

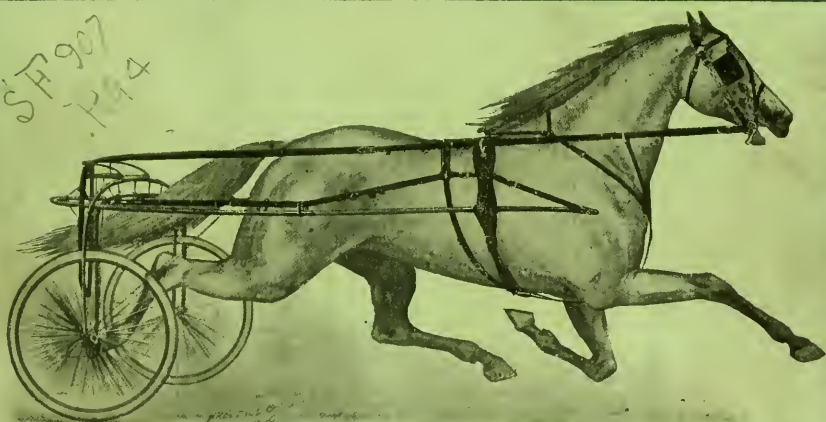
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RUSSELL'S
INSTRUCTIONS ON THE
LEGS, FEET AND TEETH
OF THE HORSE.



PROF. W^m RUSSELL
CINCINNATI, OHIO.



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PRESCRIPTIONS AND INSTRUCTIONS

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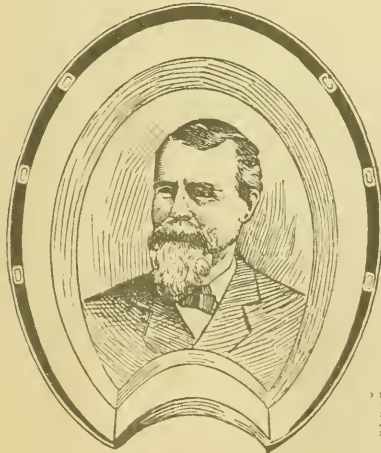
DISEASES OF THE FEET AND LEGS OF THE HORSE

By PROF. WILLIAM RUSSELL

TOGETHER WITH A

TREATISE ON THE TEETH OF THE HORSE

By W. A. LEWIS, D. V. S.



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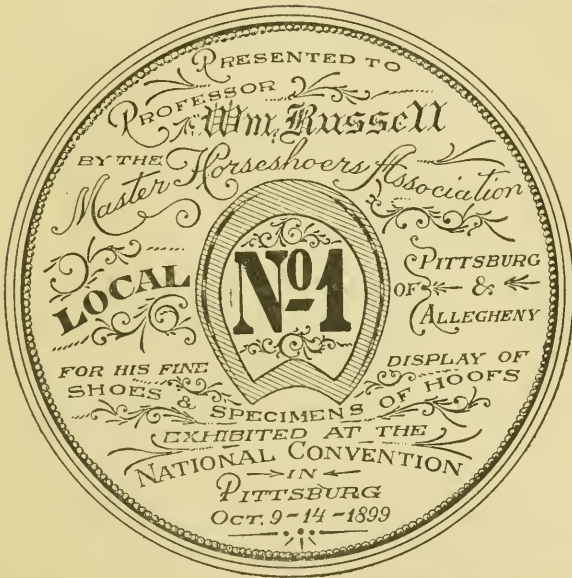
INTRODUCTION.

Following are some reasons why every lover of the horse, horseman and horseshoer should have a copy of the Sixth Edition of my work on "Scientific Horseshoeing," and study it well. It gives most valuable information on scientific horseshoeing, shows beyond all doubt how to preserve the foot in the state of nature, and how to restore the foot and leg when they become diseased from neglect or improper and ill-constructed shoes, as seventy-five per cent of foot and leg lameness is caused by allowing the foot to grow too long at the toe or too high at the heels. By keeping the feet properly balanced under the legs the weight of the body is equally distributed to all parts of the feet and legs. If the feet are properly pared and shoes properly fitted and driven on, there is but little danger of the horse having sore or tender feet. As the old adage says, "Prevention is better than cure."

"Scientific Horseshoeing" is a book of 346 pages, with over 500 illustrations of the feet and legs of the horse and shoes to suit all gaits, the walk, the trot, the pace, the gallop, and the fleet-footed running horse. By having a copy of the Sixth Edition and studying its contents you will avoid ninety per cent of the foot and leg lameness. It is published by The Robert Clarke Company, 31-35 East Fourth street, Cincinnati, Ohio.

PROF. WM. RUSSELL,
No. 1722 FREEMAN AVENUE, CINCINNATI, OHIO.





MEDALS.

At the Cincinnati Industrial Exposition, held in 1870, First Premium Silver Medal and Diploma were awarded to Wm. Russell for the best display of hand-made horseshoes and for morbid specimens of horses' feet, caused by improper shoeing.

The First Premiums and Diplomas have been awarded to Prof. Wm. Russell's display of hand-made horseshoes, as above, for the successive years 1870, 1871, 1872, 1873, 1874, 1875, 1879, 1880, 1881, 1883.

First Premiums have been awarded to Prof. Wm. Russell's display wherever exhibited, notably at the Texas State Fairs and Dallas Exposition, held in 1889 and 1890. Best system of scientific horseshoeing, best display of hand-made horseshoes, and best display of morbid specimens of horses' feet.

Have been awarded First Premium Medal and Diploma at the World's Fair, held in Philadelphia, Pa., in 1876.

Was awarded First Premium, Medal and Diploma at the World's Fair, held in Chicago, Illinois, in 1893.

Was awarded First Premium, Medal and Diploma at the World's Fair, held in Nashville, Tennessee, in 1897.

I can say one thing, without boasting: I have taken more First Premiums than any man living. I have the Medals and Diplomas to show for themselves in my office. I have always been awarded First Premium wherever I made an exhibit with my hand-made horseshoes and horses' feet and legs. I have always taken first prizes wherever I have made an exhibit with my hand-made shoes and specimens of horses' feet and legs. I have over two hundred and fifty

different styles of hand-made shoes which I have invented and made myself in the past fifty years.

Horseshoeing is one of the trades a man never finishes learning. As time changes, almost everything changes. As the horse increases in speed, he quickens his evolution and changes his way of going. I wish to impress upon the minds of horse owners and drivers that in shoeing track horses it is more or less experimenting. The shoer, driver and trainer must experiment in getting the feet and toes of just the right length, and shoes just the right weight; weight and thickness and style to suit the gait of the horse, as scarcely any two speed horses are shaped and gaited alike. The style and weight of shoes that would suit one horse would not be suitable for another. So, after all, shoeing speed and race horses is experimenting in getting their feet just the right length on the ground tread, and shoes just the right weight; weight and thickness and style to suit the gait of the horse. As the horse increases in speed he changes his way of going and requires a different style of shoe.

Why every man who shoes horses should have a copy of my Sixth Edition: It has over 500 cuts of different styles of shoes, feet and legs, over 348 pages. It contains sixty-four years of experience at the anvil, with hammer and tongs, knife and rasp in hands under the horse. Any man who will follow the instructions given can do fifty per cent better work by following the instructions given in the book than without following the instructions. Send and get a copy of the Sixth Edition.

Why every man owning horses ought to have the Sixth Edition is to know for himself when his horses' feet are properly shod and the foot and leg is set plumb under the body. It ought not to be a question how cheap I can get my horse shod. The question ought to be, how good can I get my horse shod, so as to preserve his usefulness. Horses do not wear out from hard work; they wear out from the abuse of the foot and leg.

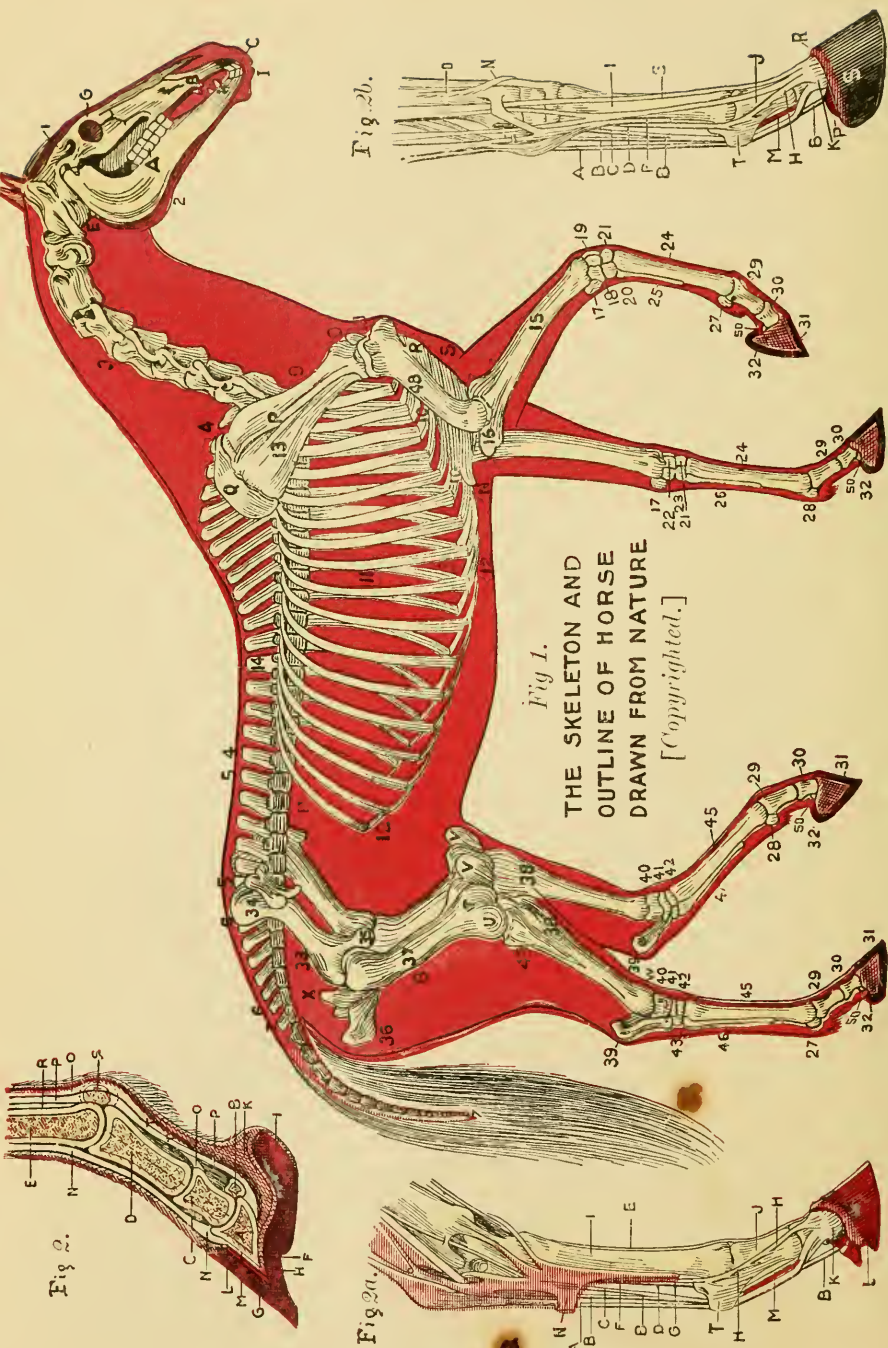


Fig. 2.

Fig. 2a.

Fig. 2b.

Fig. 1.
THE SKELETON AND
OUTLINE OF HORSE
DRAWN FROM NATURE
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THE SKELETON AND OUTLINES OF THE HORSE

DRAWN FROM NATURE. SEE FIG. 1.

1. Cranium and face.
2. Lower jaw.
3. Cervical vertebrae—Jointed process of the neck.
- 4-4. Dorsal vertebrae—Jointed process of the back.
- 5-5. Lumbar vertebrae—Jointed process of the loins.
- 6-6. Sacrum. A consolidation of five vertebrae, articulated, or jointed in front with the last lumbar, or loin vertebrae, and behind with the first coccygeal bone; and on the sides with the coxae, the bones which, with the sacrum, form the pelvis. The sacrum is triangular, flattened above and below, and from before and behind, describes a slight curve upward.
- 7-7. Coccygeal vertebrae—Jointed process extending from sacrum backward.
8. Sub-trochanterian crest.
- 9-9. True ribs.
- 10-10. Cartilages of true ribs.
- 11-11. False ribs.
- 12-12. Cartilages of false ribs.
13. Collar-bone.
14. **Fourteenth Dorsal Vertebra**—The axis upon which the body is hung.
15. Radius—Forearm.
16. Elbow.
17. Pisiform, or pea-shaped bone.
18. Cuneiform, or wedge-shaped bone.
19. Lunar bone.
20. Trapezoid, or table bone.
21. Magnum, or large bone.
22. Scaphoid, or cradle bone.
23. Unciform, or hook bone. The pisiform bone, together with the last six named, make up the carpal bones, and correspond with the wrist bones of man.
24. Cannon or shank bone.
- 25-26. Splint bones, two on each leg.
- 27-28. Sesamoid bones.
29. Upper pastern bone.
30. Coronary, or lower pastern bones.
31. Coffin or foot bone.
32. Wing of coffin, or foot bone.
- 33-36 and 34-35. Coxae—these bones with the sacrum form the pelvis.
37. Femur.
38. Tibia.
39. Os calcis—heel bone.
40. Astragalus.
41. Scaphoid, or cradle bone.
42. Cuneiform, or large wedge-shaped bone.
43. Os cuboides, or cube bone.
44. Little cuneiform, or wedge-shaped bone. The heel bone, together with the five last named, form the tarsus, or hock.
45. Cannon, or shank bone.
- 46-47. Exterior and interior splint bones.
48. Shoulder.
49. Fibula.
- 50, 50, 50, 50. Navicular or nut bone.
- A. Molars.
- B. Canine teeth or tusks.
- C. Incisors.
- E. Atlas—First Vertebra, or joint of neck, and articulating or jointing immediately with the occipital or head bone, sustaining the head. Hence its name.
- G. Orbit—Cavity in which the eye is situated.
- H. Lower tusks.
- I. Lower lip.
- M. Cartilaginous cartilages.
- N. Ensiliform, or sword-shaped cartilage.
- O. Coracoid process of scapula.
- P. Spine.
- Q. Cartilage, or gristle.
- R. Major trochanter.
- S. Sternum, or breast bone.
- T. Trochlea.
- U. External condyle.
- V. Patella or stifle.
- W. Hock joint.
- X. Trochanter—Major externus.

FIG. 2.

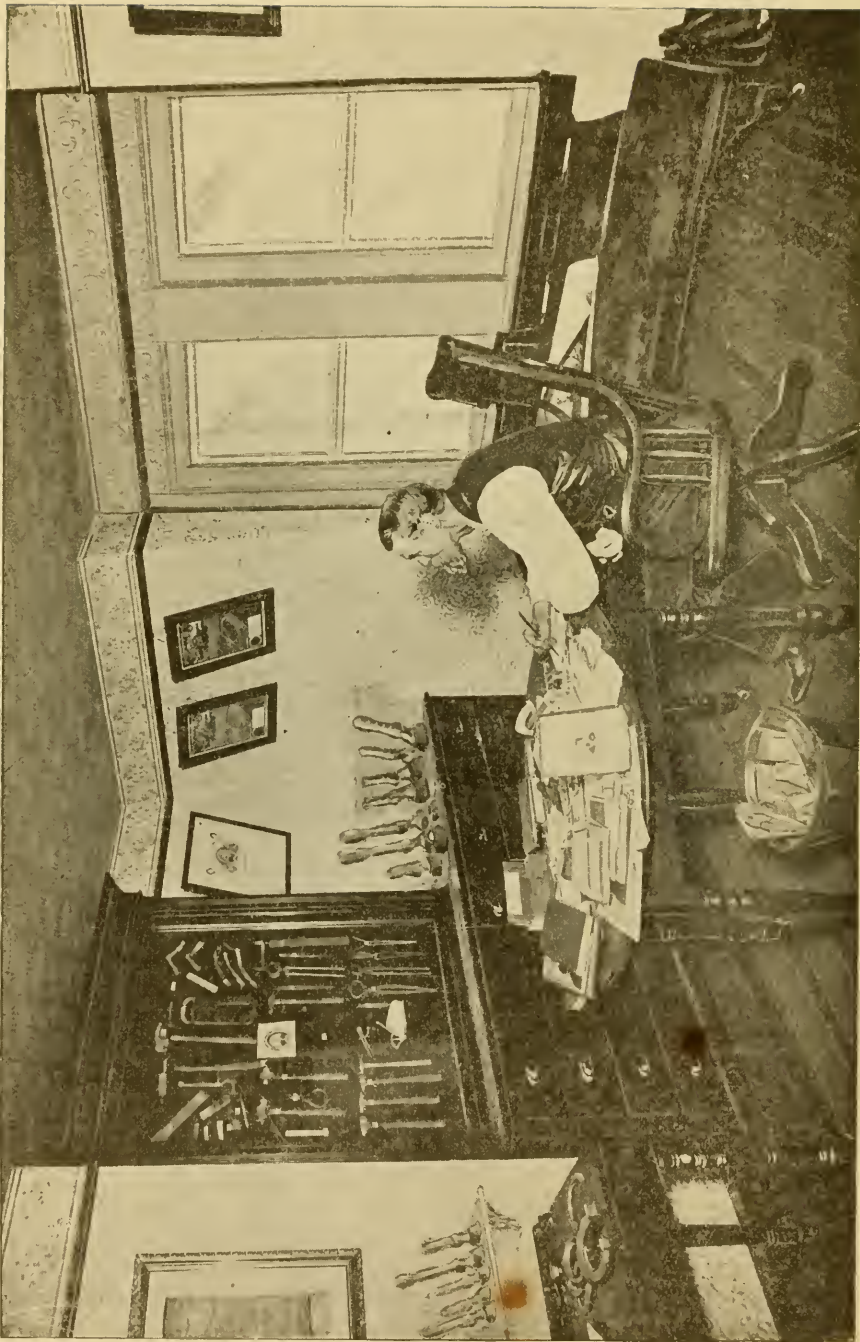
SECTION OF RIGHT FRONT FOOT AND LOWER PORTION OF LEG SHOWING ARTICULATIONS OF BONES AND TENDONS.

- | | |
|--|---|
| <p>A. Coffin bone, or os pedis.</p> <p>B. Navicular, or nut bone.</p> <p>C. Lower pastern bone.</p> <p>D. Upper pastern bone.</p> <p>E. Lower end of cannon bone.</p> <p>F. Velvety tissue, or sensitive sole.</p> <p>G. Horny outer wall.</p> <p>H. Horny, or insensitive sole.</p> <p>I. Horny, or insensitive frog.</p> <p>K. Plantar cushion and sensitive sole.</p> | <p>L. Horny, or insensitive laminae.</p> <p>M. Sensitive laminae.</p> <p>N-N. Front extensor tendon.</p> <p>O-O. Flexor perforatus (superficial flexor).</p> <p>P-P. Flexor perforans (deep flexor of the foot, inserted under the coffin bone).</p> <p>R. Suspensory tendon of the fetlock.</p> <p>S. Sesamoid bones (dotted lines).</p> <p>T-T. Branch of perforatus tendon attached to upper side of lower pastern bone.</p> |
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FIGS. 2-a AND 2-b.

SIDE VIEWS OF FORE AND HIND LEGS AND FEET, SHOWING CORRECT POSITIONS OF THE TENDONS, LIGAMENTS AND SHEATHS.

- | | |
|---|--|
| <p>A. Flexor perforatus.</p> <p>B-B-B. Flexor perforans.</p> <p>C. Metacarpal or upper check ligament of the perforans tendon.</p> <p>D. Suspensory ligament of the fetlock.</p> <p>E. Front extensor tendon (inserted into foot of coffin bone).</p> <p>F. Splint bone.</p> <p>G (Fig. 3). Branching of the suspensory ligament.</p> <p>H-H (Fig. 2-a) and H (Fig. 2-b). Branch of suspensory ligament passing forward to join the extensor tendon.</p> <p>I-J. Periosteum membrane covering surface of cannon and pastern bones.</p> <p>K. Junction of suspensory ligament and extensor tendon forming broad covering to lower pastern.</p> | <p>L (Fig. 2-a). Fibrous reticulum (podophylus tissue), forming the numerous leaves of the sensitive laminae, covering the external face of the coffin bone and interlocking with the horny leaves (keraphyllous tissue) of the inner surface of the surrounding wall.</p> <p>M. Pastern supporting, or lower check ligament. See Fig. 4, p. 51, "Scientific Horseshoeing," for full explanation.</p> <p>N (Fig. 2-b). Tarsal sheath.</p> <p>N (Fig. 2-b). Oblique extensor.</p> <p>O (Fig. 2-b). Anterior extensor of metacarpus.</p> <p>F (Fig. 2-b). Lateral cartilage.</p> <p>R (Fig. 2-b). Coronary chamber.</p> <p>S (Fig. 2-b). Horny exterior, or outer wall of hoof.</p> <p>T. Sesamoidal sheath.</p> |
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PROF. W. M. RUSSELL IN HIS STUDY.

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USEFUL PRESCRIPTIONS AND INSTRUCTIONS

FOR

TREATING DISEASES OF THE HORSE.

The recipes and prescriptions herein I have gathered from many which have come to my knowledge in the course of 64 years experience as a horseshoer, and all of which I have tried with satisfactory results. In the treatment of the horse for diseases of the leg or foot, which have come through accident or improper care, much depends upon good judgment and the proper application of the remedy. And right here I want to say that it is far from my intention to advise that the attendance of a regular veterinarian be dispensed with, when any serious form of disease exists which calls for medical treatment beyond the farrier's art. Nor do I desire to appear in a false light with respect to the valid claims of professional veterinary practice. At all times surgical treatment of the foot is combined more or less with the mechanical work of shoeing, and a capable farrier should to-day be more than a mere worker in iron, and it is for his guidance that I have published these recipes and prescriptions.

Success in the use of these preparations, I may add, depends upon a right understanding of the nature of the trouble in each instance, and then in the proper application of the remedy.

No. 1.

Cleansing the feet.—The importance of cleanliness in keeping the feet of horses free from certain disorders of the skin and other excretory matters that are causative of eruptions can not be overlooked. In prescribing a simple wash for the feet, therefore, it is only a step in the way of preventing disorder in its functions, to which neglect of such precaution may lead. In hot, dry weather the extremities of the limbs should be thoroughly scoured at least once a day. Use the best castile soap, with a liberal supply of warm water, and make a good stiff lather and apply it with a brush—to rub it in and thus cleanse the skin from all impurities. Then rinse off with clear water and dry with a cloth. This operation should apply to all parts of the ankle and hoof, including the heels, and in this way a clear, healthy condition of skin and elastic, tough, glossy wall will be insured, if the foot is otherwise healthy.

No. 2.

Foot Salve.—Shoemaker's wax, $\frac{1}{2}$ lb., Beeswax, $\frac{1}{2}$ lb.; mutton tallow, for summer use, $\frac{1}{4}$ lb., and for winter use, $\frac{1}{2}$ lb. To be melted in an iron pot over a gentle fire, kept constantly stirred until the composition is well dissolved and thoroughly mixed.

This preparation is invaluable for many foot ailments when used according to directions.

FOR CONTRACTION.—After the foot has been prepared and the shoe fitted, have the salve well warmed, and fill the bottom of the foot with it, then cover with a thin overlay of white cotton or clean oakum, and nail on the shoe with a piece of leather fitted under the web to cover the bottom of the foot to retain the salve in place and protect it from dirt.

FOR CORONITIS.—Warm the salve as before and thoroughly saturate with it several pledgets or thin flat layers of white cot-

ton, and cover the coronary band all round with a thick coating of salve, secured with a compress bandage of linen, laid over it to keep it in place, after which rub a warm smoothing iron over the surface from toe to heels, repeating this process once or twice daily for the space of a week or more, being careful not to scorch or burn the bandage in so doing. The application of heat will operate as a tonic to stimulate the circulation throughout the diseased organ, causing it to absorb the salve, which will at once check the ossified coronary cushion.

FOR LAMINITIS AND VILLITIS, or for inflammation and soreness of the villous tissue of the toe and sole of the foot, follow the directions given for treatment and shoeing in Chapter VII, Russell's "Scientific Horseshoeing," covering such diseases.

FOR BRUISED AND ULCERATED HEELS.—Have the foot leveled and prepared by removing all the hard, dead portions of the horny sole around the affected part, then apply the salve and cotton in and around the sore or tender spot. After the shoe is applied, soak the foot in tubs of warm water, as this will act favorably in reducing inflammation and removing soreness.

FOR CHAPPED HEELS OR DRY SKIN.—Apply the salve same as above, secured with bandage, and repeat the heating process with warm iron as recommended for Coronitis, and all soreness or derangement will quickly disappear.

FOR PUNCTURED WOUNDS.—Whenever the foot is wounded by a nail or other sharp body, it will be necessary to immediately open up the injured spot by means of a drawing knife and remove the edges of the wounded parts as deep as the horny tissue extends. The salve is then to be poured into the orifice until the cavity is filled—the foot being held up that the salve may cool and harden. By having it remain there the stimulus which it imparts will soon allay any irritation and bring on a healthy growth.

No. 3.

Liniment for Chronic and Painful Inflammations of Tendons, Coronary Cushion, etc.—Tincture of Aconite Root, 2 oz.; Spirits of Ammonia, 2 oz.; Tincture of Iodine, 4 oz. Mix and shake well before using.

This remedy is applicable to all cases of soreness or inflammation in the tendons and coronary structures; also it operates favorably on bog spavins, wind galls, and chapped hocks. It stimulates the parts affected to healthy action by causing all exudations, whether of the bones or soft parts, to be quickly re-absorbed and the irritations allayed. In applying, saturate and rub the parts affected well once a day, and in severe cases, twice a day, morning and evening, continuing the operation until recovery takes place.

No. 4.

Wash for General Purposes.—The following recipe is a mild caustic, and will result in no injury to the foot if used as directed: Carbolic Acid, 1 ounce; Glycerine, 1 ounce; Distilled Water, 6 ounces. Mix thoroughly.

When used for bruised heels, pare all the dead hard sole from around the bruised parts, thinning the insensitive sole until it will spring under the pressure of the thumb. After having done this, saturate white cotton large enough to cover the affected parts, lay over the bruise, and allow it to remain for fifteen or twenty minutes. Put a few drops of the wash on the cotton occasionally, so as to keep it thoroughly saturated. It sometimes happens that the horse strikes his opposite ankle or shin, cutting it, and quite often proud flesh sets up in the wound. If this happens, take white cotton large enough to cover the wound, thoroughly saturate with the wash and lay over the wound. Bandage the leg to hold the cotton in place, and let it remain on the wound for fifteen or twenty minutes.

This will remove the proud flesh and stimulate a healthy growth. I have used the above wash and it has always produced the best and most satisfactory results.

No. 5.

Witch Hazel Wash, for General Purposes, such as Sprained Tendons, Sore Loins and Soreness of the Muscles.—Witch hazel wash is an old, long-standing remedy, well known to horsemen, and has a well-earned reputation as a relief for the above-named troubles. I have used it myself with the most satisfactory results. Always bear in mind to have the foot properly balanced, and a shoe so constructed and fitted that when nailed to the foot the horse will stand with his foot and leg naturally under the body. In this way the weight of the body is equally distributed to all parts of the foot and leg.

No. 6.

Black Liniment.—Oil Spike, Oil Stone, Oil Turpentine, a. a. This liniment is very valuable for burns or scalds, or fresh cuts in horses or men. Saturate white cotton with the liniment, large enough to cover the affected parts. Apply the cotton to the wound, and wrap a rag over it. Saturate three or four times a day with the liniment until cured.

No. 7.

Condition Powders.—Jamaica Ginger, powdered, 2 oz.; Black Antimony, 1 oz.; Salt Petre, 2 oz.; Gentian Powder, 2 oz.; Finogruk, 2 oz.; Rosin, powdered, 2 oz.

Give one tablespoonful once a day in Mash, made of bran and middlings. Put two tablespoonfuls of salt in the Mash. Feed light for a few days and give the powers at night.

No. 8.

Green Liniment for Scratches and Old Sores.—Verdigris, $\frac{1}{2}$ oz.; Oil of Origanum, 6 oz.; Barborous Tar, 6 oz.; Turpentine, 4 oz., Olive Oil, 14 oz.; Oil Spike, 2 oz. Mix.

I have used this liniment with wonderful success for Scratches, Grease Heel, and removing granulated flesh in old sores. Before using, have the liniment well shaken up, so as to have it thoroughly mixed. In applying, thoroughly saturate the parts affected, and rub it in with the hand until they become softened. The old scales will exfoliate and be cast off, and the skin will become quite soft and pliable. Use once a day until cured.

No. 9.

A Good Liniment for Soreness of Tendons, Loins and Coronary Band.—Sulphuric Ether, 2 oz.; Chloroform, 2 oz.; Laudanum, 2 oz.; Liquor of Ammonia, 1 oz.; Croton Oil, $\frac{1}{4}$ drachm; turpentine, 1 pint. Mix and shake well before using.

In case the horse shows signs of soreness in the tendons; muscles, etc., by pressure of the thumb and finger, apply the liniment to the affected parts. To test the loins for soreness pass the finger and thumb down on the back toward the hip-bones. Apply daily until the soreness disappears. This liniment will relax the skin and tendons and speedily remove soreness, but if applied too freely will blister. I gave \$50.00 for this recipe.

No. 10.

Hoof Paste for Building up Flat Feet and Restoring Broken-down Quarters.—Gutta Percha, 6 oz.; Gum Ammonia, 3 oz.; Burgundy Pitch, $\frac{1}{2}$ oz. Heat and mix in a vessel over a slow fire until well dissolved.

Before using this paste, the hoof must be pared as low at toe and heels as can be safely done, also the outside wall must be rasped to its proper shape and the

shoe fitted in the manner directed in Chapter IV, Russell's "Scientific Horseshoeing," punching the nail holes to enter at the strongest part of the wall. When this is done, have enough of the hoof paste in readiness by boiling it in hot water until it is quite soft and pliable. In this state it will be of an elastic consistency and may easily be stretched or molded to suit the purpose intended. Next have the hoof well warmed, wherever the paste is to be applied, by holding a piece of hot iron near enough to thoroughly heat the parts, as this will make the paste unite itself firmly to the hoof. Then with a stiff-bladed case knife, spread the paste over the parts of the hoof as required, to fill all defects evenly with the toe and heels, working it very quickly before it cools and hardens. After which nail on the shoe. By use of this paste as directed, any part of the hoof may be built up to its natural form. The base of the wall or the bars may be restored, and where the sole is flat, the application of the paste in sufficient quantity will restore the flattest foot to a good cup-like form. This paste is also invaluable for filling toe and quarter-cracks.

No. 11.

Green Ointment for Scratches and Granulations.—Russian Tallow, 1lb.; White Rosin (ground), $\frac{1}{2}$ lb.; Pulverized Alum, 1 oz.; Verdigris (pulverized), 4 oz.; Venice Turpentine, 4 oz. Melt over a slow fire. This is good for scratches and for granulated flesh in horse's feet.

No. 12.

Liniment to Remove Pain and Produce Local Anesthesia in a part affected.—Veratria, 3 drachms; Soap Liniment, 2 oz., Tincture Aconite Root, 2 oz. Mix. Rub in well with the hand every two or three hours, on the affected parts of the horse.

This is also valuable for the human being. When used for

man, rub the affected parts well. After rubbing, cover with a warm piece of red flannel. Repeat every half hour until the pain ceases. This has proved to be one of the best liniments I have ever used for lumbago for pains in any part of the body. After rubbing, wash your hands well with soap and warm water, otherwise, they should not come in contact with the face or eyes, as a painful, smarting sensation will be created, although its effects will not be injurious to either face or eyes.

No. 13.

Eye Wash to Relieve Soreness and Improve Clouded Sight in Horses.—Put half a pint of rain or spring water, half a drachm of White Vitrol, and half a drachm of Sugar of Lead together. Take a fine camel's hair brush, and with it put one drop in the eye, night and morning, until the scum or film is removed. I have known this to remove the worst cases in 48 hours, so as to show a good clear eye

No. 14.

Green Salve for Old Sores or Scratches on the Horse.—Rosin, 4 oz.; Hog's Lard, $\frac{1}{2}$ lb.; Beeswax, 3 oz.; Common Turpentine, 6 oz. Dissolve in an iron pot, over a gentle fire; then add 2 oz. of pulverized Verdigris. Stir all together until they are thoroughly mixed. Strain through a coarse cloth, and set aside until it cools. It is then ready for use. This is a splendid salve for old sores, bruised heels and scratches on horses. I have used it with great success.

No. 15.

Recipe for Colic.—Tincture Opium, 2 drachms; Tincture Capsicum, 2 drachms; Spirits Peppermint, 2 drachms; Tincture Rhubarb, 2 drachms; Spirits Camphor, 2 drachms. To 1 gill of Molasses, $\frac{1}{2}$ pint of water. Mix for one dose. Repeat in 30

minutes, if not relieved. This should be kept on hand by all who keep charge of horses, as it is invaluable as a remedy for colic.

This painful affection of the bowels requires prompt attention, and the above is to be given in a drench.

No. 16.

Hoof Ointment.—Pine Tar, Fresh Butter, Carbolic Acid, Strained Honey. Equal portions of each to be melted over a slow fire. To be applied around the coronet band three times a week. Have it rubbed in well with the finger, from the hair about one inch, down around on the hoof. There are cases where nature requires assistance, and it is only in chronic cases and whenever the foot becomes hard and dry from fever and laminitis, and has partially lost its growth, looking rigid and rough, that I would recommend the above hoof ointment. If used as directed, it will produce good results.

No. 17.

Recipe for Kidney Trouble.—Equal parts of Buchu and Uva Ursi Tea. Give one-half pint at a dose twice a day. It can be given in a drench or in food. Also give one pint of fresh Flax Seed Oil at a dose twice a day, two hours after giving him the drench. Get the flax seed, put a sufficient quantity into an iron pot, over which pour water, boil the seeds well, then skim off the oil to give to the horse. In this way the oil will be fresh and pleasant, and may be given in a drench or in food. Better to use chopped feed.

No. 18.

Recipe for Loosening up Cold in the Head.—In case the head and throat are partially closed up from the effects of a cold, or other causes, steam the head well with hot bran. Take a small measure of bran in a bag, place this in hot water, and

then take $\frac{1}{4}$ of a teaspoonful of ammonia and pour it on the steamed bran. Hold the bag over the head and let the horse's nose remain in the bag for 15 or 20 minutes. By so doing, this will loosen up the mucus in the head and throat, allowing the horse to breathe more easily. Repeat the steaming, as may be necessary to keep the head open. Be careful not to let the horse take cold after steaming.

No. 19.

Treatment for Weak Ankles or Knuckling.—By referring to Chapter VIII, Russell's "Scientific Horseshoeing," under the head of Defective Ankle Joints, a full description is here given for preparing the foot, and a style of shoe shown for remedying this defect. After having the foot in shape and the shoe nailed on, clip off all the hair around the fetlock joint close to the skin. Then apply porous plasters cut in strips one and a half inches wide. Let the horse stand on foot, dip the plaster in warm water, and wrap it six or eight times around the joint for a bandage, both above and below, at least two inches each way. After this has been done, cover with a red flannel bandage, and let it remain for three or four weeks. As the hair begins to grow, the bandage will become loose, when it must be removed, and the hair clipped close to the skin, and renew above treatment, applying bandages as before. In extreme cases it will be advantageous to have an iron toe piece, two inches wide, extending forward two inches, welded on the front of shoe level with the ground surface, without calks to heels of shoe. Let the horse have rest. By faithfully adhering to these directions, the most stubborn cases will be cured. I have used it and never failed to make a cure.

No. 20.

Recipe for Splints on Horses.—Equal parts Mercury and Spanish Flies. Mix into a salve. Before using, clip the hair off around the enlargements of the bony structure. Then

cover it with this salve. Let it remain on for three days. Then grease well with fresh lard, and let it remain on for three days. After this, wash the sore well with carbolic-acid soap and warm water, and then apply the salve again, as above, followed by the greasing and washing, until the enlargement of the boney structure has been removed. If used as per directions, a successful cure will follow. Keep the head of the horse tied up during this treatment, so he can not bite the sore.

No. 21.

For Horse's Feet. For Old Chronic Cases, such as Bruised Heels, Wounds of Nails, and Other Causes.—Washing Soda, 4 oz.; Four Broken Eggs; Pulverized Alum, 2 oz.; Carbolic Acid, 2 oz.; Ground Flax Seed, enough to make a poultice to suit the occasion. Mix all together into a poultice; apply to foot as warm as possible; tie up the foot so as to retain the poultice. In case of suffering, add 4 oz. laudanum to the above. Remove the poultice after 24 hours, and have the wound thoroughly washed with warm water and carbolic soap. In case the wound requires another poultice, repeat the above for 24 hours longer. In almost every case two poultices are sufficient. In many cases the foot would be better off having a shoe lightly nailed on the foot. The above is a recipe par excellence for poulticing bad ulcerated heels, especially if broken out at the coronet.

No. 22.

Ringbone, Spavin, Side-bone, Curb-εplints, thorough-pin, Wind-puff or Pastern, Bog Spavin.—Oil of Origanum, Tincture of Iodine, Oil Stone, Tincture Camphor, Tincture Turpentine, Tincture Cantharides, Corrosive Sublimate, Oil of Cedar, Croton Oil, Gum Euphorbium, of each one ounce. Mix with ten ounces of fresh lard. Cut off the hair the size of the lump and around the bony deposit. Use ointment on the affected parts lightly once a day for three days, and grease the blister once a day with Castor Oil for three days. The seventh day wash the blistered part with warm water and castile soap. After having the blistered part thoroughly dried, use the liquid or salve as before for twenty-four days and the horse will be relieved if not cured of his lameness, and in many cases the lump will be removed. When the above named medicine is mixed altogether, it will be a liquid. When used in a liquid state, take a soft brush; dip into liquid; brush over the affected parts lightly so as to produce a sweat blister. When I have my druggist to make the spavin medicine, I have it made into a salve. I always apply the salve to the affected parts with the finger. If the medicine is used according to the above instructions given, it is a sure cure for all the above-named diseases of the foot and leg. In my Sixth Edition, I invented and made a four-calked shoe to be used for spavins. On pages 248 and 249 is a cut of the four-calked shoe to be used for spavins, and full instructions given how to shoe the foot to give relief to spavin leg at once. When made into a liquid, keep the bottle corked tight. When made into a salve and put into a tin box, some of the ingredients are less liable to evaporate. Always bear in mind to keep the medicine tightly boxed up. This recipe is one of the Scotch spavin remedies that

has been used over one hundred years ago, and it has proven to be a success wherever used, if used according to instructions given.

No. 23.

Caution.—Never use Butter of Antimony, or Spirits of Salt, for wounds of nails, corns, or bruised heels, as is frequently done by many shoers, as these acids are very injurious to the feet. I have specimens showing their destructive effects upon the wings of the coffin-bone, which were diseased and wasted away from their use.

No. 24.

To Remove Warts on Horses.—Muriate of Ammonia, two drachms; powdered Savin, one ounce; fresh Lard, twelve ounces. Mix all together, and it will be ready for use. Apply daily, and they will soon disappear.

No. 25.

For Lampers.—All young horses are more or less liable to this trouble; it is nothing but inflammation of the gums. Bleed or scarify the gums; never burn, for it may add to the disease of the teeth. After bleeding or scarifying, rub the gums well with salt, and feed bran mash so as to keep the bowels relaxed for a few days.

No. 26.

Unexcelled Cough Powders.—Angelica Root, 4 oz.; Zedoary, 4 oz.; Galangal, 4 oz. Grind coarse, put into evaporating dish, moisten with alcohol, then pack tight, cover it over and let it stand until next day; then pack in a percolator and pour on alcohol slowly until one pint is filtered through, then

evaporate to a dry powder and add 2 oz. of Red Sulphuret of Antimony burnt black in a crucible; Sulphur, $\frac{1}{2}$ lb.; Fenugreek, 1lb. Mix into a powder; give one tablespoonful twice a day in feed. Better to feed mash or chop feed. This recipe is invaluable to horse owners, and the powder should be kept constantly on hand.

No. 27.

Celebrated Cough Syrup.—One of the finest preventives for lung fever, which the horse is subjected to in certain climates and seasons of the year.

Oil of Tar, 2 oz.; Balsam of Fir, 2 oz.; Alcohol, 8 oz.; Mix. Shake well before using. In case you find your horse has taken cold and commences to cough, give one ounce of the liquid at a dose three times a day, one hour before or after eating. The best and easiest way to give the medicine is to get a long necked syringe, open the horse's mouth, pull his tongue partly out, then put the syringe well into his mouth and throat, and inject the medicine. Always have two persons at hand to assist in this operation.

No. 28.

To Kill Worms in the Horse.—Give one handful of pulverized sage in mash feed at night for fourteen days.

No. 29.

To Kill Lice on the Horse.—Equal parts of Acetic Acid and water. Mix. Sprinkle with the liquid over the body lightly once a day for three days. A good receipt for the above purpose.

No. 30.

For the Prick or Wound of a Nail in the Foot.—Equal parts of Carbolic Acid and Morphine, a. a.

First, open the wound to the bottom with a farrier's knife; then drop the wash into the wound, saturate white cotton with

the wash, lay the cotton into the wound, let it remain there for fifteen or twenty minutes, then get pickled fat salt pork from the brine, cut into slices, cover the bottom of the foot well with it, and tack on the shoe lightly with a piece of sole leather, so as to retain the poultice in its place; have it dressed occasionally until the soreness is removed. This treatment is also good for thrush in feet.

No. 31.

To Stop the Flow of Blood.—Horses are often liable to calk themselves in icy weather, after having been sharp shod. The wound in many cases is deep and hard to cure. To stop the flow of blood, saturate a sufficient quantity of white cotton to cover the wound, with Muriate of Iron, and bind over the wound with a cloth bandage.

No. 32.

Liniment for Nail Punctures and Thrush.—Corrosive Sublimate, 2 oz.; Gum Camphor, pulverized, 2 oz.; Spirits of Turpentine, 1 quart. Mix thoroughly before using. In case the horse picks up a nail, pull the nail out, open the wound around the nail hole to the sensitive sole; then 3 or 4 drops of the solution should be placed in the nail hole. Two or three applications are generally enough. When used for treating thrush, hold up the foot, drop the solution into the diseased part, enough to reach the bottom or seat of the disease. In moderate stages of Thrush, two or three applications of the solution, once a day, will generally be sufficient to effect a cure.

No. 33.

Treatment for Sore Tendons, Curbs, and Callous Skin.—A callous skin may result from knee hitting, cuffing, or what is frequently termed boxing the ankles. Long-continued curbs on the hind legs is also productive of this callousness. In my

treatise upon "Scientific Horseshoeing," I have very fully explained, with ample illustrations, how to shoe for curb, page 179, and for inflamed or sore tendons, on pages 196 and 197, and how to apply the bandages and when to remove the bandages. As supplementary thereto, I repeat here in substance the treatment. After the bandage has been applied, keep it well wet with warm water until the inflammation be subsided. Remove the bandage once or twice a day, and bathe the affected parts with Recipe No. 3, replacing the bandage and keeping it wet with warm water. These applications should be kept up as long as any inflammation is observed; for they tend to keep the pores open and assist Nature in scattering the serum through the pores. If the skin becomes callous, I would recommend painting the affected part with iodine, well heated in with the hot iron, Fig. 1, page 36, but do not apply the iodine and heated iron until after the effects of the first blister have disappeared. Grease the blister well with castor oil to preserve the roots of the hair. In five days wash the wound well with warm water and castile soap. Do not bandage after using the iodine. Continue the iodine and hot iron treatment until the skin becomes soft, pliable and natural.

No. 34.

Quittors of the Bone and Flesh.—This is a very important subject, and its treatment demands most careful attention to all the details. There are two kinds, Quittor of the Bone and of the Flesh. Bone Quittor is the more obstinate of the two, and less often yields even to the most careful treatment. Bone Quittor is most frequently caused from old, long-standing, ulcerated or bruised heels, accompanied by a continued slushing discharge of purulent matter through the bottom of the heel, under the outside or inside of the front foot. This suppurating condition is, or has been, allowed to continue through an indefinite period without checking. The result is that the periosteum, or skin covering of the bone becomes diseased, and is wasted away under

and around the heel of the coffin bone. It becomes diseased, loses its elastic toughness, and is liable to become fractured. Cases of this kind will be very difficult of cure. It is easy to distinguish a Bone Quittor from a Flesh Quittor, as the discharge from the former is of a greenish tinge and very offensive to the smell.

The first step in the treatment of Bone Quittor is to remove all the hard insensitive sole around the affected parts; then take a silver probe, made for the purpose, and probe around the wound for any loose particles of bone. After all the fractured pieces of bone have been removed, inject with a small syringe Carbolic Wash, Recipe No. 4, on page 18, thoroughly cleansing the wound. Next use Salve, in Recipe No. 2, page 15, in this manner: Warm the salve first, and then holding up the foot, fill the cavity well with the salve and cover the affected parts with white cotton well saturated with the salve. After having done this apply a bandage around the foot so as to hold the dressing in its place. Next, stand the feet in the soaking tub filled with warm water 6 or 8 inches in depth (Fig. 93, p. 197, Russell's Scientific Horseshoeing). Let the horse stand with his front feet in the tub of warm water at least 2 or 3 hours. Have the foot dressed daily as above until cured, which will be assured under the attention of a skillful and practical man.

Flesh Quittors often arise from bruised heels, quarter crack, a prick or wound from a nail, or a bruise or cut from the opposite foot, as well as from many other causes. The treatment of Flesh Quittor is comparatively easy. With a silver probe, probe down to the bottom of the pipe, and insert a stick of lunar caustic its full length, as far as the pipe extends, to the bottom. If there are more, treat all alike, and after filling the pipe or pipes with the caustic, bandage the foot with a linen cloth so as to hold the caustic in the wounds. After leaving the bandage upon the foot for 30 hours, remove it, and wash the wound well with warm water and carbolic soap. After cleansing, see if the

pipes are loose enough to be removed with a sharp instrument supplied with a small hook on the end, as in Fig. 2, on page 36. In case the pipes can not be easily removed after 30 hours, probe them again to the bottom, and fill with the lunar caustic long enough to reach the bottom, placing a bandage around the foot to hold the caustic in place. Remove the bandage in 24 hours, and the pipes can be easily removed. After the pipes have been removed wash the wound well with warm water and carbolic soap, making a good stiff lather. After thoroughly cleansing the wound, inject the Wash No. 4, page 16, thoroughly cleansing the wound. When this is done use Recipe No. 2, page 14. Have the salve warm and thoroughly saturate with it enough white cotton to cover the inflamed parts, having the dressing thickest around the wound. Place a bandage around the foot wide enough to hold the dressing in place. Then take iron No. 1, page 36, and after warming it hold it close to the wounded and inflamed parts, thoroughly heating the salve into the foot. Repeat the heating process at least morning and evening for the first day or two. This will open the pores of the skin and assist nature in passing the inflammation through them, and it will soon be reduced. With the above named treatments I have never failed to make permanent cures of Bone and Flesh Quitters.

No. 35.

Poultice for Horses' Feet, Wounds of Nails, Bruised Heel, or Insole.—Take strong wood ashes, over which pour boiling water, and let it stand for a few hours, straining off the ley-water. Heat this ley-water until hot, with which, make a poultice, using bran and middlings. Apply it in the foot as warm as possible. Tie up the foot so as to retain the poultice. Repeat the application twice a day for a day or two, or until the soreness is removed. If there should be granulated flesh in the wound, lunar caustic can be used, either in the solid stick or diluted with distilled water, in the proportion of fifty, a

hundred, or two hundred grains to the ounce. After cauterizing, use salve, Recipe No. 2, according to directions given.

No. 36.

Remedy for Kidney Trouble.—In case the horse is suffering from Kidney trouble and can not make water freely, or is suffering from the want of making water, give one ounce of Sweet Spirits of Nitre, mixed in one gallon of water. Give it as a drench. Repeat every three or four hours until relieved. It is better to lay wet cloths over the loins, covered with blankets, until relieved. Then remove cloths and rub the parts dry. Afterward cover the horse with a dry blanket to prevent taking cold.

No. 37.

A Relief for the Heaves.—Oil of Tar (in one vial), 2 oz.; Sulphuric Acid (in another), 2 oz. Drop twelve drops of Oil of Tar into a mash or into vats at night. Put twelve drops of Sulphuric Acid into a half bucket of water and let him drink it; put one tablespoonful of pulverized Resin into the feed with the Tar. Use in this way once a day, and when the above quantity of Oil of Tar and Sulphuric Acid is consumed, the horse will be relieved. It is better to wet the hay and straw and feed chopped feed for the above disease. This prescription I have used in many instances with satisfactory results, not as a cure but as a relief for the heaves.

No. 38.

For corns and bruised heels in horses' feet.—Pine Tar, Gum Turpentine, well powdered. Take equal parts, put into an iron pot heated over the fire, and stir well until thoroughly mixed. Before using, have all the insensible sole pared off around the bruised spot in the heel, then put a suitable shoe to the foot. If there is proud flesh in the heel, sprinkle fine table salt over sore, then warm the salve. Pour it in and around

the sore, cover the sore well with the salve, then lay a thin layer of white cotton over the sore spot to hold the dressing into its place; then get a piece of stiff leather the size of the shoe; nail leather under shoe. By so doing the leather will hold the dressing in its place. Keep the pressure of the sore spot at heel. In many cases soak the foot in warm water for an hour or two. Will give great relief to the horse. As soon as soreness is gone, lameness is gone.

No. 39.

Recipe to preserve the hair on the skin after the horse has died.—I have often been asked how I kept the hair on the horse's leg and pasterns. It can be done by using the following wash: 1 ounce of carbolic acid mixed in a pint of water. Keep the bottle well corked when not in use. After the leg has been cut off the dead horse, it must be done before mortification sets in by a string around the limb. Hang it up in the air. Sprinkle the above wash over the hide twice a day. By so doing, all the hair can be retained on the skin so as to be natural. Keep this up for a week or ten days, or more if necessary, until the leg is perfectly cured and dried.

No. 40.

Worm Powder for the Horse.—Powdered Ginger, 6 drachms; Powdered Calomel, 2 drachms; Powdered Worm-Seed, 6 drachms; Santorien, 4 drachms. Give the above in 4 doses. Give the horse but little rough feed while taking the worm medicine. Feed a small quantity of ground flaxseed meal; add one tablespoonful of salt to the chop feed; better feed powders at night. Give the horse all the water he will drink while taking the worm powders, and see that the horse is well groomed and cared for after the four doses have been given. Feed my condition powder as directed and you will soon see the change for the better.

No. 41.

Wash for Sore Mouth of the Horse.—This has proved to be an excellent wash: Sage Tea, 1 pint; Pulverized Borax, 3 drachms; Pulverized Alum, $\frac{1}{2}$ ounce; Cider Vinegar, 1 pint; Sugar of Lead, 2 drachms. Shake the bottle well before using. The best way to use the wash is to take a fine sponge well saturated with the above wash, open the mouth, and swab the sore places. Open the mouth so far that you can get at the sores with the wash, which will soon heal them and toughen the skin. It is best to swab the mouth three times a day. Do not feed your horse hay or clover, but give soft feed while the mouth is sore.

No. 42.

Recipe for Horse Colic.—Spirits Peppermint, 1 oz.; Sulphuric Ether, 1 oz.; Tincture Capsicum, 1 oz.; Tincture Opium, $\frac{1}{2}$ oz.; Tincture Camphor, 1 oz. Mix and give in 4 doses, 15 minutes apart, until relieved; give in $\frac{1}{2}$ pint of warm water at each dose, in a drench. The best and safest way to give the medicine is to take a long nozzle swing, put the medicine in the swing, place the swing well up in the mouth, and then swing the dose down the throat. By following these instructions the horse will receive the benefit of all the medicine given. The above has proven to be a splendid recipe for colic.

No. 42 $\frac{1}{2}$.

Treatment for Arm or Shoe Boils.—This is a lump or callous on the inner side of the fore leg, or on the upper end of the forearm near the body, and is caused by the horse laying down on the heel and shoe of the same foot. Many horses do this from habit. I blister, and make the lump or callous sore, so that the horse will take his foot away, because it will hurt him when he lays down, and the blister will help remove the

lump; then apply any simple healing salve to the blister. In case there should be heel caulking on the shoes, clip them off smoothly on the ground surface. By following the above instructions you will remove any arm boils in the first stages. Old, long-standing, or arm boils often baffle the skill of the best professors; in such cases my advice to all farriers is to apply suitable shoes; then I recommend the owner of the horse to the most skilled veterinary surgeon in the city or village to take charge of the case.

No. 43.

Red Liniment.—Turpentine, 2 oz.; Oil Origanum, 1 oz.; Red Souders, q. s.; Cider Vinegar, 4 oz.; Arnica, 6 oz. This Liniment I use for swollen joints and legs on horses. It is a mild stimulant and speedily removes soreness; the parts being thoroughly saturated and rubbed in with the hands, rubbing the hands down toward the feet. Feed my Condition Powders according to directions.

No. 44.

Cure for Barbed-Wire Fence Bruises.—One of the most difficult bruises to cure and leave no trace, either of lameness or sear, is a barbed-wire fence laceration around the heels or quarters of the foot and the coronet band. This is especially true if not taken in time and properly treated. I have successfully undertaken the cure of some cases where the hair had been drawn and lodged at the bottom of the wound.

In such an instance as the above, the first thing to do is to cleanse the wound, syringing well with the Wash No. 4, page 16. Afterward take a small probe and remove carefully all the hair which may have lodged, being sure to get the very last hair at the bottom of the wound. Then dress the wound with Recipe No. 2, page 14. Take white cotton, well saturated with the salve, and, after warming it well, apply to wound, and fasten a linen bandage around pastern to hold the dressing upon the wound.

Then warm the iron, Fig. 1, page 36, and holding it to the affected part, warm the salve into the bruise. Dress the wound once a day until it begins to show a healthy appearance.

Before removing the dressing at any time, first hold the iron, well warmed, over and around the dressing, so as to soften the salve, thus allowing it to be removed without irritating the sore. If the wound has an irritated and inflamed appearance, use the Wash No. 4, page 16, as before, dressing and heating in the salve as above described, until the healthy appearance results. Wounds of this sort, even if they do not lame, often leave a disfiguring scar. In such an instance remove all the disfigured wall as deeply as the keraphyllous tissue, being careful not to draw blood. Next, fit a shoe to suit the diseased condition of the foot. After nailing on the shoe, dress the affected parts with the Salve No. 2, page 14, as before, bandaged and heated in with the warming iron No. 2, page 36, covering the hair and skin with salve from one-half to an inch above the wall at the coronet. Then apply the linen bandage around the foot and coronary band so as to hold the dressing on to the affected parts. Then with the iron heat the salve into the affected parts well, once every day for a week or two. The dressing will exclude the air from the affected parts, the heating will caused a sweating and assist nature in producing a healthy growth of skin and horn. If the above instructions are strictly adhered to, I will guarantee to restore the foot to a healthy, natural wall. The heating process is something new, and has always proven to be successful in this treatment.

No. 45.

A Good Powder for Horse or Man.—Calomel, powdered, sprinkled over ulcered sores, will afford the greatest relief. In some cases it may be necessary to cover the affected parts so as to hold the powder on to the sore. For drying up running sores this powder is especially efficacious.

HEATING IRONS AND HOOK.

The illustrations in Fig. 1, are heating irons and a hook, used by me in the treatment of the various diseases of

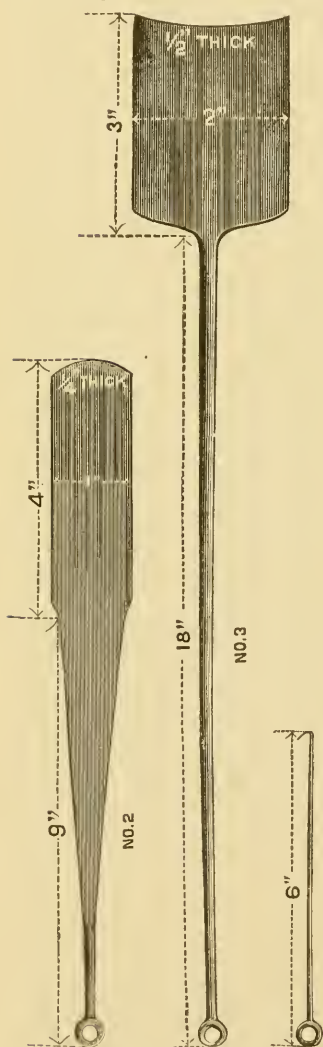


Fig. 1.

the leg and foot, as described in my book "Scientific Horseshoeing." I use No. 2, for burning and cauterizing old sores and removing proud flesh in the various diseases in which they occur or from which they spring. This blade is made of steel, is sharp on the convex end, and of the following dimensions: Blade $1\frac{1}{4}$ inch wide, $\frac{1}{4}$ of an inch thick, and 4 inches in length. The handle is 9 inches long, with a ring turned at the end.

No. 3 has a width of blade of 2 inches, slightly curved, with thickness of $\frac{1}{2}$ an inch, and length 3 inches. The handle is 18 inches in length. This instrument is used to heat salves, poultices and liniments into the sores, arising from any cause whatsoever, as fully described in my book above named.

No. 1 is a hook, made of steel, is 6 inches long, and used for such purposes as drawing pipes from feet affected with Flesh Quittor, and other similar purposes.

For all these treatments, the uses of the salves, liniments, poultices, and the various methods of bandaging, together with the use of the instruments and the

various processes, the most detailed instructions are given in the Fourth Edition of "Russell's Scientific Horseshoeing." In this book of recipes, I have only touched upon the subjects, outside of giving the full recipes.

RUSSELL'S FOOT ADJUSTER.

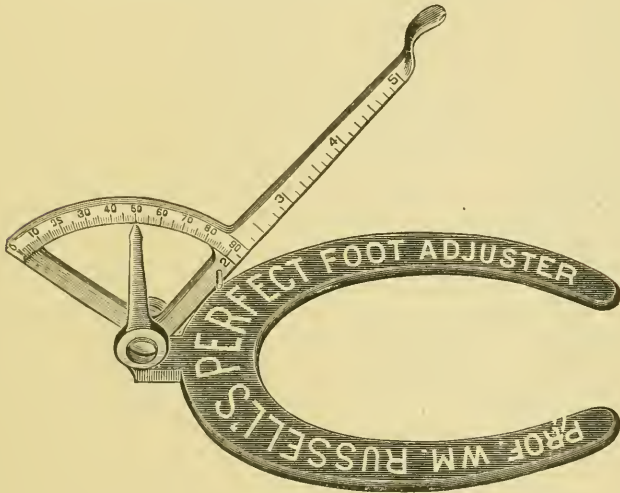
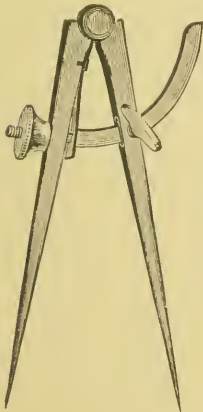


Fig. 2.

Instructions for use given on pages 77 to 81; see also Figs. 16 to 29, Russell's "Scientific Horseshoeing."



THE COMPASS.

Pages 94, 95, 97, Russell's "Scientific Horseshoeing," give full explanation how to use the compass, so as to produce the best results in leveling and balancing the foot, so as to equalize the pressure to all parts of the foot and leg. To be had of any hardware house.

Fig. 3.

RUSSELL'S SCIENTIFIC FOOT ADJUSTER,

For Leveling and Balancing the Horse's Foot. The Latest, Best, and most useful Improvement in Farriers' Tools.

Fig. 4. Bed-plate of adjuster.

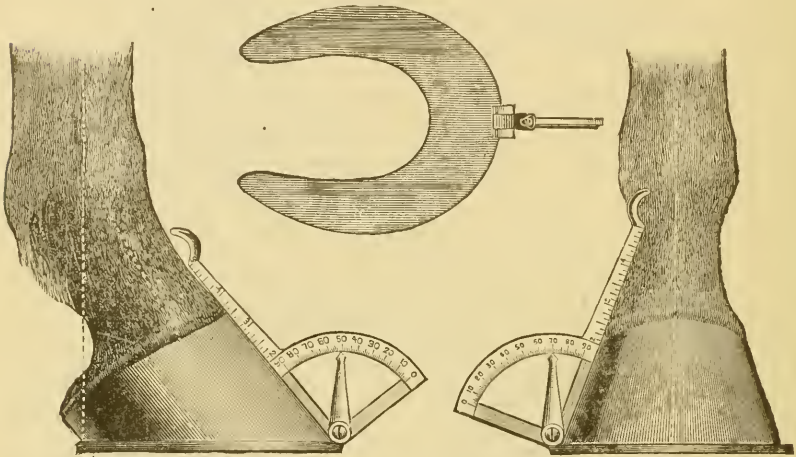


Fig. 5. { Adjuster at toe=50 degrees
/ Height on lever=3 $\frac{1}{2}$ inches.

Fig. 6. { Adjuster at quarter=70 degrees.
/ Height on lever=2 $\frac{1}{2}$ inches.

This device is very simple, and astonishingly effective in use. It consists of a bed-plate similar in form to an ordinary horseshoe, as per Fig. 3, to which is pivoted at center of toe a movable quadrant, graduated or divided into 90 degrees, from the ground surface upward, and is operated by means of a lever working the sweep of the quadrant forward and back. This lever is also marked to a scale of inches and fractional parts, so that the height or depth of wall is obtained at the same time with its degrees of obliquity, which is pointed out by a stationary indicator fixed perpendicularly to the toe of the bed-plate, registering the angles of the foot upon the arc of the quadrant when the lever is brought forward to bear against the wall of the hoof.

This use of the adjuster is represented in Figs. 4 and 5, which show the adjuster applied at toe and over the quarter of the foot, with their respective angles indicated on the quadrant and their height on the lever, as explained. Manufactured and sold by the M. & M. Machine Company, No. 216 West Pearl street. Price \$3.00.

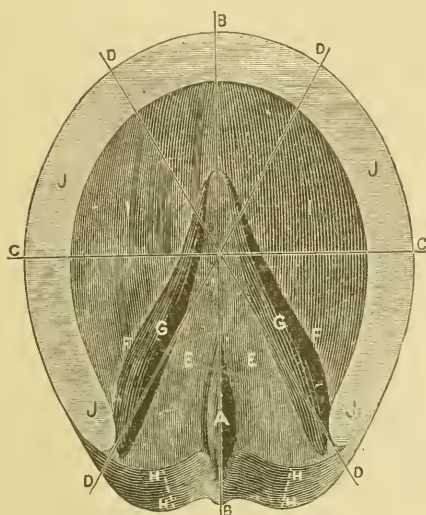


Fig 7

Showing under surface of a perfect front hoof properly prepared for the shoe, with guide lines for leveling and balancing the foot.

A, Center of frog cleft in line with the insertions of front and back tendons, and parallel to their straight line of movement. **B, B**, Line through longitudinal center of foot, dividing it into exact halves, and indicating middle of heels and front toe. **C, C**, Line transversely across center of foot midway through inside and outside quarters. The point of intersection of these lines indicates the normal center of gravity. **D, D, D, D**, Intersecting lines marking the width of inside and outside toes and heels. **E, E**, Branches or forks of the frog on either side of the median cleft. **F, F**, Bars on either side of the frog. **G, G**, Commissures or grooves between the bar and the frog. **H, H, H, H**, Line marking height of heels from coronet to base. **I, I**, Concave surface of sole. **J, J, J, J**, Wall-bearing surface leveled and prepared for the shoe.

The letters of reference apply to the different divisions of the foot, and the intersecting lines mark the several regions of the hoof at middle of toe and heels—width of inner and outer toes and heels—and center of inner and outer quarters. The foot is to be leveled and balanced by measuring the wall at these points from coronet to base of hoof, and having the height of any two opposite points on either side of line **B, B**, correspond, to insure proper levels, while the distance from the center or convergence of the lines to any point on opposite sides must be equal, to secure a perfectly balanced foot. As it is not to be supposed that accurate leveling can be done by the unaided eye, resort must

be had to mechanical means. To subserve such purpose, "Russell's Scientific Foot Adjuster" is admirably adapted, as will be clearly seen by a reference to the description and illustrations of its practical use, inserted here for the benefit of all concerned.

RUSSELL'S HEEL ADJUSTER.

For Equalizing the Foot back of the Quarters.

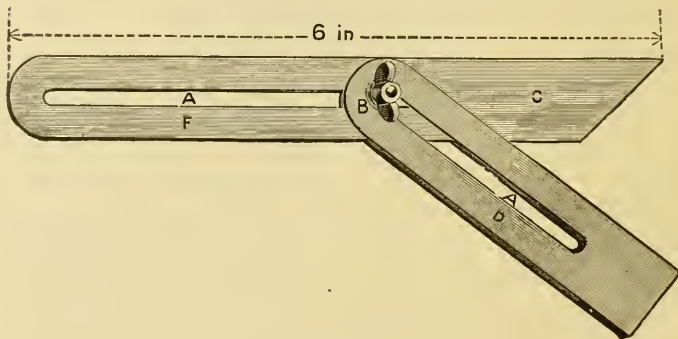


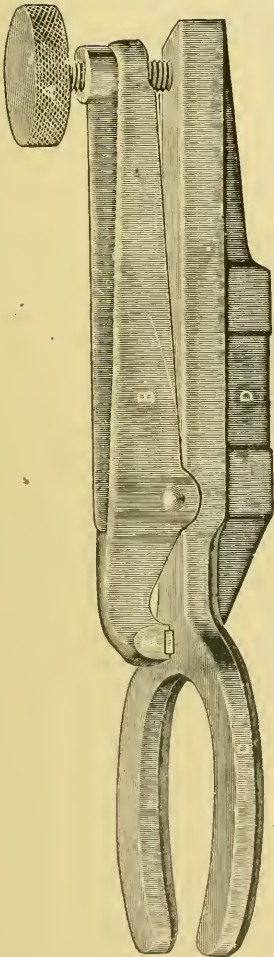
Fig. 8.

A, a, Slots for shifting the arms to position desired. **B**, Thumb or set screw for adjusting the arms in place. **C, F**, Arm of adjuster, to obtain angle of heels. **D**, Arm to be firmly held against the bottom of foot,

Under normal conditions of the foot, the angle at the heels is the same as that of the center toe; thus, if toe registers 50 degrees, as indicated in Fig. 4, the heels of the same foot should be the same, and in each instance the height and slope of one heel should correspond with the other. The tool above shown will prove useful in detecting any inequalities of the heels and and guide the farrier in his correction of them. It may be procured from any hardware or tool dealer. Usual price \$2.00.

RUSSELL'S HAND VISE.

For Hot Rasping and Filing Shoes. Length, 16 inches.



The lower extension of the vise, as shown by D, is for the purpose of fastening in a bench vise while in use. The bed-plate C, is to be made in the form of an ordinary horseshoe. This tool is indispensable to every farrier who shoes light horses, for by its use he can work light thin shoes accurately without bending or twisting them out of shape. The heels of a shoe can be filed while the shoe is red hot. The heels on the shoes of all speed horses ought to be beveled on the ground tread with the angles of the heels of front feet, so as to prevent scalping their hind shin when up to speed. Manufactured and sold by the M. & M. Machine Company, No. 216 West Pearl street, Cincinnati, Ohio. Price \$3.00.

Fig. 9.

A. Thumb screw, for lowering point of jaw, B, and grasping the shoe on bed-plate C.

RUSSELL'S FOOT TESTER

(Manufactured by the Heller Bros., Newark, N. J.)

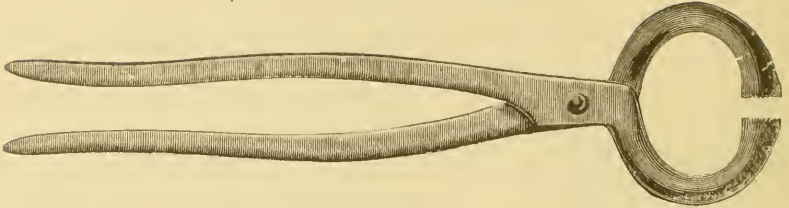


Fig. 10.

Is very useful in locating lameness, to test the sore spots, and to discover them. Having closely examined any external injury or bruise, and settled its connection with any symptoms of lameness, with the foot tester, compress the lower margin of the wall all around, from the toe to the heel, as high as the nail hole, and wherever there is soreness, the horse will flinch or shrink from the pressure. Continue this process up around the coronet, by gripping it between the base of the hoof in the jaws of the tester.

RUSSELL'S FOOT LEVELING PLATE



Fig. 11.

Is the basis from which the correct measurements of the height of wall, which I have already mentioned, are to be obtained. The horse rests his foot firmly upon this plate, and the necessary measurements from coronet to base of hoof, or face of plate, are easily obtained by spanning with a compass around the different points, and any deviation or inequality between two opposite points is to be

marked and the hoof pared or rasped to a perfectly level bearing. If this is accurately done the horse will move with orderly soundness and efficiency, and all danger of injury by unlevelled hoofs will be entirely obviated. Price \$2.00. Manufactured and sold by the M. & M. Machine Company, No. 216 West Pearl street, Cincinnati, Ohio.

LEG AND FOOT TESTER.

FOR LEVELING AND BALANCING THE FEET CORRECTLY UNDER THE LEGS AND BODY OF THE HORSE.

It is a fact well known to all, that no piece of machinery can work smoothly and last long unless it is set perfectly plumb and level; and so it is with the horse. If the feet and legs are not set plumb under the body, some part of the feet and legs will give out. Unless the feet and legs are breaking straight through the journals of the joints at each footfall, there will be overtaxation of some portion of the muscles and joints. By using my leg and foot tester in dressing the foot, and following the instructions given, the foot and leg can be correctly balanced under the body, so that the joints will work properly in their journals at each footfall. By so doing you will avoid foot and muscle soreness. The old adage is, "Prevention is better than cure."

I have shown by three drawings how to properly use the foot and leg tester. Fig. 1 shows how to use the leg and foot tester. First, hold the leg up in the left hand, as shown in the drawing; then lay the tester straight down the tendons, as shown, with lower end across the heels, as indicated in the drawing. Looking over the bottom of the foot, it will readily be seen if the bottom of the foot is level. Be sure that the bottom of the foot is level from heel to toe, as shown in the diagram. By holding the leg above the upper pastern joint, leaving the foot and pasterns hang loose, in some cases the foot and pasterns will twist in or out. If the foot twists in, the outside will be too high; if the foot twists out,

the inside will be too high. By applying the leg and foot tester on the leg and foot, it will readily be seen which heel is the higher. In all cases, pare the feet perfectly level,

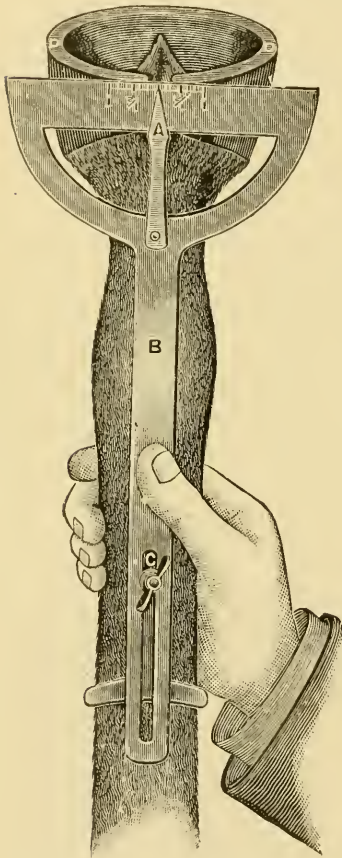


FIG. 1.

as shown on pages 94, 95, 97, Figs. 17, 18, 19, 23. Always bear in mind to keep the heels of the same height and the toes of the same length from coronet band to ground tread. If the foot twists in, take a piece of sole leather thick enough to make up the difference between the two sides of the heel; cut the leather the same shape and width as the shoe; let the leather extend to the center of the shoe at the toe; punch a rivet hole in the heel of the shoe; rivet the leather at the heel of the shoe, as shown on page 220, Fig. 110; then commence about three-quarters of an inch in front of the heel and gradually thin the leather down to the center of the toe, as shown in Fig. 110, page 220. By so doing, the foot can be built up to a perfectly level bearing on the

ground tread; so that when the foot lands on the ground it will land perfectly level from heel to toe. The thickness of the leather must be made to suit the case in hand. If the foot and pasterns twist out, the inside of the heel will be the higher, and the leather must be placed under the outside

of the shoe. In many cases the foot and pasterns will hang perfectly straight.

When the foot is uplifted, the problem is solved why a horse will wear the outside heel and quarter and heel on one foot, and on the opposite foot the wear will be greater on the inside heel and quarter. The cause is, when the foot is uplifted, one pastern and foot will twist in, while the opposite foot will twist out.

There is a cause for all things. First find the cause; then, by removing the cause, the effects cease. The great science in horseshoeing is to know how to balance the foot under the leg and body, so that when the foot lands on the ground it will land perfectly level from heel to toe. When the horse is wearing his shoes level from heel to toe, the foot and leg are breaking straight through the journals of the joints. By the use of my foot and leg tester every horse can be shod correctly.

Fig. 2, Back view, shows the foot resting on a level floor, with the leg tester placed back of the leg. Whenever the dial letter, A, hangs straight, the foot and leg are perfectly under the body. This shows how every sound horse stands with perfect feet and legs.

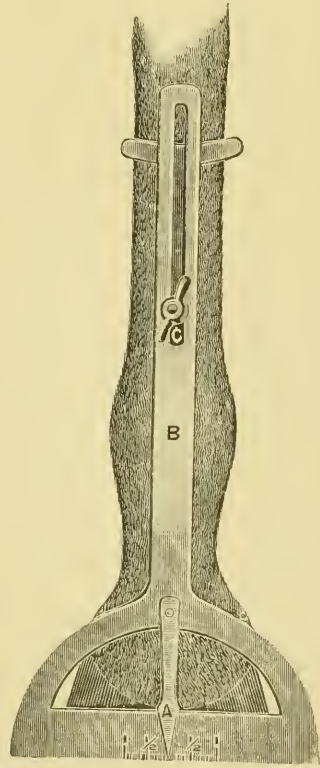


FIG. 2. RUSSELL'S SCIENTIFIC LEG AND FOOT TESTER.

- A, Movable dial.
- B, Back of tester, on leg.
- C, Thumb-screw to set slide to suit the length of shank or cannon bone.

Fig. 3, Russell's Scientific Foot and Leg tester, shows by a side view how to apply the tester when the foot rests upon a perfectly level floor.



FIG. 3.

- A, Heel of foot.
- B, Bent to suit the length of pasterns.
- C, Thumbscrew to slide up and down to suit the length of cannon bone.

manufactured and for sale by The M. & M. Machine Co., 215 West Pearl Street, Cincinnati, O. For sale by Prof. Wm. Russell, 1722 Freeman Avenue, Cincinnati, O. Price, \$2.00, charges prepaid. [Copyrighted.]

upon a perfectly level floor.

In my opinion, it is just as essential to balance the foot and leg behind as in front. By keeping the feet and legs balanced under the body every joint will work smoothly, and the horse will move with ease and comfort.

It is said by all expert horsemen, trainers, drivers, and shoers who have seen the leg and foot tester, that it is the most accurate instrument that has ever been invented to correctly balance the foot and leg under the body.

The foot and leg tester is manufactured

VALUABLE HINTS TO FARRIERS AND HORSEMEN.

Since the publication of the fifth edition of "Scientific Horseshoeing" many new and valuable ideas have occurred to me as the result of my practice for sixty-four years, some of which I venture to give to farriers and horsemen, feeling confident that they will be of benefit to them.

For the benefit of readers I show on pages 42, 44, the foot prints of the noted Queen of the Turf, Maud S., both in her slow work and when up to her full speed, when her stride was eighteen feet six inches. She proved herself in 1885 to be the greatest mare or horse living. I show also on page 45 the stride and foot-prints of Jay Gould in 1864; third, on page 46 the stride and foot-prints of the majority of race horses when up to speed; fourth, on pages 47, 48, the stride and foot-prints of horses cross-firing with the right hind foot and leg; fifth, on page 49, of splay foot horses; sixth, on the same page, of pigeon-toed horses; seventh, foot-prints of the line trotters on page 50, hitching and hopping on right hind foot and leg on page 52. These drawings should be of great value to the thoughtful farrier and horseman.

My theory has always been first to locate the cause of the faulty action in the gaits, and then as a result of removing the cause the defect will cease. No fixed rule can be given for shoeing any two horses alike, as there are scarcely any two horses shaped and gaited alike. As a result, the shape and style and weight of shoes that suit one horse will not suit

another. Horseshoeing necessarily depends largely upon good judgment. For instance, take the draft cob road horse. There are scarcely two horses that wear their shoes alike, as some will wear the outside of one shoe and on the opposite foot will wear the inside ; some horses will wear the toes of shoes more than the heels, and some will wear the heels more than the toes. (See cuts shown in 6th edition.) Now, to overcome faulty action, make a close examination of the foot. Where the wear is the greatest on the outside heel, the foot is not level, and the inside toe of the foot is too high ; in some cases the outside heel and quarter are curled under. Take the opposite front foot where the wear is the greatest on the inside, and on close examination it will be found that the outside toe is too high. If the foot is pared and shoe properly made and fitted, the shoe will be worn level. (See page 97, figure 23 ; pages 94 and 95, figures 17, 18 and 19.) By keeping the foot pared level, the foot and leg in their forward movement will break straight through the journals of the joints. (See page 148, figure 45, where the cuts clearly show the effect of having the foot pared and dressed level from coronet to ground tread.) One of the most important points in horse-shoeing is in having the feet pared level. (As shown on pages 94 and 95, figures 17, 18 and 19 ; page 97, figure 23 ; page 100, figure 26 ; page 103, figure 29, in 6th edition.) Stand the horse on a level floor, then step in front and behind the horse and see if the upper and lower pasterns stand upright and plumb under the cannon bone. If the upper and lower pasterns are leaning in and out the foot is not level on the ground surface ; if the pasterns are leaning in, the foot is too high on the outside toe and quarter, while if the pasterns lean out the foot is too high on the inside toe and quarter. Step to the side and see if the front part of the foot is on a

line with the upper and lower pasterns. (See page 62, figure 5, sixth edition.)

One of the most important points in the science of horseshoeing lies in dressing the foot for the reception of the shoes. If the horse is wearing his shoes level from the toe to heel, the weight is equally distributed to all parts of the feet and legs at each foot-fall. Seventy-five per cent of lameness in feet and legs can be traced and located in unbalanced feet. A horse well shod is twice shod. And my theory has always been that prevention is better than cure. First, find the cause; then, remove the cause and the effects will cease. A close observer never finishes the learning of horseshoeing; and no one man knows it all. The world moves in every department of mechanics and in all the professions; science now holds supreme sway, and the farrier must keep up with the march of improvement.

PROBLEMS IN FARRIERY.

The principal points demanded in the training and development of a perfect and sound horse are, for a driving horse, speed and endurance, and for a draught horse, strength and endurance. How can the utmost speed and greatest endurance be best attained? These are the ends aimed at by the skillful and experienced farrier, and after the practical experience of a lifetime, extending beyond the allotted years of man, I am ready, from that practical experience and from my observation of the practical experience of others—for no one man can know it all—to give to the world what measure of practical knowledge has come to me in the way of the development of speed and endurance or strength of the horse.

In the first place, it is undeniable that the value of a horse for speed and endurance depends primarily and always

upon the soundness of the feet and legs; and, in the second place, that this soundness depends upon the skill, competency, and good practical judgment of the shoer; that is, the farrier. The most important thing the farrier should know is that the more equality of pressure obtained at all points of the feet and legs, at each footfall, the greater will be the speed and endurance attained, and this stands to reason. There are three very essential points which he should bear in mind to attain to these desiderata of speed or strength with endurance.

First, the farrier should know how to obtain accurately the natural angle of the foot; he should know where to cut and when to stop cutting. I am perfectly convinced that such knowledge entitles a farrier to the name and fame of a master in his trade as a professional farrier.

When the feet are properly balanced the weight of the horse's body is equally and proportionally distributed in all parts of the feet and legs at each footfall. Before proceeding to dress the foot, close observations should be taken from in front of, as well as the rear of the horse, to ascertain whether the foot is directly underneath the leg; that is, if the center line of the foot is in the same vertical line with the leg; then step to the side, take note of the vertical line and whether the upper and lower pasterns are on a line with the front wall of the foot, when the horse stands on a level floor. It can thus be readily determined if the feet are directly under the legs, as before advised, in dressing or paring the feet, so as to get the heels the same height from coronet to ground tread—same height over the quarters from coronet to ground tread—same height and length of toes from coronet to ground tread, on the front feet, and also for the hind feet.

The eye cannot be trusted; guesswork must cease; mathematical accuracy is demanded. This can only be ob-

tained by resorting to the use of mathematical instruments, and for this purpose the six-inch compass, foot and heel adjuster, leg and foot adjuster have been invented, and should be adopted and used by all expert farriers.

The front feet being of the same length from the top of the coronet band to the ground tread, and shoes of equal thickness and weight being used, the stride of the front feet will be of the same length at each footfall when up to speed. The correct rule for the angles of the feet: when the front feet stand or measure 48 degrees, the hind feet should stand at 50 degrees, for the reason that the hind legs are the propelling powers of the horse. This has been my never-failing rule after an experience and close observation for more than sixty-four years as a practical farrier.

Rate of Speed of Trotters and Pacers—I give here a table showing the distance covered per second by a horse when going at speeds varying from a 2:00 to a 2:30 gait. The table given is believed to be a substantially correct compilation of the figures.

It will be noticed that in the distance covered by the horse when going at a rate of speed of from 2:30 to 2:20

RATE OF SPEED.	DISTANCE PER SECOND.		RATE OF SPEED.	DISTANCE PER SECOND.	
	Feet.	In.		Feet.	In.
2:30	35	2	2:15	39	..
2:25	36	5	2:14	39	4
2:24	36	8	2:13	39	8
2:23	36	11	2:12	40	..
2:22	37	2	2:10	40	7
2:21	37	5	2:08 $\frac{1}{2}$	41	..
2:20	37	8	2:08	41	3
2:19	38	..	2:05	42	3
2:18	38	3	2:04	42	7
2:17	38	6	2:00	44	..
2:16	38	9			

there is an approximate increase of three inches per second for each additional second's lowering of the speed rate, while in the speed rate between 2:10 and 2:00 the increase amounts to four and one-tenth inches per second. A horse going a mile in two minutes would distance Martha Wilkes, Palo Alto and Maud S., and have something to spare, and would leave Nancy Hanks and Mascot, the fleetest of the present day, about seven lengths to the rear. A railroad express train, one mile a minute, eighty-eight feet a second, is a good comparison.

Abnormal Feet.—Before making an examination of faulty limbs, it is proper to present the subject of abnormal feet. The foot is in perfect poise when it is level and balanced, the heels being of the same height, so that the horse lands upon both alike, and springs from a level toe, after he has rolled over quarters of the same height. The heels must not be too high, nor the toe too long, nor the hoof out of proportion at the sides, taking the median line of the cleft of the frog as the basis of measurement.

Fig. 80 represents a perfect front foot. It is placed properly under the carcass. The vertical line, A, A, passes down through the axis of the cannon bone, and reaches the ground at the posterior angle of the wall and bar. The line B B intersects the line A A at the center of the ankle joint, and passes through the

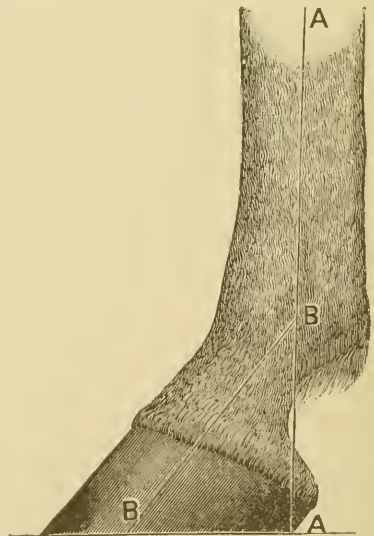


FIG. 80. PERFECT FRONT FOOT.

A, A, Axial line of leg. B, B, Axial line through coffin bone.

axis of the coffin bone to the ground, which indicates the perfect poise of the coffin bone when the foot is at rest. This is the crucial test of a foot both level and balanced. If the coffin bone is out of position with reference to the median line, B, B, the entire foot and limb are out of balance. The journals of the joints at the ankle and knee do not articulate *in equilibrio*, and the tendons and ligaments are unduly taxed or relieved, dependent upon which side of the hoof bears an undue strain. The ac-

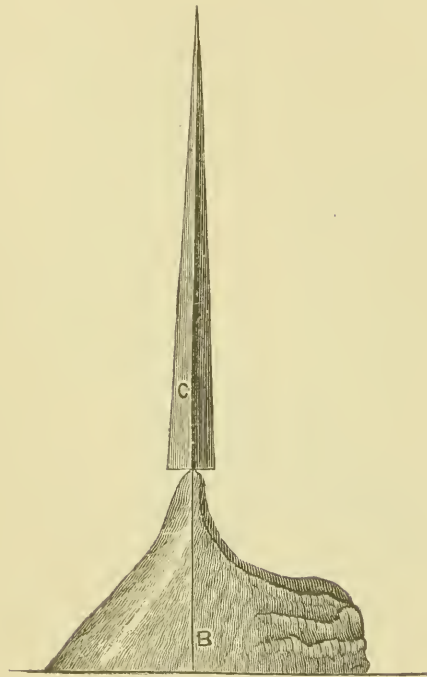


FIG. 81. COFFIN BONE.

Lateral view—correct position.

companying drawings will illustrate this point. Fig. 81 shows the proper position. Fig. 86, with the vertical dropping through the apex of hoof, is the reproduction of a perfect coffin bone, photographed from nature. The line of pressure was thrown back from its correct vertical position by an undue length and height of the wall at the toe (see Fig. 82). The reverse result is obtained by an excessive height of the heel, as shown in Fig. 85. In the one instance a preponderance of the weight is thrown upon the flexors, and in the other upon the extensors; and in both cases depriving the bone structure of the limb of its primary function of being the organic weight bearer.

The practical result of thus placing the foot out of line with reference to the vertical position of the cannon bone, and

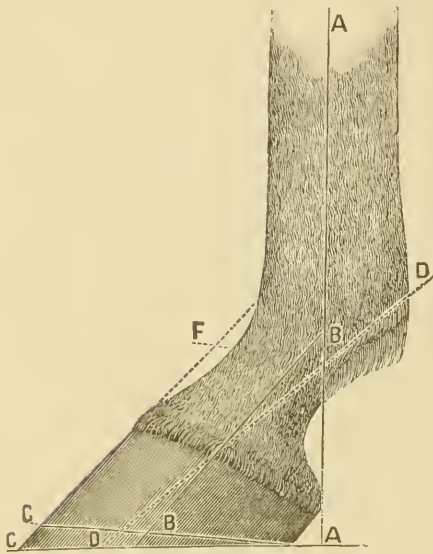


FIG. 82. HIGH TOE.

Defective results shown by lines B, B, and D, D.

passes through the axis of the cannon bone reaches the ground at an appreciable distance back of the heel, thus showing the entire foot and limb are thrown forward out of their proper position. Moreover, the inclination of the pastern joint is enormously increased, as shown by the line D, D, whereas the proper inclination is shown by the line B, B. Now, if the toe is lowered the distance marked C, C, it is apparent that the vertical line A, A, will be thrown forward till it will pass through the axis of

the proper inclination of the pastern joint, is precisely the reverse of what is the general conclusion of the average horseman. For instance, an abnormal high toe invariably pitches the foot and limb forward, and an extra high heel (Fig. 85) has the opposite result. This is plainly shown in Fig. 84. By elevating the toe the vertical line that

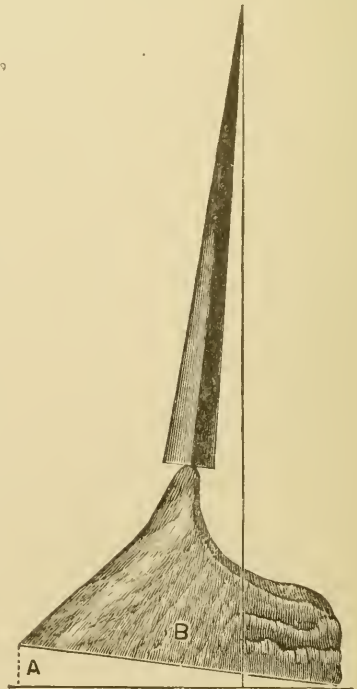


FIG. 83. COFFIN BONE, SAME DEFECT.

the ankle joint and touch the heel at the ground surface. The foot will then resume its normal position, by standing further back directly under the limb.

This investigation is so important in its practical results that the converse effect of excessive height of the heels is illustrated in this connection. Fig. 84 shows this defect in dressing the hoof for the shoe. The vertical line of pressure, A, A, is thrown forward beyond the axis of the

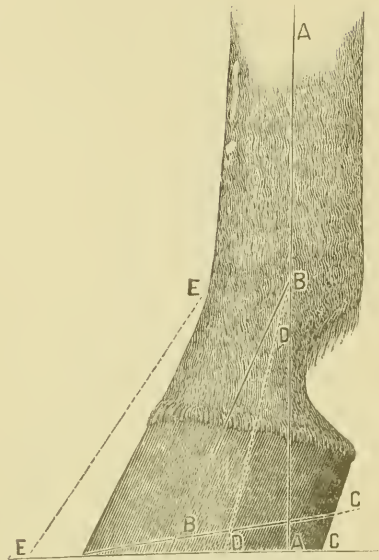


FIG. 84. SHOWS DEFECT CAUSED BY TOO HIGH HEELS.

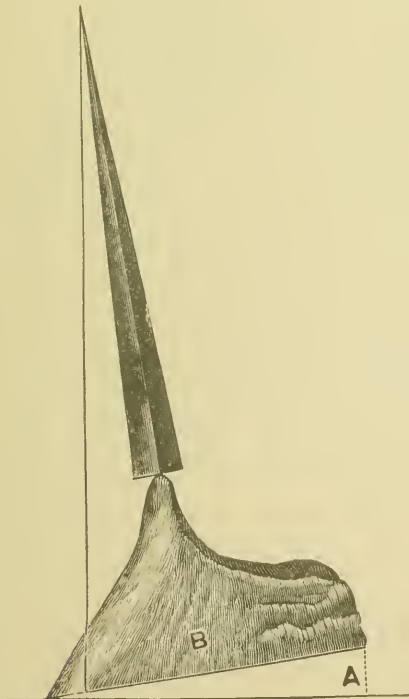


FIG. 85. COFFIN BONE, SAME DEFECT.

cannon bone, so that it reaches the ground far in advance of the angle of the heel. The inclination of the pastern is made more upright, as shown by the line D, D, instead of preserving its normal position as indicated by the line B, B. If the heels are lowered the distance indicated by the line C, C, the foot will be changed to the correct position indicated by E, E, and all the bones, joints,

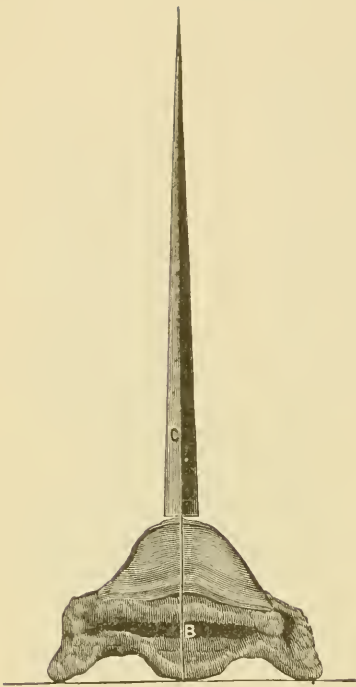


FIG. 86. COFFIN BONE—VERTICAL IN LINE.

Fig. 86 is a photograph of a perfect coffin bone, exactly level on sole bearing, with the flexor tendon cut off even with B, the navicular bone. In a well-balanced foot the vertical dropped from the center of the knee passes through the center of the apex of the coffin bone.

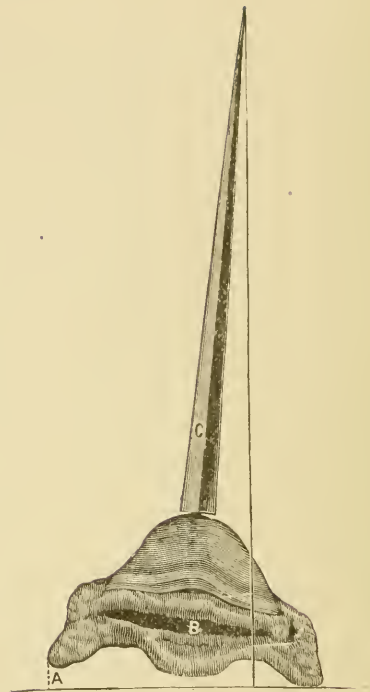


FIG. 87. COFFIN BONE—VERTICAL OUT OF LINE.

Fig. 87 is a photograph of a perfect coffin bone, showing the effects of an uneven height of quarters. Assuming width of hoof 4 inches on the bottom, distance from base to knee 20 inches, difference of height in quarters of $\frac{1}{4}$ inch would cause a displacement of $1\frac{1}{2}$ inches at the knee, thus unevenly distributing the weight and bearings.

tendons and ligaments will operate in structural harmony.

We are now prepared to advance to the consideration of the foot and leg in their proper positions as weight bearers.

Fig. 88 has been drawn with great care to show the perfect front limb and foot. It is correctly placed under the carcass, so

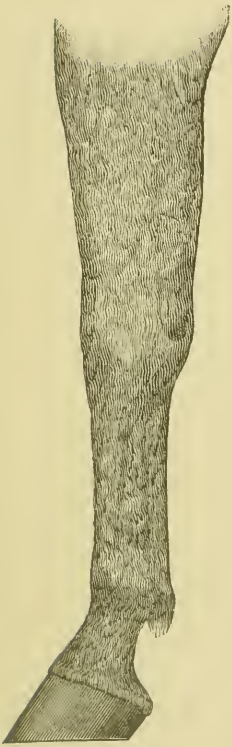


FIG. 88. PERFECT FRONT LIMB AND FOOT.

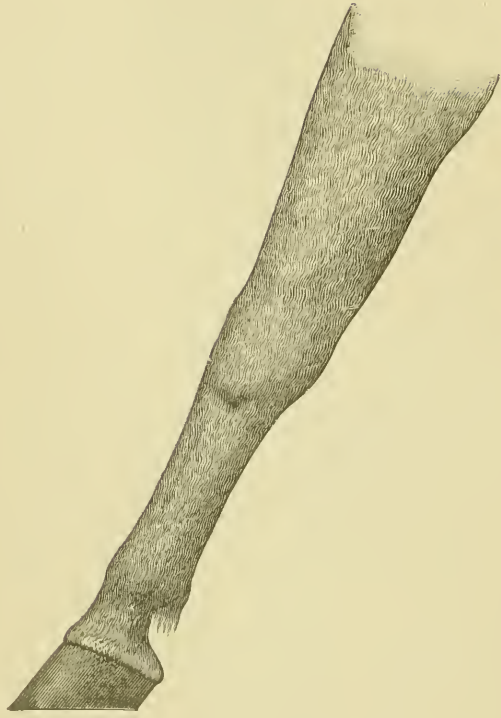


FIG. 89. FRONT LIMB AND FOOT POINTING FORWARD—HIGH TOE.

that the bone structure from the shoulder to the ground surface shall bear its exact proportion of the body, and enable all the complex actions of the joints, tendons and ligaments to operate with the greatest ease, precision and effect.

Fig. 89 shows the limb and foot pointing forward, by reason of the causes heretofore explained. The invariable result of this faulty position is soreness at the point of the frog. To relieve this painful ailment, the toe should be lowered and the wall relieved at the toe, so that no bearing will be placed upon the shoe, at least the thickness of a No. 5 horseshoe nail around the forward arch of the hoof, and the two toe nails be left out. This will give almost instant relief.



FIG. 90. FRONT LIMB AND FOOT,
POINTING BACKWARD.

The opposite result, from an excessive height of heel, is exemplified in Fig. 90. The trouble, after a careful examination, will invariably be located in the heel and the flexor tendon. Gentle pressure or slight blows will indicate the sore spot. The hard, unyielding sole at the point of pain should be removed and the inflammation reduced by standing

the foot and limb in a bath of tepid water. The hospital shoe to prevent lameness, if the horse is needed for immediate use, can be selected from several approved patterns. It may be necessary to cover the sole of the foot for the first shoeing with protecting leather. When this is done the best shoe to use is the bar, as shown on page 233. As a remedial shoe it can be improved by welding on oblong heel calkins, and a long toe calkin set back from the outer web of the shoe in front. If an open shoe is preferred, the four-calkin shoe illustrated on page 213 (Fig. 101) will answer the purpose. In case the lameness is severe, the leather covering may be supplied with a packing to keep the sole of the foot from becoming hard and dry. In that event, my experience has demonstrated the benefit of using

fat pickled pork, just out of the brine, cut in long, thin slices and pressed well into the sore spot and into the commissures. The inflammation will be relieved if the foot, when thus packed, is placed in warm water for at least two hours, keeping up the temperature as hot as the hand can bear.

If speed is required while the horse is under treatment, the rolling motion shoe (Fig. 125), on page 235, may be used; or, if the action is already too high, the scoop-toe shoe (Fig. 121, page 232) can be substituted.

When the weight is thrown, by reason of a too high or long toe, unduly upon the flexor tendon, the result in violent action shows itself in either an inflamed flexor tendon or a complete let-down. In the latter case the usefulness of the horse is at an end, but in the former, remedial treatment, accompanied with absolute rest, insures a perfect cure. The tendon bows out as shown in Fig. 91. The foot should be dressed as shown in the illustration, and a prepared surgeon's bandage, wrung out in witch hazel, applied as therein shown, after the limb has been thoroughly bathed in the same preparation.

After the leg has thus been bandaged moderately tight, the foot should be shod with the four-calkin



FIG. 91. FOOT PROPERLY PARED BEFORE BEING SHOD.

shoe as illustrated in Fig. 101, page 213. The heel calkins should be higher than the toe calkins. This will throw the weight forward upon the cannon bones and relieve the flexor tendons till the inflammation subsides. When this is accomplished the witch hazel may be discontinued, and the more

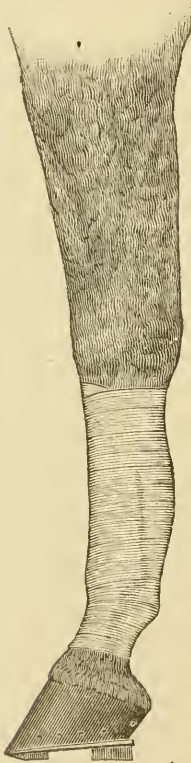


FIG. 92. FOOT AFTER BEING BANDAGED AND SHOD.

stimulating liniment described on page 294, Recipe 3, can be substituted. The liniment can be alternated with the bandage, each being applied every other day for ten days, when nature will complete the cure.

It may be useful to describe a proper soaking tub. Such a vessel is shown in Fig. 93. It should be made of hard wood,

about twenty inches in height and width, with a strong bottom sufficient to stand the pressure of the heaviest draught horse. When the treatment is for inflamed tendons, the warm water should be at least sixteen inches in depth, while five or six inches of water is sufficient for the ordinary foot bath.

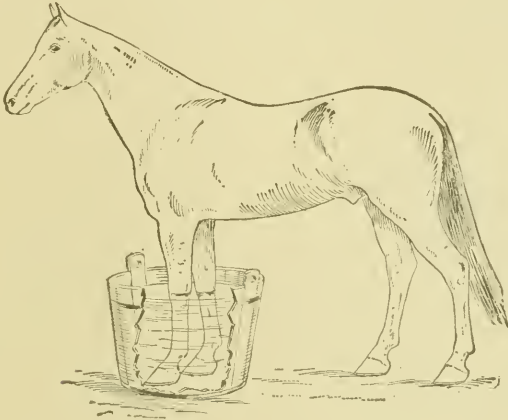


FIG. 93. SOAKING TUB.

FAULTS OF STRUCTURE AND ACTION.

REGULATED OR RESTRICTED BY SHOEING.

A large percentage of the horses have feet or legs which are not perfect in conformation, and as a consequence of these imperfections they are especially predisposed to certain injuries and diseases, as well as to manifest discordance of action—undesirable in itself and unpleasant in its effects according to the rapidity of motion in different gaits. Much may be learned from careful observation of the action of an evenly-balanced horse, as a standard by which to compare and determine that which is defective or undesirable in figure and gait, as previously indicated in Chapters I and V (6th edition).

After examining the gait at which the horse moves, as pointed out, carefully study the poise of the legs and feet when at rest. The weak points of a horse's conformation can be better discovered while standing than while moving. If he is sound he will stand firmly and squarely on his limbs without moving them, with legs plump and naturally and equally poised; or if the foot is taken from the ground and the weight taken from it, disease may be suspected or at least tenderness, which is the precursor of disease. If the horse stands with his feet spread apart, or straddles with his hind legs, there is a weakness in the loins and the kidneys are disordered. Heavy pulling bends the knees. A kicking horse is apt to have scarred legs; a stumbling horse has blemished knees, etc.

Never buy a horse in harness. Unhitch him and take every thing off but his halter and lead him around. If he has a corn or is stiff, or has any other failing, you can see it. Let him go

by himself aways. Back him too. Some horses show their weakness or tricks in that way when they don't in any other.

The vital part of a horse, as far as his value is concerned, is the foot, for it is only as an organized locomotive machine that the horse is practically the most valuable companion to man. Hence without good feet and supple, muscular legs he would be of small value, either for work or speed, and the rational care of these underlies all else in the equine economy, as any impairment of them is a matter of extreme gravity and apprehension.

It is difficult, indeed, to understand how the feet and legs of horses stand the wear and tear of work in our great cities, where every step of their iron-shod hoofs is upon a hard, unyielding road; and where, even at rest in their stables, they are, in a majority of cases, condemned to stand upon hard floors. There is no other creature living—save and excepting the donkey or mule—which can long bear the constant battering entailed by rapid locomotion over a paved surface. But if we look at the structure of the horse's foot (Figs. 3 to 15) we see how it is that the jar and vibration do not injure them more—severe as it is known to be. He is in fact mounted on springs, and it is not surprising that the intricate apparatus of locomotion, with its symmetry of movement and the perfection of its details should be admirably termed “a living machine.”

In the language of another: “His very muscles appear at every motion, not soft and flabby, but firm and distinct. His veins, like rivulets, run in an infinite number of meanders, his limbs are clean, nervous, durable and ready at every call—and of all creatures he seems to approach nearest man, both for beauty, majesty and sagacity, and his services are likewise the most noble and excellent.”

The drawings on the following pages fairly illustrate the difference between well-formed and malformed legs, and good and faulty standing positions. A comparison of these may enable the reader to judge for himself as to what is the best position, and

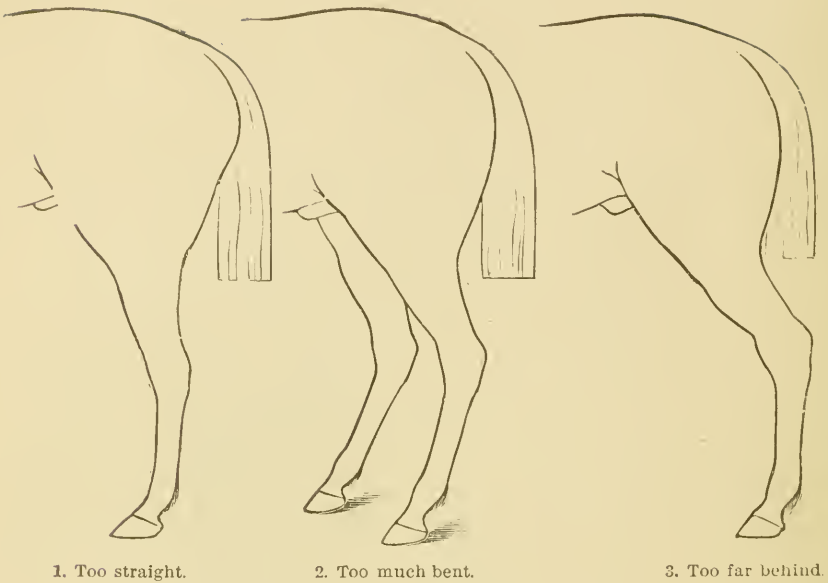


FIG. 94. FAULTY POSITIONS OF HIND LEGS, SIDE VIEW.

what condition or malformation of the legs causes deviation therefrom. It must be borne in mind, however, that experience is the best and only teacher in matters of this kind, and that all I can attempt within the limits of this branch of my subject, is to set the reader on the right track; the rest depends upon himself.

The character and position of the hock has much to do with the standing position of the rear part of the horse, and the numerous faulty positions in which we show this is conclusive on this point. The qualities of a good hock are that it should be clear, rigid, and well defined, without puffiness or swelling; the bones should be large and prominent, and viewed from the side should appear wide above and below. They should be neither straight or overbent. There is also a relative value to be attached to hocks malformed or apparently differing from those laid down. Horses with defective hocks may be good for one sort of work and unsuited to another. As for instance,

hocks that will not stand violent exertions may endure for years in quiet work; but these are exceptions, and the rule stands good as before.

Comparing Figs. 1, 2, 3 (page 200), and 4 and 5 (page 201), we recognize some broad distinctions.

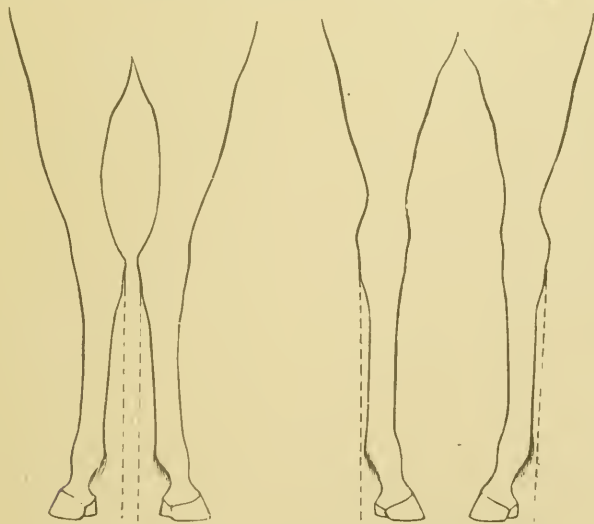
In Fig. 1, the hock is too straight. The legs in this position are subject to spavin and thorough-pin.

In Fig. 2, the hock is overbent and we may look for curb.

In Fig. 3, the leg is too far behind; and, therefore, does not afford the horse sufficient propelling power.

In Fig. 4, the hocks stand in and the toes stand out; and in Fig. 5, the hocks stand out and the toes stand in.

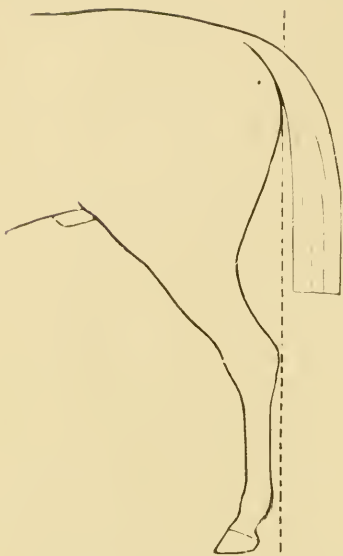
In contrast to the foregoing, Figs. 6 and 7 (page 202), represent the usually recommended position and what is considered the best position; and in connection herewith the reader is respectfully referred again to Fig. 1, illustrating the model horse, according to my 50 years' experience and observation.



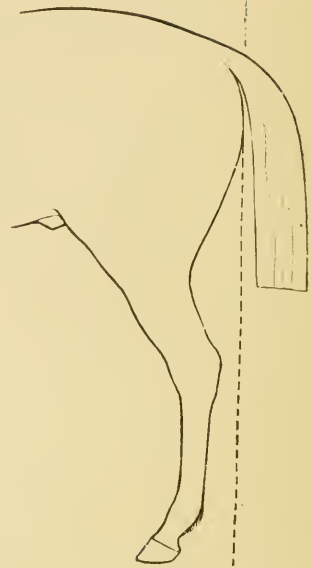
4. Hocks too close.

5. Hocks too open.

FIG. 95. FAULTY POSITION OF HIND LEGS, BACK VIEW.

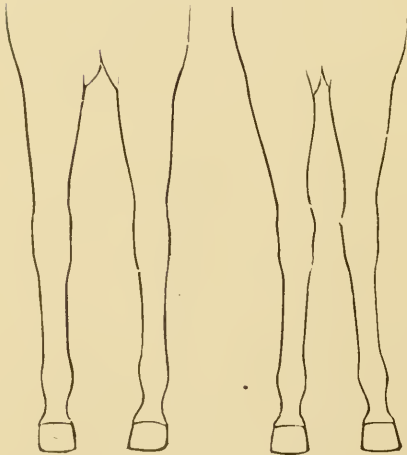


6. Position usually recommended.



7. Best position.

FIG. 96. GOOD POSITION OF HIND LEGS.



8. "Pigeon-toed."

9. Knock-kneed.

FIG. 97. FAULTY POSITIONS OF FORE LEGS.

Figs. 8, 9, 10 and 11 represent faulty positions of the fore legs. In Fig. 8, the elbow stands out and the toes stand in, commonly called "pigeon toes." In Fig. 9, the elbows stand in and the toes stand out, causing the knees to spring together.

In Fig. 10, on the 189th page, we have a side view of what is termed a "calf leg," in this the verti-

cal line from the shoulder through the axis will pass outside of and at a distance from



10. Calf leg. 11. Feet too close.

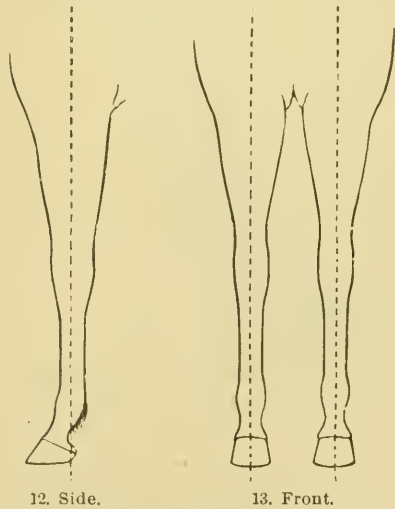
FIG. 98. FAULTY POSITIONS OF FORE LEGS.

the wings of the heels. This, as will be seen upon reference thereto, varies much from the requirements of a perfect horse. Such a position does not denote speed, but is not objectionable in a draft horse. In Fig. 11, the feet stand too closely together on the ground; a position not recommended in a good horse.

Finally, in contrast with these faulty positions of the fore-legs, we show front and side views of them, in which the points favorable in a perfect horse are all noticeable. In the side view, the

foot is well under the leg, and the axis of the bones of the leg are all in line, as indicated by the vertical dotted line that drops from point of shoulder to foot, and the foot stands upon its proper angle.

In the front view the conditions still remain the same. The shoulders are prominent, strong and well-set back, the fore arm is muscular, the fore leg tapered from elbow to foot, and the dotted line, in the vertical, passes directly through the axis of each leg and foot.



12. Side. 13. Front.
Fig. 99. VIEWS OF PERFECT LEGS.

Curb.—This consists of an inflammation and swelling of the posterior of the tendon passing over the calcis or hock bone. (See page 36, Fig. 2, in sixth edition.) It is often accompanied with considerable heat, pain and lameness. It



FIG. 73. HIND LEG, SHOWING CURB, BEFORE BEING SHOD.

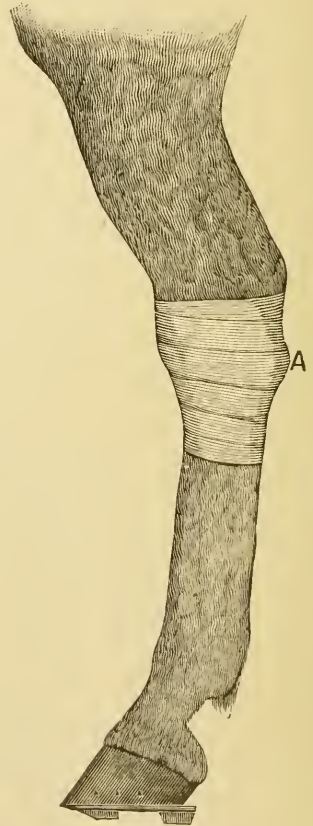


FIG. 74. SHOWING DIFFERENCE OF POSITION OF LEG WITH CURB BANDAGES AND FOOT SHOD.

is caused by overtaxation of the back tendon passing over the calcaneus or hock bone, and is often the result of hard pulling, prancing or galloping over uneven ground surface, etc. The peculiar formation of some hind legs renders them more likely

to spring curbs than others. It is always the result of over-taxation, and does not admit of much labor in the affected parts. It should be treated as soon as possible. Fig. 73 shows an extreme case of curb, such as may come from the feet and legs standing too far under the body (see p. 200, Fig. 94), the result of a bent or cycle hind leg formation. In these cases use four calkin shoes (p. 213, Fig. 101). The heel calkins should stand higher than the toe calkins, thus placing the foot farther back; and the changed position, together with the elevated heel, will support the leg and relieve the strain upon the affected weak joint. Bathe the curb frequently in warm water, and bandage in four or five thicknesses (Fig. 74). After the inflammation has subsided, apply liniment described in Recipe 3, page 294, for a week or more. If any callous remains, paint the surface with iodine until it disappears.

LINE TROTTER
AT A SLOW GAIT.

SPEED HORSES AND THEIR STRIDE.



Fig. 12.
A, A, front footprints.
B, B, hind footprints.

It seems incumbent upon me to say a word as to the gaits and strides of horses. In general, it may be laid down that no two beings, human or animal, are alike, so diversified is nature; and, therefore, what can be said of one horse, can not be said of another. But as each horse, when up to speed, has its own individual stride, just as it has its own record for speed, a few examples from the first in the race will serve our purpose. Now, in the first place, we should understand that in any case, as a horse starts upon a walk, changes to an amble, breaks into a trot, and then speeds away, in each instance the stride is lengthened, and when up to speed varies but a trifle. Again, I have watched very closely, and noticed that as a horse increases his speed he quickens his strides. Take a horse, for instance, going at a 2:30 gait, and suppose he increases his speed to a 2:20 "clip," the change is quite noticeable. Let the speed be increased to a 2:10 "clip," it is very plain he must have quickened his stride; and when the speed drops down to 2:04 or 2:03 $\frac{3}{4}$, the increased number of strides is very noticeable. The following illustration may make my point more clear to the reader:

Fig. 12 is the diagram of a line trotter at a slow gait. In this instance it will be seen by the footprints that the hind feet, B, B, fall right in line and behind the front feet, A, A. Such was Maud S at a slow, jogging trot. The next illustration, Fig. 13, shows the stride of Maud S when up to speed in her

MAUD S. STRIDE

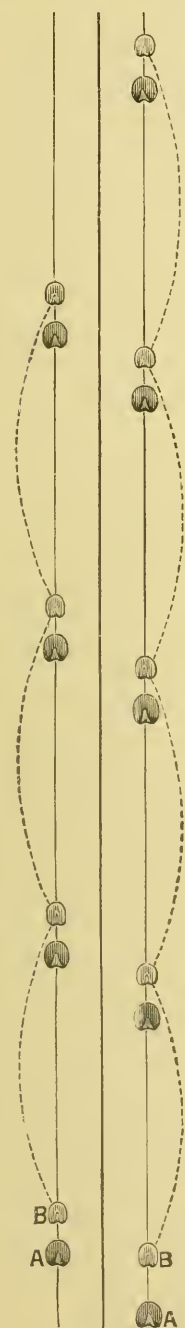


Fig. 13.

A, A, front footprints.
B, B, hind footprint.

fastest work, when she made her famous record of $2:08\frac{3}{4}$, to a high-wheel sulky, over the Cleveland track in the year 1885. When up to speed, note how her hind legs and feet, B, B, swung out around her body and landed six inches ahead of her front feet, A, A, in a true line. Maud S was called a line trotter. Her stride on this occasion, measured accurately by those who know, is said to have compassed eighteen feet six inches.

The representation of Maud S, page 37, is one of the only cuts extant, and was taken at the time she made her great record over the Cleveland track, of $2:08\frac{3}{4}$, to a high-wheel sulky, a record which stands to-day unbroken to a high-wheel sulky. She was photographed when up to speed, with all four feet off the ground at the same time, and, as many will recognize, she was driven by W. H. Baer, her old trainer and driver.



MAUD S. See article on "Speed Horses and Their Stride," page 85,

JAY GOULD STRIDE.

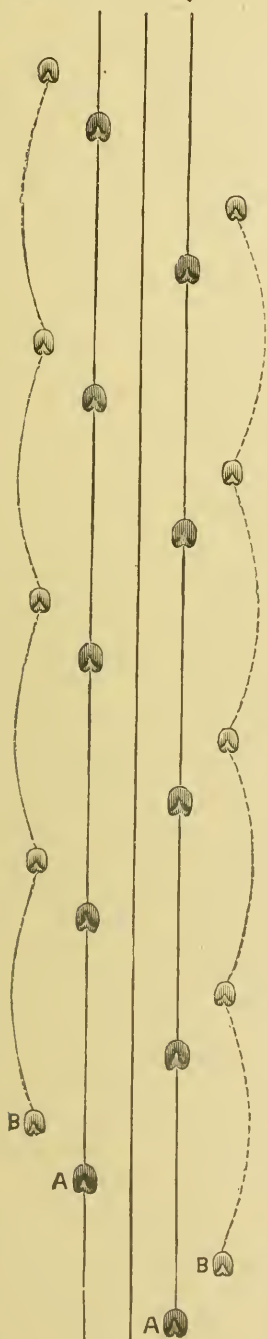


Fig. 14.

A, A, front footprints.
B, B, hind footprints.

Jay Gould's stride was very wide behind, as shown in diagram. A, A, represents the front footprints; B, B, the hind footprints. This famous trotting stallion was so wide gated behind as to have made it very tiresome for him, and if as much had been known in his day as at present about the shoeing of trotting horses, he could have been shod behind so as to have closed up his gait and increased his speed from four to ten seconds. Jay Gould was as plucky, as game a horse as ever was entered upon the track. It is my opinion that for the lowering of records in the past thirty-five years and more of trotters, from 2:40 to 2:03 $\frac{3}{4}$, the modern farrier, educated and experienced, can not be given too much praise, and also for his labor in balancing the leg and body so as to equalize the pressure to all parts of the foot and leg. Thus a uniform motion is produced, no unnatural strain fatigues one part of the body more than another, and the motion of the trotter is like clockwork in its regularity.

NATURAL TROTTER

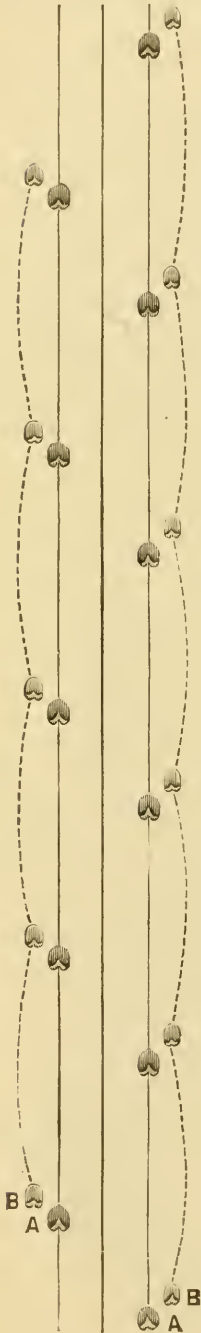


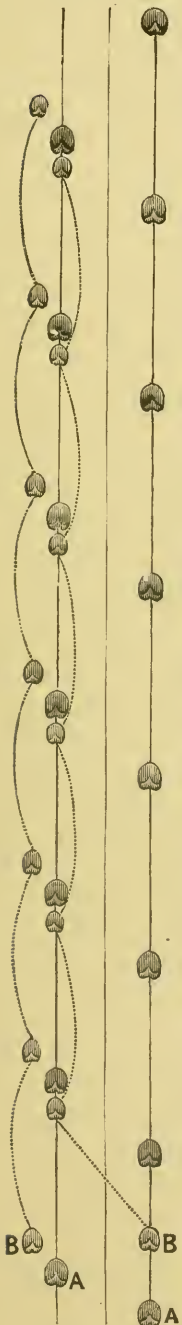
Fig. 15 represents the true gait of a majority of trotters when up to speed. A, A, footprints of front feet; B, B, footprints of hind feet.

In all long-striding horses, when up to speed, the hind feet are carried in advance of the front footprints, sometimes eight inches more or less. The stride in front and behind are of the same length at each footfall, and the foot fall is as regular as the ticking of a watch.

Fig. 15.

A, A, front footprints.

B, B, hind footprints.

CROSS FIRER**CROSS-FIRING.**

Probably no infirmity of action impedes the gate of the trotting and pacing horse, causing him to become discouraged and leg weary, and thus condemning him as wanting in race horse courage, than the vicious habit of cross-firing. This drawing shows very plainly the foot-prints of the horse that cross-fires with the right hind limb and foot. Letter *A* indicates the front foot-print, while *B* shows the hind foot-print.

In order to determine the extent of cross-firing, the studious farrier should have the horse speed on a level dirt road or track, and then accurately measure the foot-prints with a tape line, in order to ascertain the stride of the front and hind feet. To his surprise, this diagram on the ground will disclose the fact that the cross-firing hind limb and foot will make a stride from three to six inches shorter than that of the opposite hind limb and foot; and, furthermore, this instructive diagram will show that the stride of the left front foot will be from three to six inches shorter in the stride than the right front foot.

In all cases of this kind, the front feet should be shod with shoes of equal weight. Then to the shorter striding front hoof apply the stick-fast toe weight, one ounce to the inch; so that six inches shortness of stride requires six ounces in the toe weight.

Then pare the cross-firing hind foot, as described on page 260, and shoe the same with the cross-firing pattern, as illustrated in figures 165 and 166, on the same page of my sixth

edition of *Scientific Horseshoeing*. These hind shoes should also be of equal weight, but on the outside of the foot the horse cross-fires with, should be attached a stick-fast weight having exactly the same ounces in weight that the cross-firing hind stride is short in inches.

The desirable patterns for the front feet will be found illustrated in figures 150 and 151, pages 252 and 253, of the sixth edition of *Scientific Horseshoeing*. The prevalent cause for cross-firing is that of unbalanced feet, produced largely by uneven dressing, and rarely by misshapen limbs. To the misshapen feet and limbs can be applied, too often, badly constructed and fitted shoes. Sometimes the causes are more hidden than these ordinary troubles. For instance, the teeth are sometimes out of order, causing the horse to take the bit on one side, and thus throwing the head and neck out of line. This one-sided carriage of the head and neck is frequently accompanied by tilting the rump to the opposite side. With the use of the cross-firing shoe above set forth and the aid of the weights, and the balancing of the feet, the stride can thus be made as regular as the ticking of a watch.

It is to be hoped that these remedial agents have been made so clear to the average farrier that horses thus afflicted will be universally benefited.

SPLAYFOOT.

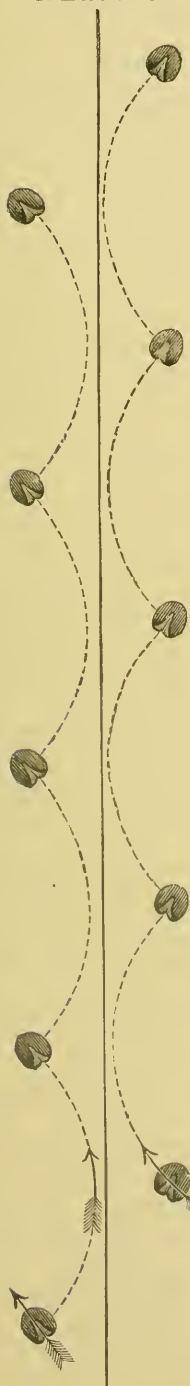


Fig. 17.

Splay Foot.

Fig. 17 shows the inward and outward sweep of the horse's foot, known as splay foot. This evil causes horses to hit and bruise the ankles, shins, and knees. Low speed, low cut; high speed, high cut. Full instructions for shoeing splay foot will be found on pages 208 (Fig. 100) and 202 (Fig. 83), in "Scientific Horseshoeing," sixth edition.

Pigeontoe.

Fig. 18 shows the outward and inward sweep of the horse's foot, known as pigeontoe, just the opposite sweep to the splay foot. In my work upon "Scientific Horseshoeing," page 216, Fig. 104, I have given cut of shoe to remedy the above evil. Rarely, if ever, do pigeontoed horses hit their ankles, shins or knees.

PIGEONTOE

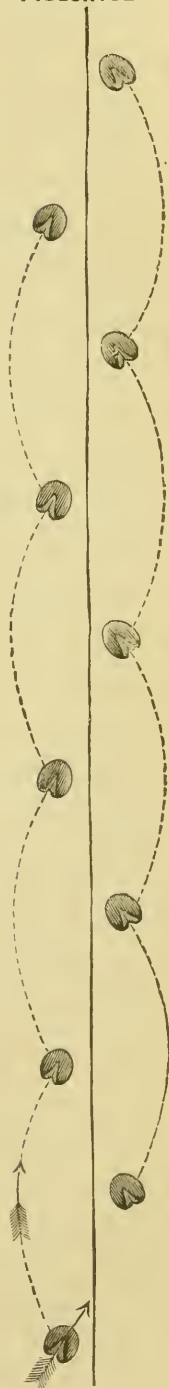


Fig. 18.

LINE TROTTER

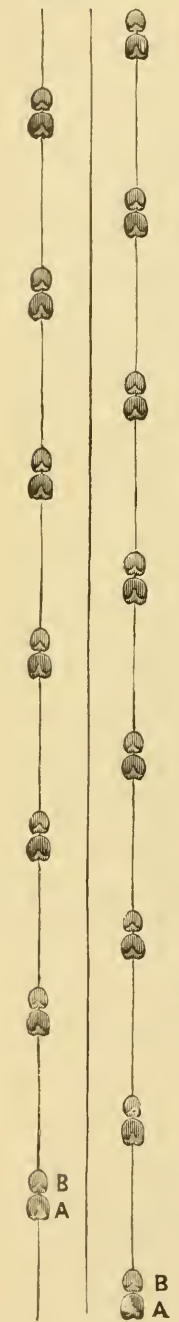
THE LINE TROTTER.

The trotting horse that moves as close to a straight line in his action, economizes in the greatest degree his muscular exertions, as well as shortens the space over which he moves to the goal. It must be remembered in the mathematical axiom that a straight line is the shortest distance between two given points, applies with force to the action of the trotting horse. The trotting action that is all abroad, technically speaking, wherein the hind legs violate the line precision by excess of width and height, and the front legs climb, with a waste of knee action as to interfere with the length of stride, means over-exertion, muscular weariness, and total exhaustion at the finish of a race.

The illustration clearly shows the foot prints of a line trotter :

A shows the print of the front foot, and
B that of the hind foot.

Such a horse trots with the precision of a perfectly constructed machine. He must be perfect at birth. His stifles must be developed straight, with the points turning neither outwardly nor inwardly, for the outward turning of the stifles indicates the straddler in action, while their inward turning would make the horse pigeon-toed behind, with a predisposition to cross-firing. But, if the stifles are straight, the hind feet will land in a line with the front feet; all the prints will flex straight, backward and forward in their journals, and the horse can sustain his speed with extreme endurance,



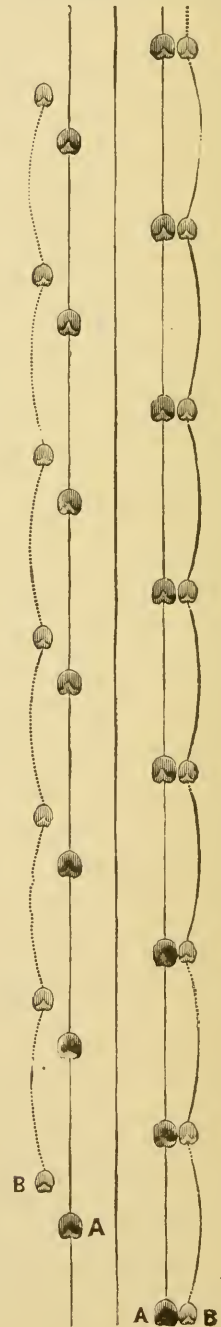
because he moves with the greatest possible economy of muscles. The stride of such a trotter can be lengthened or shortened by the rules laid down in Scientific Horseshoeing, as his development in speed may require. But, to preserve his line of action, he must be shod so as to be perfectly comfortable in his feet. This means that the comparative length of toe and height of heel should be accurately adjusted; that the foot should be dressed to a level; that the weight of the shoe, and in the sulky or road wagon should be in proportion to his muscular capacity, and that all his brushes of speed should be finished well within his courage. If he is short pasterned, he will have a quick-drum-beat revolution, and this should not be interfered with to the extent of making his muscles sore.

If he is long in the pasterns, he will be long gaited, and provided in either action the horse goes clear free from hopping or hitching, or cross-firing or over-reaching or any other defects, then he should be shod with thin, broad, wide web shoes, that place the hoof as near to the ground, almost, as in the natural state; and the front shoes should not be made more than two and one-half or three ounces heavier than the hind ones, in order to comply with the same relative weight of the front and hind feet in their natural green state. Thus shod and rigged, the line trotter in perfect condition, under the most skillful reinsmen, is destined to become the perfection of the fleet-footed trotting horse.

HITCHING AND HOPPING BEHIND IN TROTTING MOTION.

This drawing accurately marks the foot-prints of the horse that hitches, while trotting, with his right hind foot. In diagram, letter A shows front and B hind foot prints. The most unusual cause for hitching is the malformation of the offending hind limb; that is, in some cases it is shorter than the other one. In all my experience, of more than a half a century, as a farrier, I have never found but two cases of this description. The method of discovery is of sufficient interest to narrate. I procured a carpenter's leveling board, then stood the horse upon a level-board floor with a man in front to hold his head at the proper angle with the body. The leveling board was then laid across the hips. I then took two iron rods, stood one end on the floor, placed one rod on each side of the hips, and took the measurement on rods under the leveling board. I then placed the spirit level on top of leveling board, and then raised the low end of leveling board until the spirit level was accurately adjusted to a perfect level, and both measurements proved that one leg was just three-quarters of an inch shorter than the other. Subsequent examination and measurements showed this difference was in length of the hind limb. The shorter

HITCHING & HOPPING



one required to be lengthened by shoeing. I selected a piece of iron three-quarters of an inch wide by three-eighths thick and turned it edgewise, then formed it into a shoe and nailed it on to the foot. The opposite foot was shod with a thin, flat steel shoe. This gave the short leg the required three-quarters of an inch to make it the same length as the other limb, and the horse moved off clear in stroke in one shoeing and the hitching disappeared. This horse was the noted trotting horse called Galier, owned in Cincinnati, Ohio, in 1870.

The other horse, similarly afflicted, was a noted road horse owned in Chicago. I found that the rear hind limb, upon close examination, was five-eighths of an inch shorter than the opposite limb. The same remedy was applied. The short limb was lengthened to the length of the other by making and placing thereon a shoe five-eighths of an inch thicker than the other hind shoe. The horse moved off square without the chronic hop that had before disfigured his trotting action.

But generally the hind legs are of the same length, and the cause of hitching must be detected in the front action. Take the case of the phenominal trotting mare, Lida Bassett, whose performance at Chester Park, in 1883, startled the turf community. At first she hitched in her slow work in the left hind leg and then extended it to her brushes of speed. On one occasion, at Chester Park, I noticed that the mare nodded every time the right front foot landed on the ground. This led me to have the stride of the front and hind feet measured with a tape line. The front print of the right front foot was just four and one-half inches shorter than the left foot print. I removed the right front shoe, welded a spur in center at toe, bent up at angle at front part of foot, then placed a four ounce weight on spur on the right front

foot and had the mare driven. The hitching entirely disappeared on the left hind leg. This is one of the causes of hitching behind was in the opposite front leg. The stride of front and hind feet must be as regular as the ticking of the clock.

In many instances the horse will hitch by being speeded every day, or being overdriven frequently at his highest flight of speed too long at a time. More frequently he is compelled to haul too much weight, and his ambition to forge ahead will frequently cultivate the habit of hopping or hitching as a means of overcoming the excess of weight he should drag along. Such horses have been known to hitch on one hind leg for a time till they get very weary and then rest themselves by shifting the hopping to the other hind leg.

In all these cases the remedy should be apparent to the thoughtful farrier and owner. The feet must be dressed to a mathematical level; their weight should be regulated to promote a balanced stride; the weight burden should be lessened, and the impatience of the horse should be curbed till, by slow handling, he is again restored to a well-poised gait, and then his speed should be gradually quickened, always within the desire to hitch.

In thus locating the various causes of hitching, the author trusts that his efforts may prove beneficial to the horse community.

A, Flexor perforatus (attached to lower pastern bone).

B, Flexor perforans (inserted under coffin-bone).

C, Metacarpal or check ligament of the perforans tendon.

D, Suspensory ligament of the fetlock.

E, Front extensor tendon (inserted into front of coffin-bone).

F, Splint bone on outer side of the cannon.

G, Branching of the suspensory.

H, Branch of same passing forward to join the extensor tendon.

I, J, K, Periosteum membrane covering the surfaces of the cannon and pastern bones.

L, Fibrous reticulum covering the face of the coffin-bone and forming the reticular tissue leaves, or sensitive laminae, which dovetail into the horny leaves of the wall, completing the union of these regions.

M, The pastern-supporting or check ligament. This has never before been shown in anatomical drawings. It binds the upper head of the lower pastern to the lower head of the upper pastern, and is located midway between the flexor tendon and upper pastern bone. Its office is plainly duplex—it holds the ankle and pastern joint firmly in position, and divides the strain with the flexor tendon in its severe downward action.

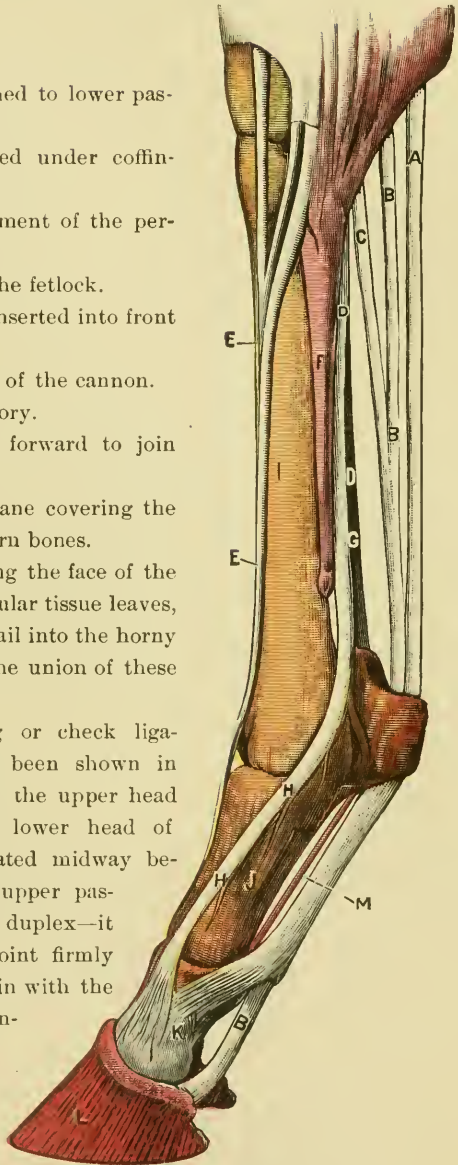


FIG. 4. EXTERNAL SIDE VIEW OF LEFT FRONT LIMB, SHOWING THE ARTICULATIONS, TENDONS, AND LIGAMENTS OF THE KNEE, FETLOCK, AND FOOT.

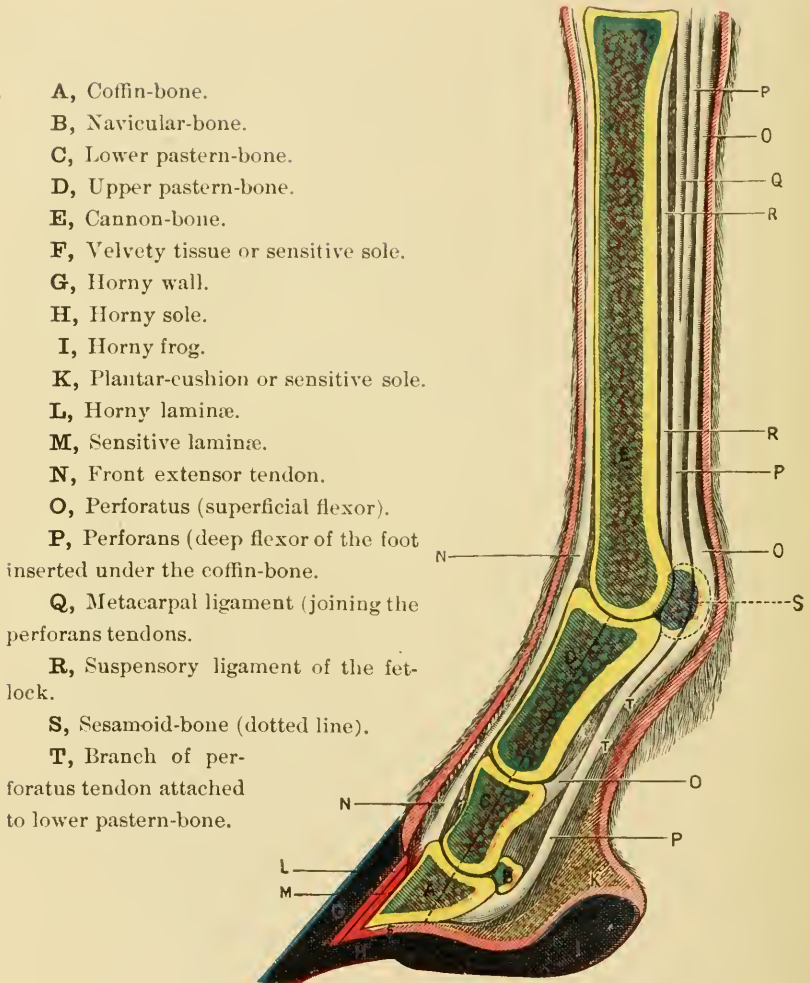


FIG. 5. MEDIAN SECTION OF FRONT DIGIT, FROM BASE OF FOOT TO HEAD OF CANNON BONE, SHOWING ARRANGEMENT OF THE ARTICULAR AND MUSCULAR APPARATUS.

The dotted line through center of digital bones shows the line of action of weight from above to below, and marks the normal angle of the foot.

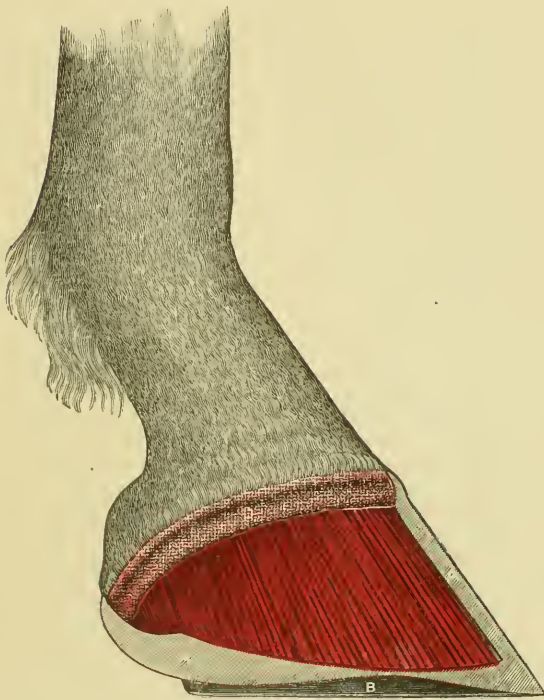


FIG. 6. SIDE VIEW OF THE OUTSIDE HALF OF THE RIGHT FRONT FOOT WITH WALL OF THE HOOF REMOVED, SHOWING NUMEROUS LEAVES OF THE SENSITIVE LAMINAL TISSUE.

A, Median section of the hoof, continued through wall, sole and frog. **B**, Base of hoof on opposite side. **C**, The keratogenous membrane or sensitive laminae, covering the upper face of the pedal-bone, consisting of vascular leaves, designed to interlock with the horny laminae on the inner face of the wall of the hoof. **D**, The coronary-cushion, showing its continuance to the bulbs of the plantar-cushion at the heel and the periopic ring around its upper border

To the great vascularity of these sensitive tissues is due the bright red color they show on the surface. They form in their connection with the plantar surface of the velvety tissue, the essential apparatus of touch and feeling in the foot. They are, in addition, highly elastic and assist in the springy action so necessary to the ease of the foot when exerted in speed or in the severe strains of drawing heavy loads.

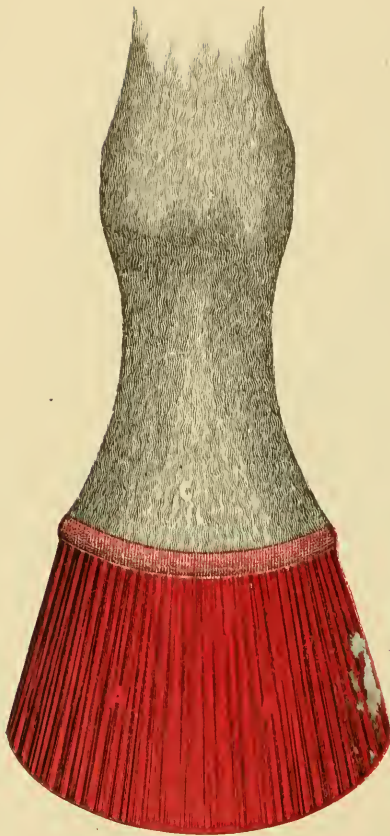


FIG. 7. FRONT VIEW OF THE HORSE'S FOOT, SHOWING THE SUPERFICIAL APPEARANCE OF THE KERATOGENOUS MEMBRANE, OR LAMINAL TISSUE, AFTER REMOVAL OF THE HOOF.

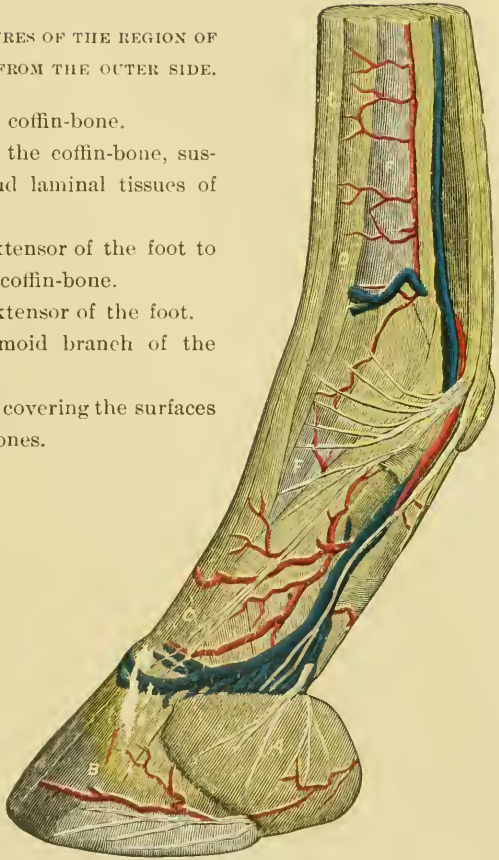
A, Numerous leaves of the sensitive laminae (podophyllous tissue) formed by the reticulum covering the external face of the coffin-bone, and which interlock with the horny leaves (keraphyllous tissue) of the surrounding wall.

B, Coronary-cushion, the organ which develops the horny wall, and acts in reciprocal relation between it and the skin above, as an elastic medium of connection. It also unites in the same manner with the vascular laminae, and is prolonged downward at the back, into the bulbs of the plantar-cushion and the villous tunic of the velvety tissue.

The villi of the coronary-cushion and velvety tissue determine the structure and maintain the elasticity of the entire hoof. The laminal tissue has the property of throwing out a temporary horn, whether exposed by stripping off the hoof or by the active changes of inflammation, but this must be replaced by that from the coronet when the foot returns to its normal condition.

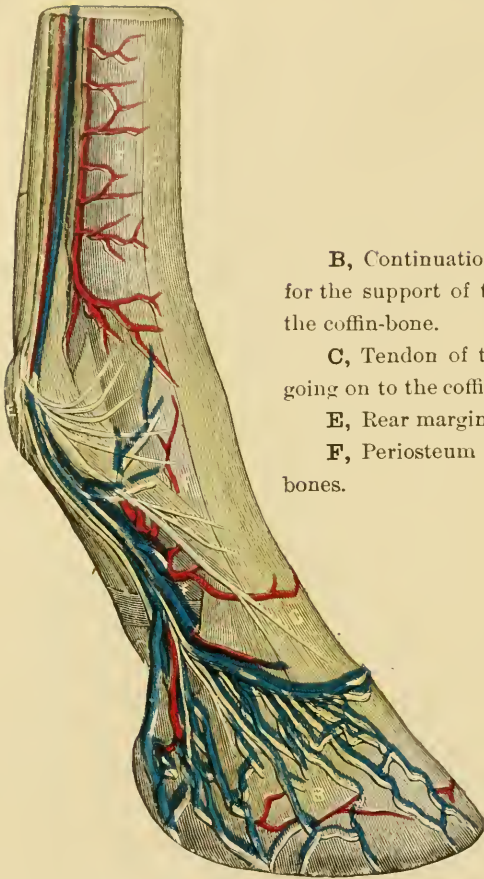
FIG. 8. INTERNAL STRUCTURES OF THE REGION OF THE LEFT FORE-FOOT AS SEEN FROM THE OUTER SIDE.

- A**, Lateral cartilage of the coffin-bone.
B, Reticulum, enveloping the coffin-bone, sustaining the blood-vessels and laminal tissues of this region.
C, Tendon of the front extensor of the foot to its insertion on eminence of coffin-bone.
D, Terminal of the side extensor of the foot.
E, Rear face of the sesamoid branch of the transverse ligament.
F, Periosteum membrane, covering the surfaces of the cannon and pastern bones.



These plates represent the arteries in red, the veins in blue, and the nerves in white. Each of these systems maintains the most intimate relations with the others and meets in the extremities in various forms of branches, collaterals, and ganglionic enlargements, remarkable alike for their large volume, intricate reticulation and extreme delicacy.

The divisions shown in this plate are the digital and unguis arteries and veins of the plantar region, the veins of the coronary plexus, and the median circumflex artery of the foot together with the digital branches of the median or cubic plantar nerve.



B, Continuation of the fibrous reticulum, for the support of the vessels and leafy tissue on the coffin-bone.

C, Tendon of the front extensor of the foot going on to the coffin-bone.

E, Rear margin of sesamoid ligament.

F, Periosteum of the cannon- and pastern-bones.

FIG. 9. INTERNAL STRUCTURES OF THE REGION OF THE LEFT FORE FOOT, AS SEEN FROM THE INNER SIDE.

The digital arteries and veins course almost immediately beneath the skin. Descending from above the fetlock joint they follow the course of the flexor tendon and throw out innumerable twigs and divergent ramifications to supply the surfaces, as well as the deeper tissue substances of the foot. Those shown in this plate are the perpendicular artery, circumflex coronary, artery of the plantar cushion, preplantar unguis, venous network of the laminal tissue, coronary plexus, and the deep cartilaginous layer—all flanked by the plantar nerve, which interlaces them with numerous filaments.

FIG. 10. FRONT VIEW OF THE FOOT REGION, SHOWING THE ARRANGEMENT OF THE INTERNAL STRUCTURES.

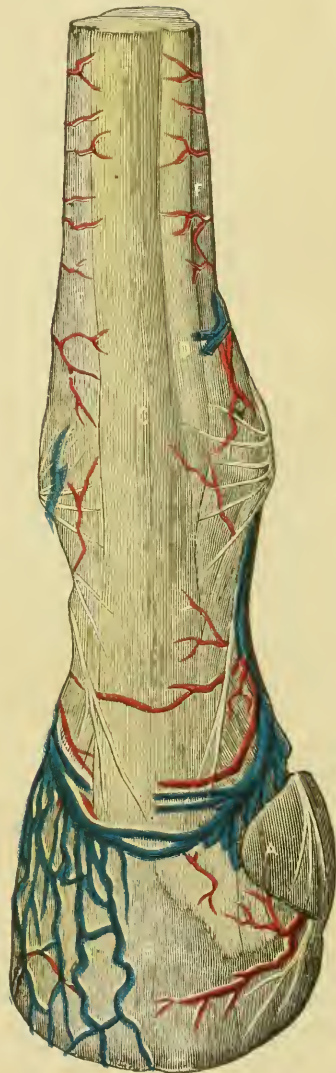
A, Front border of the lateral cartilage of the coffin-bone (the corresponding piece on the other side having been removed).

B, Continuation of the reticulum, forming the membranous net, which holds in its meshes the dependent vessels and laminal tissues on the coffin-bone.

C, Tendon of the front extensor of the foot to its insertion in the coffin-bone.

D, Terminal of the side extensor of the foot.

F, Inner and outer borders of the cannon-bone.



The external and collateral branches of the perpendicular artery and satellite veins and nerves are here shown by their anterior branches, which concur in forming the articular branch of the phalanx, veiny plexus of the coronary crown circle, and net of the reticular tissue, accompanied by the vasa motor nerves belonging to the plantar system.

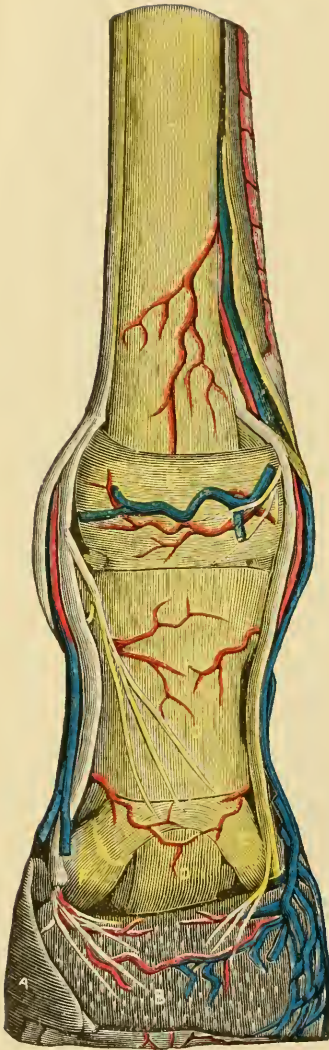


FIG. 11. BACK OF THE FOOT REGION, SHOWING THE INTERNAL ARRANGEMENT OF THE PHALANGES.

The arteries, veins and nerves are the posterior offshoots of the internal and external collaterals, furnishing this region same as previously referred to.

A, Rear border of the lateral cartilage (the other being omitted).

B, Pyramidal base or bulbs of the plantar cushion or sensitive frog, interposed between the perforans tendon and the horny hoof.

C, Reinforcing phalangeal sheath covering the perforans tendon and the suspensory ligament with a fibrous expansion and attaching itself to the larger part of the pastern-bones.

D, Flexor perforans at its exit from between the two branches of the perforatus.

E, Superficial bundle or ring of the sesamoid ligament.

F, Flexor perforatus, giving off two branches toward the bottom, which become attached to the lower pastern-bone.

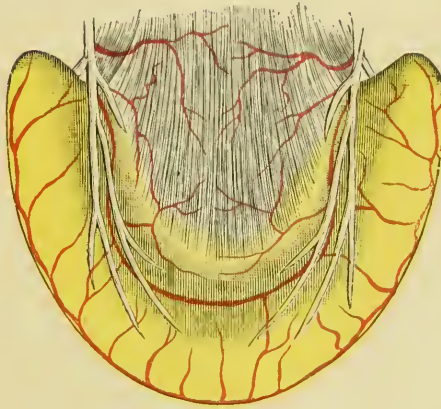


FIG. 12. PLANTAR SURFACE AT LOWER FACE OF THE THIRD OR UNGUAL PHALANX OF THE FOOT, THE PEDAL, OR COFFIN-BONE, UPON WHICH THE DIGIT IS BASED

This view represents the sole of the bone covered by the plantar reticulum and shows the origin of the preplantar unguis artery as it emerges at the retrosal process of the wings and loops into the semi-lunar anastomotic arch, communicating in the bone. The radiating branches from this arch and from the outer border correspond with the affluents of Figs. 13 and 14. The nerves shown are the descending posterior branches of the preplantar nerve, accompanying the digital artery on the retrosal process, traversing the cartilages and laminal tissues, and terminating around the plantar unguis artery in the plantar fissure.

The attachment of the deep flexor of the foot—the perforans—is shown as covering the semi-lunar crest and the median imprints of this bone; widening into a large expansion designated the plantar aponeurosis. This terminal expansion is covered by the plantar cushion which adheres to it most intimately. This muscle flexes the phalanges on one another, and it also concurs in flexing the entire foot on the fore-arm.

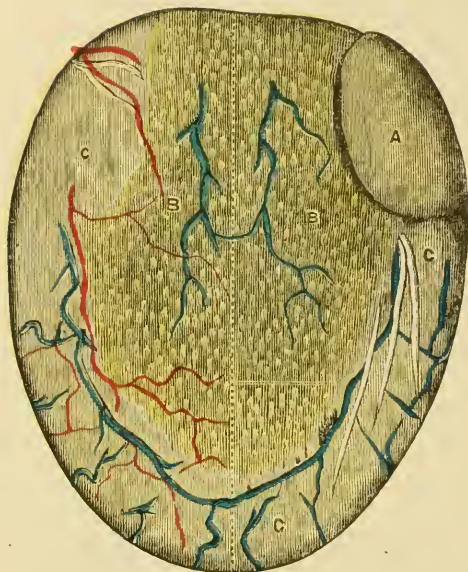


FIG. 13. THE PLANTAR RETICULUM OR KERATOGENOUS MEMBRANE COVERING THE LOWER FACE OF THE COFFIN-BONE, AND SUSTAINING IN ITS MESHES THE VEINS OF THE SOLAR PLEXUS.

A, Lower border of the lateral cartilage of the coffin-bone (the part corresponding to this on the other side being detached for this illustration.)

B, The proper tissue, or villous tunic of the reticulum, which is correlated to the upper surface of the velvety tissue, and answers to the periosteum on the coffin-bone, which it envelopes like a villous sheath.

C, The periphery of the reticular tissue, conspicuous for the divisions of arteries and vessels which it sustains and which prevail so largely throughout the whole extent of the plantar surface.

The venous apparatus of the digital region is remarkable for the number, distribution and interlaced disposition of the vessels composing it. They are extended over and molded on the two last phalanges of the foot, discharging themselves by numerous descending and ascending branches, converging in flexiform nets and arches, and communicating with each other, or traversing every element, by an intricate system of arterioles or venules, analogous to the capillary system.

A, Lower face of the velvety tissue, or sensitive sole immediately overlying the horny sole, which it secretes.

B, Base, or bulbs of the plantar cushion, separated by the depression or cleft (median lacuna), on the inside of which the spur or stay of the horny frog reaches.

C, Return of the bars to their junction with the wall.

D, Arch, or spring of the bars, formed by their angle of inflection at the heels, also showing the laminal leaves covering them.



FIG. 14. THE LOWER FACE OF THE HORSE'S FOOT, AFTER REMOVAL OF THE HORNY HOOF.

The arteries forming the plexus or network furnishing this region of the foot are similar to those shown on the other plates, and like them proceed from the parent trunk, descending on the side of the digit, terminating in the plantar unguis branch from which the inferior communicating arteries pass through the foramina just above the edge of the coffin-bone, branching closely over the laminal tissue and uniting below to form the large circumflex, or peripheral artery, which runs around the toe. They also help to form the inferior circumflex artery and finally join the coronary plexus—collectively forming the circulatory apparatus of the entire digital region.

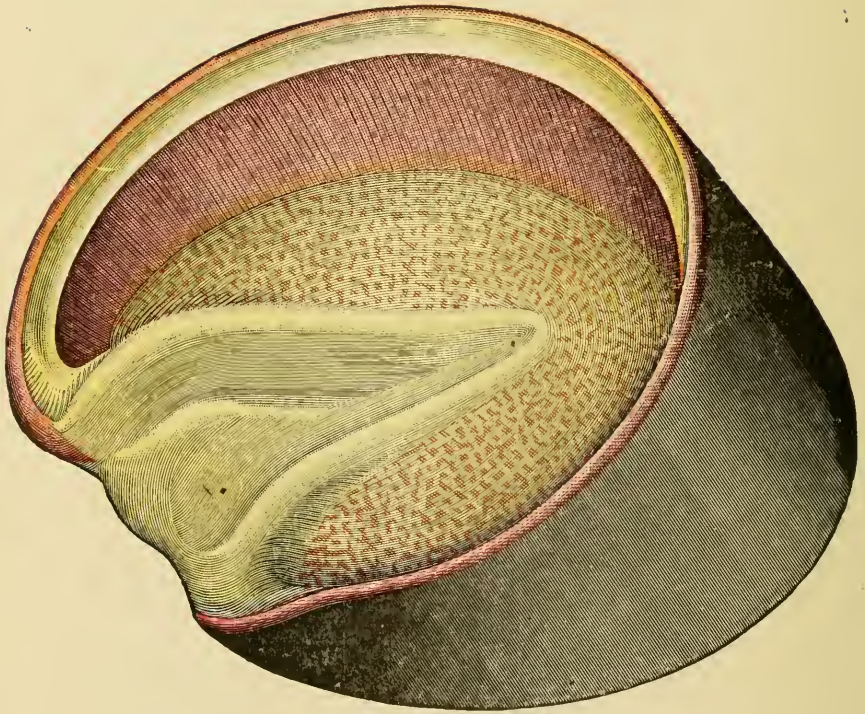


FIG. 15. A PERFECT HOOF, REMOVED FROM THE FOOT, SHOWING A LATERAL POSTERIOR VIEW OF A SOUND NATURAL AND HEALTHY DEVELOPMENT OF WALL—HORNY LAMINÆ—CORONARY CHAMBER—SOLE, FROG-STAY, FISSURES AND BARS.

A TREATISE

ON THE

TEETH OF THE HORSE.

BY W. A. LEWIS, D. V. S.

A horse has 40 teeth and a mare 36. But few people stop to consider that they suffer with the toothache just the same as the human race. And quite often they are in a pitiful condition for weeks, and the owner or driver never thinks to examine to find what condition the horses' teeth are in. A large percentage of horses, if taken in time, could have their lives prolonged if the owner would have a qualified veterinary surgeon or dentist to operate on the animal's teeth in a humane way. Young horses should be looked after as well as old ones. Some colts during dentition experience a great deal of trouble with their teeth. Many a horse has been killed for glander when it was nothing more or less than nasal gleet, and the cause is quite often due to the teeth. I know this to be true from practical experience.

Ruminants and the pig and dog are susceptible to diseased teeth same as the horse, but they are passed by unnoticed.

Many a time I have traced the seat of the trouble to the horses' teeth. Horses of all ages suffer more or less from long, sharp and projecting points which are often found on the molar teeth. They are situated on the inside of the lower

and on the outside of the upper molars, and also occasionally, but rarely, on the inside of the upper molars. They vary much in size and shape, some being small and blunt, while others are long and very thin and sharp. The injury they produce will be in proportion to their length and the thinness of their edges or the sharpness of their points.

The external surface of each upper tooth usually contains two of these projections, which correspond with the ridges already described as running from the table surface to the roots of these teeth.

The internal surface of the lower molars also contains two sharp projections, which usually are much shorter though sharper than those on the upper teeth.

These projections are the result of limited lateral motion of the lower jaw. In masticating its food the animal works the lower jaw from side to side. Unless this motion is extensive enough to bring the whole table surface into wear, a portion of the teeth will not be worn away.

In some animals the width of the upper jaw (which is always wider than the lower) exceeds that of the lower to such an extent that it amounts to a malformation. Cases of this kind have come to my notice where only half of each row of teeth came into wear, and that portion remaining out of wear had become so long that it bruised and lacerated the gums of the opposite jaw. The lower teeth passing inside of the upper had cut deep cavities into the palatine processes.

CRIBBING—CAUSES, EFFECTS AND TREATMENTS.

Cribbing is a condition which may be considered as a vice or habit rather than a disease. It consists in the horse laying hold of any stationary object with the teeth, such as

a manger, post, fence, gate, etc., and violently extending his neck, and then after a convulsive action of the throat a grunting sound is heard, accompanied by a gulping in and swallowing of air.

CAUSES.

Many theories have been advanced with regard to the cause of this vice: Some maintain that it is due to indigestion, others to the closeness of the incisor teeth, while some attribute it to a combination of both conditions. Others to idleness. The latter, with heredity, undoubtedly, is the main cause, and most cases occurring could be traced directly to them if pains were taken to investigate their origin. Well fed vigorous colts sometimes get fretful and bite or lick the manger, eventually contracting the habit. With some animals it seems to be natural; they evidently derive much pleasure from the habit.

The effects of cribbing are various. The teeth are worn away and occasionally broken, so much so in aged horses that they graze with difficulty. The grain is often wasted by dropping from the mouth into the manger or upon the floor. Digestion is impaired through the loss of saliva which escapes. The stomach and intestines become distended with gas, inducing colic, chronic indigestion and sometime acute indigestion, lowering the condition of the animal and eventually producing death.

All animals, however, do not suffer from colic and indigestion; indeed, some remain healthy, fat and sleek, notwithstanding they may be addicted to the vice in the severest form.

Wind-sucking constitutes another vice equally as bad if not worse than cribbing. It consists in simply gathering air into the mouth, extending the head, arching the neck, gath-

ering the feet together and gulping down the air. It differs from cribbing in that the animal does not grasp any object with the teeth.

TREATMENT.

Cribbing and wind-sucking constitute a decided unsoundness and are incurable when once thoroughly established. Were the vice due to pressure of the incisor teeth against each other, the extraction of one or two of them would certainly remove the cause and be followed by a cessation of the habit. Some surgeons claim to have entirely dispelled the vice in young animals when first noticed by the extraction of one or more teeth. I have operated in that way (as an experiment), under like conditions on the teeth of several horses, but have never been able to entirely stop the habit. Sawing between the teeth can have no possible effect in breaking up the vice, although it is frequently resorted to for that purpose. A neck strap buckled tightly around the throat while the animal is in the harness will act temporarily in checking the habit, but has no good effect whatever when removed, but, on the contrary, will press on the throat and produce roaring in some instances.

To prevent the vice, give the horse something to do. Do not keep him tied in the stall from one week to another, but turn him out and give him plenty of exercise.

* Horses which are crib-biters or wind-suckers are to be considered as unsound, as the vices generally arise from or cause indigestion, induce colic, tend to lower condition and to depress the vital powers.

A crib-biter seizes the manger or some other fixture—the collar-shank when nothing else can be taken hold of—

* Williams' *Practice of Surgery*, page 540.

with his teeth, arches his neck and makes a belching noise. After a time the abdomen becomes evidently enlarged. Many crib-biters thrive moderately well, whilst others are always unthrifty, dry in the coat and hide-bound. Some practitioners maintain that air is swallowed during the act, whilst others state that gas is expelled from the stomach, and that the continual belching or eructation causes further derangement of the stomach, the increased formation of gases and the consequent tympanitis. I was at first disposed to think that the first opinion was the correct one, as it is quite possible for air mixed with saliva to be swallowed, but further experience inclines me to the latter, namely, that gases are expelled, and that increased disorders of the stomach are induced by the habit. A chronic crib-biter may be easily recognized by the appearance of the incisor teeth which are worn and rounded at their anterior borders, and by an enlarged or hypertrophied condition of the muscles which depress the jaw, the sterno-maxillaries, stylo-maxillaries, etc., and generally by the mark of a strap on the neck.

A wind-sucker smacks his lips, gathers air into his mouth, extends his head, or presses it against some solid body, arches his neck, gathers his feet together, and undoubtedly swallows air, blowing himself out, sometimes to a tremendous extent.*

Of the two vices this is the worst; a wind-sucker being more subject to colic, indigestion and polyuria than a crib-biter.

To prevent crib-biting a muzzle or neck-strap made for

* For my part I cannot understand why a crib-biter should only expel gas, and a wind-sucker swallow air. The action and noise made in both cases are similar, as also are the results of the vices. I am inclined to believe from observation that air is swallowed in both instances.

the purpose is sold by saddlers; and for wind-sucking a strap, studded with sharp points of iron opposite the lower part of the jaw, is the best preventive, whilst the indigestion from which these animals seem to suffer is best combated with purgatives, alkalies, rock salt in the manger and regular work. Want of work, indigestion and the irritation of teething are generally the causes of these vices.

* It is very doubtful whether crib-biting originates from any disease. It may perhaps with more reason be considered a propensity, a habit, or a vice, which in time may result in indigestion, loss of condition, etc. This, however, depends much upon the extent to which it is practiced, and the constitutional vigor or strength of the animal; for it is well known that many a horse constantly practicing the vice is neither retarded in his growth nor injured in his health.

As to the cause of this troublesome vice, it occurs mostly in young horses that are well fed and insufficiently worked. There is no doubt also a special predisposition to the habit; with some horses it appears to arise naturally, as though the sucking or gulping down of air gave them pleasure or a relief from some sort of suffering. It has also been observed that horses at all disposed to it may be easily led into it by the practice of some men in cleaning them; for if they clean them before the manger and irritate them with a too severe comb, and in parts where they cannot endure it, they seize upon the manger for a counteraction of their sufferings, and in doing this first get a habit of it which may afterward extend to the removing of other pains or distressful feelings. Some horses indulge in the habit of licking the manger and gnawing the woodwork, which may eventually lead to cribbing.

* Dr. H. H. Paaren in *Breeders' Gazette*, Vol. IX, page 353.

In practicing the vice, cribbers avail themselves of any prominent object even as small as a nail or a ring, and in the absence of any protruding or prominent object they will grasp the halter or bridle-rein. Horses that simply practice the act of wind-sucking require no resting point. When horses first begin to crib-bite, and sometimes inveterate crib-biters, they only indulge in the practice at intervals, some while eating and others while standing in the stable without food before them. During attacks of painful disease, cribbers do not attempt the act, and it may be regarded as a favorable sign when such a horse returns to his old practice.

All sorts of preventives have been resorted to, including muzzling with steel rods fixed to the bit. The use of a broad leather strap around the throat is not to be recommended, because it has got to gradually produce distortion or constriction of the windpipe and thus cause roaring. Our inquirer asks whether placing the horse in a stall devoid of anything upon which to get hold would be a preventive. Well, with the plurality of horses it may; but we have seen some old and inveterate offenders thus placed who practiced the vice upon their knees and upon the hard floor while lying down.

PARROT MOUTH.

Parrot mouth is a deformity which is frequently noticed, and consists in the upper incisor teeth projecting in front and overhanging the lower incisors. The incisor teeth do not come into wear, and as a result they gradually increase in length beyond the gums. In some cases the lower incisors come in contact with the bars in the roof of the mouth, lacerating them and eventually producing serious results. The animal will fall away in flesh, presenting an emaciated ap-

pearance, and may eventually die of starvation, even in the midst of plenty.

A horse with a parrot mouth will feed well enough from the manger; but if turned out to pasture, experiences much difficulty in collecting the food.

If the lower incisors wound the roof of the mouth they may be dressed down with the incisor cutters and the rasp. If the upper incisors wound the lower lip they should be operated upon in the same manner.

HOW TO TELL THE AGE OF THE HORSE.

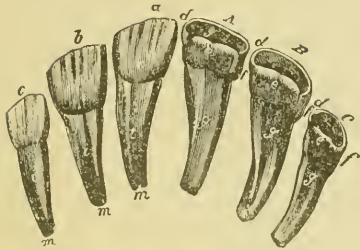


FIG. 1.

The milk incisors of the lower jaw as seen from the right side, when fully developed, are here represented in their natural size. The exterior surface of the teeth is arched as above represented. The explanation of the figure is: *a*, the nippers; *b*, the middle tooth; *c*, the corner tooth; *h*, the contracted body of teeth; *i*, the narrow arched neck of teeth; *m*, the root of teeth; *A, B, C*, the concave side of teeth towards hollow of the mouth; *d A f, d B f, d C f*, the outer edges of teeth; *d e f*, the inner edge of teeth, somewhat lower than the outer edge—the mark is enclosed within these inner and outer edges; *g*, the hollow inside surface of body of teeth.



FIG. 2. HALF YEAR.

An inside view of the lower jaw of a half-year-old foal. The outer and inner edges of nippers are worn, while only the outer edge of the middle teeth is worn, and the corner teeth have not yet come into contact.

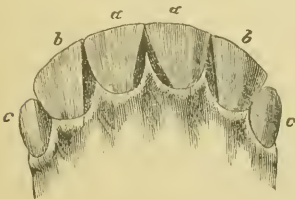


FIG. 3. HALF YEAR.

Outer side of the jaw of a foal at six months old. *a, a*, the nippers; *b, b*, the middle teeth; *c, c*, the corner teeth.

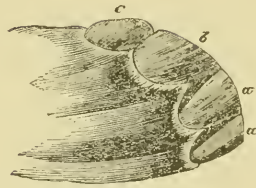


FIG. 4. HALF YEAR.

A side view of the jaw of a foal at six months. *a, a*, the nippers; *b*, middle tooth; *c*, corner tooth.



FIG. 5. ONE YEAR.

At one year old the lower jaw presents the appearance represented in this figure. The outer and inner edges of all the incisors are partly worn by grinding, while the inner edges of the corner teeth alone are uninjured.



FIG. 6. TWO YEARS.

Here we have the lower jaw as it appears at two years old. The mark of the nippers and middle teeth is now worn down, as well as their edges. The inner edge of the corner teeth also begins to show wear.

The Colt's teeth begin to shed at two and a half years old, and the permanent or Horse's teeth then appear to take their places.

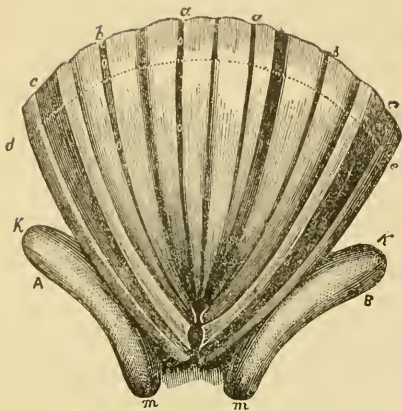


FIG. 7. A.

The horse incisors of the lower jaw as seen from the outside, with the outer surface arched towards the bony blade of the socket. The hook teeth are now seen for the first time.

Explanation:—*a, a*, the nippers; *b, b*, the middle teeth; *c, c*, the corner teeth; *K, K*, the hook teeth; *e, d*, the line from *d* to *e* shows the position of the cavity in the outer partition of the mark; *o, o, o, o*, the furrows which distinguish the horse's teeth from the colt's teeth; *m, m*, the roots of the hooks.

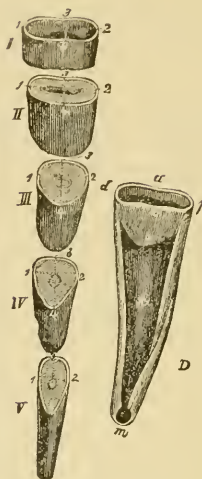


FIG. 8. A. D.

A nipper in the various stages of development and wear from three years to twenty-four years. *I* is the nipper just pushing thro' at three years old; from 1 to 2 is its breadth, from 3 to 4 its thickness. *II* is the same tooth at six years, the crown worn off $\frac{1}{4}$ inch, the breadth decreasing and the thickness increasing, so that the surface takes more of an oval form. *III* is the tooth at twelve years old, the surface nearly round, and the breadth and thickness nearly the same. At eighteen years old the surface becomes triangular, as shown at *IV*. At twenty-four years the tooth is just the reverse of what it was at three years, and the breadth is only half the thickness.—See *V*.

The larger figure *D* shows an incisor of a full-grown horse, split lengthwise. *d, a, f*, the outer raised edge; *a, o*, the funnel-shaped cavity of the tooth; *k*, the hollow body of the tooth; *m*, the root not yet filled.

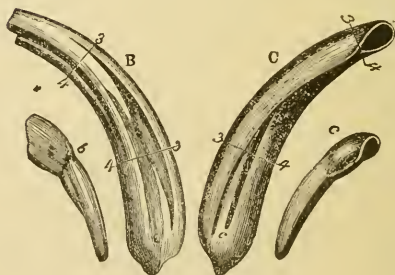


FIG. 8. B. C.

The large figures *B* and *C* represent side views of a horse incisor, in which the root *c, c*, is twice as thick as the upper end. The two small figures on the right and left at *b* and *c* show side views of a foal's tooth.

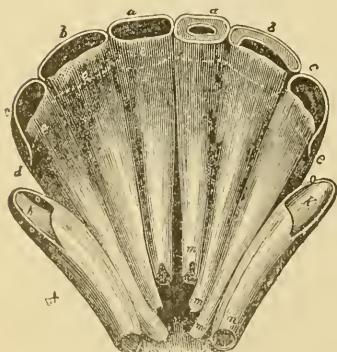


FIG. 7. B.

The incisor teeth of the lower jaw, from the inside of the mouth. *a, a*, the nippers, showing wear of the upper and outer edge; *b, b*, the middle teeth, showing wear on the outer edge while the inner edge remains uninjured; *c, c*, the corner teeth; *d, e, e*, the dotted lines, mark the divisions between the crown of the teeth and the gums; *K, K*, the hook teeth about to push through the gums; *m, m, m, m*, the roots of teeth not filled out with bony substance.



FIG. 9. TWO AND ONE-HALF YEARS.

The lower jaw at two and a half years old. The horse nippers are just pushing through the gums, while the middle and corner teeth not yet shed (foal teeth) present a smooth, worn surface.

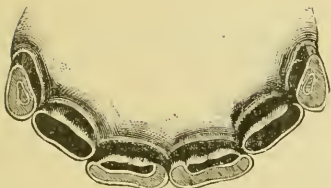


FIG. 10. THREE AND ONE-HALF YEARS.

At three and a half years the lower jaw presents the appearance shown in this figure. The middle teeth (horse teeth) are just pushing through, and the nippers show wear on the outer edge. The corner teeth (foal teeth) are worn down blunt.

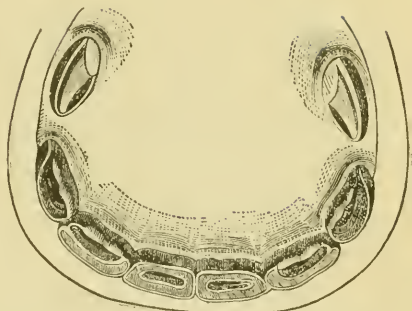


FIG. 14. FIVE YEARS.

The lower jaw at five years—an inside view. The nippers are worn down on both edges until the mark is nearly gone. The outer edge only of the middle teeth shows wear, while the outer edge of the corner teeth is just beginning to be worn a little. The full-grown hook teeth do not show any wear whatever.

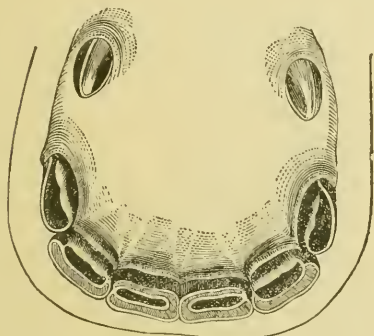


FIG. 11. FOUR AND ONE-HALF YEARS.

At four and a half years the foal teeth are all gone from the lower jaw. The nippers show wear on both edges, and the outer edge of middle teeth is worn. The hook teeth and corner teeth of the horse are just appearing.



FIG. 15. SIX YEARS.

In the lower jaw at six years old the nippers are worn down even with the middle teeth, which latter still have a cavity. The inner edge of the corner teeth is also even with the outer one.

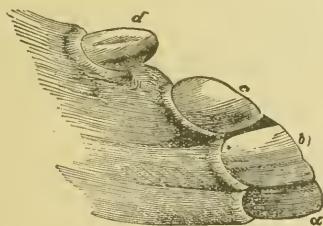


FIG. 12. FIVE YEARS.

A side view of the lower jaw at five years old.

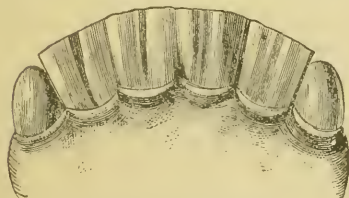


FIG. 13. FIVE YEARS.

A front view of the lower jaw at five years old is here given.

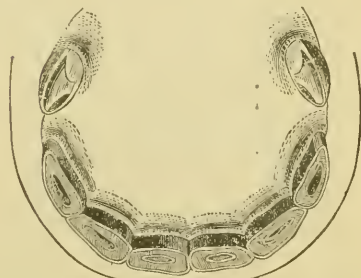


FIG. 16. SEVEN YEARS.

The lower jaw at seven years is here represented. The pointed ends of the hook teeth have become more rounded, are worn away somewhat. Both edges of the corner teeth are worn to a smooth surface, with a small cavity between them. The middle teeth have lost their cavity and show an even surface all the way across.

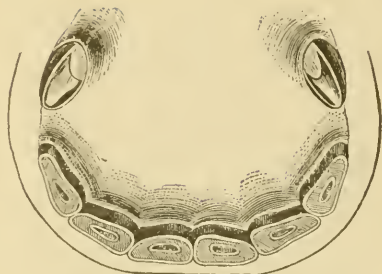


FIG. 17. EIGHT YEARS.

At eight years old the teeth of the lower jaw, forward of the hooks, are all equally worn, and only a trace of the mark is seen in the corner teeth. The edges of the hook teeth are worn down almost half.

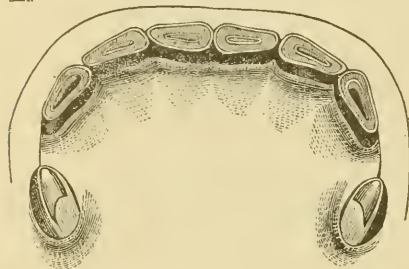


FIG. 18. NINE YEARS.

The upper jaw at nine years old is shown in the above figure. The mark in the corner teeth is comparatively deep and clearly defined; the mark is still visible in the middle teeth; but it has almost entirely disappeared from the nippers, and the inner edge is worn down.

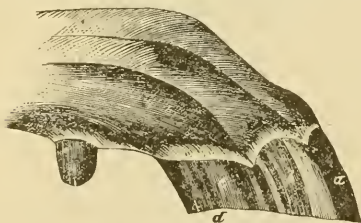


FIG. 19. NINE YEARS.

The upper jaw at nine years old—a side view. *d*, the indentation usually seen in the corner tooth.

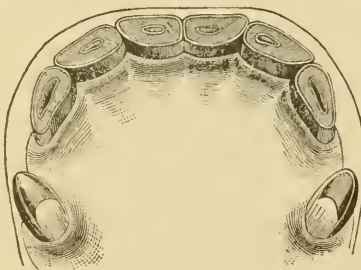


FIG. 20. TEN YEARS.

In the upper jaw at ten years the mark in middle teeth is worn down. The mark in the corner teeth is still visible.

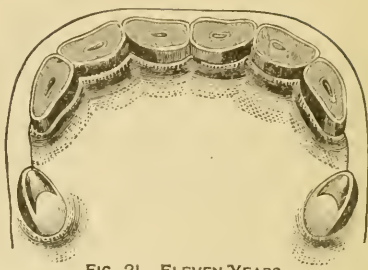


FIG. 21. ELEVEN YEARS.

In the upper jaw at eleven years old the mark of the corner teeth is worn down even with the edges.



FIG. 22. TWELVE YEARS.

Showing the lower jaw at twelve years old. The nippers are round or nearly so—as thick as they are broad. The middle teeth are getting round, and the corner teeth are gaining in thickness by comparison with their breadth.

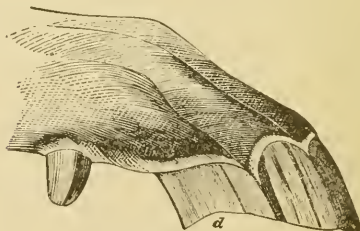


FIG. 23. TWELVE YEARS.

In the upper jaw at twelve years the indentation of corner tooth has become larger and more plainly visible. *d*, the indentation increased in size.

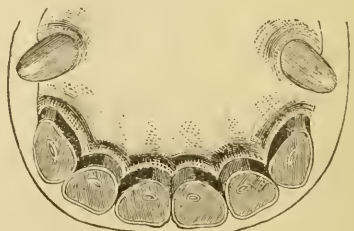


FIG. 24. THIRTEEN YEARS.

The nippers and middle teeth of the lower jaw at thirteen years old are almost perfectly round. Their breadth and thickness are the same. The corner teeth are not yet round, but are fast becoming so. The hook teeth are now blunt.

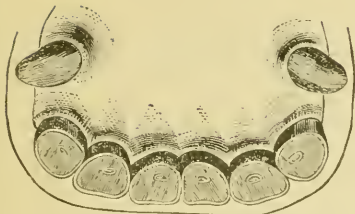


FIG. 25. FOURTEEN YEARS.

The corner teeth of lower jaw have now become round.

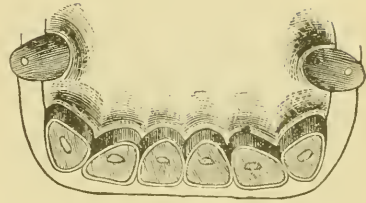


FIG. 29. EIGHTEEN YEARS.

The nippers in the lower jaw are triangular at eighteen years old.

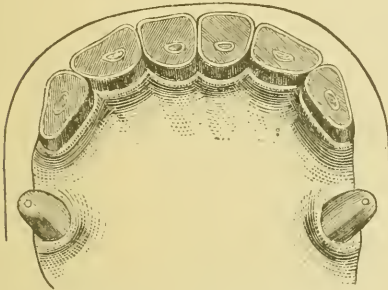


FIG. 26. FIFTEEN YEARS.

The nippers of the upper jaw become round at fifteen years old.



FIG. 30. NINETEEN YEARS.

The middle teeth of the lower jaw are also triangular at nineteen years old.

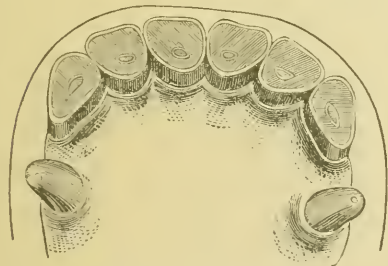


FIG. 27. SIXTEEN YEARS.

The middle teeth of the upper jaw become round at sixteen years old.



FIG. 31. TWENTY YEARS.

In the lower jaw at twenty years old the corner teeth have become triangular.

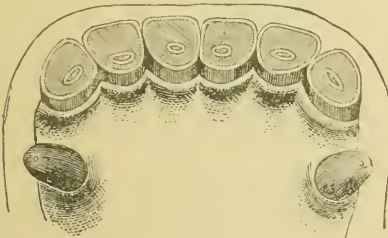


FIG. 28. SEVENTEEN YEARS.

The corner teeth of the upper jaw become round at seventeen years old.



FIG. 32. TWENTY-ONE YEARS.

The nippers of the upper jaw are now triangular.

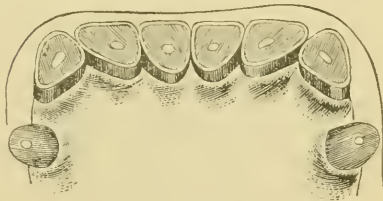


FIG. 33. TWENTY-TWO YEARS.

The middle teeth of the upper jaw become triangular at twenty-two years old.

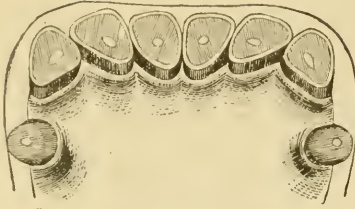


FIG. 34. TWENTY-THREE YEARS.

The corner teeth of the upper jaw assume the triangular form at twenty-three years.



FIG. 38. TWENTY-SEVEN YEARS.

The nippers of the upper jaw have now become twice as thick as they are broad.



FIG. 35. TWENTY-FOUR YEARS.

The nippers of the lower jaw are now twice as thick as they are broad.

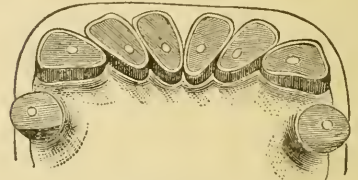


FIG. 39. TWENTY-EIGHT YEARS.

The middle teeth of the upper jaw are twice as thick as they are broad.



FIG. 36. TWENTY-FIVE YEARS.

The middle teeth of the lower jaw are now twice as thick as broad.



FIG. 40. TWENTY-NINE YEARS.

The corner teeth of the upper jaw at twenty-nine years old are twice as thick as they are broad.



FIG. 37. TWENTY-SIX YEARS.

The corner teeth of the lower jaw at twenty-six years are twice as thick as they are broad.

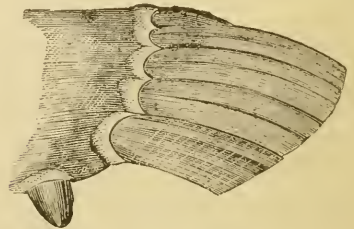


FIG. 41. TWENTY YEARS.

Here we have a tooth of the lower jaw that is twelve lines too long, as shown by the diagram. It has grown up a line each year, but, owing to its position too far forward in the mouth, it has not worn down proportionally. The mark indicates eight years, but we must add twelve for the extra lines—which gives twenty years as the true age of the horse.

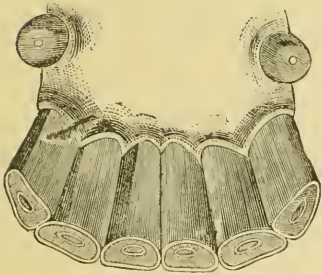


FIG. 42. TWENTY YEARS.

Showing an inside view of the lower jaw at twenty years when the teeth are twelve lines too long. The mark and the friction surface only show eight years' wear.

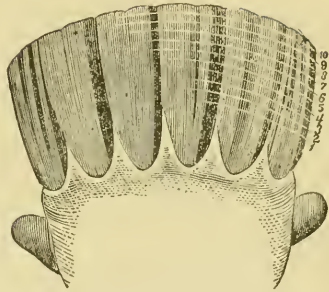


FIG. 45. SIXTEEN YEARS.

Here we have an outside view of a lower jaw at sixteen years, showing teeth ten lines too long.

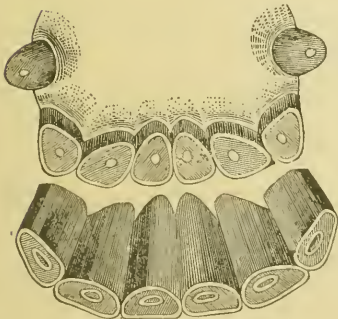


FIG. 43. TWENTY YEARS.

Here the superfluous length of the same teeth is removed, and we have an inside view of the lower jaw, showing the natural wear of a twenty-year-old mouth.

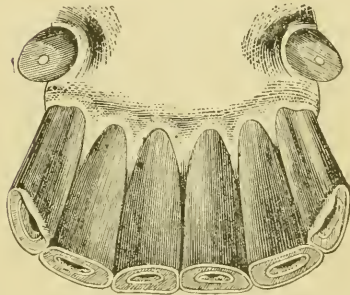


FIG. 46. SIXTEEN YEARS.

This is an inside view of the same jaw in which the mark indicates six years, but, as the teeth are ten lines too long, the true age is sixteen years.

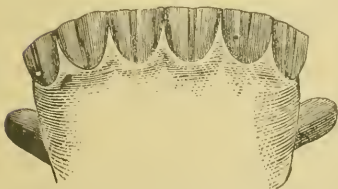


FIG. 44. TWENTY YEARS.

This gives an outside view of the lower jaw, showing the teeth in their proper length at twenty years.



Side view of horse's head, showing the fourth molar of the upper jaw one inch longer than the balance of the teeth and grinding away tooth in lower jaw. Hundreds of horses have elongated teeth and are in need of treatment.

DOSES FOR THE HORSE.

NAME OF DRUG.	DOSE.
Aloes.....	From $\frac{1}{2}$ to 1 ounce.
Alum	“ 2 to 3 drachms.
Anise Seed.....	“ $\frac{1}{2}$ to 2 ounces.
Aqua Ammonia.....	“ 1 to 4 drachms.
Arsenic.....	“ 1 to 5 grains.
Assafœtida.....	“ 1 to 3 drachms.
Bicarbonate of Potash.....	“ 3 to 5 drachms.
Bismuth	“ $\frac{1}{2}$ to 1 ounce.
Black Antimony	“ $\frac{1}{4}$ to $\frac{1}{2}$ drachm.
Blue Vitrol.....	“ $\frac{1}{2}$ to 1 drachm.
Calomel	“ 10 to 40 grains.
Camphor.....	“ $\frac{1}{2}$ to 1 drachm.
Cantharides.....	“ 3 to 6 grains.
Carbolic Acid.....	“
Castor Oil.....	“ $\frac{1}{2}$ to 1 pint.
Cayenne.....	“ 5 to 25 grains.
Chlorate of Potash.....	“ $\frac{1}{2}$ to 2 drachms.
Copperas	“ $\frac{1}{2}$ to $1\frac{1}{2}$ drachms.
Croton Oil.....	“ 10 to 15 drops.
Digitalis Leaf.....	“ 10 to 20 grains.
Epsom Salts.....	“ 2 to 8 ounces.
Ether	“ $\frac{1}{2}$ to 2 ounces.
Fowler's Solution.....	“ 1 to 4 drachms.
Gentian Root.....	“ 1 to 1 drachms.
Ginger	“ 2 to 5 drachms.
Glauber's Salts.....	“ 6 to 12 ounces.
Iodide of Potassium.....	“ $\frac{1}{2}$ to $1\frac{1}{2}$ drachms.
Linseed Oil, Raw.....	“ 1 to 2 pints.
Magnesia	“ $\frac{1}{4}$ to 1 ounce.
Mercurial Ointment.....	“
Nux Vomica.....	“ 15 to 25 grains.
Opium.....	“ $\frac{1}{4}$ to 1 drachm.
Prepared Chalk.....	“ $\frac{1}{2}$ to 1 ounce.
Quinine	“ 15 to 50 grains.
Saltpetre	“ 1 to 3 drachms.

NAME OF DRUG.	DOSE.
Soda Bicarb.....	“ 3 to 8 drachms.
Soda Sulphite.....	“ $\frac{1}{2}$ to 1 ounce.
Solution of Lime.....	“ 4 to 6 ounces.
Spirits of Chloroform.....	“ 1 to 2 ounces.
Strychnia... ..	“ $\frac{1}{2}$ to 1 grain.
Sulphur	“ $\frac{1}{2}$ to 2 ounces.
Sweet Spirits of Nitre.	“ $\frac{1}{2}$ to 1 $\frac{1}{2}$ ounces.
Tannic Acid.....	“ 20 to 40 grains.
Tartar Emetic.....	“ $\frac{1}{8}$ to $\frac{1}{2}$ drachm.
Tincture of Aconite Root.	“ 15 to 35 drops.
Tincture of Cantharides.....	“ 1 to 2 drachms.
Tincture Ergot.....	“ 1 to 2 ounces.
Tincture Iodine.	“ $\frac{1}{2}$ to 1 ounce.
Tincture Iron.....	“ 2 to 4 drachms.
Tincture Nux Vomica.	“ 1 to 2 ounces.
White Vitrol.....	“ 5 to 15 grains.

NOTE.—For a colt one month old, give one-twenty-fourth of the full dose for an adult horse as given above; three months old, one-twelfth; six months old, one-sixth; one year old, one-third; two years old, one-half; three years old, three-fourths.

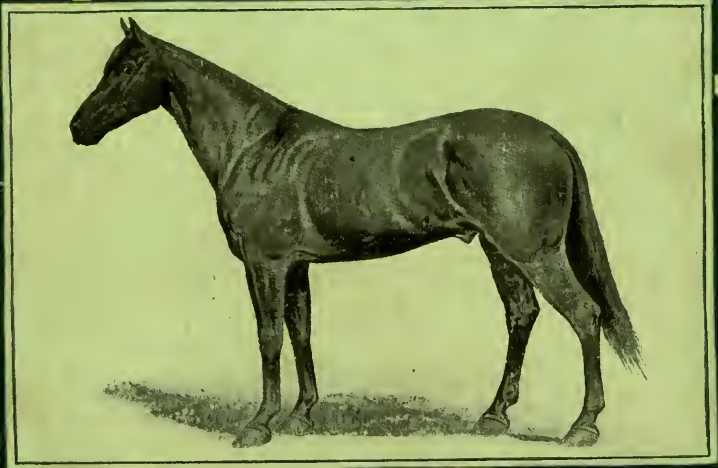
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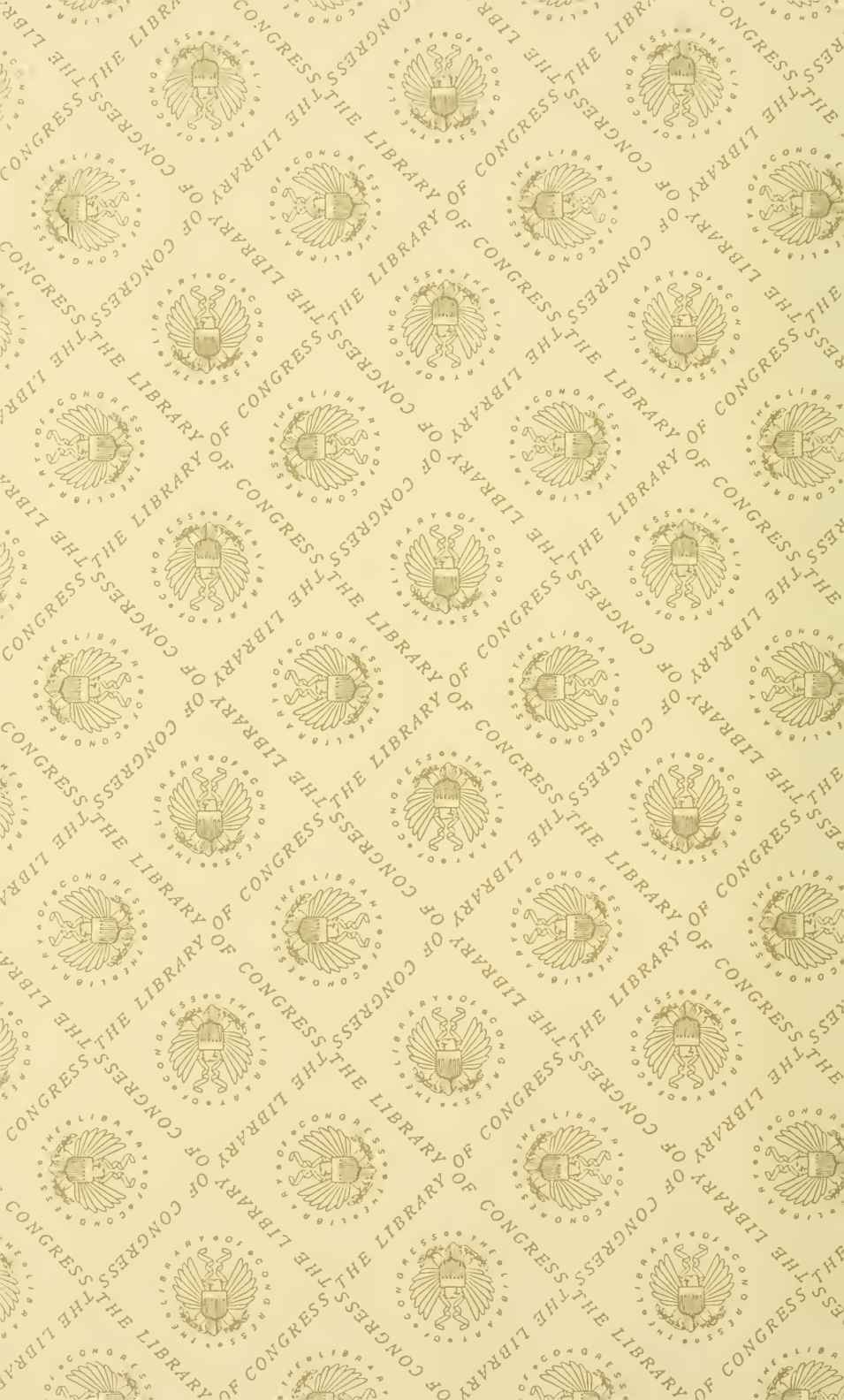
W. A. LEWIS, D.V.S.,

MT. VERNON, OHIO.

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A MODEL LIGHT HORSE WITH PERFECT FEET.



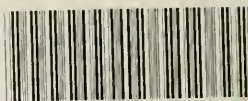


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