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OBSERVATIONS,

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OBSERVATIONS

ON THE

FORMATION AND USES

OF THE

NATURAL FROG OF THE HORSE;

WITH A DESCRIPTION OF

A PATENT ARTIFICIAL FROG,

TO PREVENT AND CURE

CONTRACTED HOOFS, THRUSHES, CANKERS, AND SAND
CRACKS.



BY EDWARD COLEMAN,

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PRINTED FOR THE AUTHOR,

By J. Crowder, Warwick-Square;

AND SOLD AT THE VETERINARY COLLEGE;

AT THE FORGES IN GROSVENOR MEWS, BOND-STREET;

AND LITTLE MOORFIELDS, FINSBURY-SQUARE:

ALSO, BY J. JOHNSON, IN ST. PAUL'S CHURCH-YARD.

1800.

1872

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P R E F A C E.



THE principal object of the present publication, is to give a description of a patent Artificial Frog, and to point out the necessity of its application in the stable to the natural frogs of horses, to prevent and cure contracted hoofs, thrushes, canker, and sand cracks.

But to demonstrate the utility of an artificial frog, it is necessary to describe the structure and functions of the natural frog; and in this description I shall be obliged to borrow some observations from my own work on Shoeing, &c. Unless the structure and functions of the frog of the horse be well understood, it is scarcely possible to know the great importance of pressure to the health of that organ.

If

If it be a fact, that the frog is very generally raised above the surface of the ground, and that the absence of pressure to the frog in the stable is the cause of contracted hoofs, thrushes, canker, and sand cracks, and that the artificial frog is capable of giving any degree of pressure to the natural frogs of all horses, even when shod with the most common shoes, so as to prevent and frequently cure those diseases; then I trust the patent frog will be found an important improvement.

Had it been thought as necessary for the health of the whole foot that the frog should have pressure, as it has been hitherto considered expedient to raise the frog from the ground, then no doubt a very little observation might have suggested the advantages to be derived from an artificial frog.

But the inventive faculties of those who attended to this subject, were employed in a contrary direction and produced a contrary effect. They sought not how to give pressure

pressure to the frog of the horse ; but how to raise it from the ground.

The artificial frogs are sold for three shillings each at the Veterinary College ; also, at the Forges in Grosvenor Mews, Bond-street, and Little Moorfields, Finsbury-square, where they are fitted to the feet of horses without any additional expence.

They are also sold by the Veterinary Surgeons who have quitted the College, and may be had in most of the principal towns in the Kingdom.

OBSERVATIONS, &c.



THE natural Frog of the Horse is placed in the centre of the sole, externally convex, and of a wedge-like form, pointed towards the toe, but expanded as it advances to the heels. In the centre of the broad part there is a fissure, or separation. The frog is connected internally, with another frog, of a similar figure, but different in structure. The external frog is composed of soft elastic horn, and totally insensible. The internal frog has sensation and is much more elastic than the horny frog; and at the extremity of the heels is connected with two elastic substances called cartilages. The toe of the sensible frog is united to the coffin bone; but more than nine tenths of both frogs are behind the coffin bone.

B

bone. The toe of the sensible and horny frogs, from their connexion with the coffin bone, are fixed points, and have no motion; but the heels of the frogs being placed posterior to the coffin bone, and in contact with moveable, elastic, (and not fixed or resisting) substances, a very considerable lever is formed, and whenever the horny frog comes in contact with the ground, it first ascends, and then descends. The pressure of the ground also expands the horny frog, and the sensible frog expands the cartilages, and at the heels and quarters immediately below the hair, totally governs the direction of the future growth of the crust.

This ascent of the frog, not only by its wedge-like form preserves the heels and quarters from contraction, but affords to the horse an elastic spring, and prevents the animal from slipping whenever it embraces the ground. Without any anatomical enquiry into its internal structure and union with other parts, the shape and convexity of the horny frog clearly demonstrates that it was formed to come into contact with the ground.

We cannot suppose that the all-wise Creator would have made an organ, much exposed to
injury,

injury, without making its structure adequate to its function. Animals destined for a cold climate are provided with a much warmer covering than animals in a higher temperature: the eye is admirably constructed for receiving light; the ear for the vibrations of sound; and every organ, in every animal, is beautifully formed to answer its peculiar use. Shall we then doubt that the frog is made with the same degree of wisdom as other organs? Shall we not conclude that it was intended to receive pressure, since its convexity must make it liable to touch the ground at every step? The more I investigate this subject, the more I am convinced that the use of the frog is to prevent the horse from slipping, to preserve the cartilages and hoof expanded, and, by its motion, to act as an elastic spring to the animal.

Mr. Saintbel, and many others were of opinion, that the use of the frog, is, to serve as a cushion, or guard to the tendon of the flexor muscle of the foot. Where this opinion prevails, it is very natural to conclude, that art should endeavour to raise the frog from the ground, by a thick heel'd shoe, in order to guard the tendon from bruises. But, if it be

a truth that this projecting body was intended to receive the pressure of the ground, then it will follow, as a law of nature, *that unless the frog performs its functions, it must become diseased.*

The human legs are formed to move and support the weight of the body; but if they are kept in a horizontal posture, in a state of rest, the whole machine will soon become enfeebled and diseased. The horse is an animal intended for active life, but if he is suffered to remain without motion, not only his legs but his whole system becomes affected. Indeed, common observation clearly proves, that no animal, or any part of any animal, where the natural functions are perverted, can be preserved in health. If the real œconomy of the frog had been equally well understood, it would have been thought as necessary, for the health of that organ, that it should receive pressure, as we know it to be important for the health of the horse to have motion.

It is therefore as great an act of violence to the frog, to raise it from the ground, and must as necessarily produce disease, as to deprive muscles of action. That the frog was not made to defend the tendon, can be demonstrated. There is no medical man, acquainted

quainted with the structure and œconomy of tendons, but must be convinced, that the frogs of horses are formed for other functions. It has been proved by experiment, that the substance of tendons *in health* has no sensation; and, consequently, that one insensible body (*viz.* the frog) cannot have been made for the purpose of protecting an organ void of feeling. Again, the frog, being made of a wedge-like form, a great part of the tendon is not covered by the frog, and more than one half of it projects behind the tendon. If the frog had been made to act as a cushion, to save the tendon, then its shape and magnitude would have been exactly equal to the tendons.

The practice of shoeing very much depends on the functions of the frog being understood. If the opinions here advanced respecting its uses, be well founded, then it must follow, that paring the frog, and raising it from the ground annihilates its functions, and ultimately, if not immediately, produces disease; and that exposing the frog to pressure, is the only proper method to keep it in health. Moreover, it has from experience been ascertained, that unless the frog sustain an uniform pressure, *when at rest*, the heels as well as the frog contract,

tract, but if that organ be in close contact with the ground, then it spreads and is free from thrushes and canker, and operates as a wedge to keep open the heels of the hoof.

The same degree of perpendicular pressure* applied to the insensible frog, that produces only pleasant sensation to the sensible frog when in health, creates exquisite pain when diseased. It is therefore of great importance to preserve the frog sound, for when contracted or cut, or inflamed, it becomes highly susceptible of every impression; we might with as much wisdom contract the shoe of the human subject, or remove the skin of the foot, when obliged to walk on stones without shoes.

Granite and other hard substances, give no pain to a frog exposed to constant pressure *in the stable*; but when above the pavement, it generally becomes *contracted*, and the sensible frog inflamed, and then one stroke from a projecting stone, will produce pain, perhaps lameness, while perpetual perpendicular pressure is attended with salutary effects.

Those who conceive, that the frog was not made to come in contact with the ground,
and

* By perpendicular pressure, I mean that pressure the frog meets with from the ground, and not the lateral pressure of a contracted hoof.

and with that view cut the frog, to diminish its convexity, and employ high heeled shoes for its protection, would do well to consider, whether their practice is in truth conformable to their own principles. If it be true, that no shoe, however high at the heel, applied to any hoof, can prevent the frog from *occasional pressure*, then it must follow, that the practice and principles do not agree; and it is obvious, that no frog is totally exempt from pressure, even if the shoe be turned up two inches at the heels.

Where the roads are covered with a convex pavement, or with loose stones, the frog is liable to be struck by every stone that exceeds the thickness of the shoe; and in other situations, where there are no stones, the cavity of the shoe is filled with earth; so that the frog, when the horse moves, is exposed to unequal surfaces, and consequently receives frequent pressure. It therefore becomes a question, whether repeated blows on a part that has been raised, on the average, five-sixths of the twenty-four hours above the ground of the stable, and from the absence of pressure made very susceptible of impression, will not produce more pain, and more disease, than constant and uniform pressure.

When a sharp stone comes in contact with a soft and thin frog, horses are liable to fall. It may therefore be imagined, that if a horse feels pain from the pressure of one blow, great mischief must ensue, when the same cause is many times repeated; and that the effect or disease must increase in proportion to the cause. But it has not been considered, that in consequence of always standing on the frogs on hard surfaces, in the stable, these organs retain their natural insensibility and elasticity, and resist even the hardest bodies without the least irritation. Do we not see that the skin of the palms of hands of smiths and watermen, become thickened and callous, and feel no inconvenience from substances that would absolutely blister a hand, in the habit of wearing gloves? And, is it not a fact, that the sole of the human foot is equally void of feeling, with those persons who are accustomed to walk without shoes? A man obliged to travel on sharp stones would not think it prudent to lay up his legs, and give the soles of his feet no pressure within doors. If the hoof of the horse was always exposed to natural air and moisture, and the frog to irregular surfaces, the form of the shoe would be of less consequence. But as in the stable the frog is very generally raised above the
ground,

ground, the artificial heat tends powerfully to contract the heels of the hoof. When the hoof contracts, the frog must also become contracted, and inflammation and a suppuration follows, called a Thrush. No contraction, however, takes place, where the frog is made to receive constant pressure, as the standing perpetually on that wedge encreases its growth, presses upward the sensible frog, and expands the cartilages of the hoof. And as the first shoot of the crust at the coronet is very thin, the direction of its fibres will be altogether regulated by the width of the cartilages immediately below the hair at the quarters and heels, and the cartilages will be always more or less expanded, and the hoof more or less circular, as the frog has more or less pressure.

On that principle I long since recommended a shoe with thin heels, as the best formed shoe to bring the frog on the same level; and with great truth I can assert, that, although in some instances, from a sudden misapplication of the thin heel'd shoe to improper feet, I have seen the tendons affected, yet from all the experience I have since had, and from all that I have seen or heard of the practice of others, I know of no instance where *the frog*, from constant pressure, did not expand

pand and receive great benefit. Neither is it true, as has been asserted, that the frogs of horses, from the pressure of the ground, are made *inelastic*, and incapable of motion. It is as totally contrary to the invariable laws of nature, that an organ should, *in consequence of performing its natural functions* become diseased; as it is an invariable principle, that an organ deprived of its functions cannot continue in health. I have particularly examined the structure of many hundred frogs, in hoofs shod with various shoes, and I have uniformly found, that in proportion as the foot is *contracted*, it becomes hot and inflamed; and if the frog be not destroyed by thrushes or canker, it is *brittle* and *inelastic*. But where the frog has been constantly on a level with the heels, whatever may have been the form of the shoe, or without shoes, the hoof remains circular, and the natural form and elastic structure of the frog is preserved.

The inelastic quality therefore of the frog, so far from taking place in consequence of the pressure of the ground, proceeds wholly from contraction, and contraction from the want of perpendicular pressure.

Where the frog constantly meets the ground in the stable, the heels are open, and the
frog

frog elastic, expanded and healthy ; but where the cavity of the horny frog is contracted, the sensible frog is violently squeezed, and becomes hot and inflamed, and from this heat the horn is dry and inelastic.

Those who from false kindness raise the frog from the ground, to prevent pressure, will probably be surpris'd at the assertion, that the sensible frog suffers most pain and most pressure when most raised from the ground.

It is, nevertheless, literally true ; for in proportion as the frog is free from perpendicular pressure, the heels of the hoof contract ; and, as the hoof contracts, the frog also becomes contracted ; and, in proportion to the degree of contraction, the sides of the sensible frog, without any respite, must receive lateral pressure from the sides of the horny frog. Perpendicular pressure is natural both to the horny and sensible frogs, and the ascent of those organs prevents concussion and preserves them in health. But nature has made no provision for permanent unnatural pressure, produced by a contraction of the cavity of the horny frog, and it has certainly not been considered that the frog suffers the greatest violence and more pressure, when raised from, than when in contact with, the ground.

Where

Where the frog is in a morbid state, and unnaturally deprived of perpendicular pressure, it is seldom safe to lower the heels at once, so as to make the frog on a level with the shoe; and, in many cases, it is not possible with any shoes, or even without shoes, to give the frog pressure on smooth surfaces; much less is it practicable for the frog to rest on the ground when shod with common thick-heeled shoes. In the stable, therefore, while at rest, the frog is generally raised above the shoe, and as pressure is essential to its health, particularly when the hoof is exposed to heat, it appeared to me of great importance, in all cases where the heels of the shoe and the frog cannot with safety be made on the same level, to apply *an artificial frog*, to fit and give any degree of pressure, in the stable, to the natural frog, with any shoes. With that view, I first employed plaster of Paris, but from its tender texture, that application was found to fail, and Mr. Rickword, a very intelligent pupil of the college, proposed to employ leather, and to connect it with the shoe by strings. This plan also did not succeed, but I think it a duty due to Mr. Rickword, to mention, that in the construction of the artificial frog, I have received considerable assistance from his attention and ingenuity.

ingenuity. While the horse is in motion, and the hoof exposed to unequal surfaces, the artificial frog should be removed, as the natural frog, out of the stable, will receive frequent pressure with any shoes; but that period is of short duration, when compared to the length of time the horse remains at rest, and the frog raised from the ground.

Artificial pressure is most particularly wanted when the heat of the stable operates powerfully to contract the hoof. *In all cases, therefore, where the pavement of the stable does not touch the natural frog, an artificial frog is necessary to resist contraction of the hoof, thrushes, and canker.* Sand-cracks, also, very generally arise from a contracted hoof, and may be prevented by the artificial frog.

If the frog does not absolutely rest on the pavement, whatever shoes are employed, the hoof in the stable will be as much disposed to contract, as if the frog was raised any greater distance. I wish this fact to be well considered; for it has been supposed that shoes with a flat seat, without pressure to the frog, will prevent contraction. But I am fully convinced that neither thick nor thin heeled shoes, *where the frog is raised above pressure, and exposed to the heat of the stable,* can prevent contraction.

contraction, or its effects; and where the frog receives that pressure, the heels cannot contract even with the most common shoes. For very obvious mechanical reasons, a wedge in the centre of the heels, aided by the pressure from below, must be best calculated to preserve them expanded, or when the heels are contracted, to force them open. The heat of the stable in all cases tends to contraction of the hoof: but with common shoes there is no pressure on the wedge, or other cause to counteract that tendency. The artificial frog, which is intended to cover and give any degree of pressure to the natural frog only, is made of iron. In order to fit the natural frog, it is requisite to ascertain its width, the length of the foot, and the distance between the lower surface of the shoe and the frog. But if the artificial frog be too long, the toe, which is flat and thin, may be shortened; and if the heels of the shoe are higher than the artificial frog, nothing more is requisite than to introduce a quantity of tow between the natural and artificial frog, so as to raise it equal or above the level of the shoe. I have ascertained by experience, that no inconvenience takes place by raising the artificial frog even one quarter of an inch above the shoe; but in ordinary cases, it should not

project

project more than one sixth of an inch above the surface of the shoe. It may, however, be imagined, that so much perpendicular pressure to the frog would *retard rather than increase its growth*. But the very reverse is the fact: for as the frog, when long elevated above the ground, is very generally contracted, this unnatural lateral pressure excites inflammation of the sensible frog, and deprives in a great degree the blood vessels of the power of secreting horn. When the horny frog is exposed to perpendicular pressure, it gives health, and not disease, to the sensible frog. The blood vessels secrete their due proportion of elastic horn, and then the cavity of the frog is preserved, expanded, and fully equal to contain the sensible frog, without the smallest degree of lateral pressure.

It therefore follows, that perpendicular pressure encreases the bulk of the frog; while its absence from the ground produces contraction, and lessens its growth.

Neither is this fact in any respect peculiar to the frog of the horse. The cuticle, or outer skin of the human feet and hands, always grows in proportion to the quantity of pressure. These parts grow from within outwards, and the blood vessels will be stimulated to secrete
more

more or less horn, or more or less skin, as they receive pressure.

The vessels of the skin of the hand, or of the sensible frog of the horse; that have but little pressure, will produce only a very thin and delicate covering. Give more pressure, and nature will furnish an adequate quantity of insensible matter to protect those parts from injury. The toe of the artificial frog is intended to be inserted under the toe of the shoe. This effectually fixes the frog forwards, and to prevent backward or lateral motion, an irregular groove is made in the iron frog, to receive a corresponding piece of steel, placed under the heels of the shoe. In general it is necessary to fix the frog more firmly, and, for that purpose, a hole is necessary, made in the heel of the artificial frog, to receive a strap, and to buckle at the outside quarter below the coronet. And that the artificial frog may give pressure in all cases with shoes thickened, or turned up for hunting or frost, a variety of frogs are made, to be adapted to particular feet and particular shoes. In cases of thrushes and canker of the frog, where no remedies without pressure are likely to be serviceable, an astringent thrush powder may be applied between the natural and artificial frog. And in contracted hoofs; (or what has improperly been termed chest foundered,)

foundered,) where it may not be advisable to lower the heels equal with the horny frog, the artificial frog is essentially necessary.—But indeed in every horse where the shoe and frog on a smooth surface are not on the same level, whatever shoes may be used, the iron frog in the stable should be applied, and in order to fix it with facility, the spring should first be **P**laced under the shoe and brought backward to the heels of the hoof.

The toe of the iron frog should then be inserted under the centre of the spring, and pushed as far as the toe of the shoe, while the other hand confines the spring until the centre of the spring meets the centre of the groove. The strap may then be buckled. And to dislodge the spring and iron frog, after the strap is unbuckled, nothing more is requisite than a *small* horse picker, introduced into a hole at the bottom of the groove of the iron frog; and the spring being raised above the groove and carried gently forward, the frog may be withdrawn from under the shoe without the smallest difficulty.

It may be proper to add, that there is no cause of lameness from common shoeing so frequent as contraction of the hoof and frog, and as those diseases are productive of violent pain to the animal, it must afford great satisfaction

to the mind of every humane man to be informed, that by the assistance of a simple machine, that perpetual torment under which sooner or later most of the horses of this country labor, may be effectually prevented. A shoe too small for the human foot gives considerable pain, even when worn for a short period, but the hoof of the horse when the frog has no perpendicular pressure, every day becomes more and more contracted, and gives more and more lateral pressure to the sensible parts of the foot, and with this permanent pain the horse is frequently obliged to support additional weights. Perpendicular pressure on the frog, preserves not only the frog, but the whole hoof of the same form as it comes from the hands of the Creator. Nevertheless there are many persons who doubt the good effects of thin heel'd shoes, or of bringing the frog in any case on the same level with the shoes. But since my publication on the foot of the horse, longer experience has not altered, but confirmed my opinion on that subject ; and under the circumstances and precautions already pointed out in that work, I do not believe it possible for my judgment to waver.—I beg therefore to be clearly understood, *that in all cases where the frog and the heels*

heels of the shoe are placed on the same level, the patent frog is unnecessary. But where the frog is small, or the pattern joint long, or the action of the animal high, or the heels low, so as to render the application of thin heel'd shoes improper, or when the frog from any cause is raised above the ground in the stable, an artificial frog is useful in all such cases, and necessary to resist contraction of the hoof. But if thin heel'd shoes were productive of mischief, or if my opinion had misled me to recommend in all cases thick shoes to protect the frog from injury, still my present opinion, as to the necessity of giving pressure to the frog *in the stable*, when at rest and exposed to heat, would still be the same. Whatever may be the thickness of the shoe, there are stones still thicker, and to enable the frog when in motion to bear such pressure without pain or mischief, and to resist the influence of heat, and to keep the hoof and frog expanded, perpendicular pressure to the frog in the stable must be always beneficial. To raise the frog from pressure when *at rest*, and yet to expose it to sharp and hard bodies when combined with force and constant action, must be obviously destructive to the œconomy of the whole foot, and to the sensible parts in particular.

It therefore follows, that whether it be proper or improper for the frog to touch the ground while in motion, no one with any propriety can doubt the necessity of giving pressure to the frog when at perfect rest and exposed to artificial heat.

EXPLANATION

OF

THE PLATES.



FIGURE THE FIRST.

A view of the natural hoof of the Horse, of a circular shape.

- a a a* The external surface of the sole of a concave form.
- b b b* The inferior edge of the crust.
- c c* The junction of the bars with the crust.
- d d* The points of the bars.
- e e* The sole between the heels of the crust and bars, the seat of corns.
- f f* Two cavities between the sides of the bars and the sides of the crust.
- g* The toe of the frog.
- h h* The heels of the frog.
- i i* The cleft between the heels of the frog, the seat of thrushes.

FIGURE THE SECOND.

A view of the hoof with contracted heels, produced by raising the frog above the pressure of the pavement in the stable,

- a a a* The sole.
b b The original seat of the bars, but improperly removed by the farrier.
c c The original seat of the cavities between the bars and crust, but now from contraction a solid horn.
d d The heels of the frog very much compressed, by the contraction of the hoof.
e e The width of the hoof at the heel, not being more than one half of the length from *f* to *g*.
f The extremity of the heels of the frog.
g The toe of the crust.

FIGURE THE THIRD.

A view of the patent frog, made of cast and wrought iron.

- a a* The lower surface opposite the ground, formed of cast iron.
b An irregular cavity for the reception of an elastic spring. Fig. iv.*
c The

* In the fore part of this cavity there is an opening for the point of a picker to remove the spring, but which has been omitted in the plate of outlines.

- c* The toe of the patent frog, formed of wrought iron, to be occasionally shortened and adapted to the length of the foot, and placed under the toe of the shoe to confine the artificial frog from moving forwards.
- d d* A hole in the heels of the iron frog, for the passage of a strap to buckle at the outside quarter or coronet.

FIGURE THE FOURTH.

A view of a flat steel spring to fix the artificial frog.

- a* An irregular projection, to be received into a corresponding concavity in the patent frog.
- b b* The ends of the spring, to be placed under the heel's of the shoe opposite *c e*, in Fig. 1.

FINIS.

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Fig. IV.



Fig. II.

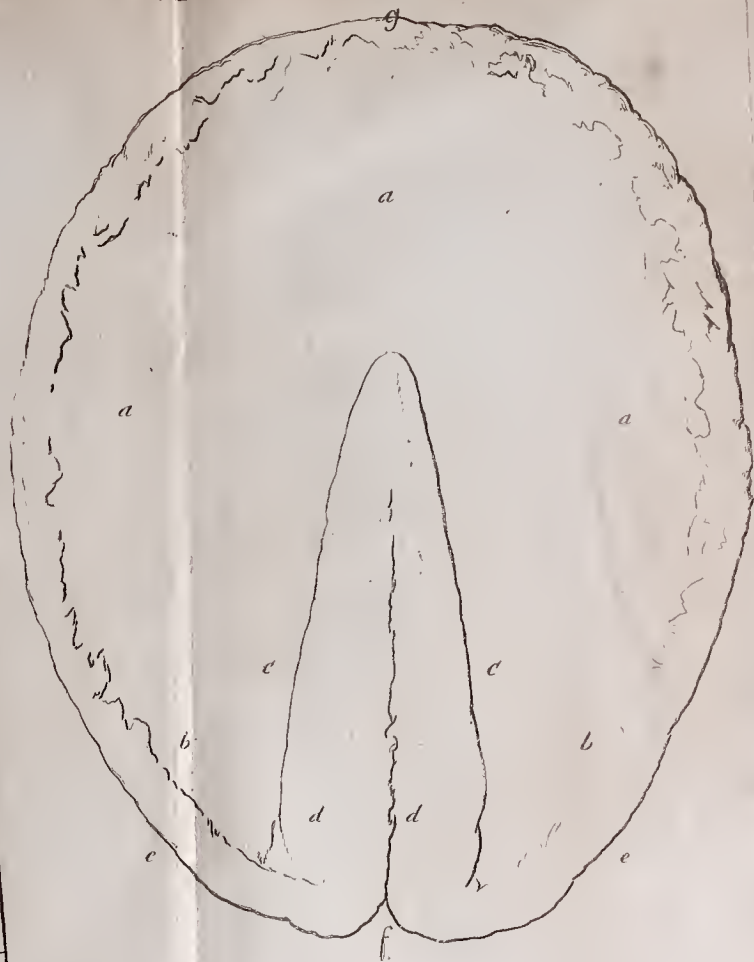
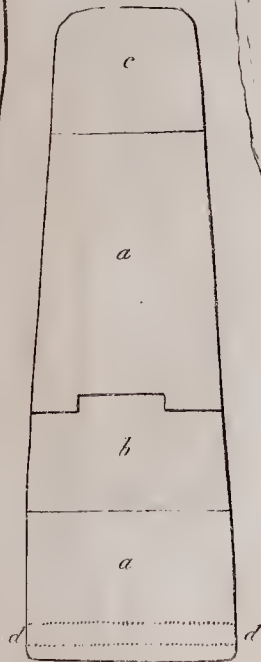


Fig. I.



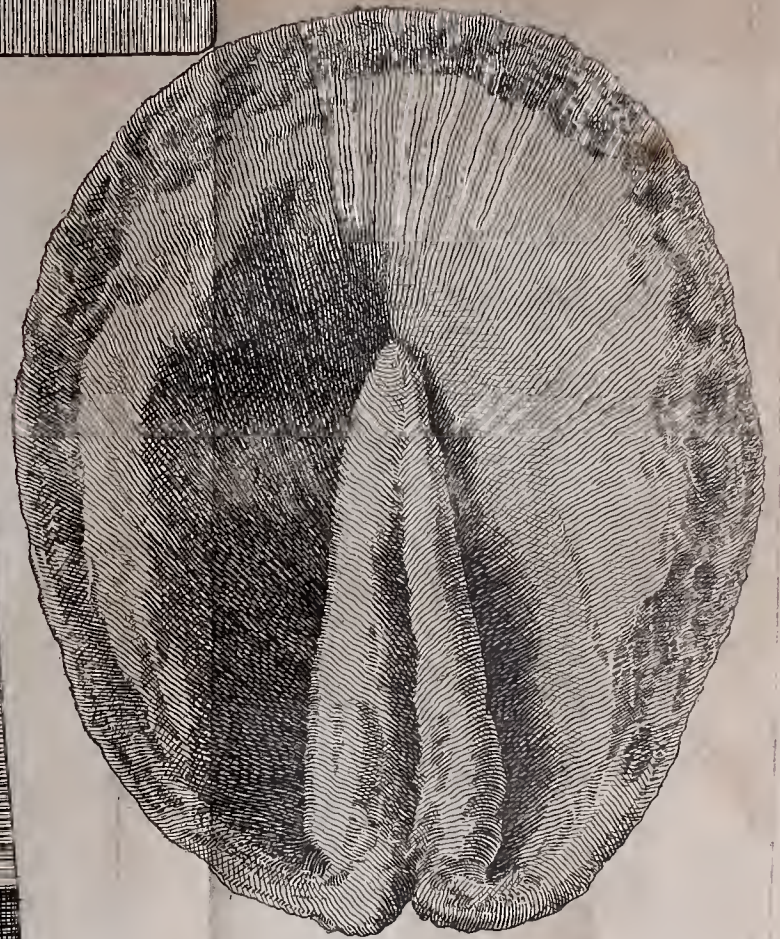
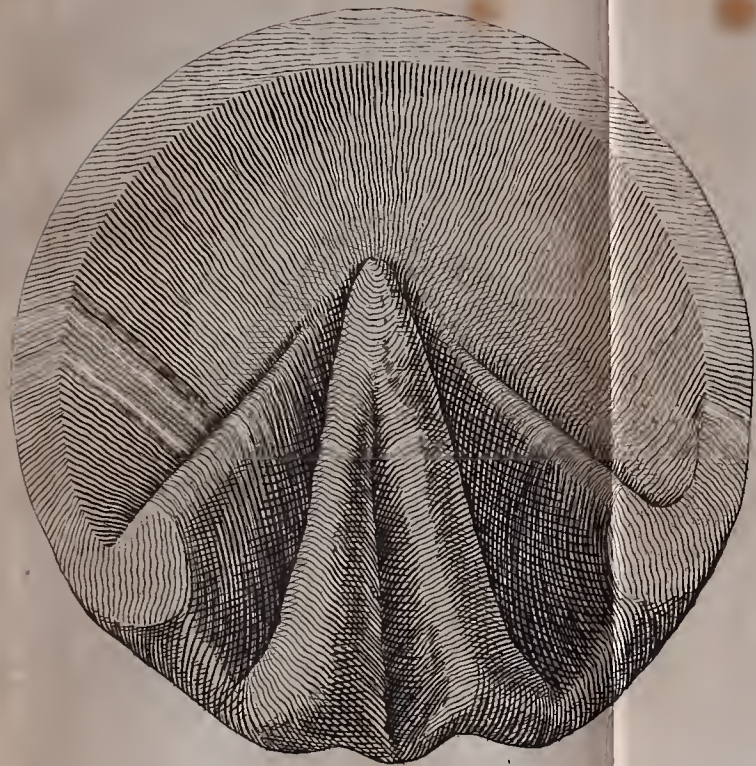
Fig. III.





A Perfect Foot.

A Contracted Foot.



Kirtland Pinx. et Sculp.

London Publish'd as the Act directs by E. Coleman, Professor of the Veterinary College 1800.

