NOTES
ON
SHOEING HORSES

LIEUT.-COL. FITZWYGRAM

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BY
LIEUT.-COL. FITZWYGRAM,
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CONTENTS.

CHAPTER I.

OF THE STRUCTURE OF THE FOOT.

PARA.	PAGE
1. Reason of the need of Shoeing - - - -	1
2. Preservation of the Crust or Outer Wall of the Foot -	2
3. Remuneration to Farriers for Good Workmanship -	<i>ib.</i>
4. Structure of the Foot - - - - -	3
5. Of the Crust or External Wall of the Foot - -	<i>ib.</i>
6. Structure of the Crust - - - - -	4
7. Effect of Rasping the Crust - - - - -	7
8. Moisture of the Crust not Restored - - - -	<i>ib.</i>
9. Crust not to be Rasped - - - - -	9
10. Crust to be Lowered - - - - -	<i>ib.</i>
11. Lowering <i>v.</i> Rasping the Crust - - - -	10
12. Illustration of the Effects of Rasping - - -	<i>ib.</i>
13. Of Crusts, which do not need to be Lowered -	11
14. Increased Growth at the Toe - - - -	<i>ib.</i>
15. Increased Growth sometimes found at the Heels -	12
16. Of Rounding the Lower Edge of the Crust - -	13
17. Structure of the Sole - - - - -	14
18. Illustration of the Structure of the Sole - -	16
19. Sole not to be Pared out - - - - -	<i>ib.</i>
20. Fallacy of the Sole accumulating or becoming Hard -	17
21. Stopping the Feet - - - - -	18
22. Leather - - - - -	19
23. Tar - - - - -	20
24. Structure of the Frog - - - - -	<i>ib.</i>

PARA.	PAGE
25. Functions of the Frog - - - - -	21
26. Frog not to be Pared - - - - -	22
27. The Bars - - - - -	23
28. Seat of Corn - - - - -	24
29. Opening of the Heels - - - - -	25

CHAPTER II.

OF SHOEING.

30. Practice of Shoeing - - - - -	27
31. Removal of the Old Shoes - - - - -	<i>ib.</i>
32. Width of the Shoe - - - - -	<i>ib.</i>
33. Fitting of the Shoe - - - - -	29
34. Length of the Shoe - - - - -	30
35. Thickness of the Shoe - - - - -	31
36. Weight and Wear to be evenly distributed over the Shoe -	<i>ib.</i>
37. Form of the Toe of the Fore Shoe - - - - -	32
38. Stumbling and its Remedies - - - - -	33
39. Action of the Fore Leg - - - - -	35
40. Mr. Hallen's System of Shoeing - - - - -	<i>ib.</i>
41. Evils occasioned by Straight Toes - - - - -	37
42. Toes of the Unshod Colt - - - - -	39
43. Objections to Turned-up Shoes - - - - -	40
44. Of Making Turned-up Shoes - - - - -	41
45. Of the degree of Turn-up required - - - - -	43
46. Lightness of Turned-up Shoes - - - - -	<i>ib.</i>
47. Ordinary Remedy for Wear at the Toes - - - - -	44
48. Clips not required at the Toe - - - - -	<i>ib.</i>
49. Of Farriers - - - - -	<i>ib.</i>
50. Of Nails - - - - -	45
51. Nails to be frequently Examined by the Farrier - - - - -	46
52. Position of Nails - - - - -	47
53. Form of Nails - - - - -	48
54. Form and Position of Nail-holes - - - - -	50

CONTENTS.

vii

PARA.	PAGE
55. Counter-sunk Nail-holes - - - - -	51
56. Holes for Rose-headed Nails - - - - -	<i>ib.</i>
57. Nail-heads not to Project below the Shoes - - - - -	51
58. Of Clenches - - - - -	52
59. Of Removing Shoes - - - - -	53
60. Importance of Nails and Nailing - - - - -	<i>ib.</i>
61. Of Fullered Shoes - - - - -	<i>ib.</i>
62. Flat and Concave Shoes - - - - -	54
63. Hind Shoes - - - - -	56
64. Hind Feet less Liable to Disease - - - - -	57
65. Importance of the Subject - - - - -	58

CHAPTER III.

OF THE DISEASES AND MALFORMATIONS OF THE FEET.

66. Punctures of the Sole, Pricking, and Picking up Nails— Punctures of the Frog - - - - -	61
67. Nail Bound - - - - -	64
68. Corns - - - - -	<i>ib.</i>
69. Quittor - - - - -	68
70. Sanderacks - - - - -	71
71. False Quarter - - - - -	73
72. Small Feet - - - - -	75
73. Contracted Feet - - - - -	76
74. Tips - - - - -	80
75. Thrush or Frush - - - - -	83
76. Canker - - - - -	87
77. Navicular Disease - - - - -	<i>ib.</i>
78. Sprains as affected by Shoeing. Of the Flexors, Suspensory Ligaments, and Extensor Tendons - - - - -	91
79. Laminitis or Fever in the Feet - - - - -	93
80. Seedy Toe - - - - -	100
81. Clicking or Forging - - - - -	101

PARA.	PAGE
82. Brushing, Cutting, or Interfering - - - - -	103
83. Over-reach - - - - -	107
84. Treads - - - - -	108
85. Speedy-cut - - - - -	109
86. Straight Pasterns - - - - -	110
87. Windgalls - - - - -	<i>ib.</i>
88. Ringbone - - - - -	111
89. Side-bones or Ossified Lateral Cartilages - - -	112
90. Injuries Behind - - - - -	113
91. Calkins - - - - -	114
92. Spavin - - - - -	115
93. Curb - - - - -	<i>ib.</i>
94. Thoroughpin - - - - -	116
95. Shoes to be Level - - - - -	117
96. Shape of the Foot - - - - -	<i>ib.</i>
97. Expansion of the Foot - - - - -	119
98. Elasticity of the Heels - - - - -	121
99. Feet to be Pairs - - - - -	<i>ib.</i>
100. Suspected Lameness in the Foot - - - - -	<i>ib.</i>
101. Of Blistering round the Coronet - - - - -	122
102. Directions for Shoeing ordinary Fore Feet - -	<i>ib.</i>
103. Directions for Shoeing ordinary Hind Feet - -	125
104. To shoe a Troublesome Horse - - - - -	126
105. Conclusion - - - - -	127

NOTES ON SHOEING OF HORSES.

CHAPTER I.

OF THE STRUCTURE OF THE FOOT.*

1. THE OBJECT of shoeing is to preserve the horse's foot from undue wear. Reason of the need of shoeing.

Without artificial protection, hard work on our hard roads would wear away the horn quicker than nature supplies it, and injury to the foot would be the result.

THE ART of good shoeing is to afford the necessary protection with the least possible damage to the structure, or interference with the functions of the foot.

To keep the foot sound and healthy when shod, we must aim at preserving it as nearly as possible in a natural state.

* The plates, intended to illustrate the description of the structure of the foot, will be found at the end.

Preservation of the crust or outer wall of the foot.

2. The preservation of the crust, or outer wall of the foot, is the primary essential in good shoeing. All else is subsidiary to this, although many other points are of great importance.

Whether or not the reader may think proper to adopt the particular form of shoes which will be hereafter advocated, is comparatively immaterial. The preservation of the foot is of equal importance, whatever be the form of shoe adopted.

Remuneration to farriers for good workmanship.

3. The preservation of the crust, or outer wall of the foot, involves the mechanical difficulty of fitting the shoe to the foot.

The farrier will probably assent readily enough to the principle that the shoe ought to be fitted to the foot, and not the foot to the shoe; but it is not easy to get him to carry out this principle in his practice, because the proper and accurate fitting of the shoe to the foot is a matter both of time and trouble, especially to an indifferent workman.

It will well repay any owner of horses to encourage good and accurate workmanship on the part of his farrier by giving him some slight extra remuneration for his extra trouble.

When, however, a farrier has once acquired the necessary skill, and has by a few months' care and attention got sound firm crusts to deal with, he will shoe his horses properly in as little time as other men can shoe in the ordinary careless manner.

4. The external foot of the horse is mainly made up of three parts, viz. : Structure of the foot.

1st. The crust, or outer horny wall.

2nd. The sole, or concave ground surface.

3rd. The frog, or elastic pad, or cushion at the back.

Each of these parts differ in structure and uses ; and each may be divided as follows :—

1st. The crust, into the external portion which is commonly called the hoof ; and the internal, or laminated structure, which connects the sensitive with the insensitive parts of the foot.

2ndly. The sole, into the insensitive, or ground surface ; and the sensitive portion lying immediately above it, and from which the insensitive is secreted.

And 3rdly. The frog, into the insensitive, or ground surface ; and the sensitive portion lying immediately above it, and from which the insensitive is secreted.

5. The crust, or wall of the outer circumference of the foot, sustains nearly the whole weight of the horse. In the shod horse, as horses are usually shod, it may be assumed to sustain the whole weight. Of the crust or external wall of the foot.

The crust varies in thickness in different parts of the foot, and also in different horses. It is thickest at the toe, and thinner on the inside than on the outside quarter. It is rarely more than half an inch thick at any part.

The crust, at best, is very thin, in comparison with the great weight of 12 to 15 cwt., which it has to sustain. It is very easy, therefore, to conceive how important it must be to preserve it whole and uninjured, and to understand how much harm results from even a little thinning or rasping.

It is true that the crust is constantly growing down from the coronet, but to form an entirely new crust requires six or seven months, during which period, under the ordinary system of shoeing, it may have been rasped some six or seven times, whilst the lower part, on which the shoe immediately rests, and into which the nails are driven, having been longest in growing, will also have been rasped the most.

But the mere diminution of the thickness of the crust, though in itself undoubtedly a serious evil, represents but a very small portion of the mischief caused by rasping. This will become more apparent when the structure of the crust is understood.

Structure
of the crust.

6. The crust, or outer wall of the foot, is secreted by the protuberant band of thickened vascular skin, extending for about a finger's breadth above the hoof, and grows down from it in longitudinal fibres. The secreting substance is called the coronary band.

The crust is attached to the interior of the foot by the sensitive and insensitive laminae, which dovetail into each other.

The sensitive laminae are expansions and continuations of the fibrous periosteum of the coffin-bone; they are tough, white, and abundantly supplied with bloodvessels, which shine through their semi-transparent structure, and give to them a bright pink tinge.

The insensitive, or horny laminae, are secreted in part from the sensitive laminae, and in part from the coronary band.

The fibres, of which the crust consists, are each of considerable substance. They are placed at an angle of about 45° to the ground, with their lower ends resting on it. Each fibre of the crust, if magnified, will be found to be a hollow tube. This tube at its upper end is organized, or in other words is a living substance, and its interior is filled with an oily material.

But the fibres, though organized at their upper ends and perhaps through three-fourths of their length, gradually lose their organic structure as they descend, and earthy materials only are found in their lower ends.

Between each of the fibres or tubes composing the crust is an oily adhesive material, which cements them together. This oily material is derived partly from the coronary band and partly from the sensitive laminae.

To the presence of the oily material contained in its fibres and deposited around them, the crust owes

its toughness, and without it quickly becomes dry, hard, and brittle.

Over the whole exterior of the crust is laid a gluey superficial layer, by which this oily material is preserved from exudation. So long as this outer layer is maintained uninjured, the crust retains its moisture, toughness, and strength.

The crust from its structure is well calculated to sustain weight. Its fibres are each of considerable substance; their strength is greatly augmented by being closely cemented together; the cement, which binds them together, is protected from evaporation by the external gluey layer; and lastly, the fibres themselves stand in the position most favourable for sustaining weight and resisting the pressure which falls on them. Any row of props, as is well known to all builders, will sustain greater weight, when placed perpendicularly to the thrust, than when in any other position. The weight of the horse, whether in a state of rest or in motion, falls nearly perpendicularly on the fibres of the crust, when placed at an angle of about 45° to the ground.

In the sole, on the other hand, all these conditions favourable for sustaining weight are wanting. The fibres are much less substantial than those of the crust, they are not so closely connected together, and, lastly, they are placed in layers in a horizontal position. The sole, therefore, from its construction, is unable to sustain weight or pressure.

7. The strength and toughness of the crust depends on the maintenance of its structure whole and uninjured. Any filing or rasping, as it is called, destroys its gluey superficial layer, and as a natural consequence the nutritive and adhesive oily material between the fibres evaporates. If the rasping be continued, the coats of the outer fibres become injured, and the oily material contained in them also dries up. Further rasping may cut through and destroy the fibres themselves.

Effect of
rasping the
crust.

The crust or horn, when deprived of its moisture, not only becomes dry, but also shrinks and contracts. Again the pressure on the sensitive parts of the foot caused by this contraction produces heat, which reacting on the crust dries up whatever little moisture may be left in it, and produces increased dryness, brittleness, and still further contraction.

The disposition of horn to contract under the influence of heat and want of moisture may be very readily demonstrated by exposing a small piece to heat. If a whole hoof be exposed to this action, it will be found that the first effect is to cause the heels to curl in, and then gradually the quarters, and indeed all parts, contract. In the living foot the injurious effects of heat and dryness are perfectly similar.

8. Nature, it may be said, can and does reproduce fresh oily material and moisture in lieu of that which

Moisture of
the crust
not re-
stored.

has been lost. Such, no doubt, is the case as regards the upper or more organized portions of the crust, but inasmuch as the outer superficial layer spoken of above cannot be reproduced except with a new growth of horn, the moisture, even if reproduced, cannot be long retained. It must, like the former moisture, evaporate, because the outer impervious layer provided for its retention has been destroyed by rasping.

But the lower portion of the crust, which is most severely and most often rasped, into which the nails have to be driven, and which is, therefore, peculiarly liable to suffer from brittleness, is, as already mentioned, of such an inorganic nature, that it may be doubted whether its moisture, if once lost, is ever resupplied. But whether resupplied or not, the moisture must soon exude on account of the damage done to the structure of the crust by such repeated rasping.

From this inorganic structure of the lower part of the crust, it is however sometimes argued, even by those who well understand its nature, that a little rasping below the clenches can do no harm, whilst it facilitates the fitting of the shoe.

We admit that there is some reason in this argument; but even in such structures as the lower part of the foot there remains some natural moisture, which contributes to its toughness, and which it is most important carefully to preserve in order to

counteract the splitting tendency of the nails, and to enable it to retain the shoe securely.

Against the propriety of rasping even these lower portions of the crust there further remains the obvious mechanical evil of reducing and weakening that very portion of the crust on which the shoe immediately rests, and which, when preserved in all its entirety and strength, is not more than sufficient to sustain the superincumbent weight of the horse, and to carry the shoe safely, so as to prevent undue pressure upon the sole.

9. The crust, then, must not be touched on the outside with the rasp, except so far as is necessary to round off its lower edge, *before* the shoe is nailed on, in a manner that will be hereafter described.

Crust not
to be rasp-
ed.

10. The crust will indeed need to be lowered, but this must be done by removing with the drawing-knife from its ground surface so much as may be necessary, that is, so much as has grown during the month, and having grown has been protected by the presence of the shoe from that wear to which it would have been naturally subjected in an animal without shoes.

Crust to be
lowered.

The lowering of the crust may be effected with the rasp, but it is better and more quickly done with the knife.

Lowering
v. rasping.

11. It may here, perhaps, be asked by the reader, “What is the difference between rasping and lowering the crust? Why is one permitted and recommended, whilst the other is so strongly condemned? Do not both injure and destroy the crust?”

By rasping, as explained above, the gluey superficial layer is destroyed, the coats of the fibres themselves are injured, the structure of the crust is affected, and the consequences which have been already detailed must follow.

Lowering the crust is a totally different operation, and is not open to any of the objections urged against rasping. It will be remembered that the organic structure of the fibres of the crust is not continued down to their lower ends. If a portion, then—say, from a quarter to half an inch—is cut off these ends, no injury is done to the structure of the fibres, nor is their strength in any way reduced, nor is any injury done to the gluey superficial layer.

Illustra-
tion of the
effects of
rasping.

12. The difference between lowering and rasping may perhaps be better understood by the following homely illustration. Let the fibres or tubes of the crust be represented by a bundle of straws cut to the same length, and bound round by a thin imperious tissue. Let the lower ends of these straws be filled with earthy materials, and their upper portion with oil. Let the lower portion of the interstices between the straws be similarly filled with earthy

materials, and the upper portion with a thick gelatinous adhesive material, which may cement the straws together. We have then a structure somewhat nearly resembling the crust. Both the oil in the straws and the adhesive material between them will be preserved, so long as the coats of the straws and the thin impervious tissue outside, which represents the gluey superficial layer of the crust, remain uninjured.

When, however, by filing or rasping the tissue outside is injured, it is obvious that the adhesive material between the straws will exude; and if by further rasping the straws themselves are injured, the oil contained in them will escape.

But this structure will not be injured if a quarter or half an inch is cut off the ends of the straws, for it will be remembered that the lower portion both of the straws and of the interstices between them was filled with earthy material.

13. In some horses there is very little growth of crust apparent at the end of the month, and little or nothing may require to be cut away. This occurs where the crust is so thin, or of a quality so inferior, that it has been worn away during the month by pressure and friction, even though protected by the shoe from actual contact with the ground.

Of crusts which do not need to be lowered.

14. In most horses there is a quicker growth of

Increased

growth of
the toe.

horn at the toe than in other parts. This is a beautiful provision for the increased wear and tear to which the toe is subjected in the unshod horse.

As, however, in the shod horse this increased growth has been protected from wear, though the shoe itself is worn out at the toe, it will obviously be necessary to remove a greater quantity of crust from the toe than from other parts, *i. e.* at each shoeing the toe must be shortened by the drawing-knife to something like the same extent to which it would have worn away by friction with the ground in the unshod horse.

General directions will be given below as to the preservation or non-paring of the sole; but there is a small portion of the sole which immediately adjoins the crust, in which the fibres of the sole and crust are to a certain degree interlaced, which will need to be removed along with the crust, both because that portion of the sole has been protected by the presence of the shoe from wear, and because from its fibres being interlaced with those of the crust, it will not exfoliate as readily as other parts of the sole. The same stroke of the knife that removes the crust, will also remove all that is ever necessary to be taken away from the sole.

Increased
growth
sometimes

15. In some horses, and especially in Arabs, an increased growth of crust is sometimes found at the

heels, or at one heel. Wherever this is the case, found at the heels. more of course will require to be taken off the crust at that part than from the quarters, except in those horses that turn their toes out. The inside heel in such horses is naturally higher than the outside heel, and had better be so left.

As regards horses with oblique, that is, long pasterns, the crust may with advantage be left somewhat higher than usual at the heels, and the toes shortened as much as possible. This increased height at the heels, combined with shortening the toes, will tend to lessen that strain on the ligaments and tendons of the fetlock, to which such formations are predisposed. It is doubtless an advantage to such horses when nature has provided them with high or donkey heels.

16. When the crust is sufficiently lowered by the knife, the edge next the ground, which will necessarily be sharp, must be rounded off, or blunted by the rasp. Of rounding the lower edge of the crust.

This is most essential. Yet, though it is a simple and efficacious means of preventing the common evil of splitting and chipping of the edge, few farriers practise it, or indeed know how to do it properly.

The rasp must be held and worked not perpendicularly, but at an angle of about 45° to the crust. When the sharp edge is thoroughly removed, the

rasp should be run round the crust once or twice with a semicircular motion, so as to remove any ragged ends left by its previous action.

The rounding of the crust must be done before the shoe is nailed on ; it cannot be done afterwards, because the rasp *cannot then* be got into the necessary position. Farriers frequently attempt to take off the sharp edge after the shoe has been nailed, but if it is closely looked into, it will be seen that the desired effect is not produced. The rasp so applied, though it may remove any projecting lip, invariably leaves a sharp feather edge underneath, which is very liable to split and chip, and render the hold of the nails insecure.

It is not easy to get a farrier to carry out the proper rounding of the crust, even after he has been shown how to do it, because, inasmuch as the rounding must be done *before* the shoe is nailed on, it involves the necessity of fitting the shoe to the foot instead of the easier and more ordinary process of rasping the foot down to fit the shoe.

Structure
of the sole.

17. Whilst the structure of the crust, as described above, is in fibres, standing with their ends on the ground, the structure of the sole consists of fibres placed in layers horizontally.

The difference in power of sustaining weight, which arises from this difference in the position of the fibres, will be easily seen. Any beam standing

perpendicularly will sustain a much greater weight without yielding, than it will, if placed horizontally.

Besides this difference in position, the fibres of the sole are in themselves much less substantial than those of the crust.

Whilst, then, from its construction it is evident that the insensitive sole is not intended to bear weight, it is also most important, on account of its position, that no undue weight should be put on it. If pressure is thrown on the insensitive sole, the sensitive layer above must suffer compression between the hard and unyielding coffin-bone above and its own insensitive layer below.

Again, the sole is recessed or concave. It is a rule in nature that recessed parts are never intended to bear weight or to sustain pressure.

At the junction, however, of the sole with the crust, the fibres of both are interlaced for the breadth of about a quarter of an inch. This intermediate substance possesses considerable strength, and is capable of bearing both weight and pressure. It will be referred to again, when we come to consider the proper width of shoes. (*Vid. inf.*, par. 32.)

The sensitive, or vascular and organized, sole lies immediately above the insensitive, and is protected by it from external injuries, such as blows, &c. The insensitive sole can only perform this function effectually, when preserved in its entirety, sound and unpared.

Illustration of the structure of the sole.

18. The crust was compared above to a bundle of straws placed end-ways to the ground, closely cemented together, and covered by an outer varnish. It was stated that straws so placed and so bound together would bear a very considerable weight without yielding.

The fibres of the insensitive sole may be compared to layers of fibres of hay, placed horizontally. These will necessarily crush in under a comparatively light weight, for neither by their position nor by substance are they calculated to sustain weight or pressure.

Sole not to be pared out.

19. Whilst the crust, from its construction in fibres standing on their ends, requires that those fibres should be lowered or shortened as they grow, the sole, on the other hand, on account of its construction in bundles of fibres laid one over the other horizontally to the ground, does not require to be pared out. The bundles or layers of fibres will of themselves exfoliate in flakes at their own proper time.

The exterior, or lower surface of the sole, is not furnished like the crust with an external gluey layer to preserve its moisture; but each outer layer of fibres in its turn, before it exfoliates, acts as a covering to the fibres underneath and preserves their moisture. Again, the outer layers, if left entire in a natural and healthy state, form a most valuable and effective pad and protection to the sensitive sole.

The insensitive sole is supplied with nutriment and moisture from the sensitive sole, by means of foramina which run through it in the same direction as the fibres of the crust.

20. It is a common fallacy that the insensitive sole, if not pared out, will unduly accumulate and become hard, and thus injure the sensitive sole, which lies immediately above it.

Fallacy of the sole accumulating or becoming hard.

In reality, however,—and the reader need only try the experiment to convince himself,—the sole never does and never can unduly accumulate (if the external surface of the crust be not rasped), because the new layers of fibres, as they come down from the sensitive sole, are perpetually pushing off the old and outer layers.

Nor does the sole become hard, as supposed. The outer flakes of fibres, though they get in some degree hard, are yet not so hard as in the ordinary pared sole, but act as scales, and preserve the deeper seated layers soft and moist. For example, if a quire of whitey-brown paper be soaked, and each outer sheet removed as fast as it becomes dry, the lowest sheets will soon be exposed, and will also become dry and hard; but if the upper sheets, though dry, are allowed to remain, they will preserve the lower moist and soft. And so it is with the flakes of fibres, which form the insensitive sole.

In some cases, however, when the crust is rasped, there is an abnormal growth of sole. The reason of this is simple enough. From want of horn in a damaged crust to sustain the superincumbent weight, undue pressure comes on the insensitive sole. The pressure on the insensitive reacts on the sensitive sole, and may produce irritation and inflammation in it, and hence an increased secretion of insensitive sole. The irritation of the sensitive sole is also aggravated by the pressure on the interior parts of the foot caused by the contraction of the hoof, which results from rasping.

Stopping
the feet.

21. The non-paring of the sole obviates the necessity of the ordinary practice of stopping the feet.

The supposed object of stopping is to keep, or rather to render, the sole moist or soft. Nature, however, will do this better than art, if the natural covering of the sole, viz. the outer flakes of fibres, be not artificially removed.

Again, there are objections to stopping even in pared feet. If the insensible sole, after being pared thin, according to the usual practice, is also made soft by stopping, there is a risk that the sensitive sole, which lies immediately above it, may be injured by stones or other causes, which would not have been felt through a sole of the thickness which nature provided, nor, perhaps, unless it had been rendered artificially soft by stopping.

Lameness may be, and, indeed, frequently is, the consequence of injuries arising in this way. No complaint is more common than that horses go tender after shoeing. Though, of course, this may result from pricks, badly-fitting shoes, or various other causes, yet it is far more often traceable to the feet being "well pared out," a feat on which most farriers rather pride themselves.

The nature, too, of the stopping in ordinary use is objectionable. Cow-dung is dirty, and apt to corrode the frog; and clay is liable to get dry and hard before it is removed. Grooms also sometimes neglect to remove the stopping from the feet before the horse goes to exercise. Such neglect is the ready cause of lameness.

22. Leather is sometimes used as a protection Leather. to the sole, but it is not needed, unless nature's leather, that is, the sole itself has been pared away.

Though we object to the use of leather as a substitute for the real sole, yet there are cases of injury to the sole from pricks in shoeing, or from accidentally picking up a nail, &c., in which it is of value; but its use in these cases will be explained under its proper head in the next chapter. It is also valuable in some cases of founder, and perhaps also for a time as a protection to thin, weak feet, which have been injured and rendered tender by paring and rasping.

When leather is used, no tow should be put under it. Tow, especially if combined with tar, is apt to cake and get into lumps. These lumps cause pressure on the sole, and are themselves apt to produce lameness. The only case in which tow under leather is admissible, is to fill up a concavity in the sole, which may have been made in cases of punctures or picking up nails, in order to afford a free exit to matter.

Tar. 23. Neither is tar needed as an application to the healthy sole. It is generally applied with a view of promoting its growth. But as the insensitive sole is secreted from above by the sensitive sole, it is difficult to see how tar applied to the outside of the insensitive sole can produce the desired effect.

The only circumstances under which tar is admissible in healthy feet, is when horses are very much exposed to wet and dirt. But even then it is mainly useful in protecting the frog rather than the sole from excessive moisture and its injurious consequences.

Structure of the frog. 24. The structure of the frog is fibrous, but its fibres are more minute than either those of the crust or sole. They approach, indeed, the texture of wool. The fibres of the frog are interlaced with each other, and are mixed with a far larger

proportion of adhesive material than those of the crust or sole. It is this peculiarity of structure which gives to the frog its toughness and elasticity.

As is the case with the sole, the outer covering of the frog gradually at its own proper time, if left to itself, shells off or disappears insensibly by friction with the ground.

A thoroughly healthy frog does not require to be touched with the knife. A ragged frog is generally more or less unhealthy; such a frog may, perhaps, be advantageously trimmed, because ragged parts, if allowed to remain, harbour wet and dirt; and moreover may, in a carelessly managed stable, be the means of concealing for a length of time the existence of actual disease.

Wet and dirt, aided by general neglect, are the ordinary causes of disease of the frog. Too much attention, therefore, cannot be given to keeping the frog clean and dry.

The sensitive and vascular frog lies immediately above the outer and insensitive frog, and is protected by it from external blows and injuries. Its office is to secrete the insensible frog.

25. The insensible frog, when duly preserved, performs three very important functions: First, it acts as an elastic pad at the back of the foot, and, receiving on itself much of the concussion which arises from the weight and action of the horse,

Functions
of the frog.

lessens it in other parts of the frame ; secondly, from its peculiar shape, and from the tenacious nature of the material of which it is composed, it forms a stay to the foot against slipping ; whilst, thirdly, in conjunction with the bars, it is calculated to resist and prevent the common tendency of the heels to wire in or contract.

Frog not
to be pared.

26. But the frog can only perform these functions effectively if large and well-developed. Any diminution of its size, whether caused by paring, or by want of use, or by disease, lessens its value as a pad or as a stay against slipping, or as a barrier against contraction.

All the objections which, for reasons connected with its structure, have been urged against paring the sole apply equally to the paring of the frog. In addition to those reasons are many others connected with its peculiar functions. The frog, being intended to receive pressure and concussion, will thrive and develope, if exposed to these influences ; it will, in accordance with the usual rule of nature, shrivel up or become diseased, if deprived of its proper functions, or if, as some people call it, " saved."

As a general rule, any paring of the frog, by diminishing its size, withdraws it from the wear which is essential to its health and development, and therefore has a tendency to produce in it debility

and a predisposition to disease. High-heeled shoes and other such devices have a similarly injurious tendency.

27. The bars are but the doubling back or The bars. reduplication of the crust inwards at the heels, and are of the same structure as the crust.

They are the stays of the outer wall of the foot at the heels. They are, if preserved, the greatest possible obstacle to contraction at the heels ; moreover, by affording a double bearing to the shoe at that part, they greatly diffuse and lessen concussion ; and further, by the double bearing given to the shoe at the heels, they aid materially in preventing undue pressure of the shoe on the seat of corn.

But if the bars are cut away and thereby removed from the healthy and natural stimulus of work, they, in accordance with the usual rule of nature, shrink up, and thus are unable to give to the crust at the heels that support which nature intended them to afford.

Again, though the bars themselves may not be cut away, yet if the sole, and especially the seat of corn, be pared out, the bars are deprived of lateral support, and further, have a tendency to dry up and shrink. The flakes of the sole round the bars appear to have the same effect in preserving their moisture as the gluey superficial layer in preserving the moisture and toughness of the crust.

Seat of
corn.

28. The seat of corn is in the angle between the crust and its reduplication, viz. the bars.

Corns are produced by pressure either from the shoe, or from the lodgment of dirt or gravel in that angle, or from the blow of a stone or any other bruise.

As in most horses pressure and concussion are greatest on the inside of the foot, corns are most common on the inside heel.

If the crust be not damaged by rasping, and if the bars are not cut away, no pressure from the shoe (if the shoe fits) can come on the seat of corn; nor can dirt easily lodge in that angle, if the sole be not pared out from it; nor is there much fear of injury sufficient to cause corn from the blow of a stone, if the sensitive sole in that angle is duly protected by the presence of its natural covering of insensitive sole.

The seat of corn, therefore, should *not be pared out*. It is better protected from the chances of injury by being covered, as Nature intended it to be, by the soft flakes of the unpared sole. And besides, the paring out of the seat of corn weakens the walls of the crust and bars, by depriving them of that lateral support which they would receive from the presence of that portion of the sole; and in this way also, paring out the seat of corn has a tendency to produce rather than prevent the evil.

Again, inasmuch as the sole when pared has a tendency to get dry and hard, it is more likely when in this state to irritate and injure the sensitive parts above, than if left unpared.

The case is different when corn has actually formed, but this will be treated of under its proper head hereafter.

29. Opening of the heels is an old-fashioned, and happily now nearly abandoned practice. The operation consists of cutting away about half an inch of the crust on each side of the frog, and also a portion of the frog. This practice had its origin in some idea of giving room to the heels to expand.

Opening of
the heels.

It gives for a time an appearance of width at the heels, and for that reason the practice is still resorted to by dealers, but its ultimate effect must be, that the heels, deprived of that portion of the crust which would keep them apart, must collapse, or "wire in," as the term is.

When to the practice of so-called opening of the heels is joined that of cutting away the bars, the door to contraction is fairly open, and such a result is only what might be expected.

Dealers also frequently endeavour to produce an appearance of open heels, by shoeing the horse wide at the heels, that is, by making the inner edge

of the shoe rest barely on the outer edge of the crust, so that the remainder of the web projects beyond the crust. This is, of course, a mere deception, easily detected by ordinary observation.

CHAPTER II.

OF SHOEING.*

30. HAVING now very briefly, but, it is hoped with sufficient detail, considered the structure of the foot, and thereby gained some knowledge of the broad principles, which govern the theory, we pass on to the consideration of the practice of shoeing.

Practice of shoeing.

31. The first operation is the removal of the old shoes. The clenches should be carefully raised without injury to the crust, and then each nail separately drawn. Much damage is frequently done to the crust by neglect of these simple precautions. It takes very little time or trouble to remove an old shoe properly, and there is really no excuse for the hurried and violent manner in which this simple operation is too often performed.

Removal of the old shoes.

32. The width of the shoe must be exactly that of the weight-bearing structure of the foot. The width

Width of the shoe.

* The plates intended to illustrate this portion of the subject, are numbered 3, 4, and 5, and will be found at the end.

of the crust, it will be remembered, is generally about half an inch, and that of the intervening structure between the crust and the sole, in which the fibres of both are interlaced, and which is therefore capable of sustaining some portion of the weight, as mentioned above under the head of "structure of the sole" in para. 17, is about a quarter of an inch. The total width, then, of the weight-bearing structure of the foot is about three-quarters of an inch. This, therefore, must be the width of the shoe.

The shoe must rest not on a part, but on the whole of the weight-bearing structure. To enable it to do so, it is necessary, that the shoe should, contrary to the usual practice of seating out, be made flat towards the foot. (*Vid. inf.*, para. 62.)

The width of the shoe must not be greater than that of the weight-bearing structure of the foot. Any greater width than this must, as regards supporting weight, be perfectly useless, and further will be the means of allowing dirt and gravel to lodge between the shoe and the recessed sole, and will also render the shoe liable to be pulled off in heavy ground. The width of the shoe is technically termed its web.

The width of the weight-bearing substance of the foot being practically uniform throughout, until it approaches the heels, the web of the fore shoe must likewise up to the same point be uniform. At the

heels, where the crust gradually comes to a point and forms a junction with its bars, the shoe must likewise come to a point, the inner edge of its heels exactly following and resting on the bars. The double bearing thus given to the shoe by its inner edge resting on the bars prevents the possibility of any undue pressure from it coming on the seat of corn.

The narrowing of the web of the fore shoe at the heels may seem unnatural to those who are accustomed to it; but if it is the shape, as it undoubtedly is, which nature has chosen for the crust and bars at their junction, can it be either unnatural or unsuitable?

The ordinary square or rounded heels of fore shoes are objectionable, because that part, which overlaps either the bars or crust, rests on nothing, and moreover affords the ground a handle, by which, as it were, to wrench off the shoe.

33. The outer line of the shoe must accurately follow the crust everywhere; it must not be one particle smaller than the crust, nor overlap it in the slightest degree.

Fitting of
the shoe.

If a shoe be applied smaller than the crust, and such is the ordinary practice, the crust must be rasped down to it. If the shoe be larger than the crust, treads and other injuries are the result, and in deep ground the shoe may be pulled off.

It is often objected to close-fitting shoes that they do not allow room for expansion, and will therefore cause contraction. It may be sufficient to observe that all shoes are for fear of treads and cutting fitted close on the *inside*, on which side contraction almost invariably occurs; and that they are only left wide on the outside, where contraction is seldom or never found. It is almost needless to observe that a shoe left wide on the outside can have no effect in preventing contraction on the inside.

All fitting of the shoe must be effected by altering the shoe to the foot, not by rasping down the foot to the shoe. Any mark of the rasp on the crust is the sure sign that the farrier has not taken the trouble to fit the shoe to the foot.

Length of
the shoe.

34. The length of the shoe is determined by that of the crust. The shoe must be the exact and full length of the crust. Nature, in fact, in all cases, points out the proper and natural length of the shoe by the termination of the crust.

If shoes are made shorter than the crust, their ends are apt to press upon and dig into the seat of corn. If, on the other hand, the fore shoes are longer than the crust, the hind shoes may catch in their heels and pull them off.

In fact, the form of the shoe, its proper length, the width of its web, and the shape of its heels are plainly indicated by the shape of the weight-bearing

surface of the foot, when freshly cut down and prepared to receive the shoe.

An objection is sometimes raised to fore shoes of the full length of the crust on account of a fear that the hind shoes may catch in them and pull them off. There is, however, no fear of this accident occurring, where the heels are not longer than the crust. The possibility of it will be prevented by sloping off the heels of the fore shoe in the direction of the fibres of the crust, and by sloping off the under inner anterior edge of the hind shoe.

35. The thickness of the shoe must be such that, Thickness of the shoe. with ordinary work, it will wear for a month.

36. Every person accustomed to horses must have remarked the very uneven manner in which the wear is distributed over the fore shoe in ordinary use. At the end of the month the toe is the only part worn out. Weight and wear to be evenly distributed over the shoe.

It is inconsistent with the general structure of the foot, and with the beautiful economy of space and material shown by nature in all her works, to suppose that such unequal wearing can be natural.

The structure of the weight-bearing portion of the foot sufficiently indicates, that the weight is intended to be pretty evenly distributed over the foot. The crust itself is continued completely round

to the heels. At its posterior part it is strengthened by the addition of the bars ; at the toe its thickness is increased ; whilst in the middle or at the quarters, which are the broadest part of the foot, its greater breadth enables it to sustain weight better than at any other part.

Arguing, then, from its structure, we should expect the greatest weight to fall on the quarters. Here it will fall, if nature's requisitions in regard to the form of the toe are complied with.

In our adaptation of a shoe to the foot, we must endeavour not to interfere with the natural bearing of the weight on the foot, or with the natural tread of the animal. Any artificial interference with the natural distribution of weight and wear over the surface of the foot, such as that which might be produced by a misshapen shoe, must induce many evils, much inconvenience to the animal, and in some cases disease.

Form of
the toe of
the fore
shoe.

37. To maintain in the shod horse the natural bearing and tread of the foot, the toe of the shoe must be turned up in the same manner as the toe of the unshod horse is naturally worn away and turned up by friction with the ground.

It will be remembered that in para. 10 it was stated that so much must be removed from the under surface of the crust at the toe, as had grown during the month, and had been by the presence of

the shoe protected from the wear to which it would have been otherwise subjected. The shoe must be turned up to the same degree as the crust is lowered at the toe.

The reader will probably at this point ask, how much should be taken off the toe of the foot, in order to represent the effect of natural wear? The answer is simple. As much as is necessary in each case to give the horse a level bearing on his foot, and a natural tread, or, in other and plainer words, as is necessary to make the wear *nearly* even all over the shoe.

After once or twice shoeing a horse, the farrier ought to know exactly how much his fore shoes require to be turned up, in order to make them wear even. Practically, however, it will be found, that most horses take much about the same degree of "turn up."

The wear is never completely even all over the foot, because when horses are shod according to the natural formation of the foot, the greatest weight and wear falls, as it ought to do, on the quarters which are the broadest part of the foot.

38. Whilst the structure of the foot, and the maintenance of an equal bearing on its different parts, both require that the natural form of the toe should be followed, the ease and convenience of the horse in his action, and his safety in travelling,

Stumbling,
and its re-
medies.

especially if ridden, likewise require that the toe of the shoe should be turned up.

Most people have noticed how badly many horses go when newly reshod, how apt they are to stumble ; and that it is not until the shoes have been worn some days, that they seem again to go at their ease.

The reason of this is simple enough. As horses are usually shod, that portion of the toe, which would in a state of nature have been worn away by friction with the ground, is retained. Not only is this the case, but the evil is further aggravated artificially by the presence of a straight iron shoe, which is made to fit the protected, and therefore elongated, toe. It can scarcely be a source of surprise that a horse so shod strikes his toes against the ground and stumbles.

The horse has neither ease or comfort or safety in travelling, until by friction with the ground he has worn off some portion of the projecting toe of this straight shoe, until, in short, he has in some degree by wear assimilated the toe of the shoe to the natural tread of his foot.

But the horse which is shod with straight shoes never gains complete ease and comfort in action, because the shoe not only requires to be worn through, but a portion of the crust at the toe must also be removed before a really natural shape and level bearing can be attained.

The relief gained by the wearing away of the toe

of the shoe is only comparative, and is very inferior to that obtained by the use of turned-up shoes, adjusted to fit the crust, previously lowered by the knife to represent the natural rounding off of the toe by wear, as seen in the unshod horse.

39. With reference to the tread of the horse, it is necessary to observe that it is a mistake to suppose that in action he merely lifts up and puts down his feet. If he did so, there would be no objection to straight shoes, for such shoes would perfectly suit such a movement. But then there would be no progression. Progression is gained by a semicircular movement of the foreleg, aided by impulse from behind.

Action of
the fore
leg.

To assist this movement, it is necessary that the toes should be rounded off. The horse, when shod with straight shoes, has, every time he lifts his foot from the ground, first to overcome by additional exertion of the flexor tendons the resistance of the straight toe against the ground. This resistance of the straight toe against the ground, when the foot is being raised, coupled with the striking of the toe against the ground when the foot comes down, is the main cause of the wearing away of the toe of the ordinary straight shoes.

40. From noticing how badly many horses went

Mr. Hal-
len's sys-

tem of
shoeing.

when newly reshod, Mr. Hallen, late veterinary surgeon of the Inniskilling Dragoons, took his first ideas of turned-up shoes. Starting from this simple and notorious fact, he carefully traced out its causes, and was thereby enabled to throw much light on the whole subject of shoeing.

At first, to remedy the evil just spoken of, he made the new shoes in shape exactly like the old ones; improved going was the natural result. At the next shoeing he followed up his advantage, and made the new exactly like the then old shoes; and so on, each time with improved results.

He did this at first only with horses that stumbled or "toed," as horsemen say; he thought on the subject, followed it up, watched the results carefully, and at last saw that nature intended a horse to have a bearing on his whole foot, and not mainly on his toe. He saw, too, not merely that the straight toe caused the horse to trip and stumble in putting down his foot; but that it also produced an unnatural lever-like resistance against the ground, and consequently an additional strain on the tendons every time the foot was raised from the ground.

After much consideration and various trials he eventually shod all horses with the toes so turned up that the wear at the end of the month should be nearly even all over the foot. He rightly argued that if stumbling horses were sensibly relieved by complying with nature's requisitions, *all* horses would

go more comfortably and more safely by following the same unerring guide.

Mr. Hallen did not argue for any arbitrary degree of "turn up" at the toes, but for a general principle, viz., so to shoe the horse that there should not be an unnatural degree of wear at one part, and an almost total absence of it at others.

It will be found, however, that in practice most horses, as we might expect in the adoption of a natural system, require very nearly the same degree of turn up at the toes.

There are, no doubt, exceptional cases. The author some years ago had a horse with very flat feet, which, as animals with such feet usually do, went much on his heels; he shod that horse with straight shoes, because, with his particular action, such shoes produced an even wear. A friend soon after attacked him with not daring to apply his own principles of turned-up shoes to a horse with bad feet; but the author believes that in shoeing that horse with straight shoes he was obviously consistent to his own principle of so shoeing horses that the wear should be even all over the foot.

41. The evils occasioned by the ordinary straight shoes may be briefly summed up as follows:—1st, a tendency to contracted heels, and shrivelling up of the frog, from the absence of a legitimate proportion of wear at the back of the foot; 2ndly, stumbling,

Evils occasioned by straight toes.

and inconvenience to the horse in action ; 3rdly, loss of speed from the resistance of the toe against the ground ; 4thly, undue strain on the flexor tendons, whose office is to flex and raise the leg. One of these tendons in particular—viz., the flexor perforans—is liable to injury from this increased and unnatural strain ; it suffers at its weakest point, that is, where it makes its bend round the navicular bone, prior to its insertion into the coffin bone, or bone of the foot ; strain of this tendon caused by resistance of the toe against the ground is a common cause of navicular disease ; this will be further considered under the head of that disease. 5thly, undue stress on the suspensory ligament ; on this ligament the whole weight falls, when in action the foot is brought to the ground ; straight toes, by interfering with the fair and natural bearing of the foot on the ground, have a tendency to cause an unnatural stress on it. It is this ligament which suffers when in galloping the foot is brought with sudden violence to the ground, constituting the injury so well known in race-horses as a “ breakdown.”

Straight shoes have a tendency to produce these evils, but they do not produce them to the full extent, which we might expect, because nature, so to say, takes the matter into her own hands, and by friction with the ground, wears away a large portion of the straight toe, and so, in part, diminishes its injurious effects ; and again, because the animal

frame has been so beautifully and aptly constituted by nature, that it will stand a vast amount of abuse and ill-treatment without sustaining any material injury.

The reader has only to observe the toe of a straight shoe that has been worn for a month, in order to see how nature has altered its shape. It is now completely rounded off, and not only so, but if it be placed on a flat surface, towards the light, it will be seen that it is completely arched underneath, and if looked at from behind, the light may be seen under it. It may be remarked, that the under surface of the coffin bone is similarly arched underneath.

Straight shoes also necessitate the use of heavier iron than is required if the wear is more evenly distributed over the whole surface.

42. From what has been advanced, the reader would probably expect to find the foot of an unshod colt rounded off at the toe. Naturally, of course, the foot would be so rounded off, but in this country, at least, it is not easy to find a fair case, for colts, though at grass, are seldom really in a state of nature. They are generally kept on soft pastures, and have no distance to travel in search of food or water, and there is, therefore, little wear and tear of the hoof.

Toes of the
unshod
colt.

Objections
to turned-
up shoes.

43. Many objections have been raised to the turned-up shoes now recommended. Among the more prominent are:—1st. That a horse, when so shod, cannot get a fair, level, and natural bearing on the ground with his foot. This objection, if well founded, would at once be fatal to the proposed plan, but the level wear of the shoes disproves it.

2ndly. That horses will be liable to fall and come on their heads, when deprived of the fulcrum of the toe against the ground. This objection will not stand inquiry. Horses very generally stumble from striking their toes against the ground. They are certainly not saved from falling by length of toe. On the contrary, it is usually the length of the toe, which first causes the horse to stumble, and afterwards prevents him from recovering himself, the toe forming the lever which overbalances him.

3rdly. It is urged that a horse must be more liable to slip in turned-up than in ordinary shoes. This objection, although at first sight it may appear forcible, arises entirely from misconception of the functions of different parts of the frame. The hind legs and feet are the agents by which the horse stops himself, and prevents himself from slipping. The fore feet are very little concerned in the matter.

But even as regards the fore feet, a straight

level iron shoe can have no effect in preventing a horse from slipping. The frog and the bars are, from their structure, the natural stays of the foot against the ground. Turned-up shoes, by causing the weight and wear to be evenly distributed over the foot, develope the frog and bars, and, instead of facilitating, have, therefore, a tendency to prevent slipping.

4thly. It is alleged that turned-up shoes are unsightly and make a horse look as if he wanted shoeing. The first of these two objections is a matter of opinion, the second a matter of habit.

5thly. They are said to be unnatural, but the level wear is sufficient to disprove the assertion. Again, the structure of the coffin bone, which has been noticed above (para. 41), disproves it. An external form corresponding to the internal bony structure can hardly be said to be unnatural.

6thly. It is urged that the toes in the new-born foal are not turned up. Assuredly not, for the feet have not yet been subjected to any wear.

44. Both skill and practice are necessary in fitting a shoe to the natural tread. A farrier seldom succeeds well in his earlier attempts. The following hints may assist the workman. The turn up of the shoe is made on the horn of the anvil by beating out the toe. The process of beating out the web at the toe will necessarily make it wider. This

Of making
turned-up
shoes.

extra width must be removed by the file, for, as we have before observed, the web should be of uniform width all round. The breadth of the part turned up is from the anterior part of the quarter on the one side to a similar point on the other. The degree of turn up is, of course, greater at the toe than at the sides. A very common error is committed by turning up merely the point of the toe. This may be of some use in preventing stumbling, but it is not sufficient to restore the natural tread and make the wear even all over the shoe. To effect this object, the turn up must be broad. The farrier has always a simple guide in the wear of the old shoe. Where he finds undue friction going on, he must ease off the part and not attempt to fight against nature, by thickening it or by inserting a bit of steel, or by putting on calkings or such other devices.

The shoes being, as previously directed, flat towards the sole, the upper inner line of the circumference of the web will be level all round, while the ground, or lower surface of the toe of the shoe will be turned up throughout, and will thus form a very slight but complete arch from quarter to quarter, imitating exactly the formation of the inferior surface of the coffin bone.

If the farrier finds a difficulty in beating out the toe sufficiently on the anvil, he must file out the under surface. The shoe should not be thicker

at the toe or elsewhere than is necessary for the month's wear.

45. In theory as much of the crust at the toe as represents a month's growth is taken off, and then the shoe is made to fit the crust. In practice, however, this is reversed. The shoe undergoes the wear, and is marked by it, and, therefore, practically, the wear of the shoe must be our guide in making the new shoe, and the crust must be lowered to fit the shoe. No real difficulty ever exists in ascertaining the degree of turn up in the new shoe, which is required to give a natural tread, because the wear on the old shoe affords the necessary indication. When a farrier has shod a horse for two or three months he ought to know the degree of turn up at the toe which the particular horse will require.

Of the degree of turn up required.

46. The weight of shoes of the form recommended is materially less than that of the ordinary shoe. The thickness of the ordinary shoe is regulated by the thickness required at the toe to stand the unnatural friction at that part. In turned-up shoes, the weight and wear being evenly distributed over the whole surface, and no unnatural friction taking place at any part, the substance may be comparatively light. From nine to ten ounces is quite sufficient for feet of the ordinary size. A light shoe is in itself an advantage. Weight tells

Lightness of turned-up shoes.

much more on the foot than on the back, for it is, so to say, a weight attached to the end of a long lever. The principle of the steel-yard is a sufficient illustration.

Ordinary
remedy for
wear at the
toes.

47. To ease off the part at which friction takes place seems a natural and obvious remedy, but farriers generally have recourse to an exactly opposite process, and thicken the shoe at the toe, or put in a bit of steel. It really seems as if they were determined not to be beaten by nature.

Clips not
required.

48. A clip at the toe is unnecessary in the turned-up shoe. The turn up is in itself a very sufficient clip, and will keep the shoe steady on the foot, and render unnecessary any nail or nails at the toe.

Of farriers.

49. The system of turned up shoes is comparatively new ; and farriers, as a class, are prejudiced against novelties, and, moreover, are apt to resent any interference with their usual practice. Some personal attention, therefore, and some knowledge of the subject is necessary on the part of the owner of the horse in order to ensure success.

But every owner of horses, whether or not he adopts the turned-up shoes, will find it to his interest to prevent the crust from being rasped, the

sole from being pared out, the bars from being cut away, the frog from being pared, or the crust being needlessly injured by the use of more than five nails.

50. The appropriate number of nails must obviously be the fewest that will answer the required end, viz., the retaining without fail the shoe in its place on the foot. Of nails.

The regulations for cavalry prescribe six nails for fore shoes; but it will be found that, with an un-rasped crust, and a well-fitted shoe, five are sufficient for any sort of work.

In good truth, however, the number of nails that will retain a shoe depends on the accurate fitting of the shoe, on the goodness and right placing of the nails, on the quality, toughness, and thickness of the crust in which they are driven, on the due preservation of the clenches, and the timely removal of any broken or defective nails.

If any of these points are neglected—if, for example, the shoe is wider than the foot—in deep ground no number of nails will hold it on; or if the crust be weakened or rendered brittle by rasping, the nails will get no real hold; or, again, if the clenches be half cut through by filing, or if the heads of the nails are worn out or defective, no number of nails can retain the shoe.

It is astonishing to see the number of horses that

lose shoes when out hunting; but the author, though using only five nails, has not lost a shoe for years.

It is not denied that even less than five nails may on some feet retain the shoe. Experiments are said to have been successful with three nails only. Under favourable circumstances, and for road-work, they have, no doubt, answered; but there is at least this objection to three nails only, namely, that if any of these fail the shoe must come off.

For hind shoes, when horses are shod level, five nails are also sufficient; but when one or both heels are raised, as is pretty generally the case, either by calkins or by thickening the shoe, there is a tendency in the shoe to "twist," and six nails, three on each side, are required.

Nails to be frequently examined by farrier.

51. Whenever few nails are used, it is absolutely necessary that the farrier or groom should frequently examine them, and see that each nail and clench is good and sound. A broken nail, or one with its head or its clench gone, is obviously useless, and must be replaced.

The necessity of replacing a damaged nail is often urged as a serious objection to the use of few nails by many persons whose horses are seldom seen by the farrier except when taken at the end of the month to the forge to be shod. This, however, is easily obviated by making the servant responsible

for looking to the nails and taking the horse to the forge when necessary.

52. The position of the nails is a matter of great importance. In turned-up shoes the proper place for the anterior nail on each side is immediately posterior to the turn up; the two other nails on the outside dividing the remaining distance evenly to the heels. On the inside the one other nail should be placed exactly opposite the second nail on the outside.

Position of
nails.

In the common or straight shoe, the proper position of nails is exactly the same, though it is not so easy to define it on paper. Perhaps we shall be better understood if we say, "place the foremost nail on each side in the anterior portion of the quarter, and let the two remaining nails on the outside divide evenly the remainder of the shoe towards the heels. On the inside place the one other nail opposite the second nail on the outside." The ordinary, or at least common, practice of putting one or two nails forward, at or towards the toe, is erroneous. The leverage at the toe breaks them, and in straight shoes the friction at that part must wear the heads off, and a nail, when its head is worn off, is useless. In shoes of the form recommended, the "turn up" keeps the shoe steady on the foot, and renders a nail at the toe wholly unnecessary. It is a matter of some importance that the two anterior nails on

each side should be exactly opposite each other and at even distances. So placed they get a more even hold, and keep the shoe steadier and tighter.

These are, of course, only general directions as to where it is *desirable* to place the nails. If a crust be broken or damaged, the nails must be placed where they can get a hold. The use of two nails only on the inside, that is, the omission of a third and posterior nail on that side, will leave the inside heel, which is the ordinary seat of contraction, as free as is possible to expand or contract, as the foot is raised from or placed upon the ground.

Form of
nails.

53. Nails must be made of the best and toughest iron, for none else can stand the strain and jar of fast work. The size of the nail must be varied according to the size of the foot and the weight of the shoe. The dimensions of the head must of course be proportionate to the size of the nail. The point should be hammered out sharp and fine.

A nail larger than necessary is objectionable, because it needlessly damages the crust, and besides requires a larger hole, which obviously weakens the shoe. It is absolutely necessary that the countersinks should be punched of a size corresponding to that of the nails which it is intended to employ, and nails must then be selected to fit the countersinks.

When a nail breaks, the seat of fracture is generally at the neck. The principal cause of its break-

ing at that point is the neck being made too thick for the upper part of the countersunk hole. When this is the case, there is a difficulty in driving the nail home, and the neck is frequently so injured in the operation, that it breaks off when subjected to the strain and jar of work.

Whenever the head is much battered in the operation of driving a nail home, the farrier may be pretty sure that it has become injured in the neck, and he should draw it and substitute another. When the neck of a nail is sound, it seldom breaks during a month's wear.

On the other hand, if a nail is too small for the countersunk hole, it gets but little hold, becomes loose, and by working about soon breaks.

A nail of the proper size will not go through the countersink by mere pressure, but requires some, though not excessive hammering. A farrier should have a variety of punches suited to different sized shoes.

An exception to the general rule of adapting nails to the size and weight of the shoes, and also as regards the position of the nails, occurs in the case of flat-footed horses. Under the head of Laminitis, it will be recommended that such feet should be shod with shoes of a broad web, but on account of the weakness of the crust it is desirable to use fine thin nails. Additional care is of course required to watch these nails, and to remove them if neces-

sary. It is also sometimes advisable to put in nails at the toe, and the practice is not objectionable in feet of this formation, because such horses always go on their heels, and therefore there is not the ordinary degree of wear and leverage at the toes.

Form and
position of
nail-holes.

54. Nail-holes should be punched "coarse," as it is technically termed, *i. e.* nearly in the centre of the web; and they should be punched straight through, *i. e.* brought out nearly in the centre of the web on the other side.

Farriers very generally punch the holes much too near the outside. The nails, of course, do not get so firm a hold of the crust, but farriers are fearful of pricking the horse, and with feet rasped, as they usually are, they are right. If, however, a crust of ordinary quality and thickness be not rasped, the farrier can afford to drive his nails "coarse," and with infinite advantage to their holding power.

In saying that nail-holes should be punched nearly in the centre of the web, it must be borne in mind that the width of the shoe recommended is one-fourth less than that of the shoe in ordinary use.

Nail-holes should be made of evenly diminishing size from the under to the upper side of the shoe. If otherwise, the nail will get play where the hole is too large for it, and so break; on the other hand, if the hole is too small, the neck of the nail will be injured in driving it home.

55. A great advantage is gained in the form of nails, by making use of countersunk nail-holes. Counter sunk nail-holes. With them the heads of the nail can never wear out, if they fit the holes, until the shoe itself is worn through. With these nails the head should exactly occupy and completely fill the hole. No portion of the thin part of the nail should be in the shoe, nor any portion of the thick part or head in the crust. The thin part should begin where the nail quits the shoe to enter the crust.

56. Nails made with rose and other heads, and nails made in the usual form for fullered shoes, do not in general fit exactly into the holes. Holes for rose-headed nails. Frequently a portion of the neck of the nail is in the shoe. These are all apt to break at the junction of the thin part with the head; and again a portion of the head is pretty generally left projecting below the shoe.

57. The heads of the nails should not project below, but should be driven down flush with the shoe. Nail-heads not to project below the shoes. The necessary accuracy in punching countersinks of the proper size, and selecting nails to fit them, will give the farrier a little extra trouble.

The objections to the nails projecting below the shoe are, first, that the horse must, except on soft ground, stand uncomfortably on them, until the excrescences are worn down; and secondly, that

when this occurs, the half of the head of every nail is gone, and with further wear of the shoe a further portion of the head will be worn away. A nail without its head, as without its clench, is useless. A shoe, be it remembered, is held on by the head of the nail and its clench. Without these a nail is nothing more than a sprig.

Of clenches.

58. The clenches before turning down should be broken off as short and stubby as possible, and laid down flat with the hammer without being filed either before or after turning down, for any filing must necessarily weaken the clench. It is quite possible to turn down clenches perfectly smooth with the hammer.

The common practice of filing clenches has arisen from a fear on the part of the farrier, lest he should bruise the crust in hammering them down; but this fear need only exist where the crust has been damaged and made thin by previous rasping.

When a horse with average feet is well shod, the clenches ought never to rise during a month. In fact, the clenches do not in general really rise; it is usually the shoe that sinks into the foot, either because the crust, which ought to carry it safely, has been weakened by rasping, and thereby rendered incapable of supporting the weight of the horse, or because the shoe has shifted and got on to the sole, or because the nails were not hammered home.

Rising of the clenches is a sure sign of bad shoeing in some respect or other, or of the shoes being worn over the proper time.

59. Shoes, if properly fitted, and if resting on a sound unrasped crust, should never require to be removed during a month; but one or more of the nails may, if faulty, require to be drawn and renewed.

Of removing shoes.

60. We have dwelt thus long on nails and nailing because the subject is really of importance, for the best made and best fitted shoes will not stay on the best feet unless due attention is paid to it. Without good nailing and good clenching all the labour is thrown away. We have considered it advisable to enter more fully into details because we advocate the use of a smaller number of nails than usual; and it is obvious that, where few are used, the goodness and right placing of each individual nail becomes of greater importance.

Importance of nails and nailing.

Before leaving this portion of the subject it may be well to repeat that no trouble should be spared to obtain nails of the very best quality. It is scarcely possible to insist too strongly on this point.

61. By fullering is meant a groove, extending round the web of the shoe. The advantages supposed to be gained by it are, first, that the farrier is

Of fullered shoes.

enabled to punch the holes more easily and with greater accuracy than he could do without the assistance of such an artificial line. Secondly, that the groove will prevent slipping. Thirdly, that the nail-heads, being in the groove, will be thereby better protected.

None of these reasons have much force. A tolerably good workman ought not to need the assistance of a fuller line to guide him in punching the nail-holes. Again, although slipping may in some degree be prevented on soft ground by the groove, it can hardly be affected by it on pavement, where horses are most apt to slip; and, lastly, the groove does not protect the nail-heads any more than or even as much as countersinks.

Fullering, moreover, is objectionable, because it weakens the shoe; and, again, nails never fit so well or so tightly into the groove of the fuller as into properly countersunk holes.

Flat and
concave
shoes.

62. The ordinary practice is to make shoes concave towards the sole and flat towards the ground. The object of this form is to prevent the risk of pressure from the shoe on the sole.

If this pressure occurred it would certainly be injurious, as has been explained at length above; but with a good unrasped crust—and this is the foundation of everything—there is no fear of a shoe flat towards the sole pressing unduly on it, because the

sole is concave and recessed, and the proposed shoe is no wider than the crust and adjoining interlaced structure.

There are many reasons for and advantages in reversing the ordinary practice. The unshod foot naturally presents a concave surface to the ground ; and it cannot be wrong thus to follow nature. Again, a concave ground surface of the shoe must render a horse less liable to slip, an object of some importance at certain seasons of the year. Again, shoes flat towards the sole get a bearing, not merely on a part of, but on the whole of the weight-bearing structure, and they are, therefore, less liable to sink into it ; and, lastly, the fact that no dirt can lodge between the shoe and the sole is of no little importance.

While there is no need of a shoe concave towards the sole, there are serious objections to it. Shoes concave toward the sole have their bearing only on the outer edge of the crust, instead of on the whole crust, which, as has been explained above, is but a narrow surface for supporting the great weight of the horse. Again, dirt and gravel are apt to lodge in the space between the foot and the shoe ; and, furthermore, in deep ground this portion of the shoe affords the ground a handle, as it were, by which to pull it off.

When shoes flat towards the sole are used, proper attention must be paid to the preservation of the

crust, otherwise undue pressure may come on the sole. It is imperatively necessary to guard against such an evil. This may be best done by preserving the crust sound and unimpaired; but even with a damaged crust pressure on the sole may be obviated by paring it away and using a concave seated shoe, as is the ordinary practice:

Hind shoes.

63. The same general rules as regard fitting, nailing, and clenching, apply to hind as to the fore shoes. The general principles as regard rasping, paring, the avoidance of opening the heels, the treatment of the frog and preservation of the bars apply here equally.

A level and natural bearing on the ground is needed as much behind as before, but from a difference in action which is easily to be observed, the hind shoes do not require to be turned up in front in order to give a level bearing.

The action of the fore leg, as has been remarked above, is that of a semicircular progressive motion, which is hindered at every step by the leverage of the long toe, but the action of the hind limb is one of propulsion or pushing, and it both quits and reaches the ground in a manner quite different to the fore leg.

The greatest wear in the hind shoe, it will be observed, is at the heels, and therefore, consistently with the general principle of making the wear nearly

even all over the shoe, the hind foot must be shod with a straight shoe.

To the make and shape of the hind shoe in ordinary use there is in general no objection, though circumstances often require some modification to prevent cutting, &c. The accurate fitting of the hind will require as much attention as that of the fore shoe. Two clips, one on each side, just anterior to the first nail, will hold it firmer than one at the toe.

The various peculiarities occasionally requiring attention in the shoeing of the hind feet will be noticed under the head of overreach and other injuries and malformations of the Hind Limbs.

64. The reader may, perhaps, ask why so much has been said regarding the shoeing of the fore and so little on that of the hind feet. Are not both, he may ask, of equal importance, and of the same structure? Doubtless: yet it is notorious that, if a horse is lame *before*, in the great majority of cases the seat of lameness will be found in the foot. On the other hand, it is equally well known that, if a horse is lame *behind*, the seat of lameness usually is not in the foot.

Hind feet
less liable
to disease.

The difference, we believe, arises from the following causes:—1st. The action of the hind limb, as already explained, consists in propelling or pushing, whilst the concussion and hammering caused by the propulsion from behind is received

on the fore feet. 2ndly. The weight of the rider and the additional concussion caused by that weight, falls more on the forehand than on the hind quarters. 3rdly. The sole of the hind foot is more concave than that of the fore, and is, therefore, less liable to suffer from undue pressure and those diseases which have their origin in that cause. 4thly. The crust of the hind foot is thicker than that of the fore, and is, therefore, less susceptible of injury. 5thly. The hind foot is in general less maltreated by rasping and inordinate paring; and lastly and chiefly, the form of the hind shoe in ordinary use is better suited to the foot. It gives a level and natural bearing to the whole foot, and thereby throws a fair amount of pressure and work on the heels, and thus lessens the tendency to contraction and other diseases.

Import-
ance of the
subject.

65. Some people are pleased to ignore the subject of shoeing, and consider it as unworthy of any serious attention, as unimportant, as a mere farrier's art. The actual practice of shoeing is, no doubt, mechanical, but its theory and principles must rest on knowledge of the structure of the horse and his foot. Further, that the subject is not unworthy of attention, is sufficiently proved by the fact, which has been stated above, that the great majority of horses lame *before*, are lame in the feet.

Almost all diseases of the feet have their origin,

not in work or age, but in improper treatment. Joints, tendons, and ligaments, suffer from work and age, but feet do not, and, indeed, from their construction, are not likely to suffer from those causes. The feet of an old horse, which have been properly treated, are just as sound as those of a young one.

Unless owners of horses take the trouble to look after their own interests, they may rest assured that no one else, and certainly not the farriers, will trouble themselves much about the matter.

It is true that the farrier may know more about shoeing than most owners, just in the same way as the tenant may know practical farming better than his landlord. Yet most proprietors are aware, that if they wish to see their farms thriving and well managed, they must have a knowledge of the principles of agriculture, and must give both time and personal attention to the management of their estates.

Again, farriers, like workmen in most trades, generally tread in a beaten track, and but few are capable of rising above the stereotyped prejudices and narrow views in which they have been reared. Almost all important improvements in trades come not from the actual workmen, but from those who can bring to bear on the subject theoretical as well as practical knowledge.

It is always difficult at first to carry out any improvement, because the workman generally sets

his face against any alteration in his accustomed practice. Owners of horses, who desire to have their animals properly shod, must expect to meet with many difficulties, and perhaps positive opposition from their farriers and grooms, and may, for a time, at least, find it necessary to give their personal superintendence at the Forge.

CHAPTER III.

OF THE DISEASES AND MALFORMATIONS OF THE FEET.

IN the preceding chapter the general principles which ought to regulate the practice of shoeing have been laid down.

In the present chapter we shall treat of the more ordinary diseases and malformations of the feet, so far as they are connected with shoeing.

66. When the sensitive sole is injured by a puncture or bruise, inflammation is necessarily set up in it. The inflammation, unless when very trivial, produces a secretion of pus, or what is commonly called matter.

Punctures of the sole, pricking, and picking up nails.

The pus, which forms in the internal structure, must have an exit. The processes of suppuration and ulceration are the means by which nature provides an exit for such secretions. These processes, however, can only take place in organized

structures. The insensitive sole is of too inorganic a structure to be capable of either suppuration or ulceration.

The pus, therefore, which forms in the sensitive sole, is unable to gain an exit through the insensitive sole. Hence not being able to escape below, it works its way upwards through the vascular parts of the interior of the foot, which are capable of suppuration and ulceration, and gains for itself an exit usually immediately above the coronet between the hoof and the coronary band. The fistulous sore so formed is known as quittor.

The evil, then, with which we have to deal in cases of puncture, is the confinement of the pus, which has been produced by the inflammation of the sensitive sole. The cause of the confinement is, as explained above, the inorganic nature of the insensitive sole.

In all these cases, therefore, our treatment must aim at affording the pus an easy and depending exit. This is effected by paring away the insensitive sole. In order to afford a free exit, it is essential, not merely to open out the seat of the puncture, but to remove a considerable portion of the surrounding sole.

With a view of further assisting the percolation of the pus through the hard insensitive sole, it is advisable to soften it by applying poultices, composed of linseed meal and bran.

When these measures are promptly and efficiently taken, injuries of the sensitive sole seldom prove either serious or tedious. In a few days the horse in most cases is again sound.

The sole, however, having been freely removed, the horse is not fit for work, until nature has re-supplied a sufficient quantity of insensitive sole for the protection of the foot, or until an artificial covering, such as leather, is provided.

Leather, though we have objected to its use as a substitute for a sole unnecessarily removed by paring, is useful in the above cases, because it affords the means of working the horse, as soon as the inflammation caused by the injury has subsided.

Punctures of the frog are similar in nature, and require similar treatment to those of the sole. When taken in time they are not serious, and yield to treatment even more readily than injuries of the sensitive sole, inasmuch as the insensitive frog is more permeable than the insensitive sole.

Punctures
of the frog.

If neglected, however, they are apt to lead to extensive disease of the frog, and canker may be the result. In some few cases the inflammation caused by the puncture may involve the neighbouring coffin joint, and a serious and tedious case may ensue. In still rarer instances it has happened that a nail has penetrated through into the joint, and fatal consequences have sometimes followed.

Nail-bound.

67. Nail-bound is the name given to a slight lameness or tenderness arising from the nails being driven too "coarse," that is, too near, but not into the quick. Removal of the shoe and rest for two or three days will give the necessary relief. If driven into the quick, the injury amounts to that which has just been treated of under the head of "pricking."

Corns.

68. A corn is simply a bruise, or other such injury of the sensitive sole, in the angle between the crust and its reduplication at the bars. (Plate No. 2, ff.) Corns are generally found on the inside, because greater weight, and therefore greater pressure, falls on the inside than on the outside heel, except where horses turn their toes in, and thereby throw their weight on the outside. In such conformations, corns on the outside are not unfrequent.

The presence of a corn is easily known by the reddened appearance of the sole in the angle above mentioned. This redness arises from extravasation from the blood-vessels of the part. A similar appearance is found in other parts of the sole when bruised or subjected to undue pressure.

The immediate cause of corns is pressure, generally continued pressure, on the seat of corn. The causes of this pressure are various. Of direct causes, the most common are short shoes, the ends

of which press unduly on the seat of corn ; and in shifting of shoes from bad fitting or from being worn beyond the proper period.

The indirect, though equally real and more common causes of this disease are to be found—1st, in the ordinary practice of rasping the crust, by which it is rendered weak and insufficient to bear the superincumbent weight ; 2ndly, in the removal of the bars, which, jointly with the crust, ought to sustain the shoe ; 3rdly, in the practice of paring out the seat of corn, by which the sensitive sole becomes more exposed to injuries from bruises ; 4thly, in lateral pressure on the seat of corn from the crust and bars, when the insensitive sole in that angle is pared out.

The treatment of a corn in its earlier stages is extremely simple, and consists only in removing the cause, namely, undue pressure.

This may be effected by paring out the seat of corn carefully and without injury to the crust or bars, and by applying a three-quarter shoe, which will relieve the part affected from pressure. If, however, the corn is very tender, a three-quarter bar shoe, which will give more complete relief, had better be used.

The common practice of applying a complete bar shoe with the view of protecting the seat of disease from bruises, stones, &c., is objectionable, because dirt and gravel are apt to lodge under the

shoe in the hollow made by paring out the seat of corn, and may produce increased irritation.

The cause, namely pressure, being removed, the corn will soon cease to exist. It is essential, however, to bear in mind, that, though as a temporary measure pressure may be prevented by the use of three-quarter or bar shoes, yet the only real and legitimate means of preventing the recurrence of the mischief consist in the maintenance of a good sound unrasped crust and sound unpared bars, on which a well-fitting shoe of the proper length can rest firmly and securely, and with fair and equal pressure.

If, however, the cause of the corn is not removed, the inflammation in the sensitive sole will increase, and suppuration, or, in other words, the formation of matter, will follow. In such cases it is necessary to rest the horse, in addition to adopting the treatment recommended above.

If further neglect takes place, the disease may run into quittor, of which the appropriate treatment will be found in the succeeding paragraph.

It is a common practice to pare out the seat of corn, even in sound feet, under the idea of preventing undue pressure on it. Nature, however, is in all cases our safest guide. A certain amount of insensitive sole is supplied to this part of the foot, and is useful to it as a protection against bruises. As in other parts of the sole, it will shell off in due

time, and therefore should not be removed artificially. Again, the paring of the seat of corn weakens the crust and bars by depriving them of the lateral support which they would otherwise derive from the presence of the insensitive sole in that angle of the foot, and in so far has a tendency to produce rather than to prevent the evil.

Again, there is a further reason against this paring. Nature has made that part not more recessed than other parts of the sole. We may therefore conclude, that in common with the rest of the sole it is intended to bear a certain amount of pressure. The amount of pressure which it will naturally receive, when the crust and bars are maintained in their integrity, is doubtless good for it, and will tend to strengthen it, and so prevent the liability to corn.

Corns, when treated only by paring out, even though they may be got rid of for a time, generally reappear. The means of their permanent removal will be found in the careful preservation of the crust and bars, and in the proper fitting and length of the shoes.

Probably from the greater degree to which the sole is recessed, and therefore removed from all chance of undue pressure, corns are seldom or ever found in the hind feet.

The author believes that he is justified by practical experience in saying that corns will never

occur in good feet, when horses are properly shod.

Quittor.

69. Quittor is a fistulous sore at the coronet. It arises either from a neglected corn or from a prick, bruise, or other injury of the sensitive sole.

When pus, which has formed in the sensitive sole, is unable to gain an exit through the tough protecting horn, it works its way upwards through the soft parts of the interior of the foot, and makes its escape immediately above the crust at its junction with the coronary band.

It will readily be seen that the real seat of the evil is not in the outward sore at the coronet, but in the irritation and inflammation in the interior of the foot.

In treatment our first aim must be to afford an exit to the matter arising from this inflammation. The remedy to be applied will vary according to the degree to which the disease has run. This will mainly depend on the length of time which has been allowed to elapse before the injury is properly treated.

In slight cases, or, in other words, in cases which are taken moderately early, it will probably be sufficient to pare out the insensitive sole freely, and thus allow the matter an exit below. The sole may be further softened, and the percolation of matter

through it assisted by the application of poultices, as recommended under the head of Punctures.

When the disease has run to a greater length it is necessary to cut through a portion of the crust in addition, so as to allow the matter to escape through it, as well as through the sole. To assist this process the whole foot should be enveloped in a large poultice for two or three days. It is necessary to observe that this application should not be continued longer than that period, as it is apt, if unduly persevered in, to induce the growth of unhealthy granulations. When the poultice is discontinued, a simple wet bandage, which will keep the parts sufficiently soft, should be substituted.

Another, and perhaps the best, mode of treatment is to cut away completely all the horn or crust immediately below the fistulous sore. This portion of horn, having by the process of suppuration become detached from the living parts, can never be reunited to them. Its complete removal will give immediate relief by affording an exit for the pent-up matter. When the sore is removed, fresh horn will soon be supplied by a fresh growth from the quick.

When, however, quittor has been neglected, the disease becomes formidable. The fistulæ or sinuses caused by the pent-up pus in the interior of the foot will be found to be numerous, extensive, and often ramifying in various directions. In addition

to the treatment previously recommended, caustic applications must be inserted into the sinuses, in order to get rid of the tough secreting membrane which lines them, and to promote a new and healthy secretion. No cure can be effectual without the removal of the "core," or internal secreting membrane of the sinuses. Some practitioners, however, prefer to treat it by free incisions in the first instance; and subsequently apply stimulants with the view of promoting adhesion and obliteration of the canal of the sinus. These cases, however, always need the care of a veterinary surgeon.

When the internal disease is removed, the treatment of the mere sore at the coronet is easy. In fact, beyond keeping it clean, applying simple water dressing, and occasionally caustic lotion, little need in general be done. Occasionally, however, there is a tendency to the growth of unhealthy granulations round the sore, which will require to be repressed by the application of pressure and caustic.

Care must be taken in all cases of quittor to prevent the external sore healing over before the internal disease is thoroughly eradicated. From the vascularity of the parts in the neighbourhood of the coronet there is always a tendency to this action.

In all cases of quittor a three-quarter shoe, or

three-quarter bar shoe, should be used, in order to prevent pressure and concussion on the part of the foot affected by the disease. In some cases it may be desirable to apply a complete bar shoe.

Wounds of the coronet resulting from treads and such other accidents, and unconnected with injuries of the sole, are not in their primary stage true quittor. They only require to be treated as ordinary sores, but, if neglected, they readily run into quittor. (See *infra*, Treads, para. 84.)

70. Sanderacks are fissures in the crust, and are usually found on the inside in the fore feet and in front in the hind feet. They frequently have their origin in brittleness of horn combined with contraction. Whilst, however, the disease is due to these causes, the author would wish particularly to impress on the reader, that these causes are themselves greatly aggravated by the malpractices of rasping the crust, cutting away the bars and frog, and opening the heels. Sanderacks.

Sanderacks are also found in flat or sprawling feet, and in these cases seem to arise from want of tone in the secretions of the crust.

A sandcrack does not usually cause lameness, until it has become sufficiently deep to injure or expose the sensitive laminae, or until it has extended to the coronary band.

The usual treatment is to open out the crack

with the drawing knife, in order to prevent dirt and gravel lodging in it, and to enable it to be the more easily kept clean; secondly, to relieve the part affected from all pressure by drawing a deep furrow with the hot iron round the crack in the shape of a **V**. Relief is also given, where the fissure is deep, by applying the hot iron down the crack itself, so as to stimulate the parts to throw out new material for the protection of the laminae; and thirdly, to blister round the coronet with a view of promoting a new growth of horn.

Various plans, such as a strap or fine wire drawn round the foot, have been tried, with a view of bringing into and keeping in apposition the parts, and so preventing the extension of the fissures. These, however, fail in producing the desired effect, because from the shape and structure of the foot the pressure, which is so applied, draws in the heels and develops rather than otherwise the crack.

Fissures in front, where the crust is thick, may however, when the inflammation consequent upon the occurrence of the disease has subsided, be successfully drawn together by inserting a nail sideways in the crust through the crack, and clenching it on the further side. A very fine nail should be selected for this purpose, and reduced both in length and thickness, and a sharp but broad point must then be given to it. In order to prevent the

crust from splitting at the point of the insertion of the nail, a niche should be made for it with the drawing knife. It will be desirable to give the nail a bearing of about half an inch on each side of the fissure. When, however, the sandcrack occurs on the side, this treatment must not be attempted, as the crust in that part is too thin to admit the insertion of a nail with safety.

The treatment of sandcrack, as regards shoeing, will consist, if time and circumstances allow, in removing the shoes altogether. When, however, the horse cannot be spared from work, considerable relief from pressure and concussion will be gained by "springing" the shoe under the line of the crack. When the fissure is at the side a three-quarter bar shoe may often be beneficially applied.

Sandcrack can always be got rid of, as long as the coronary band remains entire, but if by neglect the disease is allowed to involve the secreting substance, false quarter or permanent separation in the crust at the quarters may probably be the result.

71. When any part of the coronary band is involved in serious inflammation, its ordinary secretions are necessarily arrested. If the inflammation is long continued, the portion of the band affected becomes wholly disorganized, and its vitality is

False
quarter.

destroyed. As the crust is secreted from the coronary band, it necessarily follows that there must be a break or separation in the horn immediately below the place where the injury to the secreting surface has occurred. This separation is called "false quarter."

The disease in the coronary band is usually the result of neglected corns, or of sandcrack, or of quittor, or of any external injury sufficient to produce violent inflammation in the secreting substance and consequent arrest of its secretions.

As the secreting surface, when once destroyed, cannot be restored, there is no cure, properly so called, for false quarter. The treatment will consist in restricting the disease within the narrowest possible limits, and in adopting such measures of relief as may enable us most speedily again to work the animal.

As the treatment of those diseases which terminate in false quarter has already been given, we have now only to deal with the result, namely, the permanent separation in the crust.

The earlier stage is generally accompanied with lameness, and the horse must be rested, and, if not in very low condition, had better be given a dose of physic, which will tend to allay any irritability. The detached portion of the horn on the sides of the fissure must be removed, and the fissure itself kept scrupulously clean, for any admission of dirt

or gravel will produce irritation and delay the cure. If much pain is present, it is advisable to apply a poultice.

As soon as the acute symptoms have subsided, a plaster of tow and tar should be applied to the fissure, with a view of keeping out the dirt, and of stimulating the parts to throw out new material. In a few weeks the lameness will probably subside, and with the assistance of a three-quarter shoe, which will prevent undue pressure and concussion on the seat of disease, the horse may again be worked.

In course of time, though the legitimate secretion of the coronary band is not restored, nature will from the surrounding parts throw out a species of spurious horn, which will sufficiently protect the sensitive parts immediately under the seat of injury, and the horse will again for all practical purposes be sound, and eventually even the aid of a three-quarter shoe may be dispensed with.

Especial care must be taken that the new deposition of horn in the neighbourhood of the false quarter be not injured by rasping.

72. Feet, somewhat smaller than the standard Small feet. size, if equally so all round, are not so objectionable as many people consider. Small feet are natural to the high-bred horse, who is a native of dry sandy

plains, whilst the under-bred horse, brought up in low wet pastures, and fed on succulent diet, has a tendency to large coarse feet.

Small feet, if equally so all round, are, as a general rule, preferable to wide spreading feet. The horn in small feet is generally sound and tough, whilst in feet above the standard size it is usually deficient in toughness and strength.

Small feet, when a natural formation, are easily distinguished from contracted feet, by the fact that they are correspondingly small all round. Contraction rarely affects all the feet, and never affects all the feet equally. One foot smaller than the rest is rarely, if ever, a natural formation.

Contracted
feet.

73. Contraction of one or more feet, though by no means an absolute bar to the purchase of a horse otherwise desirable, must always be regarded with great suspicion.

Contraction has its origin either in saving or "favouring" the part, or in bad shoeing.

The ordinary cause which induces a horse to save or "favour" a foot, is pain either in the foot or in some limb connected with it, either directly or indirectly. The foot which is saved, by the usual law of nature becomes smaller than the others, which are sustaining their proper share of work and wear. Want of use in any part of the animal frame, which is intended for work, invari-

ably leads to shrinking and imperfect development of the part so saved.

It must be borne in mind that it is not necessary that the pain or disease should be in the foot. It may be in some portion of the frame only indirectly connected with it. For example, a strain of the tendons of the leg or an injury of the shoulder will cause the horse to save the foot on the side so affected, just as much as if the disease had been in the foot, and contraction will equally be the result.

At the time of the occurrence of the disease it is of course easy enough to ascertain whether it is in the foot or elsewhere. When, however, the disease has passed away, but the contraction remains, it is often difficult to say whether its origin has been in the foot or elsewhere.

According to the causes from which it arises, contraction may show itself in one or both fore feet, or similarly in the hind feet, or, again, it may appear in only one part of a foot or feet. Disease, for instance, in the posterior portion of the foot will cause the horse to save as far as possible that part, and the heels will in consequence become contracted. In seedy toe, on the other hand, the anterior portion of the foot will be favoured, and contraction in that part will result.

In some few cases the action of the horse is such that he brings one foot to the ground with greater

force than the other ; and in consequence the foot which is most severely used becomes somewhat larger than the other, which is comparatively saved.

Bad shoeing, however, rather than actual disease, is in most instances the cause of contraction. The too common practices of rasping the crust, of cutting away the frog and bars, and of so-called opening the heels, have a marked tendency, as has been explained at length in the previous chapter, to produce contraction.

The fore feet, for reasons already given, generally suffer more than the hind feet from the effects of bad shoeing. Inasmuch as these causes generally affect both fore feet, we often find contraction in both.

The heels suffer more from contraction than other parts of the feet, because the ill effect of cutting away the bars and frog and opening the heels aggravate at this part the mischief done by rasping the crust. Contraction at the heels is also aggravated by the ordinary system of shoeing, which throws undue wear on the anterior portion of the foot, and thereby deprives the posterior parts of that amount of work and wear which are essential for their due and healthy development.

Contraction is not usually in itself a primary disease, but is generally the result of disease or of mal-usage of the foot. The treatment of contracted feet must therefore vary according to the causes

from which the contraction arises. In those cases which result from disease, our aim must be to remove the causes which induce the horse to favour the part affected. When that cause, whatever it may be, is removed, time and use will do something to restore the parts, but in many cases the contraction will be permanent.

In those cases which are due to bad shoeing, unless they are of very long standing, we may hope for a marked improvement, when a better system of shoeing is adopted. Various plans, such as expanding shoes, have been at times put forward for the prevention or cure of contraction. They all, however, aim at treating the symptoms rather than the disease itself, and are therefore scarcely worth much consideration.

It is very commonly believed that contraction in the feet, apart from disease, is the almost necessary effect of shoeing, that is, of binding the foot round with an iron band. The author believes that where a rational system of shoeing is adopted, where the crust is not rasped, where the bars and frog are not cut away, where the heels are not opened, where only two nails are used on the inside, and where a natural amount of wear and work is by shortening the toes allowed to fall on the heels, that the foot of the old horse will be found to be as sound and healthy and as free from contraction as that of the colt.

Where one heel shows a disposition to wire in, it will be found advantageous to omit the posterior nail on the side affected. Tips, however, give more freedom to the foot than any sort of shoes, and may be beneficially applied in many cases of contraction. Their use will be further considered in the succeeding paragraph.

Before quitting this portion of the subject it may be necessary to remind the reader, that all diseases of the foot do not terminate in contraction. Some, such as laminitis, produce an opposite effect.

Tips.

74. Some reasons have been given above in paragraphs 32 and 33, why closely fitted shoes, such as have been recommended, are neither more likely to cause contraction in sound, nor more objectionable than other shoes in cases of contracted feet. If, however, it be desired especially to guard against contraction, or to give a horse with already contracted feet every possible chance of recovery, let him be shod with tips.

A tip is intended to cover the toe and anterior portion only of the quarter, whilst the heels, frog, and bars are left uncovered, or unprotected, as some call it. Practically, the length of a tip should be *rather less* than half that of an ordinary shoe.

The advantages gained by the use of tips may be summed up under the following heads:—

1st. Freedom is secured to the heels, which are the most common seat of contraction. Whatever a shoe may do, a tip cannot cause contraction at the heels. 2nd. Concussion, and the evils and diseases which arise from it, must be greatly diminished by substituting for the jar of the iron shoe against the ground, the natural and elastic action of the heels and frog. 3rd. The heels and frogs are strengthened and developed by being brought more actively and prominently into work and wear. 4th. The liability to slip is much less in horses shod with tips than with any kind of shoes, because the heels can perform their functions much more perfectly when brought into actual contact with the ground, than when elevated from it by means of a shoe. The frog and bars are from their structure evidently the natural stays of the foot against slipping, and therefore, when they are brought into actual contact with the ground at each step, the liability to slip is much diminished.

On this account it is suggested that tips might be used with great advantage on the modern square-cut pavement now in use in London and other towns, on which we constantly see horses shod on the present system slipping about in a most helpless and dangerous manner.

The principal objections urged against tips are, 1st. That they do not afford sufficient protection to the foot; that a horse, for instance, cannot with

them travel safely over stones. This, however, is a question which can only be settled by experience. The author has tried them for years, and is satisfied that they do afford sufficient protection. 2ndly. It is urged that with our hard roads and hard work the heels and frog would soon be worn away. This again is a matter of experience. The author has invariably found that both heels and frog strengthen and develop under use.

Time is of course necessary, after substituting tips for shoes, to allow the heels and frog to grow strong. It would not do to take the shoes off a horse to-day and to rattle him in tips over stones to-morrow.

Some persons who have tried tips have pronounced them failures. This has generally been where the feet have not been properly treated, or where the tips have been made too long. Tips are generally made much too long, so much so that they are little else than short shoes, and of course produce the many evils of such shoes.

Though convinced of their value, we can hardly venture to recommend them to the public generally. They are a great innovation on the ordinary practice of shoeing, and farriers, as a class, are not well disposed towards anything much out of the beaten track. It is always difficult without considerable personal attention and some knowledge of a subject, to ensure the success of anything new,

especially if the workman is determined that it shall not answer.

It need scarcely be added that it will be in vain to think of adopting tips until the too common practices of rasping the crust, of paring the sole, and of cutting away the frog and bars, are wholly discontinued.

Though good for ordinary, valuable for contracted feet, and most useful as a remedy for thrush, tips are unsuited for weak or flat feet.

75. Thrush or frush is, to the discredit of our stable management, a common disease. It shows itself under the form of an acrid, strong-smelling, unhealthy secretion issuing from the sensitive frog through the cleft of the external or insensitive frog.

Thrush or
Frush.

The causes of the altered secretion of the internal structure may be summed up under two heads, namely, wet and dirt, or in other words, neglect—and want of use.

The frog must be washed scrupulously clean every day with a hard water-brush, and the feet picked out at each stable hour. The mere fact of dung being allowed to remain in the feet is sufficient in a few days to produce thrush. Again, the ammonia and other noxious gases generated by dirty or decaying litter act most injuriously on the structure of the frog. Continued wet has likewise a mischievous effect by softening the external

structure, which then ceases to afford proper protection to the sensitive parts within. But it is from the effect of dirt combined with wet, that the frog suffers most rapidly. The result of the disease set up in the sensitive structure is an increased and unhealthy secretion, which issues through the cleft and through fistulous openings in other parts of the frog.

Disease in the frog is also readily produced by paring, contraction, or any other causes which bring it into disuse.

Work, wear, and pressure, are natural to the frog, and essential to its health and development. If, however, by being constantly pared away at each shoeing the frog is deprived of pressure and wear, it soon becomes unhealthy and diseased. In feet, affected with navicular disease, a similar effect after a time is produced on the frog, because the horse, on account of the disease, the seat of which is immediately above the frog, "saves" as much as possible that portion of his foot, and treads on his toes. It is singular, however, to remark that this effect on the frog is often not found in the earlier stages of navicular disease. Again, in contracted feet, the sole is generally so much recessed that the frog hardly ever comes to the ground, and hence, again, from want of use it becomes diseased.

If the frog be pared, a further cause of disease

arises. It will be remembered that the structure of the frog is such that its external coat shells off in due time. When, however, this coat is artificially removed, the surface, which is then fresh exposed, is not at that time adapted by Nature to resist the effect of wet and dirt, and is therefore very susceptible of injury.

In the treatment of those cases of thrush which originate in wet and dirt, our first care must be to remove the cause, and our next to keep the frog scrupulously clean and dry. The removal of any ragged or partially detached parts will lessen the difficulty of keeping clean a diseased frog.

Having removed the cause, our further endeavour must be to absorb the discharge. This will be best effected by inserting pledgets of dry tow into the cleft. The process of drying up the secretion may be hastened by the application of zinc or other astringent lotion. Further, with a view of restoring the parts to a healthy action, pressure should be applied. This may be effected by lowering the crust at the heels every fortnight.

When the disease in the frog has arisen from deprivation of its natural functions, the treatment will be, first, to dry up the discharge; and, secondly, to endeavour to bring about a more healthy state of the organ by subjecting it to wear and pressure. The means of giving this pressure will consist mainly in the absence of paring, in lowering the

crust at the heels, and in shortening the toes, so as to bring wear on the heels. Additional pressure may also be given in the stable by the use of Cherry's felt pads.

These remedies, however, sometimes fail in effecting a thorough cure, and the disease, though it does not extend, becomes chronic.

When the cause has its origin in navicular disease, little more can be done than to keep the frog scrupulously clean, and to dry up the discharge as soon as it appears.

For chronic thrush, when not arising from navicular disease, we recommend a remedy that will strike at the root of the evil. Let the horse be shod with tips and the frog be boldly exposed to wear and pressure. Nature has made the frog of the horse as a cushion, as an elastic pad to receive on itself concussion, and to lessen it in other parts of the frame. Only let it be subjected to that wear and pressure before the disease has run too great a length, and it will soon become sound and strong.

If however thrushes are long neglected, the neighbouring parts become affected, and in bad cases the whole sensitive sole is involved. The sole is then said to be "under-run," or, in other words, the unhealthy secretion being greatly increased, and unable to find sufficient exit through the insensitive frog, burrows between the sensitive and insensitive sole.

In these cases it will be necessary to have recourse to the veterinary surgeon. The disease has now lost its name of thrush, and is known as canker.

76. Canker is a morbid secretion of the sensitive frog and sole, involving of course the corresponding insensitive parts. This formidable disease generally has its origin in neglected thrush. As stated above, it is a case for the veterinary surgeon, not for the farrier, though it may be remarked in passing, that the application of pressure to the diseased part, as in the case of thrush, combined with the use of the strongest caustics, is the great aim in treatment.

77. Navicular disease in its primary stage is inflammation of the flexor perforans tendon and its investing sheath, at the point where it bends and passes round the navicular bone, just prior to its insertion into the coffin bone or bone of the foot.

This inflammation arises from strain or overtaxing of the tendon, and in some cases from laceration of some of its fibres. The liability to strain at this particular point is owing to the very sharp bend which the tendon here makes round the navicular bone. Greater stress must from this formation come on it here than at any other part.

In the second stage the inflammation extends from the tendon and its sheath to the bone itself. The result of the inflammation thus set up in the

bone is frequently ulceration, and caries or decay. In some cases, however, the inflammation produces union between the bone and the tendon.

The inflammation of a bursa, and subsequent and consequent inflammation of a neighbouring bone, is common enough in all parts where similar structures exist.

Horses affected by navicular disease, as is well known, tread and stand much on their toes, or, in the language of the stable, they “point.” They are greatly relieved, as most horsemen know, by having their toes shortened, and by an extension of the same principle, namely, the use of turned-up shoes.

Now why is this? At first sight, shortening or turning-up the toes would seem like taking away that part of the foot on which alone the horse can stand with ease and comfort; it would seem a measure calculated to throw weight on the hinder part of the foot—the seat of the disease.

To answer this question, it is only necessary to remember the origin and cause of the disease, viz. the undue strain on the tendon. The shortening and turning-up of the toe diminishes the angle at which the tendon passes over the navicular bone, and therefore diminishes the strain on it at that bend. The horse himself seeks for relief on the same principle by pointing in the stable, namely, by bringing his leg into a straight line, and thereby lessening the strain on the tendon at its bend

round the navicular bone. Whilst it is certain that the strain on the diseased tendon and bone is greatly relieved by shortening the toes, it is probable that in many, if not in most cases, the original inflammation has been caused by the additional strain thrown on the tendon by the use of the ordinary straight shoe.

That disease of the navicular bone originates in inflammation of the flexor perforans tendon and its investing sheath, is the view held by the great majority of veterinary surgeons; but among the public there is a prevalent idea that the disease commences in the bone, and extends to the tendon; and that the cause of the disease is concussion arising from our hard roads and iron shoes.

Even if for a moment we suppose this to be so, how greatly must that concussion be aggravated by the ordinary practice of rasping the crust, of paring away the sole, and of cutting down the frog and bars? How much more must concussion be felt in a foot where the crust has been rendered not only thin, but brittle and inelastic by rasping?

An objection may perhaps be raised by those, who believe in concussion as the cause of navicular disease, to the use of tips which have been strongly recommended in these pages, on the ground that, by laying bare the heels, tips must be very liable to produce this disease; and Mr. Miles, in his excellent treatise on shoeing, alludes to the value of a

broad shoe continued well to the heels, as a means of preventing or relieving navicular disease.

This objection may easily be disposed of. A large portion of the jar and concussion in the horse's frame is due to the presence of iron shoes on his feet. This jar is especially felt at the heels, where the shoe interferes with the action of the natural elastic pad or frog, which nature has provided in that part of the foot in order to diminish concussion. The absence of iron at the heels, the very seat of navicular disease, must lessen the jar. Again, tips, by promoting the enlargement and development of the frog and bars, must in this way also tend to diminish concussion, whilst the growth and development of the posterior parts of the foot will lessen the liability to strain on the flexor perforans tendon.

Disease in the navicular bone has also been supposed sometimes to have its origin in an accidental injury or blow on the posterior part of the foot; but it is difficult to understand how a bone so completely embedded in the interior of the foot and so thoroughly protected on every side, can be injured by any external violence.

Others again have thought that the disease originates spontaneously in the bone. Bones, however, are not liable to disease without some predisposing cause. When disease originates in a bone, concussion or some injury as from a blow

may be set down as the necessary cause; but as stated above, it is scarcely possible that the navicular bone can suffer from any such causes.

78. From navicular disease and its origin in sprain and inflammation of the tendon, we pass to sprains in general, in so far at least as they are traceable to the effects of shoeing. Sprains as affected by shoeing.

The tendons most frequently sprained are the flexors, which bend and thus raise the leg. It is very commonly supposed that they are sprained in the act of putting down the leg on the ground. Yet this idea, though common, is not always true, for little weight or strain usually falls on them on such occasions.

When the flexors are sprained, the injury is generally done, not in putting down, but in raising the leg. Hence it is that we so often find these tendons suffer from the effect of deep ground, because the difficulty of raising the leg is increased, and therefore the strain on the tendon becomes greater. The lifting of the leg is the first act in progression. This action is entirely due to the efforts of the flexors. The further acts of progression are performed by the extensor tendons, which straighten and thereby bring forward the leg, when raised by the flexors.

From this consideration of the action and use of flexors or, as they are popularly called, the back

tendons, it is evident that sprains in them are generally caused by the effort of raising, and not in putting down, the leg. It is not, however, intended to argue that the flexors are never sprained when the leg is brought to the ground. It is possible that they may sometimes suffer from over-tension on such occasions.

For reasons already given, the difficulty of raising the foot, and consequently the strain on the flexor tendons, is much increased by the resistance of the toe of the ordinary shoe against the ground. This strain will be much lessened by the use of turned-up shoes, and again, in deep ground especially, by the use of the closely-fitting shoes which have been already recommended.

Suspensory ligament.

The suspensory ligament is also frequently sprained, constituting the accident known as a "break-down." It is on this ligament that the weight of the horse falls, when after extension the leg is brought to the ground. The injury usually occurs during the exertion of galloping, as on the racecourse, or in the hunting-field, from the suddenness and violence with which the weight is thrown on this ligament. It is also from similar causes very liable to be sprained in the act of landing after a jump, especially where the ground falls. Calf-kneed horses are, from their formation, more predisposed than others to this accident.

Turned-up shoes, by allowing the whole foot at

once to get a fair and natural bearing on the ground without the hindrance occasioned by a long straight toe, will diminish the liability to sprain of this ligament.

Whether the toe or heel comes first to the ground in galloping is, we may remark, a matter in dispute among horsemen. In horses with true level action we believe that the foot, when properly shod, comes down nearly level; and that it is scarcely possible to appreciate any difference between the placing of the toe and heel on the ground.

The extensor tendons, which, as their name implies, straighten and thereby bring forward the leg, after it has been bent and raised by the flexors, are seldom sprained, because their functions in progression are only secondary. The propelling power in the horse comes from behind, and the leg is raised by the flexors. The straightening of the leg by the action of the extensor tendons, after it is once raised, is a matter of comparatively little exertion.

Extensor
tendons.

79. Laminitis, or inflammation of the sensitive laminae, is the disease popularly known as Fever in the Feet, and also as Founder. It will be necessary to consider it under its two aspects of acute and chronic.

Laminitis,
or fever
in the
feet.

We shall first describe the course of the acute attack, and next its result in chronic laminitis.

We shall endeavour to point out the means by which the acute attack may be prevented from producing permanent disease; and afterwards the means by which the horse may be preserved useful for work, even if the disease should unfortunately result in alteration of the structure of the foot.

When inflammation attacks any part or organ, it generally selects the most susceptible portion. Hence, when inflammation is present in the feet, it usually affects the sensitive laminæ, because they are the most vascular and therefore the most susceptible structures in the feet.

It will be remembered, that the sensitive laminæ are themselves attached to the coffin bone, and are dovetailed into the insensitive laminæ, to which the crust is attached. Thus united the laminæ form the bond of union between the interior and exterior parts of the foot.

Inflammation has several terminations. The most favourable is "resolution," when the parts attacked are completely restored to their former healthy condition. It will, of course, be our object to bring about this termination.

A more unfavourable termination is effusion from the inflamed and overloaded blood-vessels. In inflammation of the laminæ the effusion is poured out between the sensitive and insensitive laminæ. This deposit gradually loosens their attachment, may ultimately produce separation between them,

and sometimes even lead to sloughing of the hoof. This separation between the laminae weakens or destroys the union between the interior and exterior parts of the foot, and the outer wall of the foot consequently gives way and falls in, whilst the whole foot assumes the form so well known and so peculiar to this disease.

A further alteration of structure also takes place. The coffin bone, which was, as explained above, connected with the crust by the dovetailing in of the sensitive and insensitive laminae, having partially or entirely lost its attachment to the wall of the foot, descends and comes down on the sole.

The sole in its turn, when pressed upon from above by the coffin bone, also descends, and thereby forms the flat or even convex sole so characteristic of severe laminitis. In some cases the sole anteriorly will be found to have come down even below the crust. The sole in those parts, pressed upon by the coffin bone, becomes thin and weak and incapable of bearing even a slight amount of external pressure.

These alterations of structure, once made, are permanent. The sensitive and insensitive laminae never reunite, the coffin bone does not regain its proper position, nor does the crust recover its attachment, nor the sole its former structure.

In the treatment of the acute attack, our aim will be to reduce the inflammation, and thereby

prevent those serious after consequences which result from its termination in effusion. The shoes must be at once removed, and it will be necessary to bleed, until the pulse is affected, from the jugular vein or coronet, but not from the toe. Bleeding from the toe is very objectionable in this disease, because it renders tender the sole, on which it is of the utmost importance to throw the weight of the horse during the continuance of the acute attack. Next the crust must be pared down to the level of the sole. The effect of lowering the crust will be to transfer in a great measure the weight and pressure from the crust to the sole. It will, of course, be remembered, that at this period of the attack there is no disease in the sole. It may then be hoped, that by the relief given to the laminae by throwing the weight and pressure temporarily on the soles, aided by the blood-letting, the inflammation will rapidly subside and terminate in resolution. It will be advisable also to place each foot in a warm poultice of bran and linseed meal, which should be kept well moistened by frequent applications of warm water. The poultices should be renewed every twelve or eighteen hours, or sooner, if they get dry or cold. Abstinence from oats and even from hay, diet restricted to wet bran mashes and grass if procurable, with plenty of chilled water, and a dose of physic, will assist in reducing the inflammation. Great

care must be taken to provide the horse, whilst thus compelled to stand on the soles of his feet, with a substantial bed of old litter or sawdust.

When, however, this favourable result is not attained, but on the contrary the disease runs its course, the structural alterations above-mentioned will to a greater or less degree take place. We can then, when the acute attack has subsided, only have recourse to such palliatives as may enable us to continue to work the horse. The treatment no longer aims at curing the disease.

In treating feet affected with chronic laminitis, the evils we have to contend with are three-fold, namely,—1st, chronic disease of the laminae; 2ndly, a crust diseased and weak from want of attachment to the interior parts of the feet, and therefore apt to give way; and 3rdly, a flat or convex sole.

Our treatment in all these cases will aim at saving the crust and laminae as much as possible from jar and concussion. In mild cases, where the sole is merely flat, but not convex, it will be sufficient to shoe the horse with a straight shoe, flat towards the foot, with a broad web, and continued well back to the heels. The breadth of the shoe and its continuation to the heels will diffuse and lessen concussion.

In more severe cases, where the structural alteration is greater, and the toe of the coffin bone has descended so much as to produce a convex sole, we

must avail ourselves of this alteration of structure as a means of giving relief.

The sole is very thin and susceptible of injury on that portion which is pressed upon by the coffin bone ; but anteriorly we find a considerable thickness of tough fibrinous deposition in the space which is left next the crust by the descent of the toe of the coffin bone ; and again, posteriorly we find an increased thickness of sole under the heel of the coffin bone, which is drawn up by the descent of its anterior portion.

We must avail ourselves of this unusual thickness of the insensitive sole both anteriorly and posteriorly, as a means of relieving the crust, which must be lowered to a level with the sole, and a shoe with a very broad web applied, which will bear evenly alike on the crust and the sole.

In very severe cases, where the sole is completely convex, or, in technical language, is "pumiced," the crust will not need to be lowered. In such cases, in order to accommodate the altered structure of the parts, the shoe must be made concave towards the sole instead of flat, as has been recommended above.

With the view of stimulating the growth of the crust, it is advisable that the coronary band should be moderately blistered every nine days.

In all cases it is essential that the shoe should be continued well round to the heels. The crust

at that part is comparatively sound, because the inflammation in the laminæ has principally affected the anterior portion of the feet; and again the length of the shoe will diffuse, and thereby lessen concussion. Here the animal himself will assist us much. It will be observed that all horses affected with laminitis tread much on their heels, and save as far as possible the anterior portion of their feet.

From this peculiarity of action all flat-footed horses require to be shod with straight shoes, in order to make the wear even all over the feet.

With a view of further diminishing the jar on the crust, it is advisable to shoe such horses with leather. But where this is done, the leather should be cut out from under the sole, and left only under the shoes. On account of the flatness or convexity of the portion of the sole, which is pressed upon by the toe of the coffin bone, the leather, if allowed to remain over the sole, is apt to cause undue pressure on it; and, moreover, it is difficult to prevent dirt and gravel getting under the leather, and producing irritation and lameness.

Whilst we object at all times to rasping the crust, paring of the sole, cutting away the bars, and opening the heels, these practices are especially to be avoided in weak and diseased feet, such as those affected by laminitis.

Seedy toe.

80. Seedy toe is a disease which usually has its origin in defective or irregular secretion of the lower portion of the laminæ. Its seat is at the junction of the crust and sole. It is generally due to constitutional causes, aggravated at the time of its occurrence by neglect, such as allowing gravel or dirt to remain under the shoe. In some cases it is probable that such neglect alone may be sufficient to produce the disease without any constitutional predisposition.

This disease, as its name expresses, commences at the toe, producing separation between the fibres of the crust, and gradually extends upwards and laterally. It must be particularly noted that seedy toe, unlike sandcrack or fissure, commences in the lower portion of the structure.

Seedy toe, if taken in time, may nearly always be got rid of; but its thorough cure will demand both time and care. Our first endeavour must be to limit the extent of the disease; and secondly, to promote a more vigorous and healthier secretion of horn. All the seedy or detached part of the crust must be cut away by the knife; and if the disease shows signs of extending, such further portions as may be necessary must also be removed. The hollow in the foot so made must be kept scrupulously clean, and dressed with acids or other caustics, whilst any exuberant fungus growth must be repressed by the application of pressure.

Lastly, with a view of promoting a healthier action of the parts, the coronet must be frequently blistered.

81. Clicking or forging, as it is otherwise termed, is common in young horses, in those of any age in low condition, in badly broken animals, and especially in those with defective action in the forehand, and in breeds which, like the Arab, have very powerful hind quarters. Clicking
or forging

This unpleasant habit arises from a quicker motion of the hind than the fore leg; in consequence of which the toe of the hind shoe strikes, when advanced in action, against the under inner surface of the anterior part of the fore shoe. It is to be particularly noted that the part struck by the hind shoe is not, as is commonly supposed, the heel, but the anterior portion of the fore shoe.

There are many palliatives for this nuisance; but the means of cure in each particular instance will consist in reversing, as far as possible, the particular conditions on which the defect depends. Thus in young horses, and in those in low condition, our endeavour must be to improve the stamina by good feeding and properly regulated exercise; whilst in those with slovenly action an effort must be made to improve the faulty paces by good and careful riding. These remedies generally require to be combined; for, though clicking may mainly

arise from slovenly action, which may in a great degree be corrected by good riding, yet this want of action is in very many cases combined with, and sometimes caused by, weakness and want of condition.

The palliatives consist of various minor alterations in the shoeing, and in many cases, doubtless, the shoeing alone is to blame. The best means of ascertaining the required alterations, are to take note, after exercise and before the horse is cleaned, of the mark of the spot at which contact has taken place, and the shoe must then be eased off at that spot. In general, this may be effected by hollowing out the under inner surface of the fore shoe at the toe, and also by setting back the toe of the hind shoe a little behind the crust.

It is said that in some instances, but the author does not remember to have met with such a case, the clicking proceeds from striking the toe of the hind shoe against the heel of the fore shoe. In this case, in addition to setting back the hind shoe, it would obviously be advisable to shorten the heel of the fore shoe. If contact took place only on one side, a three-quarter shoe would be appropriate, or, if the feet were good, the use of tips.

In other cases the noise, but only the noise, may be prevented by narrowing the toe of the hind shoe; so that, instead of its striking against the

fore shoe, it may strike only against the sole of the fore foot.

A three-quarter shoe on the outside, by causing a slight alteration of the gait, will sometimes be found effectual as a remedy, when all other contrivances have failed.

In all cases, if the horse has been newly shod, it is better to wait for three or four days, until a mark is apparent, before deciding on a remedy.

In Arabs, the one thing needed is to raise, develop, and improve the action of the fore hand, which in this breed is deficient, as compared with that of the hind quarters.

Turned-up shoes of the pattern so frequently recommended by facilitating the action of the fore leg will in many cases entirely remove this evil.

82. Brushing, cutting, and interfering are only different names for the same evil. There is no objection to any of the ordinary remedies, except that *a* remedy is often applied without due consideration of the cause of the injury in the particular case. A mark, if carefully looked for after exercise and before the horse is cleaned, will generally be found which will sufficiently indicate the cause ; but in doubtful cases, a wet pipeclayed bandage should be fastened round the part struck, when a mark will be left on the part which strikes it.

Brushing,
cutting, or
interfer-
ing.

A horse may brush or cut either with the shoe, with the clenches, with the hoof, or with the fetlock.

When the injury is done by the shoe, the farrier ought without much difficulty to be able to set the matter to rights. The ordinary causes will be found either in bad fitting, or in shoes becoming loose and shifting, or in their being worn beyond the proper time. In other cases, however, in order to avoid contact, it will be necessary to underweave or even narrow the web of the shoe on the inside quarter, and to leave the crust projecting over it. In more severe cases it may be necessary to make the outside of the shoe thinner than the inside. The effect of this alteration will be very slightly to alter the gait, and so prevent collision. It is to be observed that the collision nearly always takes place with the anterior portion of the quarter of the shoe or hoof.

When the injury is caused by a clench, the fault may lie in its never having been hammered down tight; but it will more frequently be found that the clench has risen, on account of the shoe having sunk into the foot. The tendency of shoes resting on a rasped and therefore weakened crust, to sink into the foot, has already been explained under the head of clenches in paragraph 58.

Those cases which arise from contact of the hoof are more difficult to remedy. It will be

advisable in the first instance to try the effect of making the shoe thinner on the outside than on the inside, as recommended above. In other cases, in addition to this, it may be necessary to ease off the hoof at the point of contact. But, whenever the crust is rasped for this purpose, the nail, which would be ordinarily in the neighbourhood, must be omitted, and one substituted for it in some other part. The absence of the nail will lessen the risk of the crust splitting, even though rasped.

In those cases which arise from really defective action, or from collision with the opposite fetlock, it will be advisable to try the effect of making the shoe thinner on the outside than on the inside, and if that fails, to apply a three-quarter shoe.

Another common cause of cutting is leg weariness, arising from weakness, want of condition, or over-work. For instance, how often does a horse cut in coming home from hunting. From similar causes cutting is common in young horses, but disappears with age and increased strength.

In the hind leg, cutting is in most cases to be prevented by thickening the inside heel of the shoe, or, which amounts to much the same, by using a three-quarter shoe on the outside; and in bad cases by combining both alterations. The object of thickening the inside heel is to throw out the fetlock, and so lessen the chances of collision.

The heel, which is raised, should be of substan-

tial thickness ; and it is essential that it should have a firm bearing on the whole of the crust. Farriers often lose sight of the object of raising the heel, and narrow the web of the shoe and keep it within the crust. The effect of narrowing the web is to cause the heel soon to wear down ; whilst further, the shoe having a bearing only on part of the crust sinks into the foot, and thus the object sought to be attained, namely, the raising of the inside heel, is soon lost, and in a few days the horse again begins to cut. It will be found advantageous in some cases to make the raised heel of steel.

In other cases, from some peculiarity of gait collision may be prevented by thickening the outside and lowering the inside heel. When either or both these remedies fail, it is worth while to try the effect of level shoes.

The most difficult cases to remedy in the hind leg are those where contact takes place on the coronet. This injury is almost always caused by the shoe. The remedy will be to ease off the shoe and to leave the crust projecting. If this fails, a strap must be carefully fitted round the coronet over the seat of injury ; and in very severe cases it may be necessary to protect the strap with a thin plate of steel.

When there is not time, as sometimes happens, to refit shoes, the easiest temporary remedy is

a three-quarter shoe, which may be very readily made from that in use by cutting off its outer heel.

The use of all the above remedies should be discontinued as soon as increased strength or improved action allows them to be dispensed with, because all deviation from a level tread is an evil.

In some cases all alterations of shoeing are ineffectual, and in these a boot, as the term is, must be worn.

83. Over-reach is a wound of the heel of the fore foot, inflicted by the *under inner* or *posterior* edge of the toe of the hind shoe. The attention of the reader is particularly directed to the fact that the blow is struck by the inner and not by the outer or anterior edge of the shoe. Over-reach.

To prevent over-reach, the inner part of the toe of the hind shoe should be carefully and thoroughly sloped off from the upper to the lower edge. This part of the shoe is commonly left square, and becomes sharp by friction with the ground. Of how sharp it becomes, the reader may satisfy himself by picking up the hind foot of almost any horse that has been shod a fortnight or three weeks.

There is no security against over-reach in merely rounding off the under inner edge of the hind shoe at the toe, for the rounding will soon wear off. But with a good slope from the upper to the lower edge,

it is impossible that there can be a sharp edge even at the end of a month's wear.

When the inner edge is thus sloped off, there will be no over-reach properly so called, even though the hind shoe should strike the fore heel. There may be a blow and bruise, but there will be no wound. If, however, the horse should continue to strike the fore heel, it will be advisable to put the hind shoe a little back, and to leave the crust projecting beyond it.

The treatment of over-reach is simple enough. The part decidedly loose should be cut off, and the wound kept clean. If the injury is a severe one, it may be necessary to apply a poultice for a day or two. When the wound begins to heal, the cure may be hastened by cold water dressings, and if the reparative process is imperfect or tardy, by applying tincture of myrrh, diluted solution of sulphate of zinc or other such mild astringent.

Treads.

84. Treads are injuries of the coronary band or coronet, generally inflicted by the other foot. They are most common in the hind feet, especially where horses are shod, as is often the case with heavy draught horses, with calkins on the inside as well as on the outside. The best remedy is to substitute a raised heel well rounded off for the inside calkin. If, however, it is considered absolutely necessary to use a calkin on the inside, the liability to injury

will be diminished by making it very broad instead of narrow. Young horses, as we might expect, are more prone than others to injure themselves in this way. Occasionally treads occur in the fore feet. A little attention to rounding the edges of the shoes will render them less frequent, and less serious if they do occur.

The treatment of treads is the same as that of common wounds. But when lameness is present, poultices may be beneficially applied, and a dose of laxative medicine may be given. Treads, if neglected, especially when they occur towards the heels, are apt to run into quittor. When such is the case, the treatment recommended under the head of that disease must be followed.

85. Speedy-cut is a serious evil. Its seat is on the inside of the leg, immediately below the knee. Speedy-cut.

Its causes are various ; and in horses predisposed to it, mere trifles will be sufficient to produce it. It is most commonly found in horses with high action, in impetuous horses that go with their heads up, and in fretful animals generally.

The immediate cause is often bad shoeing, such as projecting shoes, a clench rising, or not hammered down flat, overtime in shoeing, a loose shoe, and in some cases misshapen feet, or irregular action.

Some horses, however, will speedy-cut when

ridden, which are safe in harness ; whilst others may be ridden with safety which cannot be driven.

If alterations in the shoeing, such as have been already suggested for cutting and interfering, will not prevent the evil in any particular horse, a boot must be worn.

Straight
pasterns.

86. Straight pasterns, which are generally synonymous with short pasterns, are a formation which naturally tends to increased concussion and its train of evils.

Much will be done to lessen concussion by preserving a good crust, a good sole, and the frog and bars unimpaired. More will be done, all indeed that is possible, by using tips instead of shoes. Some experience has given the author a high opinion of the value of tips for horses with short pasterns. By allowing a more full and natural action of the frog and posterior parts of the foot, they appear greatly to lessen jar and concussion.

Wind-
galls.

87. Wind-galls are enlargements of the bursæ of the tendons, ligaments, or joints, arising from an increased secretion of synovia, otherwise called joint oil. This increased secretion is produced by inflammation of the serous membrane which lines the bursæ of the tendons or ligaments, or of the capsules of the joints themselves. The cause of

the inflammation is generally severe and fast work. Wind-galls are therefore as we might expect, most frequently found in old horses that have been much knocked about. Horses of defective formation are more predisposed than others to suffer from such causes.

Shoeing on the principles already advocated, by diminishing concussion and lessening the strain on the tendons and ligaments, will decrease the liability to wind-galls and the diseases of a similar class.

88. Ring-bone is an ossific deposit, extending in a ring-like form round the pastern bone. A predisposition to it appears to exist in horses with short and straight pasterns, and also in those with the opposite formation of long and oblique pasterns. Ring-bone.

In the first-named cases, it is supposed to be due mainly to the effect of concussion; and any system of shoeing which diminishes concussion, will also diminish the predisposition to ring-bone.

In the latter cases, the deposit of bone is evidently an effort of nature to strengthen a weak formation. Shortening of the toes and the maintenance of a due and natural bearing all over the foot will diminish the chances of strain, and, therefore, also of ring-bone. In other cases, the osseous deposit arises from strain, and

consequent inflammation of the lateral ligaments of the pastern.

Ring-bone is especially apt to show itself where heavy horses are worked too early or severely on the road. In some horses, especially in such as are heavy, coarse, and badly bred, there appears to be a predisposition to throw out ossific matter without any assignable cause.

Side bones,
or ossified
lateral car-
tilages.

89. Side bones, otherwise called ossified lateral cartilages, are the result of the conversion into bone of the cartilaginous alæ, or wings of the coffin bone. They are most common in cart and heavy horses, though not unfrequently found in animals of a lighter breed.

The bony deposit is generally believed to be the result of inflammatory action set up in the lateral cartilages by excessive concussion. Fast work will sufficiently account for concussion in light horses, whilst in those of heavy frame the lumbering gait and weight of the carcase aggravate the evil. The excessively heavy, clumsy, and badly fitted shoes so commonly seen on cart horses must also increase the jar and concussion.

The system of shoeing cart horses, especially in towns, is probably not without its effect in producing this disease. The heels of these horses, both in fore and hind feet, are frequently so raised by calkins that no weight falls on

them, and, consequently, no motion takes place in the lateral cartilages. Now cartilage has been substituted by nature for bone at this particular portion of the foot, in order to allow of play or motion. If, however, by an unnatural system of shoeing these cartilages are deprived of their proper functions, they, in accordance with the usual rule of nature in similar structures, ossify and become useless. A like process of solidification, as is well known, takes place in joints, if long deprived of use and motion.

When cartilage is once converted into bone, nature never re-supplies the cartilaginous formation, and, therefore, there is not and cannot be any cure for this disease. As soon, however, as the bony deposit is perfectly solidified, the lameness ceases, and the animal, though strictly speaking unsound, is nevertheless perfectly serviceable. The only effect in fact is, that the tread is less elastic than before.

90. In all cases of injury behind, great advantage will be found to arise from making the horse's bed considerably higher behind than before, in order to give support and ease to the injured part.

Injuries
behind.

The worst and shortest litter from the dung heap, if properly dried, forms the best and most substantial bed. Good fresh straw does not answer for this purpose, because the feet sink through it,

and the necessary support is not given. On account of the habit of many horses of reining back in their stalls, it is advisable to make the beds very long.

Calkins.

91. Calkins, though sometimes necessary, are in all cases more or less of an evil. They are not really required for either ordinary riding or driving.

They are an evil, because, in spite of the thickening of the other heel, they interfere with the natural and level bearing of the foot on the ground; because they deprive the hinder portion of the foot of its fair share of work and motion; because they unduly raise the hind-quarter, and thereby tend to increase the tendency to sprain, so common in the hock; because they are a frequent cause of treads; and because they make both treads and kicks, when they occur, more severe than they would otherwise be.

Calkins cannot be so necessary as is generally supposed, because, although they are generally worn down long before the horse is re-shod, the public seldom or ever complain that their horses go worse towards the end than at the beginning of a set of shoes.

When a calkin is used on one heel only, the other heel should be proportionally thickened, so as to give the foot as level a bearing as possible on the ground.

A calkin should be turned up *wide* and made of steel. If made, as is often the case, narrow or little more than a spike, it soon wears down and ceases to be of any use. Besides this, a kick from a broad will be less severe than one from a narrow calkin.

Calkins on the outside may sometimes be used with benefit in horses that turn their hocks out, as a remedy against that defective formation.

92. As regards shoeing, relief is given in cases of Spavin. spavin by thickening the inside heel of the shoe, which has the double effect of giving an artificial support to that side, and again of lessening the strain on the part affected by throwing the weight to the outer side.

Calkins and high-heeled shoes are not without their effect in producing spavin, where at least any predisposition to it exists. The hind quarter from its formation, and especially from its length, is very susceptible of strain at the hock joint; and calkins increase this tendency by artificially lengthening the limb, and thus cause greater leverage, and also an uneven and irregular bearing.

93. Curb is an enlargement at the back part of Curb. the hock joint, caused by strain of the ligament, which binds down the os calcis to the metatarsal or great bone of the leg.

Horses with narrow or overbent hocks are pre-disposed to curb. Relief is given by lengthening and raising the heels, or by applying a patten shoe, so as to throw the weight more forward, and thus lessen the strain on the ligament at the back of the hock. It will be necessary to combine with this treatment rest for a few days.

Blisters of cantharides, biniodide of mercury, or iodine are frequently applied in cases of curb, but the lameness will usually go off without them under the treatment recommended above. They are also applied even where no lameness exists, with a view of removing the enlargement, but pretty generally fail in producing the desired effect. Firing, which is sometimes resorted to, has the disadvantage of producing a permanent blemish.

Though curb is rarely in itself the cause of permanent lameness, yet it is a very decided indication of weakness in the structure of the hock ; and from this defective formation lameness is likely enough to arise at any time after severe work.

Thorough-
pins.

94. Thoroughpins, like windgalls, have but little direct connection with shoeing, but it must be remembered that any system which gives a natural and level tread, and lessens concussion and the liability to strain, will also diminish the tendency to diseases of this class. Calkins, however, especially if made of the enormous size common in

heavy draught horses are very likely to produce this, as well as other diseases of the hock.

95. In the treatment of the injuries and diseases above discussed, such frequent reference has been made to the advantage gained by the use of three-quarter shoes, or of shoes raised at the heels, or at one heel only, that we must, before concluding, guard ourselves against being supposed to recommend such shoes, except in special cases.

Shoes to be level.

A natural bearing and a natural tread is a matter of primary importance to the horse. All that interferes with it is an evil, although in some cases necessary.

96. The shape of a good foot at its lower or ground surface nearly approaches that of the circle, with the crust growing down at an angle of about 45° .

Shape of the foot.

The ground surface of the foot has doubtless been made circular, because that form affords within a given circumference a greater weight-bearing space than any other. Other circumstances, however, require a slight modification of this form. The continuity of the circle is somewhat broken at the heels by the insertion of the wedge-like frog, and in front it is slightly squared off by the wearing away of the toes. Again, the circular form is less perfect on the inner than on the outer

side, because the crust is thinner on the inside than on the outside.

Two advantages are gained by the diminution of the thickness of the crust on the inside: first, the chance of the interference of one foot with the other leg is lessened; and secondly, greater elasticity is afforded. More elasticity is required on the inside than on the outside, in order to obviate the greater concussion which, as is well known, falls on the inside.

Greater concussion falls on the inside, because greater weight falls on it than on the outside. It may seem strange to the reader that less thickness of crust should be given to that side on which the greater weight falls. But a similar formation with a similar view, viz. elasticity and the lessening thereby of concussion, is found throughout on the inside of the limb up to the knee.

In considering, however, the strength required on the inside, it is important to bear in mind three points: first, although the greater weight falls towards the inside, yet it falls on it more perpendicularly than it does on the outside, and the two inside crusts or props are therefore more directly under the centre of gravity than the two outside crusts; secondly, the two inside are nearer together than the two outside crusts, and therefore *each* requires less strength—a principle well known to all builders; thirdly, the fibres of the crust on the

inside being more perpendicular than those on the outside are thereby more advantageously placed for sustaining weight.

The crust is placed by nature on the outer edge of the foot, because in that position it affords the greatest circumference for bearing weight. The shoe will be found most worn towards its outer circumference, because the portion of the crust best adapted for bearing weight rests on it there. Again, of its circumference the shoe in horses shod as recommended is most worn at the quarters, because the greatest width of the foot is found at that part, and the point of greatest width is the natural point of bearing for the greatest weight.

97. Whether the foot expands on coming to or leaving the ground, is a matter in dispute among veterinary surgeons. Expansion
of the foot.

Professor Dick of Edinburgh, if we mistake not, holds that the lower part of the foot contracts on coming to the ground, from the pressure of the superincumbent weight. The late Professor Barlow held that it neither contracted nor expanded; that though there was motion and expansion in the upper part, there was none in the lower or insensible portion of the foot, though there might be elasticity in it. The common opinion, without doubt, is that the foot expands on coming to the ground.

The solution of this question would materially affect many of the theories on shoeing which have been put forward at different times.

As regards the principles and system here advocated it is immaterial whether the foot expands or not. If the foot really does expand, it has under the system proposed every chance of doing so. The preservation of the crust in its natural state, sound and elastic, and rendered neither hard nor brittle by rasping; the preservation of the frog and bars entire; and the maintenance of the sole in its natural state by the absence of paring, must permit all throughout the foot free and natural play; whilst the use of five nails only, and only two of these on the inside, and neither of them near the heel, affords every possible facility for expansion.

It may be said that the closely fitted shoes which have been recommended above must prevent expansion. Shoes, however, for fear of cutting are usually fitted close on the inside, where permanent contraction generally occurs, whilst they are left wide on the outside, which is not the seat of this evil.

The expansion and contraction which are supposed to take place when the foot is taken up from or placed on the ground is, it must be remarked, entirely different from permanent contraction or narrowing of the foot. In the system of shoeing advised in these pages, every precaution has been

taken against this by preventing the opening of the heels, the cutting away of the bars and frog, the paring of the sole, and the rasping of the crust.

Where, however, a greater amount of freedom is sought than can be gained by any sort of shoes, the use of tips is advisable.

98. When, at the end of a month, the shoes are taken off, there is in general a bright mark on the upper surface of the shoe towards the heels, which is by many supposed to be due to the effect of the expansion and contraction of the foot at that part.

Elasticity
of the
heels.

These marks, however, it will be noticed, run along the web of the shoe, and not from side to side, as would certainly be the case if they were due to the effect of expansion and contraction at the heels. They are, in reality, caused by the motion of the heels on the shoe, which is produced by the leverage at the toe, when the horse is in action.

99. It has been already stated that feet ought to be pairs. Any difference in size is the almost sure and certain sign of disease, either past or present, in the foot or in some limb directly or indirectly connected with it, or of some irregularity of action.

Feet to be
pairs.

100. When lameness in the foot is suspected, it

Suspected
lameness
in the foot.

is usual to pinch it round with the pincers, or to tap it with the hammer.

It may be as well to put the reader on his guard against a trick sometimes played by a farrier, who, aware that the lameness has arisen from pricking or other carelessness of his own in shoeing, often attempts to screen his own negligence by omitting to pinch or tap with the requisite force the seat of injury.

Of blistering round the coronet.

101. A few words may be necessary as to blistering round the coronet, which has been repeatedly referred to above.

The object is of course to excite a new and increased growth of horn by acting on the coronary substance or protuberant band of thickened vascular skin extending for about a finger's breadth above the hoof. The blistering liquid should be applied every nine days, until the desired effect has been produced. The horse may be worked throughout.

It is necessary to mention this, because, simple as it is, the object of blistering this part seems often to be misunderstood, and the liquid is applied over half, or even the whole pastern, and the horse in consequence is obliged to be thrown out of work.

Directions for shoeing ordinary fore feet.

102. To shoe horses with ordinary feet, we would suggest the following directions to the farrier:—

1st. With your drawing knife take off from the

ground surface of the crust as much as may represent a month's growth.

Remember that there is generally a far more rapid growth of horn at the toe than at either the heels or the quarters. More, therefore, will require to be taken off the toe than off other parts; in other words, shorten the toe. Be careful to make the heels level. Having lowered the crust to the necessary extent with the knife, smooth it down level with the rasp.

2nd. Round off the lower edge of the crust with the rasp. Do this carefully and thoroughly. If a sharp edge be left, the crust will be apt to split and chip.

The preparation of the foot is now complete. It remains to fit the shoe to the foot.

3rd. Let the shoe be made with a narrow web ($\frac{3}{4}$ inch), of even width all round, except at the heels (see direction No. 8), flat towards the sole and concave to the ground, as shown in the plates at the end.

4th. Turn up the toe of the shoe on the horn of the anvil. The degree of "turn up" must be regulated by what you find necessary in each horse to make the wear nearly even all over the shoe.

It will be found in practice that most horses take much about the same degree of "turn up."

5th. Make five countersunk nail holes in each shoe, viz., three on the outside and two on the inside.

Make the anterior hole on each side immediately posterior to the "turn up." Let the second and third holes on the outside divide evenly the remaining space to the heel. Let the second hole on the inside be opposite to the second hole on the outside.

6th. Let the nail holes be punched coarse, *i.e.*, nearly in the centre of the web, and brought out straight through to the other side. This may be done with safety where a good crust has been preserved.

7th. Fit the shoe accurately to the foot. It must be *as large as the full unrasped crust*, but no part must project beyond it. The shoe must be continued completely round towards the heels, as far as the crust extends.

8th. The web must be narrowed at the heels, so that its inside edge may cover the line of the bars, and no more.

9th. Slope off the heels of the shoe in the same direction as the heels of the crust (see plate 3), so as to prevent the possibility of their catching in the hind shoe.

10th. Select nails that will fit exactly into, and completely fill, the nail holes.

11th. Twist off the clenches as short and stubby as possible, and lay them down flat with the hammer, and let the pincers during this time be firmly pressed against the heads of the nails.

The clenches are not to be filed either before or after turning down, nor is a ledge to be made in the crust to receive the clenches.

103. For ordinary hind feet the pattern of shoe in common use is recommended, but with a clip on each side, immediately anterior to the first nail, instead of one only at the toe. The double clip keeps the shoe steadier in its place than the single.

Directions
for shoeing
ordinary
hind feet.

The web should be made somewhat wider at the toe than at other parts, in order to allow space for the thorough sloping of its inner edge, as recommended under the head of *Over-reach*.

For reasons which have been already explained, the hind foot does not require to be shortened at the toe like the fore foot ; but the other directions given above, namely, as regards lowering the crust, rounding its lower edge, accurate fitting without rasping, punching the nail holes coarse, nailing, and clenching, with the total absence of rasping, paring, opening the heels, cutting away the frog, or bars, &c., apply equally to hind as to fore feet.

Six nails, namely, three on each side, are needed for the hind shoe. Without the third nail on the inside hind shoes are apt to "twist" on the feet.

The horse is now shod. Nothing more must be done for the sake of what is sometimes called appearance.

The best iron only should be used for shoes.

Good iron makes a light shoe wear as long as a heavier one of inferior metal.

To shoe a
trouble-
some
horse.

104. All horses may be shod almost without difficulty — certainly without casting. The chief difficulty generally occurs with the hind feet. The following plan will be found successful :—

1st. To prevent the possibility of the horse getting loose, put, in addition to the ordinary snaffle, a running loop, with a long rope attached, round his neck. There is a little art in putting a noose on, so as to have the best control over the horse.

2nd. Put another rope with a proper shank round his hind fetlock.

3rd. Pull up his hind leg from before. The horse will at first resist this, and try and get his foot to the ground. If he succeeds in doing so, pull up the leg again immediately; never let his foot *rest* for an instant on the ground. It will probably require three or four men at the rope to keep the horse from getting his foot down.

But in time—say in twenty minutes, or half an hour—he will be tired, and be *glad* to rest his leg on the knee of the farrier who comes to shoe him.

Since the days of Mr. Rarey we have learnt to effect much the same object as regards the *fore* leg by strapping it up; but where a leg is strapped up it is necessary, as a precaution, to provide a

soft place for the horse to fall on, in case he throws himself down.

But with the above plan this trouble is not necessary, as the rope can be slacked for an instant, so as to save the horse from absolutely falling.

105. The principles and practice set forward in these pages are those so long and ably advocated by Mr. Hallen, late veterinary surgeon of the Inniskilling Dragoons, to whom for his constant kindness and instruction the author begs to return his sincere acknowledgments. Conclu-
sion.

THE END.

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Drawn from Nature by J Connolly

Walter & Cohn, Lith

SECTION OF A FOOT.

a a	Crust or Wall.	i	Small pastern or Coronet Bone.
b b	Insensible Laminæ	k	Coffin Bone.
c c	Sensible Laminæ	l	Navicular Bone.
d	Insensible Sole	m m	Flexor perforans Tendon.
e	Sensible Sole.	n	Insertion of Flexor Perforans
into Coffin Bone.
f f	Insensible Frog	x	Primary seat of
Navicular disease.
g	Sensible Frog		
h	Coronary Band		

Walter & Co. 1871.

SHOE TURNED UP AT THE TOE

(Ground Surface).

Walter & Cohn, del et lith 31, Poland St. Oxford St

SHOE TURNED AT THE TOE
(*Upper surface*)

SIDE VIEW OF A TURNED UP SHOE.

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