and tonics may make you feel better for the present, but let me tell you that I have seen hundreds who have been through this sort of thing, and it was like whipping up the horse, before referred to. Every case of cure brought to my notice has been accomplished by these general measures of recuperation. At sanitariums where these difficulties are treated very intelligently and successfully, they take away all tonics and narcotics. Of course a great deal can be done by intelligent medical help, and in extreme cases it is indispensable ; but what is generally needed are mainly hygienic measures, such as careful regulation of food, the use of heat or fomentations to the nerve centers, massage, electricity, measures of equalizing and stimulating circulation, protection from all causes of irritation and excitement, etc. It is very important to have the food adapted to the conditions of the system ; if the digestion is weak or slow, it must be of a light, plain, nourishing character, nothing stimulating. The judicious drinking of hot water is a very important auxiliary. Give

isolation from visitors. It is very important to have the sleeping room fresh, clean, and well ventilated. For those strong enough, the very best measure during pleasant weather would be camping out; this of itself will do wonders. These, with a hundred little things, are essential to success.

Dr. Kellogg, the chief physician of the sanitarium in which I have been for the past seven years, has had great experience and success in the management of nervous troubles especially. He is a man of decided ability in the profession, the author of several fine works, and is especially successful in delicate surgical operations. He can be safely consulted. The sanitarium of which he is chief is considered the finest and most complete in all its arrangements of any in this country or Europe.

HEADACHE.

Since writing this article, the following, from an eminent physician, has been brought to the writer's notice, and it is included as of additional importance to the reader :—

“There are many kinds of headaches. In these days, the nervous headache is a distinct variety. It is generally located in the front of the head, across the forehead, over the eyes. It may be in other parts, though,—at the top of the head, at one or both sides, at the back, or all over. It is painful, depressing, disabling. A man feels, at the height of the paroxysm, like a hunter who has galloped his legs clean off, and who could not leap a three-foot ditch to save his life. The spur is of no use, neither is the whip. The pain in the head is worse to bear than either, and the patient will rather endure both whip and spur than make any kind of effort which will make the head pain worse. Physic by itself is of no use. There is not a single drug known to medical science which will of itself at once and permanently cure a nervous headache. On the other hand, drugs are not always needed. A complete change of air and circumstances will usually take away the pain in ten or twelve hours. Perfect rest of a duration proportioned to the severity and long continuance of the symptoms, will make the cure permanent. There are, of course, methods of relieving and diminishing the pain until such time as it may be possible to obtain complete rest. But rest is the thing to be secured at all costs. If not, the pain goes from bad to worse, and the risk from less to greater. The final consequence it is impossible to predict, except that a breakdown sooner or later is inevitable, and the breakdown may be for a year or for a lifetime. A nervous headache is a danger signal; if it be frequent, the danger is increased; and if continuous, a catastrophe is imminent. The driver must put on his brakes at all hazards, or he will probably soon have a leap for his life. There are few sets of circumstances in which it is a man's duty to go on with his work at all risks, when he is in this condition. Even a threatened bankruptcy had better be risked than a threatened life. Besides, a man

who is in the unyielding grip of a permanent headache, is not really the best judge of his own circumstances. He magnifies and distorts things amazingly. He takes counsel of his fears, and abandons his hope and courage altogether. Rest, immediate and sufficient, is the sovereign remedy. Two weeks at once may be better than a year later on."

SLEEP AND REST.

ESSENTIALS TO LONG LIFE—HINTS ON DIET—A REMEDY FOR INSOMNIA.

The following from a very high authority is so good that I give it a place as worthy of careful consideration :—

"To get absolute rest for mind and body at night is the necessary thing for the preservation of health. The bright eye and clear skin that characterize youth can only be retained in that way.

"It is a fact that few people know what it is to rest well. Many believe that they do rest well, and frequently I hear people remark that nothing in the world disturbs them after they have gotten into their beds.

"Yet these same people get up drowsy in the morning. Many of them are noticeably languid all the time. Some of them are irritable and nervous, and all of them now and then complain of being so 'lazy' or tired that they are incapable of displaying any energy whatever. Now the direct cause of these things is a want of rest, and of this they are robbed by a host of readily cured ailments and petty disturbances.

"No one can get refreshing sleep in a room that is not properly ventilated. The window should in the summer time be lowered from the top and raised from the bottom. In the winter, if not altogether too cold for comfort, the same practice should be observed, and in any event the room should be properly aired before retiring, and some means for ventilation after that adopted.

"No one can sleep as well next to a boiler room as he could in a place where no jar or noise exists. Every vibration or violent sound is a clash with the nerves of the sleeper and a destroyer of his needed rest, whether he be conscious of it or not. The bustle and roar of every great city is more or less a tax on the life of each of its inhabitants.

"Another great enemy of rest is mental labor, when it is called into use before retiring. Any one that concentrates his thoughts in any way likely to cause worry or anxiety before going to bed will pay the penalty by a sacrifice of his rest, and by carrying hollow eyes and unstrung nerves all the next day.

"This is very easily explained. The use of the brain functions causes an abnormal amount of blood to flow and settle there for the time being. Only by diversion of the mind in a recreative way and an ordinary amount of physical exercise can the brain be relieved of its load. Sleep will not do it, and when sleep does come on a person in this condition, after a good

deal of tossing about, the brain will continue to act and the nerves to contract perhaps continuously throughout the night.

“Then the poor victim will arise in the morning wondering why he does not feel refreshed. The fact is that, with the exception of his eyes, which have been rested by being shielded from the light, he is not much better off than he would be had he not gone to bed at all.

“Indigestion and constipation bear about an equal share in the theft of sleep. Of the latter not much can be said with delicacy. It is a common complaint that gives rise to more serious ailments than any other single disorder. It is so easily avoided by regularity of habit or some simple remedy that there is no excuse for allowing such an affliction to become chronic.

“About indigestion : it is something we must all submit to occasionally ; for our regard for our palate readily overcomes our discretion, and puts temperance in the shade. The effect of indigestion on the human system is worse when the body is meant to be in a state of repose. There is no way then of throwing it off, and it must be allowed to do its worst in debilitating the one attacked.

“When there is a tendency to indigestion, or also a torpid liver, a simple temporary relief may be afforded by taking a little bicarbonate of soda. This has the effect of quieting the stomach by creating carbonic-acid gas, which is readily thrown off. This is the ingredient the stomach lacks when in a state of indigestion.

“Now, regarding the question of eating before retiring at night, I should say it is equally as bad to eat indigestible food or a large quantity of any sort of viands as it is to go to bed hungry. An empty stomach will cause a rush of blood to the head, and one that is heavily laden is likely to be filled with obnoxious gases, in which the element of carbonic acid is not so prevalent as to prevent some consequences that lead to broken rest.

“If one is troubled with insomnia, a bandage soaked in cold water, and laid across the eyes and temples, will afford almost immediate relief, and guarantee rest to the weary person if he suffers no other ailment.

“This same appliance also proves very beneficial in directing an excessive flow of blood from the brains into its proper channel.

“These simple rules, if observed, will allow every one to get that rest which prolongs life, and preserves youth and beauty.”

CURE FOR HEADACHE.

Ferrocyanate of quinine, 60 grains; valerinate zinc, 20 grains ; solid extract hyoscyamus, 20 grains. Make into 20 pills. Take one pill three times a day, before meals, for three days ; then stop three days, unless it is about time for the return of the headache ; in that case, keep right on with the pills. These pills are harmless, and are both tonic and nervine.

This recipe is from Dr. Johnson, Atlanta, Ga., who gave it to Mr. Wm. Andrus, and he to Grandine & Hinman, druggists in Battle Creek, Mich., his successors in business, who have used it among their friends and customers with great success. It is undoubtedly among the very best remedies for headache known to the profession.

During a chance conversation with Mr. Hinman, of the above firm, he referred to this recipe as invaluable for cure of headache, and referred to a large number of cases he knew to have been cured by it. Assured of its value, with the hope of being able to help those so unfortunate as to be subject to sick-headache, the writer made a special request for a copy of it, which was kindly granted.

TO CURE FITS.

Put as much valerian root, and the castor or wart from a horse's leg, which is to be cleaned and cut into small pieces, as will be digested in a pint of whisky. Dose — three teaspoonfuls a day, and repeated until a cure is effected. A son of Mr. Hoyer, of Shelby, Niagara Co., N. Y., twelve years old, was subject to terrible fits, being in a fit sometimes, Mr. Hoyer stated, for two hours. Dr. Failing, of Royalton, next town, obtained in Canada the above remedy, which cured the boy in six months. Mr. Henderson, hotel keeper of Otisco, N. Y., claimed to have been cured by this prescription ; also three others met by the writer in Central New York.

CURE OF CARBUNCLE.

Take a cow's horn, scrape off about a handful of fine shavings, and apply to the enlargement. Continue repeating until there is relief. This is regarded specific, and gives relief in two or three days.

Mr Mc Combs, of Hot Springs, Ark., who gave it to me, referred to a number of bad cases cured. One especial case was that of a man who had a very bad carbuncle, of weeks' duration. He was recommended to use this. His doctor found it on, and took it off ; but the patient had another poultice put on. The effect was so good that the doctor, next time, said he might keep it on. The experiment was so marked a success that the doctor adopted it as his method of treatment.

TO STOP HAIR FROM FALLING OUT.

The following has proved so valuable a remedy for stopping hair from falling out, as well as growing in new hair, that it is given a place here : —

Fill a bottle with lobelia roots and stems, and cover well with good whisky, and let stand until digested ; then strain off the liquor, and add any scent desirable. Wet the hair, rubbing well into the scalp with the fingers once a day for a week or two, repeating afterward as may be found necessary.

Years ago the writer's hair was falling out rapidly ; being noticed by a stranger, he advised the above dressing, saying his hair was falling out rapidly, and was not only stopped from falling out, but had grown in thick by this remedy, and would warrant it to do so in this case. It was immediately used as directed, with the most satisfactory results, and is probably among the very best remedies known for this trouble.

TO TAKE OUT FIRE FROM A BURN.

Take equal portions lime-water and raw linseed oil. Good for burns and scalds. Bathe the parts liberally with the liniment.

This was given by W. Mansfield, of W. Roxbury, Vt., and used by him for many years in his family ; claimed it to be one of the best remedies ever used for these purposes. In the proportion of $\frac{2}{3}$ lime-water and $\frac{1}{3}$ linseed oil will cure the poisoning by ivy and dogwood. Wet a cloth and lay on the part, and keep constantly wet till well.

A lady who had much experience with these poisons, says this is the only thing that seems to take out the poison.

CURE OF SCIATIC RHEUMATISM.

A case of sciatic rheumatism of two years' standing, was cured by taking a decoction of poke berries, prepared as follows :—

Put a pint of berries into a quart of whisky. After standing until fully digested, give a dose of one tablespoonful four times in twenty-four hours, or six hours apart. The case was very severe, resisting all regular treatment, and causing great suffering. Was cured in a few weeks.

Given by Rev. Mr. Button, of Evansville, Ill. He obtained it from the man who was cured.

ITCH OINTMENT.

1 oz. red precipitate ; 1 oz. spirits of turpentine ; 2 oz. Burgundy pitch ; $\frac{1}{2}$ lb. fresh butter. Melt the butter and pitch, and add the other ingredients, stirring until cold.

TO CURE COLIC.

Take at once a tumblerful of hot molasses. A sailor who was delirious from colic, and nearly dead from it, was relieved in five minutes. Calling my attention to it, and claiming it would cure every case, I was induced to make a note of it. The sailor said he took cold molasses with the same effect.

TO CURE A FEVER-SORE.

Take 3 ounces blue vitriol and 3 ounces gunpowder. Boil in a quart of soft water until thoroughly dissolved, and reduced to one-half the quantity. Pour on to the sore while hot as can be borne.

Steven Johnson, of Gouverneur, N. Y., was cured of a fever sore on his arm, of the worst character, of a year's standing. Doctors said he must lose his arm — his own words. There was necrosis of the bones of the arm ; sores in three places ; was cured by one application. Mr. Olmstead, of Oxbow, N. Y., had a bad sore below the knee ; went on crutches for six months ; was cured with one application. Several other cases were reported of an equally remarkable character.

HOT SALT.

The following is a case of remarkable cure of bruise of thigh, from the use of hot salt.

H. D. Johnson, of Pottsdam, St. Lawrence Co., N. Y., fell from a building, twelve feet, upon a pile of wood, injuring him seriously in different parts of the body — the thigh very seriously bruised, causing him to faint away. He had a stiff leg for a month ; the part swollen from the hip to the foot to twice its size, was treated with cold water by advice of three physicians. The limb was entirely stiff and disabled. As a matter of experiment, he bound on a poultice of hot salt about an inch thick before going to bed. Next morning he could move and bend his leg, the swelling was all gone down, and he was perfectly cured.

The simple facts, as stated above, were given to the writer six years after the injury of Mr. Johnson.

TO CURE AN INDOLENT ULCER.

A gentleman who had a fever-sore on his leg for seventeen years, had spent five thousand dollars in trying to get the sore cured, and had no hope of having it healed, was cured in three months by the following remedy. —

Take the green scum that gathers on the water in the frog ponds in spring and summer ; boil over a slow fire ; then add fresh butter to the consistence of an ointment. Dress the sore with it once a day. The man claimed to have given it to others who were afflicted with obstinate ulcers, and that it had made perfect cures, and wished, from humanity to others so afflicted, that I would give it an insertion in my book.

PSORIASIS AND ECZEMA (PARTICULARLY PSORIASIS).

1. Arsenite soda, 5 grains ; powdered extract nux vomica, 4 grains. Make 100 pills ; take one after each meal. To insure a cure, should be used from 1 to 6 months.

2. Sulphur and cream of tartar, each, 1 oz. ; calcined magnesia, $\frac{1}{2}$ oz. ; powdered sugar milk, 1 oz. ; powdered anise seed 3 drachms. Mix. Dose. 1 teaspoonful in water night and morning.

3. TAR OINTMENT. — Pure tar and beef suet, equal parts. Mix the tar with the suet, previously melted with a moderate heat. And having

strained the mixture through muslin, stir it constantly while cooling. Apply 2 or 3 times daily, rubbing in thoroughly.

4. Particularly for psoriasis. Caustic potash, 2 drachms ; oil tar, $\frac{1}{2}$ oz. Mix. Apply, externally, one part of the mixture to 4 parts rain-water. After using for 2 weeks, it may be used 1 part to 2 parts rain-water.

A gentleman who had suffered terribly from psoriasis for years, though under treatment almost constantly by specialists at great expense, was given the above prescription by an eminent specialist of New York City, which cured him in three months. Knows of its curing a number of bad cases to whom he gave the prescription. Regards it priceless in value. It is included here with the hope of its helping persons so affected. The treatment given should be regularly followed.

EYE WASH.

Take three hen's eggs, and break them into a quart of clear cold rain-water ; stir until a thorough mixture is effected ; boil over a slow fire, stirring every few minutes ; add half an ounce of sulphate of zinc (white vitriol) ; continue the boiling a short time, and the compound is ready for use. In this preparation a solid substance, or curd, is precipitated or thrown down, and a liquid solution rests upon the top. This is the best wash for sore eyes of either man or beast, that was ever made. The curd applied to the inflamed eye at night will draw the fever and soreness nearly all out by morning. After two or three days, the water should be strained from the curd, and put into a bottle for future use. This wash is invaluable. When applied to the human eye, it should be diluted.

A gentleman who had a copy of my old edition, having this remedy in it, informed me that he was offered \$10 for the book on account of the value of this recipe, having used it in his neighborhood with great success, and that he would not sell it at any price.

A POSITIVE CURE FOR CATARRH.

There is a great deal of catarrh and bronchial irritation in this climate, and the treatment, generally, is so unsatisfactory that I am induced to give a remedy which I know to be of the greatest value.

I had been afflicted with catarrh for a good many years, and tried the best known treatment of the medical profession, including a great many "positive cures," without help. In a chance way I found a remedy that cured me perfectly in a few weeks, and have personally known it to cure many cases that had been given up as beyond help.

In my judgment it is by far the best known remedy for catarrh and bronchial irritations, and I would strongly urge persons afflicted with these difficulties to give it a trial. It is perfectly safe, and does not require taking any medicine internally. It is simply tar, with other ingredients, volatilized, and put up in such a way that its evaporation is inhaled directly and constantly all night, and is advertised under the name of the Pillow Inhaler.

This is not an advertisement, I have no personal interest in its sale beyond that of calling attention to its merits and value to persons who are afflicted.

In my own case, I would have given \$500 to any one for treatment that would produce the effect this remedy did upon me.

Address, The Pillow Inhaler Co., 1520 Chestnut St., Philadelphia, Pa., or 25 East 14th St., N. Y.

FOR HOARSENESS.

Squeeze the juice of half a lemon into a pint bowl, add loaf sugar (two tablespoonfuls), one teaspoonful of glycerine, and one tablespoonful of whisky ; pour over this boiling hot water to nearly fill the bowl, and drink hot just before going to bed.

TO CURE A COLD.

Put a large teacupful of linseed, with one quarter pound of sun raisins and two ounces of stick licorice, into two quarts of soft water, and let it simmer over a slow fire till reduced to one quart ; add to it one quarter pound of pounded sugar-candy, a tablespoonful of old rum, and a tablespoonful of white-wine vinegar or lemon-juice. The rum and vinegar should be added as the decoction is taken ; for if they are put in at first, the whole soon becomes flat and less efficacious. The dose is half a pint, made warm, on going to bed ; and a little may be taken whenever the cough is troublesome. The worst cold is generally cured by this remedy in two or three days ; and if taken in time, it is considered infallible.

ABERNETHY'S PLAN FOR MAKING BREAD AND WATER POULTICE.

First scald out a basin ; then having put in some boiling water, throw in coarsely crumbled bread, and cover it with a plate. When the bread has soaked up as much water as it will imbibe, drain off the remaining water, and there will be left a light pulp. Spread it a third of an inch thick on folded linen, and apply it when of the temperature of a warm bath. To preserve it moist, occasionally drop warm water on to it.

LINSEED-MEAL POULTICE.

“Scald your basin by pouring a little hot water into it, then put a small quantity of finely ground linseed-meal into the basin ; pour a little hot water on to it, and stir it round briskly until you have well incorporated them ; add a little more meal and a little more water ; then stir it again. Do not let any

lumps remain in the basin, but stir the poultice well, and do not be sparing of your trouble. What you do next is to take as much of it out of the basin as you may require, lay it on a piece of soft linen, and let it be about a quarter of an inch thick." — *Abernethy*. The practice of modern hospitals is to spread the poltice very thin to lessen the weight on the patient ; thus made, it requires renewing oftener.

MUSTARD POULTICE.

Mix equal parts of dry mustard and linseed-meal in warm vinegar. When the poultice is wanted weak, warm water may be used for the vinegar ; and when it is required very strong, mustard alone, without any linseed-meal, is to be mixed with warm vinegar. Mustard plasters are now prepared in a dry form, like sheets of paper ; these require to be immersed in water, hot or cold, and laid on the part affected ; thus a mustard plaster may be had in a moment.

DUTIES OF THE SICK-NURSE.

All women are likely, at some period of their lives, to be called on to perform the duties of a sick-nurse, and should prepare themselves as much as possible, by observation and reading, for the occasion when they may be required to perform the office. The main requirements are good-temper, compassion for suffering, sympathy with sufferers, which most women worthy of the name possess, neat-handedness, quiet manners, love of order, and cleanliness. With these qualifications there will be very little to be wished for ; the desire to relieve suffering will inspire a thousand little attentions, and surmount the disgust which some of the offices attending the sick-room are apt to create. Where serious illness visits a household, and protracted nursing is likely to become necessary, a professional nurse will probably be engaged who has been trained to its duties ; but in some families, and those not a few, let us hope, the ladies of the family would oppose such an arrangement as a failure of duty on their part. There is, besides, even when a professional nurse is ultimately called in, a period of doubt and hesitation, while disease has not yet developed itself, when the patient must be attended to ; and, in these cases, some of the ladies must give their attendance in the sick-room. There are, also, slight attacks of cold, influenza, and accidents in a thousand forms, to which all are subject,

where domestic nursing becomes a necessity ; where disease, though unattended with danger, is nevertheless accompanied by the nervous irritation incident to illness, and when all the attention of the domestic nurse becomes necessary.

In the first stage of sickness, while doubt and a little perplexity hang over the household as to the nature of the sickness, there are some things about which no doubts exist : the patient's room must be kept in a perfectly pure state, and arrangements made for proper attendance ; for the first canon of nursing is to "keep the air the patient breathes as pure as the external air, without chilling him." This can be done without any preparation which might alarm the patient ; with proper windows, open fireplaces, and a supply of fuel, the room may be as fresh as it is outside, and kept at a temperature suitable for the patient's state.

VENTILATION IN SICK ROOM.

Windows, however, must be open from above, and not from below, and draughts avoided ; cool air admitted beneath the patient's head chills the lower strata and the floor. The careful nurse will keep the door shut when the window is open ; she will also take care that the patient is not placed between the door and the open window, nor between the open fireplace and the window. If confined to bed, she will see that the bed is placed in a thoroughly ventilated part of the room, but out of the current of air which is produced by the momentary opening of doors, as well as out of the line of draught between the window and the open chimney, and that the temperature of the room is kept about 64°.

Under no circumstances is ventilation of the sick-room so essential as in cases of febrile diseases, usually considered infectious ; such as typhus fevers, influenza, whooping-cough, small and chicken-pox, scarlet fever, measles, and erysipelas. All these are considered communicable through the air ; but there is little danger of infection being thus communicated, provided the room is kept thoroughly ventilated. On the contrary, if this essential be neglected, the power of infection is greatly increased and concentrated in the confined and impure air ; it settles upon the clothes of the attendants and visitors, especially where they are of wool, and is frequently communicated to other families in this manner. The comfort of feverish patients, and indeed of most sick persons, is greatly increased by being sponged with tepid water, in which camphorated spirit is dropped. A teaspoonful should be poured

into a quart of water, and the patient may be sponged every two hours, in warm weather.

Under all circumstances, therefore, the sick-room should be kept as fresh and sweet as the open air, while the temperature is kept up by artificial heat, taking care that the fire burns clear, and gives out no smoke into the room; that the room is perfectly clean; that all utensils are emptied and cleaned as soon as used, and not once in four-and-twenty hours, as is sometimes done. "A slop-pail," says Miss Nightingale, who is the recognized authority on nursing, "should never enter a sick-room; everything should be carried direct to the water-closet, emptied there, and brought up clean; in the best hospitals the slop-pail is unknown."

VALUABLE HOUSEHOLD RECIPES.

TO MAKE A PERMANENT WHITEWASH.

Make the whitewash in the ordinary manner, then place it over a fire and bring it to a boil. Then stir into each gallon a tablespoonful of powdered alum, a half pint of good flour paste, and a half pound of glue dissolved in water, while it is boiling.

This wash, it is said, nearly equals paint, and the expense is trifling.

CHEAP, WHITE HOUSE-PAINT.

Take skim-milk two quarts, eight ounces fresh slacked lime, six ounces linseed oil, two ounces white Burgundy pitch, three pounds Spanish white. Slack the lime in water, expose it to the air, and mix in about one fourth of the milk; the oil, in which the pitch is previously dissolved, to be added a little at a time; then the rest of the milk, and afterwards the Spanish white. This quantity is sufficient for thirty square yards, two coats, and costs but a few cents. If other colors are wanted, use, instead of Spanish white, other coloring matter.

WHITEWASH FOR ROOMS.

Take four pounds of whiting and two ounces of common glue; let the glue stand in cold water over night, then heat it until dissolved, and pour it hot into the whiting mixed with cold water. This makes a nice, smooth whitewash.

MILK PAINT.

Mix water-lime with skim-milk to proper consistency to apply with brush, and it is ready for use ; it will adhere well to wood, smooth or rough, to bricks, mortar, or stone, where oil has not been used, and it forms a very hard substance, as durable as the best of paint ; any color which is desirable may be had by using colors dissolved in whisky.

TO KILL BEETLES OR CRICKETS.

Parings of cucumber strewn near their holes, or strong snuff.

TO GET RID OF ANTS.

A little green sage placed in their haunts will drive them away. Quick-lime scattered over their hills and watered will destroy them.

TO PREVENT LAMPS FROM SMOKING.

It is very often difficult to get a good light from a lamp, and yet keep it from smoking ; but if the wick is first soaked in strong vinegar, and then thoroughly dried, this annoyance will be prevented. Still the wick must not be put up too high.

REMARKABLE CHEMICAL ERASIVE COMPOUND.

This compound is unrivaled for removing grease-spots, pitch, tar, and paint from every description of woolen goods, for cleaning coat-collars, etc. Take four and a half pounds of old castile soap, one pint of camphor, half a pound of saleratus, and one pint of water ; cut the soap into small pieces, and melt over a slow fire.

A premium was taken for the above preparation in three different State fairs.

CHAPTER XXXIV.

VALUABLE COSMETIC PREPARATIONS.

WASH *used by the celebrated Countess of Landsfeldt*—COMPLEXION PASTE *used by the Celebrated Madame Vestris*—A REMARKABLE WASH *used by the Beauties of the Court of Charles II*—To REMOVE PIMPLES—Certain CURE for ERUPTIONS and PIMPLES—Queen Elizabeth's COMPLEXION WASH—FRECKLE COMPOUND, or Uction *used by the Celebrated Madame de Maintenon, Wife of Louis XIV*—Prevention WASH for SUNBURN—Baron Dupuytren's POMADE—HAIR CLEANSER *used by Lola Montez, the Countess of Landsfeldt*—The FAMOUS HONEY-WATER, *one of the MOST VALUABLE SECRETS*—To PREVENT HAIR TURNING GRAY, *used by a Famous Spanish Actress.*

Wash for the Skin and Complexion.—To remedy the rigidity of the muscles of the face, and to cure any roughness induced by daily exposure, the following *wash* may be applied, with almost certain relief, as we are assured by Madame Lola Montez, the celebrated Countess of Landsfeldt.

Mix two pints of white brandy with one part of rose-water, and wash the face with it night and morning.

The brandy keeps up a gentle action of the skin, which is so essential to its healthy appearance; also thoroughly cleanses its surface, while the rose-water counteracts the drying nature of the brandy, and leaves the skin in a natural, soft, and flexible state.

Complexion Paste.—The following is the recipe for the paste, by the use of which Madame Vestris is said to have preserved her beauty till very late in life. It is applied to the face on retiring for the night.

The whites of four eggs boiled in rose-water, half an ounce of alum, half an ounce of sweet almonds; beat the whole together till it assumes the consistence of a paste.

A "*Remarkable Wash*," said to have been used by the Beauties of the Court of Charles II., is made of a simple tincture of benzoin precipitated in water. We quote:—

"This delightful wash seems to have the effect of calling the purple stream of the blood to the external fibers of the face, and gives the cheeks a beautiful rosy color. If left on

the face to dry, it will render the skin clear and brilliant. It is an excellent remedy for spots, freckles, pimples, and eruptions, if they have not been of long standing."

To Remove Pimples. — There are many kinds of pimples, some of which partake almost of the nature of ulcers, which require medical treatment; but the small red pimple, which is most common, may be removed by applying the following twice a day : —

Sulphur water.....	1 ounce.
Acetated liquor of ammonia.....	$\frac{1}{2}$ "
Solution of potassa.....	$\frac{1}{2}$ "
White-wine vinegar.....	2 "
Distilled water.....	2 "

These pimples are sometimes cured by frequent washing in warm water, and prolonged friction with a coarse towel. The cause for these pimples is obstruction of the skin and imperfect circulation.

Certain Cure for Eruptions, Pimples, etc. — Having in numberless instances seen the good effects of the following prescription, I can certify to its perfect remedy. Dilute corrosive sublimate with the oil of almonds, apply it to the face occasionally, and in a few days a cure will be effected.

To Remove "Fleshworms." — Sometimes little black specks appear about the base of the nose, or on the forehead, or in the hollow of the chin, which are called "fleshworms," and occasioned by coagulated secretion that obstructs the pores of the skin. They may be squeezed out by gentle pressing. They are permanently removed by washing with warm water, and severe friction with a towel, and then applying a little of the following preparation : —

Liquor of potassa.....	1 ounce.
Cologne.....	2 "
White brandy.....	4 "

The warm water and friction alone are sometimes sufficient.

Queen Bess's Complexion Wash. — The following recipe has been handed down from the time of Queen Elizabeth. Its daily use preserved the beauty of her complexion to extreme old age.

Into a phial place one drachm of benzoin gum in powder, the same quantity of grated nutmeg, and about six drops of the essence of orange blossoms; then fill up the bottle with a wine-glassful of the finest sherry. Shake the ingredients every day for a week, then mix the whole with a pint of orange-flower water; strain through fine muslin, and the "Lait Virginal" is finished. The face is to be bathed with it night and morning.

Milk of Roses.—Put into a small bottle two ounces of rose-water, one teaspoonful of oil of sweet almonds, ten drops of oil of tar. Shake the bottle until the whole is combined; it makes a nice and perfectly harmless cosmetic to apply to the skin after washing.

Lavender Water of a very excellent quality may be prepared thus: Rectified spirit, two quarts; rose-water, one pint; English oil of lavender, one ounce and a half; oil of cloves, half a drachm. Mix and distill the whole together so long as it comes over bright.

Freckles.—Freckles are situated in the middle and outer membrane of the skin; and before any other application, it will be advisable to soften the surface by the use of some mild balsam or paste. The following is an excellent preparation:—

Two ounces of fine honey, one ounce of purified wax, half an ounce of silver litharge, half an ounce of myrrh. Mix them well together over a slow fire, perfuming with oil of roses, eau-de-cologne, or any other agreeable perfume.

Another:—

One ounce of bitter almonds, one ounce of barley-flour, mix a sufficient quantity of honey to make the whole into a smooth paste, with which the face, more particularly where the freckles are visible, is to be anointed at night, and the paste washed off in the morning.

Freckle Compound.—The so-called “Uction de Maintenon,” after the celebrated Madame de Maintenon, mistress and wife of Louis XIV., is made as follows:—

Venice soap.....	1 ounce.
Lemon juice.....	$\frac{1}{2}$ “
Oil of bitter almonds.....	$\frac{1}{4}$ “
Deliquated oil of tartar.....	$\frac{1}{4}$ “
Oil of rhodium.....	3 drops.

To Cure Freckles.—Take two ounces of lemon juice, a half dram of powdered borax, and one dram of sugar. Mix together, and let them stand in a glass bottle for a few days; then rub it on the hands and face occasionally.

Lemon Cream for Sunburn, etc.—Put two spoonfuls of fresh cream into half a pint of new milk; squeeze into it the juice of a lemon; add half a glass of brandy, a little alum, and loaf sugar; boil the whole, skim it well, and when cool, it is fit for use.

Preventive Wash for Sunburn.—Two drachms of borax; one drachm of Roman alum; one drachm of camphor; half ounce of sugar; one pound of ox-gall. Mix and stir well together, and repeat the stirring three or four times a day, until

the mixture becomes transparent. Then strain it through filtering paper, and it is fit for use.

Baron Dupuytren's Pomade. — The famous pomade of the celebrated Parisian physician is made as follows : —

Box-wood shavings.....	6 ounces.
Proof spirit.....	12 “
Spirits of rosemary.....	2 “
Spirits of nutmeg.....	$\frac{1}{2}$ “

The box-wood shavings should be left to steep in the spirits, at a temperature of sixty degrees, for fourteen days, and then the liquid should be strained off, and the other ingredients mixed. The scalp to be thoroughly washed with this night and morning.

An Excellent Hair Cleanser. — The celebrated Lola Montez, the Countess of Landsfeldt, gives the following hair-cleanser, as used by a great beauty of Munich, who had the handsomest hair of any lady in the Bavarian capital.

Beat up the white of four eggs into a froth, and rub that thoroughly into the roots of the hair. Leave it to dry on. Then wash the head and hair clean with a mixture of equal parts of rum and rose-water. This is said to be one of the best cleansers and brighteners of the hair ever used.

Honey-water. — This celebrated wash, known to fashionable ladies all over the world, is made as follows : —

℞ Essence of ambergris.....	1 drachm.
“ musk.....	1 “
“ bergamot.....	2 “
Oil of cloves.....	15 drops.
Orange-flower water.....	4 ounces.
Spirits of wine.....	5 “
Distilled water.....	4 “

All these ingredients should be mixed together, and left about fourteen days; then the whole to be filtered through porous paper and bottled for use. This is a good hair-wash and an excellent perfume.

To Prevent Hair from turning Gray. — A retired Spanish actress warded off the approach of gray hairs by using the following preparation whenever she dressed her head : —

℞ Oxide of bismuth.....	4 drachms.
Spermaceti.....	4 “
Pure hog's lard.....	4 ounces.

The lard and spermaceti should be melted together, and when they begin to cool, stir in the bismuth. It may be perfumed to your liking.

CHAPTER XXXV.

SOCIAL SINS.*

VALUABLE INFORMATION—NEW SECRETS OF GREAT IMPORTANCE TO THE FAMILY—PRINCIPLES REGULATING THE MARRIAGE RELATION—*UNWRITTEN SINS, THEIR DANGER, AND HOW TO AVOID THEM*—THE TRUE MORALITY OF WEDDED LIFE—ITS SUBLIMITY AND BEAUTY.

AS this book is intended for farmers, and designed to give them such information, not accessible in other forms, as would do them the most good, the author is induced to add some suggestions on peculiar matters of interest to all, and in which, though not generally discussed, he is led to believe there is a deep and growing interest, and an earnest desire for instruction.

It is true that some object to the dissemination of knowledge on the subject referred to, on the ground that it becomes dangerous in the hands of those who would make a bad use of it. To this we reply that ignorance on the subject is vastly more perilous, even, than the “little knowledge” proverbially said to be a “dangerous thing.” And if to that little which nearly everybody possesses, we add the best thoughts and the clearest light from eminent authorities, we cannot fail to do good by warning of the pitfalls into which the ignorant are almost sure to stumble.

The early discoveries of science were at first guarded as dangerous secrets. A knowledge of photography, it was said, would make it easy for rascals to counterfeit money; and the

* After writing this article, it was submitted to several expert physicians and heads of families, for the purpose of criticism, as to whether the knowledge it contained could be safely included in this book, and thus made public. All advised that it should be put in.

common knowledge of nitro-glycerine would place an element of destruction in the hands of the criminal classes. But to conceal important information from the world on such grounds is no longer regarded as philosophical or practical, the highest scope of all discovery and research being "the greatest good to the greatest number."

OBEDIENCE TO LAWS OF NATURE.

The grand object of life is to be happy. The secret of true happiness is to do right and to live right. Right doing is obedience to God's law; right living is obedience to the laws of nature. This complicated machinery of the human system is so finely and nicely adjusted, and so admirably adapted to the needs and capacities of man, that we have only to observe its operations with a careful and studious eye, to note the sad effect of any violation of its rules and regulations. Some of the most important and vital of these concern the family and sexual relations; and he who would live a true life, must carefully and conscientiously observe the rules governing them.

With the view of promoting the health and comfort of the family all I could, I have tried to make plain the serious consequences of the use of bad water, bad ventilation, etc. To make this more impressive, as will be seen, I have at considerable trouble given illustrations of germs inciting and causing dangerous and fatal diseases. In the same spirit, and with like motives, I have been induced to add such points in this connection as I am led to believe would be the most beneficial in aiding to guard against harm or injury to health.

CONTROLLING OFFSPRING — REASONS CONSIDERED.

Consultation with any physician of anything like extended practice will disclose the fact that there is a very prevalent desire, for various reasons, to limit or control the number of offspring in the family. And necessarily growing out of this, mainly as the result of ignorance, there are the most serious consequences to the health, and often involving the destruction of valuable lives.

Now, the author of this book fully appreciates the especially delicate nature of this branch of the subject, and approaches it

with extreme hesitancy. Within the past few years, many of the most thoughtful and gifted minds of America as well as of Europe have been engaged in investigating this subject. The question, "May conception be rightfully prevented, or the results of sexual communication be interfered with, under any circumstances?" is one which a quarter of a century ago would have been almost universally answered in the negative. But the medical faculty are manifesting very perceptible evidences of being divided in opinion on this sensitive issue. While not admitted in a public way, conversation with reputable physicians will reveal facts startling in their nature, which it is of the most vital interest to humanity to guard against or prevent. But the medical profession is particularly reluctant to publish anything which could be considered as opening the doors to the least tendency to profligacy in this connection; and for this and other reasons, nothing like accurate, reliable, or intelligent instruction has ever been made accessible to the public.

OPPOSITE THEORIES.

There are two opposite theories prevalent on this subject, each with strong and enthusiastic advocates in its behalf. The one takes a radical and emphatic position against any interference whatever with the course of nature, or any attempt to divert or hinder the consequences of sexual communication; the other, planting itself upon the position that there are many conditions in the marriage state where the raising of children is productive of positive evil, such as transmitted diseases, insanity, deformity, extreme poverty or wretchedness, or other inability to maintain children, claim that there is a natural right and moral duty to limit the production of offspring.

That the child inherits from its parents its physical type, including color, stature, physiognomy, temperament, and certain peculiarities of structure or arrangement of internal organs, is well known. This hereditary influence is stronger from the immediate than from the remote ancestry, notwithstanding the fact that the sins of the parents are handed down to their descendants unto the third or fourth generation. The hereditary cause of disease can be guarded against when known, although this is a delicate subject to handle, and

HAS TAXED THE SKILL OF THE SCIENTIFIC WORLD

for many years, and as stated, is largely an unsettled question at the present time. It is a grave question, and one that affects the public at large. The future welfare of any nation depends upon its rising generation ; but who has the right, or shall dare to dictate to any man or woman whom they shall or shall not marry, even though the person be a syphilitic, a consumptive, or a rheumatic? and in like manner, who shall assume to dictate whether they shall bring children into the world, although they shall be weak or sickly?

We see, then, why this subject has puzzled all nations. Now, what are we going to do with this complex matter? There seems to be but one answer at present, and that is by preventing generation on the part of persons unfit to produce offspring ; and this, as in the case of unsuitable marriages, must from necessity be left wholly in the hands of such unfortunates.

According to general reports and the experience and observation of physicians, these consequences are sought to be averted mainly by producing miscarriage, or destruction of the embryo. The

EVIL CONSEQUENCES

resulting from such a course are uterine derangements, such as displacements, comprising sub-involutions, or parts not returning to their natural condition ; and prolapsus, or falling of the womb. From these there is seldom recovery, the reason for which is that nature being cut short in carrying out its purpose, the parts are so weakened that they do not react, and serious results usually follow. The main effect is in acting as a disturbing cause to the nervous system generally. For, once there is such a derangement, it is seldom that the parts regain their former condition of health.

It is a very simple matter to bring about such a functional disturbance as abortion. Simply displacing the connection of the parts, or puncturing the enveloping membrane, is sure to do this. But the results which follow are the condition of danger — either direct death, which is quite common, or a seri-

ous illness which usually leaves one an invalid for the remainder of her life. Death may follow in consequence of inflammation, or peritonitis, or blood poisoning, or the patient may be left in a debilitated or weak condition.

As the best possible evidence proving this, I quote below the warnings of a number of leading physicians on the subject; and these opinions are only expressions of the highest authorities.

GOOD ADVICE.

With a view of showing the prevalence and danger of this sin, the *Chicago Times*, in the early winter of 1888, employed a lady reporter to visit a large number of physicians under the guise of being unfortunate and needing help to conceal her shame. From those visited, I quote the advice given by a few of the most reputable.

“Let me give you a piece of advice. Turn away from this business immediately. It’s criminal. It is an awful crime, besides being very unsafe. Don’t harm yourself any more than you have done. You certainly don’t realize there is a large chance that you might be sent home in your coffin.”

“Abortions are ruinous for the health and constitution. Scarcely a week passes but that one or more women are sent away in boxes to their homes, murdered by physicians who performed that operation for them.”

“I will be perfectly frank with you. This is not the thing for you to do. It will probably ruin your health; for with a system as vigorous as yours, it would go very hard.”

“You are young and vigorous; take my word for it, you are the very one it will go hardest with. No end of trouble may set in—pyæmia, prolapsus. I could mention half a dozen life-long ills, the price of this. Don’t do it, I beg of you.”

“‘I will be plain with you, however,’ he turned to me to say; ‘this thing is always attended with danger. I will do it for you, but you must be prepared for the worst.’ ‘What is the worst?’ ‘I cannot tell; inflammation might set in, and the Lord only knows what might follow.’”

“Still there is risk in it, however scientific the physician. A young girl got off a car, and went to a doctor on this street to have that done at four o’clock in the afternoon. She was as healthy as you. At five o’clock she was dead in that doctor’s office-chair. He got five years at Joliet.”

Among others, Dr. E. Stillman Bailey gave the young lady some very noble advice, which, though encroaching upon space, I copy at some length. "Have you any means?" he asked her. "Yes," was the reply. "Then," he resumed, "it becomes a very easy matter compared to what it once was to get out of this difficulty — do not call it trouble or disgrace — it exists, and you have to face it. Therefore, for the sake of your health and good spirits, banish what has gone before from your mind. I say it is easy for you to get out of it with good health. But it is not by the way you propose. You come to me wounded with a broken arm. Do you ask me to cut it off? — No, but to mend it and let nature work the cure. Just as certainly you come to me now, wounded, and ask to have the injured part removed. Should I do it for you, my experience warrants me in prophesying you would suffer from a more serious and lasting wound. I know an excellent lady of fine family who thoughtlessly and foolishly did the same thing shortly after her marriage, and has remained an invalid confined to her house ever since. That was years and years ago. She is atoning for it with lifelong suffering. The profession now regards that situation as the result of accident in the woman, and says in every case, 'Save the woman's health for the future, therefore care for her through her natural cure.' If you follow my advice, seclude yourself and go through it. In a year, which rolls around very quickly, you will be a well woman, simply with a chapter in your life which makes you wiser if sadder. I cannot predict consequences in the other case. I regard the mental effects of committing this deed more serious than the physical. Nothing can blot out a blight printed on your memory, even if the wound of the crime upon your body should be healed. The law in this matter is right. It indicates the danger unscrupulous physicians would place patients under did it not threaten a penalty."

If, as before stated, those afflicted with any hereditary disease, such as syphilis, consumption, scrofula, cancer, gout, certain skin diseases, insanity, or criminal tendencies of various kinds (these last being the most important), would use intelligent means at the proper time, we can realize something of the untold suffering which might be avoided.

VIEWS OF PROMINENT WRITERS ON THE SUBJECT.

The Rev. T. R. Malthus, who wrote in the early part of the present century, and who is still quoted largely, was the

first among modern writers to claim the right to limit the number of offspring. Among writers of eminence who have followed his reasoning are James and John Stuart Mill, Austin Holyoake, author of "Large and Small Families," Mr. Carlisle, author of "Every Woman's Book," Mr. Montagu Cookson, and others. The authors more recently writing on the subject are Hon. Charles Bradlaugh, member of Parliament, and Annie Besant, in England, and in this country Dr. Charles Knowlton, author of "Fruits of Philosophy," the author of "Owen's Moral Philosophy," with others. From their arguments we quote some points. Mill, Cookson, and others, after explaining reasons, want of health, etc., assume the position that (under certain circumstances named) the limitation of the family is as much the duty of married persons as chastity is the duty of those that are unmarried.

A distinguished English writer, discussing this subject, says: "But it is clearly useless to preach the limitation of the family, and at the same time to omit or conceal the means whereby such limitation may be effected. If the limitation be a duty, it cannot be wrong to afford such information as shall enable people to discharge that duty."

The higher plane would be, entire continence, which it is evident but few would observe. Second, there are certain natural laws, clearly defined in all physiologies and standard works, which, if observed, give a comparatively safe and ample basis for accomplishing this end; but not being entirely reliable, are not considered.

RELIABLE AND SAFE PREVENTION.

We might refer to a number of remedies that are proposed by reputable authors, some of which it would be repugnant even to mention; but we deem it proper to give only what science accepts as the best.* Experiments have shown that

* All reputable authorities agree that medicine cannot be depended upon, and should not be used, or attempted, for this purpose; for no medicine will have sufficient local effect without affecting the system generally most seriously, and in addition is liable to set up so much peritoneal inflammation as, like other methods, to be most dangerous to life. Out of nearly two hundred physicians consulted by the lady reporter of the *Times* before referred to, all concurred in the statement that medicine could not be depended upon, and should not be used.

the electric spark destroys the vitality of spermatozoa instantly by changing their structure, while galvanism has no perceptible influence upon them; that under the microscope mineral and vegetable acids have the same effect as electricity. The highest modern authorities give the following as the safest, best, and most effectual treatment known: A 1-2000 or 1-3000 solution of bichloride of mercury, or bichloride tablets, which can be had at any drug store, put up so that one tablet dissolved in a pint of soft water will make 1 to 1000 solution, which can be reduced to produce the desired strength; a half to one pint used as a vaginal douche, with a common fountain syringe, after intercourse, will produce the desired result.* This remedy is a comparatively recent discovery, made by Koch, a German chemist, who demonstrated that it was the best known germ-killer. Wyeth, the most recent authority on this subject, says that even one part to 15,000 or 20,000 is an effectual germ-destroyer.

When allowed to go further, and the male and female elements have come together, which they do within a few hours to several days, no person has then any right to interfere, as a life is at stake, and the law will hold a person in such a case as strictly a criminal as if the life of an adult had been sacrificed.

It should be borne in mind, however, that to prevent offspring is but the lesser of two evils, and can never be regarded as carrying out the highest purpose of man's existence, or as moving in the most exalted plane of marital life. The continued practice can be regarded as no less than a violation of natural law, which sooner or later will exact its penalty. The use of only the mildest means will often result in sterility, and the married couple who have resorted to prevention as a means of postponing an increase of family, are sometimes dismayed to find themselves doomed to a childless life.

In cases of children being born with hereditary tendencies, every precaution should be taken to overcome the weakness.

* This antiseptic douche, used with warm water, is one of the very best means in monthly periods of women, at the last stages, for the purpose of thoroughly cleansing the parts.

It is not the disease that is inherited, but a tendency or weakness in certain organs subject to such diseases, as, for example, weak lungs in cases of consumption. In such cases, plenty of outdoor exercise should be had, warm clothing, good, nutritious food, with deep-breathing exercises daily, and thus overcome the tendency.*

In connection with this subject, and as embodying the high moral position which all should take, and at the same time, as a bit of fine composition, I embody here a few sublime passages from an ancient Brahmin, translated from an East Indian manuscript entitled "The Economy of Human Life."

DESIRE AND LOVE.

"Beware, young man! Beware of the allurements of wantonness, and let not the harlot tempt thee to excess in her delights.

"The madness of desire shall defeat its own pursuits; from the blindness of its rage, thou shalt rush upon destruction.

"Therefore, give not thy heart to her sweet enticements, neither suffer thy soul to be ensnared by her enchanting delusions.

"The fountain of health, which must supply the stream of pleasure, shall be quickly dried up, and every spring of joy shall be exhausted.

"In the prime of thy life, old age shall overtake thee: thy sun shall decline in the morning of thy days.

"But when virtue and modesty enlighten her charms, the luster of a beautiful woman is brighter than the stars of heaven, and the influence of her power it is in vain to resist.

"The whiteness of her bosom transcendeth the lily; her smiles are more delicious than a garden of roses.

* Valuable books for private family reading, which give a great deal of useful information, and should be in every family library, are "The Science of a New Life," by John Cowan, M. D., published by Ogilvie & Co., 57 Rose St., N. Y., and "The Ladies' Medical Guide," by J. H. Kellogg, M. D., medical superintendent of the great Medical and Surgical Sanitarium at Battle Creek, Mich. This book is published by the Good Health Pub. Co., of that city. I would specially commend it for its careful and sound instruction to ladies on the various subjects of importance to them. As stated on page 603, the writer has been for seven years in this institution, for the benefit of his health, and he knows Dr. Kellogg personally to be an honest, conscientious gentleman, of very high ability in the medical profession, and a voluminous writer. The book above referred to is one that should be possessed by every family.

“The innocence of her eye is like that of the turtle-dove ; simplicity and truth dwell in her heart.

“The kisses of her mouth are sweeter than honey ; the perfumes of Arabia breathe from her lips.

“Shut not thy bosom to the tenderness of love ; the purity of its flame shall ennoble thy heart, and soften it to receive the fairest impressions.”

WOMAN — WIFE — MOTHER.

“Give ear, fair daughter of love, to the instructions of prudence, and let the precepts of truth sink deep in thy heart. So shall the charm of thy mind add elegance to thy form ; and thy beauty, like the rose it resembleth, shall retain its sweetness when its bloom is withered.

“In the spring of thy youth, in the morning of thy days, when the eyes of men gaze on thee with delight, and nature whispereth to thine ear the meaning of their looks, ah ! hear with caution their seducing words, guard well thy heart, nor listen to their soft persuasions.

“Remember thou art made man’s reasonable companion, not the slave of his passion ; the end of thy being is not merely to gratify his loose desire, but to assist him in the toils of life, to soothe him with thy tenderness, and recompense his care with soft endearments.

“Who is she that winneth the heart of a man, that subdueth him to love, and reigneth in his breast ?

“Lo ! yonder she walketh in maiden sweetness, with innocence in her mind, and modesty upon her cheeks.

“Her hand seeketh employment, her foot delighteth not in gadding abroad.

“She is clothed with neatness, she is fed with temperance ; humility and meekness are as a crown of glory circling her head.

“On her tongue dwelleth music, the sweetness of honey floweth from her lips.

“Decency is in all her words, in her answers are mildness and truth.

“Submission and obedience are the lessons of her life, and peace and happiness are her reward.

“Before her steps walketh prudence, and virtue attendeth at her right hand.

“Her eye speaketh softness and love ; but discretion with a scepter sitteth on her brow.

“The tongue of the licentious is dumb in her presence ; the awe of her virtue keepeth him silent.

“When scandal is busy, and the fame of her neighbor is tossed from tongue to tongue ; if charity and good-nature open not her mouth, the finger of silence resteth on her lip.

“Her breast is the mansion of goodness, and therefore she suspecteth no evil in others.

“Happy is the man that shall make her his wife ; happy is the child that shall call her mother.

“She presideth in the house, and there is peace ; she commandeth with judgment, and is obeyed.

“She ariseth in the morning, she considereth her affairs, and appointeth to every one their proper business.

“The care of her family is her whole delight ; to that alone she applieth her study, and elegance with frugality is seen in her mansion.

“The prudence of her management is an honor to her husband, and he heareth her praise with a secret delight.

“She informeth the minds of her children with wisdom, she fashioneth their manners from the example of her own goodness.

“The word of her mouth is the law of their youth, the motion of her eye commandeth their obedience.

“She speaketh, and her servants fly ; she pointeth, and the thing is done.

“For the law of love is in their hearts, and her kindness addeth wings to their feet.

“In prosperity she is not puffed up ; in adversity she healeth the wounds of fortune with patience.

“The troubles of her husband are alleviated by her counsels, and sweetened by her endearments ; he putteth his heart in her bosom, and receiveth comfort.

“Happy the man that has made her his wife ; happy the child that calleth her mother.”

HUSBAND.

“Take unto thyself a wife, and obey the ordinance of God. Take unto thyself a wife, and become a faithful member of society.

“But examine with care, and fix not suddenly. On thy present choice depends thy future happiness. If much of her time is destroyed in dress and adornments ; if she is enamored of her own beauty, and delighted with her own praise ; if she laugheth much, and talketh loud ; if her foot abideth not in her father’s house, and her eyes with boldness rove on the faces of men ; though her beauty were as the sun in the firmament of heaven, turn thy eyes from her charms, turn thy feet from her

paths, and suffer not thy soul to be ensnared by the allurements of imagination.

“But when thou findest sensibility of heart, joined with softness of manners; an accomplished mind, with a form agreeable to thy fancy; take her to thine house; she is worthy to be thy friend, thy companion in life, the wife of thy bosom.

“O cherish her as a blessing sent thee from Heaven. Let the kindness of thy behavior endear thee to her heart.

“She is the mistress of thy house; treat her therefore with respect, that thy servants may obey her.

“Oppose not her inclination without cause; she is the partner of thy cares, make her also the companion of thy pleasures.

“Reprove her faults with gentleness; exact not her obedience with rigor.

“Trust thy secrets in her breast; her counsels are sincere, thou shalt not be deceived.

“Be faithful to her bed; for she is the mother of thy children.

“When pain and sickness assault her, let thy tenderness soothe her afflictions; a look from thee, of pity and love, shall alleviate her grief, or mitigate her pain, and be of more avail than many physicians.

“Consider the tenderness of her sex, the delicacy of her frame; and be not severe to her weakness, but remember thine own imperfections.”

There is certainly great wisdom, truth, love, and justice in the terse and epigrammatic sentences of the Oriental Brahmin! Are not these sage maxims worthy the thoughtful consideration of every man and woman contemplating marriage, and of those already united in its indissoluble bonds? What purity and bliss, health and beauty, would flow from an observance of these moral obligations and physical restraints, could they be generally enforced and maintained through all the ramifications of human society!

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