THE

DISEASES OF THE CHEST

AND

AIR-PASSAGES

OF

THE HORSE.

BEING PART I, VOL. II, OF THE AUTHOR'S HIPPOPATHOLOGY.

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A NEW EDITION:

THOROUGHLY REVISED WITH LARGE ADDITIONS.

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PREFACE.

A REPRINT of this section of 'HIPPOPATHOLOGY' has become necessary, not only from the circumstance of the first impression being exhausted, but from the subject being a class of diseases which in their medical treatment, have undergone changes so remarkable that practitioners hardly suppose they are treating the same complaints. Indeed, the practice of medicine in regard to them has experienced a reformation so essentially necessary to meet their altered character, that it is not too much to say, the "mode of cure" set down for them in works but a few years old is found [illegible] present day [illegible] new one, to be not only inapplicable, but positively harmful.

The most glorious improvements of which medicine can boast in our own age are unquestionably, those which, through its judicious administration, save persons from operations with the terrific knife: surgeons now-a-days being oftentimes able to effect that by simple, safe, and comparatively innocent remedies, which in former days could in the judgment of their predecessors, be accomplished only by some [illegible]lex and dangerous procedure. Likewise, in veterinary [illegible]horses are now preserved and restored to their [illegible]he prudential management of the veterinary

surgeon; when in times past (and even in the present day under empirical and unscientific hands) they were either altogether lost, or left in an unsound state to limp out the remnant of their impaired functional powers. With the best modern veterinary practitioners the phleam is almost laid aside; and, in my opinion, the day is not very remote when the drawing knife, from the growing practice of abstaining from paring the feet, is likely to undergo a similar dereliction. The principle of "not doing too much" seems fast gaining ground in medical as well as other pursuits.

In this "New Edition" I have got rid, as much as I could, of the *hybrid* nosological character of the original work, by introducing wherever I felt able and warranted so to do, technical names for diseases in lieu of the vulgar cant and farriers' appellations in common use. I have also made some other important alterations, as well as "extensive additions," in the present Edition, which I hope will be found, in the hands of the veterinary surgeon, to place it in a yet more favorable light.

THE AUTHOR

CAVALRY BARRACKS, WINDSOR;
September, 1853

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HIPPOPATHOLOGY.

PART I. VOL. II.

INTRODUCTORY OBSERVATIONS.

No general fact appears better established in Hippopathology than [illegible] evidencing that Disease is the penalty Nature has attached to the domestication of the Horse. So long as the colt remains, unbroken, at grass or in straw yard, notwithstanding he be houseless and shelterless, little apprehension is entertained of any failure in his health. No sooner, however, does the period arrive for his being stabled, than from the day—nay, even from the hour he becomes so, do we begin to look for his "falling," [illegible] event we are so prepared for in our own mind that, should he happen to escape all ailment during this probationary stage of his life (of which the instances are comparatively very few), we regard him as a fortunate exception to what appears established as a natural consequence of domestication. In translating the animal from his native air to that of the stable—from a situation in which he has been exposed to the "rude blast and pitiless storm" to one wherein the wind of heaven is hardly suffered to visit him, and wherein he is likely to be high fed and little exercised, we have so circumstanced him as to admit of his being put into "condition," though soon or late, he is pretty certain to pay the penalty for it. In this situation, after a time, he becomes so far altered

as to be no more like the same rough and ragged animal he was when first taken up than one species of animal is like another: he is, in fact, perfectly metamorphosed. Such a change, however, I repeat, is not brought about without peril. By the means employed to accomplish all this, excited circulation is aroused in his constitution, under the operation of which the probability—nay, all but certainty—is, that some part or other of the complex animal organism will give way. As we render the hardy plant a tender one, although we augment its growth and beauty, by transplanting it from the open air into the greenhouse, so we transmute the cool, sturdy temperament of the animal into a habit of excitability, under which there is great reason to apprehend, from what we should consider slight causes, that it take on febrile or inflammatory action.

The diseases to which a young animal so situated is most of all liable, are those on the consideration of which I am about to enter; and for this liability are they, or ought they to be, paramount to all other classes in engaging the study and observation of the Veterinarian: indeed, not only for this, but for another reason too, which is, that more horses die of these complaints than of any or all others. Should the veterinarian happen to be located in a part of the country where horses are bred, and where they are taken up from their native fields and placed in stables, to be sold or brought into use, he will find himself, among such animals, almost exclusively engaged in treating cases of catarrh, sore throat, strangles, bronchitis, pneumonia, and pleurisy: it being in the fourth and fifth years of their age—sometimes the third—that horses, in general, experience these complaints. It is, therefore, of the utmost consequence that the veterinary surgeon should be well informed on these matters; and it is with the view of communicating such information that I submit to him what will be found in the following pages. At the same time, it is proper for the young practitioner to know, that the conservation of the domesticated young horse will greatly depend upon the discipline and management he is subjected to when once he comes to be

entirely dependent on man for his food, exercise, &c. Particularly will he require care and watching at the seasons of the fall and spring of the year—seasons of vicissitude and prevalence of influenza.

Although it will be my aim, it may and will, in the majority of cases, prove impossible, to preserve the young animal against certain grievances his nature, under domestication, becomes liable to at certain ages and seasons; yet, by judicious management, we may succeed, if not in warding off disease, in rendering its attack comparatively mild and harmless. Disease in one form or another he will, I almost believe *must*, of necessity, have at this period of his life: our object, therefore, should be to conditionate him for the reception of a seizure of the kind, come when it may, so as to render the attack as light as it can be expected to be. For after all is *well* over, not only is the animal no worse (unless it should happen to prove severe, and leave some unfavorable organic changes behind it), but is often the better for it; since it is well known that, not unfrequently, a horse does not thrive or "do well" until he has experienced the so called "distemper."

Three and four-year-old horses, when brought into stables for the first time, are better kept without corn altogether for the first week or so, and particularly at the seasons of spring and fall. Any soft meat may be allowed them with their hay, such as cold bran-mash, or any other mash, or carrots or turnips or mangel-wurzel; but corn, and especially beans, at this period are of too stimulating a nature for their feed. In the season when it is to be had, nothing is better for them than green-meat: vetches or lucern is excellent feed, and may be given in lieu of hay and mash too, being of itself all that is now required. Our usual practice, when green-meat is not to be obtained, is to give two or three cold bran-mashes a day, with a moderate allowance of hay. In a fortnight's time, a couple of small feeds of corn may be given, conjoined with chaff, one or two mashes making up the three or four feeds a day.[1] Thus

[1] Cavalry horses are, by regulation, allowed four feeds a day.

will the bowels be maintained soluble—a state of them which will indispose the body to feverishness and inflammation. Keep the stable of the young horse well swept and clean; and, above all, cool and free from contaminated or pent-up air. This will be effected by contriving free and open ventilation. But in keeping the stable cool, say from 50° to 55° Fah., let the temperature not descend below this mark, since that would render the stable absolutely *cold;* which, though not prejudicial to the horse like confined heat, particularly when impure as well, is still uncongenial to him, when he comes to be fastened up all day long, motionless, in his habitation. The young horse, coming from a situation where he partook of water *ad libitum*, ought to have water frequently offered him—three times a-day at least; or, what would be better still, *to have water standing by him.* I think most highly of stables and boxes which are fitted up with mangers having water-tanks in them, in which water is always standing ready for use. Exercise, at a walking pace, twice a-day, for half an hour at a time, or double that space of time should the horse not be too weakly for it, and especially should he need it from swelling in the legs from standing, is also required for his health.

A watchful and experienced eye in the superintendence of young horses will much conduce to their welfare, by taking warning in time against any malady that may seem about besetting them. An old remark of a colonel of mine, who took much pleasure in going round the stables containing the young horses, was, whenever he eyed one looking much better in condition—more glossy and sleeker in his coat than the others, and in better spirits—"such a horse will not be long before he comes into the veterinary surgeon's hands." The moment any one of them is found to be out of spirits, dull and dejected, hanging his head under the manger, refusing in part or *in toto* his food, coughing occasionally, &c., that moment let the animal be removed from his stable into, if possible, a loose airy box, where mashes will for a time constitute his sole diet, and where water will be placed at his discretion. Should he not have been in the habit of

wearing a cloth, one now will be requisite; and if he has, an additional one, unless the weather be warm, will be advisable. Flannel bandages, likewise, in case his legs be cold, may cover them. Farther than this must be the veterinary surgeon's affair.

In a former volume of Hippopathology, it has been my endeavour to show, that the natural or necessary consequence of transporting a horse from a cold to a warm atmosphere, and from poor to good living, is the generation of *plethora* or fulness of blood, the tendency of which state of body is to inflammation or eruption, called "breaking out:" the seat or site of inflammation or eruption being the part locally predisposed, or that happens to have blood attracted to it by some cause or other of topical or specific irritation; which part, in horseman's phrascology, is said to "fly." The legs, as well on account of their remoteness from the source of circulation as from their dependent position, are, constitutionally, the first to fly: hence the proneness of young horses recently stabled to swelled legs. Exposed sensitive surfaces, such as the lining membrane of the nose, of the windpipe, and of the lungs, and also the delicate tissue of the eyes, are likewise much disposed to fly or take on inflammatory action, not only on account of their exalted degree of innate sensibility and susceptibility, but from the excitement they are especially subjected to in the heated and contaminated atmosphere of the stable. We have only to extend the same train of reasoning to explain upon general principles the production of catarrh, strangles, roaring, glanders, pleuro-pneumonia, grease and farcy, and ophthalmia; which, collectively, may be said to constitute the catalogue of diseases proper to young fresh-stabled horses.

THE ADULT AND WORKING PERIOD of the horse's lifetime is that in which, though seasoned and inured to his new domicile, he is still the occasional subject of disease; but his disorders have now become such as arise either from want or irregularity of exercise, or from excess of work, rather than from heat of stable or stimulating diet. Plethora, it is true, is manifest in his system, but the parts

which in the young animal were too weak to resist its influence, as well as but too prone to yield to local irritation, have, in the adult, gained strength, and no longer "fly" as heretofore. Internal parts and organs, and particularly such as receive much blood, are now more likely to fail than those that are external and remote from the heart. The lungs will still continue very subject to attack, because they especially suffer from over-exertion; but the brain and eyes are liable at this period to fail; the bowels likewise will now experience occasional disorder from the constipations they become subject to, owing to the astringent or cumulative nature of the animal's food, and, as well as for want of proper exercise, from the disturbances apt to be occasioned in their functions by violent bodily exertion.

THIS ALLOTMENT OF DISEASE between the growing and adult periods of a horse's lifetime will, of course, be liable to vary with the regimen he is subjected to—*i. e.*, his stable management, the nature and quantity of the work he is made to perform, and other circumstances. The view I have taken of the subject is a *general* one. That the facts stated are worthy of some credit—whether the explanations coupled with them be plausible or not—will appear from the subjoined Table:—

A Table (compiled from Extracts from a "Register of Sick Horses," limited to a given period) showing the comparative Ages at which Horses appear most disposed to certain organic Diseases.

DISEASE.	No. of patients under 5 years old.	No. in their 5th year.	No. above 5 and under 10.	No. 10 yrs. and upwards, but under 20.	No. 20 years old and upwards.	TOTALS.
Disease of the Lungs . . .	170	50	20	50	10	300
Disease of the Bowels . . .	10	20	40	70	20	160
Disease of the Brain	4	2	5	14	2	27
Disease of the Eyes	30	10	70	35	5	150

From this tabular statement, to the extent that it goes, we learn that pulmonary disorders are more prevalent among horses prior to and during the fifth year of their age, the periods of their growth and domestication, than at any subsequent time; after which age that they become obnoxious to diseases of the bowels, and occasionally of the brain; and that ophthalmia is a disorder especially prevalent at the adult or most vigorous stage of life.

To enable us to pursue this interesting inquiry still further—to show at what particular seasons, and months even, these disorders, respectively, prevail, (though this is a matter necessarily greatly influenced by weather and situation,)—I have, from the same "Register of Sick and Lame Horses," regularly kept for many years, drawn up the following Table:—

A Table of Cases extracted from the same "Register," occurring within a given period, showing the particular Months of the Year in which Horses appear most subject to certain Organic Diseases.

MONTHS.	Disease of the Lungs.	Disease of the Bowels	Disease of the Brain.	Disease of the Eyes.
	CASES	CASES.	CASES	CASES.
January	20	12	1	10
February	25	8	—	9
March	23	11	1	7
April	19	10	6	10
May	13	3	3	9
June	14	16	1	13
July	13	13	3	19
August	11	23	3	17
September.....	11	5	10	19
October	24	3	3	9
November	19	10	3	9
December	16	9	1	4
Totals.....	208	123	35	135

From this synopsis, it appears that pulmonary diseases

prevail most during the autumnal and winter seasons; that bowel complaints occur oftener in summer than in winter; and that this latter observation is still more applicable to disorders of the brain and eyes.

THE FORM OF DISEASE is to be considered. With young horses—horses at the critical period of their lives, four and five years old—catarrh and bronchitis, the latter ending at times in broncho-pneumonia or pleuro-pneumonia, or else assuming the membranous type (pleurisy) altogether,—is the usual form in which destructive disease presents itself at this period of life; and on occasions it is quite surprising in what short a space of time, and how readily, through some fatal mistake perhaps in the treatment, the animal is hurried out of life.

THE COMPARATIVE FATALITY OF DISEASES, which constitutes yet another link that may be usefully appended to this chain of pathological inquiry, is thus sufficiently accounted for. Searching for the deaths in the "Register," from which the foregoing tables have been compiled, we find—

Deaths from Pulmonary Disease	77
Deaths from other Diseases (Glanders and Farcy and Accidents excepted)	57

According to this calculation, pulmonary disease carries off more horses than all other maladies besides, setting glanders and farcy out of the computation. It must not, however, be understood that, because more horses die from pulmonary diseases than from all or any other, *ergo*, in reference to the diseases themselves, separately considered, that they are the most fatal: on the contrary, pneumonia (for example) is not of itself so dangerous a disease as enteritis; for, were horses so obnoxious to one as they are to the other, more would certainly die from the latter than from the former. The predominance of pulmonary disease, among men as well as horses, is to be ascribed to the variableness of the climate we inhabit, and the continual vicissitudes of temperature we are all in consequence necessarily exposed to; against the effects of which it has been found next to impossible to protect our own bodies, much less those of our horses.

THE PROPORTION OF DEATHS from pulmonary disease may also be estimated from these computations: it appearing in the ratio of 77 to 300, or a fraction more than one in four.[1]

TREATMENT OF INTERNAL DISEASE.—The foregoing practical deductions have been submitted with a view of throwing some light on the causes of disease in general, especially of those diseases to which the horse appears most obnoxious: the brief remarks that follow are intended to elucidate their treatment. Reasoning on general physiological principles, one would suppose that, in an animal in whom the pulse in health ranges under 40, the respiration proportionately slow, and in whom the functions of the alimentary canal are so tardily carried on that we cannot insure the operation of a common purge under twenty-four hours, the progress of disease would likewise be slow; so far, however, is this from being the case, that there is no animal, probably, in which acute disease in general makes such fatal havoc in so short a time as in the horse. An attack of pneumonia has been known to kill in less than twenty-four hours: an enteritic paroxysm in half that time. Changes of structure are in like manner rapid in taking place. There is also a prevailing disposition in the constitution of the horse to convert that which was originally soft and cellular in its composition into solid substance; and that which was uniformly solid, but still pliable and elastic in its nature, into osseous substance, no longer flexible nor even impressible. These few preliminary observations will show the absolute necessity there is, in treating the acute diseases of horses, to at once have recourse to—

REMEDIES PROMPT TO ACT AND EFFICACIOUS WHEN THEY DO ACT.—This property it is which has placed bloodletting at the top of our therapeutic catalogue, and at the same time rendered it a measure to which, when requisite, it becomes our duty to have early or at least timely recourse, before symptoms supervene which may forbid it. A surgeon can

[1] The proportion of deaths to recoveries is probably too highly rated here, it being well known that cases of *slight* or incipient pulmonary disorder are very apt to become registered under the head of "Fever."

vomit his patient almost as soon as the emetic is taken; he can effect purgation in a couple or three hours: the veterinarian can accomplish neither;—at least, the one not at all, and the other but at a period when his patient (labouring under acute disease) is too far overcome to admit of being recovered. Duly weighing these important distinctions between veterinary and human pathology and therapeutics, it will not be a matter of so much surprise, why in the one case bloodletting has been oftener practised than in the other. Independently, however, of the absolute necessity there seems to exist for venesection in veterinary practice, there still appears another reason why we, oftener than surgeons, have been induced to employ it; and that is, the consideration, on two accounts, that our patients may not long lie ill: first, because his services are required by his master, and cannot for any length of time be dispensed with; secondly, because expenses are going on for his keep, &c., although he himself be in a condition to earn nothing. These considerations it is which have induced us to bleed in cases which would recover perhaps quite as surely and as completely without bloodletting; but not, as it appeared to us, within so short a space of time. However, in the practice of bleeding, in particular for pulmonary disease, in the horse as in man, strange but salutary changes in our practice have within these few years past taken place. Coleman was in the habit of saying, in "inflammation of the lungs," bloodletting is our *sheet anchor:* at the present day, I would rather say, in young subjects especially, bloodletting, as a *general* measure, must be abstained from altogether. In the form of pneumonic affection often called *Influenza,* to bleed is little less than to kill the patient. Other remedies must be employed.

In regard to medicine, bearing in mind how requisite it is, in general, that what is exhibited should take speedy and due effect, we ought to take care—at least in all cases attended with danger—to run no risk, in prescribing, as to the event: by which I mean, that in a case wherein we conceive purgation to be highly desirable, it is our duty to insure, by

proper dose and kind and form of medicine administered, the sought-for effect, without running the hazard of creating a necessity for a second dose, considering how long each dose requires to pass through the alimentary canal. Although this remark applies with more force to purgatives than to other medicaments, still it is one that ought not to be lost sight of in the prescribing of any medicine in cases of disease at all urgent. In cases of pressing necessity, there are medicines, such as æther, ammonia, opium, &c., which will speedily, and at once, afford relief, or do so on repetition. Internal remedies are more or less aided by—

External remedies of various denominations; though these turn out of little or no use in acute or painful maladies, unless they exert greater action than, or make an impression superior to, the morbid one which is going on. The insertion of a rowel or seton, in a case where inflammation is raging with a rapidity which, if not checked, in the course of a few hours, must prove fatal, is as futile in practice as piercing the ears of children for ophthalmia, or slitting dogs' ears for congested brain: the counter-irritant must be energetic, promptly and violently operative, to insure the working of any benefit in such cases. We must not forget that there are likewise various bland and soothing means, which, in certain cases and at certain times, prove of the greatest service. They may, some of them, appear but trifling; nevertheless, they have on occasions a most salutary influence.

Decision in practice is a faculty most desirable in any medical man: to the veterinarian it is often absolutely indispensable. A man who has a sick or lame horse desires to be informed by the practitioner he employs to administer to him, not only whether there be any probability of his dying, but, should his recovery appear probable, in what space of time the cure is likely to be effected, in order that he (the owner) may make a calculation in his own mind as to what the cost of keep, &c., is likely to amount during his servant's indisposition. Nay, he is not satisfied even with this information. He must know, further, if the animal be capable of being restored to his pristine condition and powers; and if not com-

pletely, to what degree of approximation. I repeat, to answer all these inquiries with any degree of correctness and confidence, requires a man of experience having penetrative and decisive judgment. Veterinarians have not to administer to the "mind diseased;" they have nothing to do with "placeboes:" their practice is an affair of cause and effect; they must be continually working either good or harm, and without, on the part of their patients (as far at least as their consciousness is concerned), being made acquainted with which they are operating, until the event has made it but too manifest to longer remain a secret.

SECTION VI.

DISEASES OF THE AIR-PASSAGES.

CATARRH, SIMPLE	NASAL GLEET
——— FEBRILE	COUGH
——— CHRONIC	ROARING
LARYNGITIS	BRONCHOCELE
——— CHRONIC	POLYPUS NASI
——— MALIGNANT	EPISTAXIS

The conduits for the transmission of air into and out of the lungs are, the chambers of the nose, the larynx, and the windpipe and its ramifications, the bronchial tubes: altogether, these parts are comprised under the appellation of the *air-passages*. Similar parts, similarly related, constitute the air-passages in man; but between man and horse there is this difference—that the one is able to respire through his mouth as well as his nose, while the other can breathe but through his nose alone: the communication between the cavity of the mouth and the passage to the windpipe being occluded by the soft palate, which in the horse is of extraordinary dimensions. To this fact, familiar as it is, I should say by no means sufficient importance had been attached in the consideration of the pathology of the air-passages. In consequence of the absence of any other outlet and entrance for the air, the nasal passages in the horse are made large and capacious, and from the circumstance of *all* the air respired having to pass through them, these passages necessarily become more under the influence of the aerial current—more obnoxious to any effluvia contained in that current—than the same parts are in man. Hence it is that catarrhal affections in the horse ordinarily have their seat in the chambers of the nose, and not in the mouth, or so often in the throat as well, as in man; hence it is, also, that glanders is (or rather used to be) a common disease in the former, while in man, unless it happen from inoculation, the disorder is unknown.[1]

[1] A case has presented itself of late, in which it is said to have had a *spontaneous* origin.—'*Veterinarian*,' vol. xxvi, p. 23.

The same difference of structure and economy will, in a measure, serve to account for the extreme proneness of the horse to pulmonary affections. The nostrils being in him large and expanded for the free admission of air, the membrane lining the nose becomes so much the more exposed and obnoxious to changes of temperature, as well as to noxious effluvia in the air; whence it follows, that inflammation is the more likely to be set up in the nasal membrane, and from that creep into the larynx and windpipe, and settle upon the lungs.

This membrane being so very subject to disease, being the seat of catarrh, of cough, of sore throat, of glanders, of roaring often, and of inflammation in the bronchial tubes, well deserves our particular attention, and (to the extent that we are able to examine it) frequent inspection. On opening either nostril we discover its surface displaying a dotted, shining, humid aspect, of a more or less carnation hue, without any collected mucus upon it, that being one of the earliest indications of disease. It is a part we should never fail to examine in passing a horse in regard to soundness; it is a part which calls for our especial examination in all cases comprehended in the class of "Diseases of the Air-Passages."

CATARRH.

Derivation.—*Catarrhus,* from *καταῤῥέω, defluo,* I flow down.

Synonymy.—A cold, a defluxion, a discharge, or a running at the nose.

Definition.—A sero-mucous defluxion from (commonly) both nostrils; increased redness of the Schneiderian membrane; oozing of tears, and sometimes mucus, from the corners of the eyes; swellings underneath the jaws; snorting; cough; sore throat; with or without febrile disorder.

The vulgar and vague appellation of "Cold" has, among professional men, very properly given place to the more definite and intelligible one of *catarrh:* there being almost invariably more or less nasal defluxion. Hardly any two persons attach the same meaning to the word *cold:* both

surgeons and veterinary surgeons are apt to be misled by it, so that nothing short of actual inspection of the case can or ought to satisfy the medical adviser. A groom will report to his master that his horse has "only a cold," when the animal is probably labouring under an attack of bronchitis or pneumonia; and will declare a paroxysm of specific ophthalmia to be but "a cold in his eye;" and do this, not from any desire to conceal the truth, but from pure consciousness of the rectitude of his report. Many a life, and still more eyes, have been lost from veterinary aid being deferred or kept aloof after this specious manner.

CAUSES. Such as are called *predisposing* may be said to lurk or arise in horses of from three to five years of age; who have been recently stabled, particularly at certain seasons, spring and autumn, and in such as are very wet or variable. Horses who are pampered, warmly clothed in stables, will be more likely to contract colds than others living, unclothed, in cool or cold stables; and if in the open air altogether they may be said to be hardly susceptible of catarrh at all.

THE EXCITING CAUSES may be said often to be connected with the states and vicissitudes of weather: cold and wet being seasons apt to produce as well as predispose to the disease.

The very appellation of "cold" for this disorder has evidently sprung from the circumstance of its production being commonly connected with exposure to diminished temperature: though cold seems oftener but the *predisposing* cause; the ordinary excitement appearing to be *heat*. It is not usual for horses which are turned out, even though exposed to every inclemency of weather, to take cold; but it is very common after they have been taken up and put into stables, and especially when the stables prove to be warm ones, to be seen falling amiss. It is much oftener the transition from cold to heat than from heat to cold that generates catarrh: in a general way, horses may be taken out of their warm stables and turned into cold situations (provided they are not exposed to wet) without anything like the risk incurred from the reverse treatment. I differ however in opinion with Professor Coleman when he says that horses *never* suffer from exposure

to cold. I have seen several instances of catarrh (not to mention other diseases) consequent upon turning horses out of warm stables into cold and wet pastures and strawyards. Still, the ordinary subjects of catarrh are horses three, four, and five years old, passing from the dealer's or breeder's hands into warm stables; and particularly during wet and cold weather, in spring and autumn. In some years, catarrhal affections become so generally prevalent, and in their attack manifest so much more than ordinary severity, spreading so rapidly among young horses that the disorder not only assumes the character of an *epidemic* or *influenza*, but has the appearance, likewise, of being *contagious;* and though I have never had a satisfactory reason to regard it as such, yet have I ever deemed it prudent to segregate such patients as emitted fluxes, inordinate in quantity or unusual in character, from knowing that every now and then, one among them will turn to glanders. On this point, Dr. Copland observes, "that there is something in the air often producing catarrh, beyond what is perceived by our senses, is shown by the very general or even epidemic prevalence of the affection, during states of the weather and of the air in which nothing peculiar can be observed. Its great frequency, particularly in certain localities and seasons, has induced some authors, among whom Dr. Macculloch is pre-eminent, to impute it to a diluted or generally diffused malaria proceeding from the usual sources of this active agent of disease."[1] In former veterinary works we find catarrh ascribed, above all other causes, to "obstructed perspiration." In old horses, and such as are at their work, no doubt, as a source of expulsion, it is an occasional cause; but the ordinary subjects, I repeat, are young horses—horses that have not yet commenced work, and that are consequently not often, or perhaps have never been, sweated. Horses whose skins have become wet, either from having been sweated or washed, and are afterwards suffered to grow dry without being rubbed, will, particularly in cold weather, be likely to take a rigor or shivering fit. The same observation may be made in regard

[1] 'Dictionary of Practical Medicine,' by J. Copland, M.D., article, 'Catarrh.'

to a horse suffered to stand in any situation where he is exposed to a current of air. But, in most of these cases, heat will be found to have supervened before the disease comes to manifest itself.

FOUR KINDS of catarrh:—*simple*, when void of fever; *febrile*, when attended by fever; *chronic*, when of long and tedious duration; *epidemic* or *influenzal*,[1] when attacking many at one time, and accompanied with remarkable prostration of strength and loss of condition.

THE SYMPTOMS of simple catarrh (which some might call *Coryza*[2]) are, a watery distillation, accompained with, or else quickly succeeded by, a defluxion of flakes of mucus from both nostrils—rarely from one alone; some slight humid blush of the Schneiderian membrane; oozing of tears from the corners of the eyes, with globules of mucus observable in them; small, loose, diffuse swellings under the jaw; occasional snorting, perhaps coughing as well, with or without slight soreness of throat: but without depression of spirits or loss of appetite.

FEBRILE CATARRH may be either *slight* or *severe*. When slight, it is nothing more than the simple form, accompanied with some unusual dulness and fastidiousness of appetite, and some little fever, preceded perhaps by shivering: this being the ordinary form in which catarrh presents itself. The severe form is that in which the depression is greater, the appetite nearly or quite lost, the fever comparatively high,—the membranous reddening greater, with turgidity also of the Schneiderian membrane. Its surface will either appear quite dry, or there may be a scanty, yellowish, albuminous fluid, turning afterwards into a thick muco-purulent running, and becoming altogether as abundant as it was at first sparing.

[1] Already described in section 3, vol. i, of Hippopathology.

[2] *Youatt* (in his Lecture VI, in the '*Veterinarian*' for 1832) makes a distinction between coryza and catarrh; by one being "inflammation of, and defluxion from, the nasal membrane, or the cells with which it is connected;" the other (catarrh) "the same thing extending to the fauces." Dr. Good has made coryza and catarrh different diseases. Unless coryza be a simple *nasal gleet*, these distinctions will prove puzzling to make in *practice*.

The glands under the throat will swell considerably, and evince tenderness on being felt or compressed; those below the roots of the ears, the parotids, will likewise become tumid, giving rise to what grooms call "the coming down of the kernels." Cough is commonly present, attended with sore throat. In a few cases so extensive and violent is the inflammation in the membranes of the nose and throat, and so abundant the discharges from them, that embarrassment is occasioned in respiration, which may increase to that degree to produce violent and convulsive fits of coughing, and even to put the animal in danger of suffocation unless relieved by the operation of bronchotomy. This, however, is what rarely happens, save in the epidemic variety of catarrh.

THE DURATION of an attack of catarrh is ordinarily from one week to three. Should it not appear to be on the decline about the third week, we may infer that the disease is becoming *chronic*, in which form its duration cannot be said to have any definable limits.

IN CHRONIC CATARRH, the nasal defluxion it is which constitutes the prominent and troublesome symptom: indeed, it is often the only one remaining. Sometimes the matter is yellow, from the admixture of pus with mucus; at others, it is altogether as remarkable for whiteness, and possesses a clotted or grumous character: in a few cases it consists of an opaque, thin, dirty-looking mucus. In general, these chronic cases "run themselves dry," as the phrase goes; though every now and then we meet with one degenerating into *nasal gleet*, an affection I shall consider hereafter.

THE TERMINATION of catarrh, taking its ordinary course, is in the return, more or less gradual, of health. At such times, however, as it manifests more than usual severity, and particularly when much inflammation in the cavities of the nose and throat, and consequent fever are indicated, and there be but little or no discharge from the nose, there is great reason to apprehend the disease running into bronchitis, in which extended and modified form it becomes pregnant with all the dangers of an inflammation in the lungs. Indeed, when a horse is received under treatment for a simple catarrh, and

through proper management recovers so far as to be on the eve of returning—or has actually returned—to his work, and then becomes attacked with bronchitis or pneumonia, it is very apt to go harder with him than had the attack of pneumonia shown itself at the first. Many a horse has changed hands having at the time a simple "cold," which in his new owner's possession has run into an attack of bronchitic pneumonia, wherefrom, should he escape with his life, there is still great risk of his becoming a roarer. Catarrh may prove but the precursor of strangles. But again, cases do occur, though happily for us but rarely, wherein the disorder, after having run its course, and cast off all signs of inflammatory action, leaves a discharge from one or both nostrils, to which we give the name of *nasal gleet;* and the appellation is applicable so long as the defluxion presents nothing beyond the catarrhal character: from the moment, however, that it loses this, and especially when it has turned to a thick, turbid, dingy-looking mucus, clinging to the nostrils of the horse, and sticking with gluey tenacity to the fingers of the person inspecting them, we must—should we not have done so before—take care to remove the animal into a stable or box apart from other horses; and at the same time advertise his owner of our suspicions of his ultimately turning out glandered. This, however, is a part of our subject which cannot be properly understood until the diseases, "nasal gleet" and "glanders," come to be taken into consideration.

Prognosis.—Of itself, a catarrh is a harmless, painless disease, often so mild as hardly to call for medical interference, and never resisting judicious counter-agency for any very long period of time. It is only from its *sequelæ* that adverse results, and occasionally even fatal consequences, are to be apprehended: I mean bronchitis, roaring, nasal gleet, and glanders.

Pathology.—Observations in this field of veterinary practice are well calculated to throw a light upon one or two extremely interesting and still disputed points, touching the cause and nature of catarrh in general. I have already endeavoured to show, from results of every day occurrences,

that the disease among horses arises oftener from heat than from cold: and yet from the circumstance of that heat acting in combination with miasms generated in situations where horses are congregated, it may be difficult, in many instances, to discriminate between the effects of heat and this insalubrious condition of the atmosphere. In very foul situations, we have not only cases of catarrh occurring, and those of unusual severity, but we meet with cases of glanders and farcy and ophthalmia as well: clearly evincing that at least these latter diseases are attributable to the impurities of the atmosphere, which are at all times rendered more influential by the accompaniments of heat and moisture. We cannot demonstrate that inflammation is present in every case of simple catarrh or defluxion; but when it is, I see no reason for viewing it otherwise than as common phlegmon: though in cases of scarlatina, and some forms of influenza, the appearances the membrane assumes, together with the products from it, are such as to induce a different belief. The seat of catarrh is the Schneiderian membrane, and in particular that portion of it enveloping the *septum nasi*. From this it mostly extends to the part covering the turbinated bones, in which situation it is apt to occasion some degree of stoppage in the nose, arising either from tumid condition of the substance of the membrane, or from the accumulation of augmented secretion. Should it extend, as it usually does, to the fauces and larynx, the consequences will be sore throat. In the windpipe and its branches—throughout which the same membrane is continuous—it will give rise to *bronchitis*. The frontal sinuses are likewise in the way of becoming affected, and inflammation in them, no doubt, would occasion headache, manifested by unusual dulness or heaviness: further than which I am afraid we know but little about this form of catarrhal disorder.

THE TREATMENT of catarrh is in general a very simple affair; consisting rather in what the French physicians call *médecine expectante*, than in any very active remedial measures.

FOR A SLIGHT CATARRH, take the horse out of his warm (perhaps foul) stable, or from any cold or wet situation in

which he may happen to be, and turn him loose into a box of the temperature of 55 deg. of Fah., and take care that he have an ample bed, clean and dry, and free from impurities. In cold weather clothe him warmly, and, if required, flannel-bandage his legs. Give him nothing to eat for the first two days but sloppy bran-mashes, and as he probably evinces signs of sore throat, let him have linseed tea or gruel, or chilled water to drink: a pailful of either beverage being hung up within his box, so that he may partake of it at pleasure. Encourage any flux there may be from his nostrils by steaming them twice or thrice a-day either with scalded bran in a hair nose-bag, or by holding the patient's head over a tub or pail containing hay upon which boiling water has been poured; an operation rendered still more effectual by enveloping the head and steaming vessel altogether within a linen cloth or bag open at both ends, which thus becomes a conduit for the steam into the nose. Should he have any cough or soreness of throat, let the throttle be rubbed with this volatile liniment:—

℞ Liquor Ammoniæ; Ol. Olivæ, āā ℥ij;
Misce et adde Saponis Mollis, j;
Ol. Terebinthinæ, ℥ij.
M. et bene agite.

Should the excrement prove hard and dark-coloured, let an enema of soft soap and tepid water be given, and repeated daily until, through it or a mash diet (without hay) to which for the first day or two the horse should be confined, the excrement becomes pultaceous. The steaming may be practised twice a day, and the liniment may be *once* repeated; but not a second time, lest it cause the hair to come off. In this simple manner, by strict confinement to stable—or rather box, which is preferable—with warm clothing, a slight cold may be in two or three or four days got rid of; but—

In severe catarrh, in which there is fever, and perhaps some embarrassment in the breathing, strict abstinence from both hay and corn should, for the first two days, be enjoined;

while an aperient (composed of half an ounce of purging mass, containing 2 drachms of aloes) ought to be given at once, which will gently operate on the bowels. As soon as the dung has become softened, then sparing quantities of hay (but no corn) may be allowed with the mashes. Should the aperient produce actual purgation—which it very rarely does—then let the bran mash, and the water with it, be altogether withdrawn, hay alone being substituted for the one, and gruel for the other, in which way any harm continued purging might do to an irritable bowel will be speedily counteracted. Linseed tea, should it be prepared, will answer the same purpose as gruel, at the same time that it is an emollient and useful drink when the throat feels sore.

If the bowels become greatly relaxed, fever medicine may be administered. This ball, Camphoris, ʒj; Antimon. ʒj; Potassio Tart., ʒiss; Potassio Nitratis, ʒiij; Thariacæ q. s. m. ft. bol. may be given once or twice a-day. All along, the steaming operations should be steadily persisted in; to which, in cases, from glandular or other swellings requiring it, fomentations and poultices even may be added.

Soreness of throat, when annoying, is best relieved by either blisters, or mustard plasters, when the repetition of liniment does not answer the purpose. The mustard plaster we generally prefer; because, after taking due effect, which it will commonly do in about twenty minutes, it may be sponged off, so as to be repeated, if requisite, another day. Blisters, become more permanent and troublesome in their operation. For the treatment of sore throat, however, in the predominant and abstract form, it now and then assumes in catarrh, see the account of "Sore Throat." And for the change which must necessarily take place in the treatment whenever the catarrh runs into bronchitis, see the account of the latter disease under the heading of "Diseases of the Lungs."

LARYNGITIS—SORE THROAT.

DERIVATION.—Laryngitis, literally meaning inflammation of the *larynx*, from which, with the addition of *itis*, the compound is formed, is the technical word ordinarily in use for *sore throat*: the word *angina*, though there be states of laryngitis in which the animal is really in danger of strangulation, being applicable to *strangles*. The objection to calling the disorder *laryngitis*, is that such a name would signify the larynx only to be its seat: whereas it is evident enough that the pharynx, and surrounding parts as well, must often, if not commonly, be similarly affected.

SORE THROAT is a common attendant on catarrh; indeed, in some forms and stages of the disease it may often be said to constitute the main or leading symptom. And so long as the throat continues very sore we may be pretty certain that the disease is confined to that part; whereas, should it decline, and the horse still continue ill, we have every reason to believe that the disease has either extended or become transplanted to the bronchial membrane in the lungs.

KINDS.—In this form the disease may be said to be either *acute* or *sub-acute*; but there is a form it now and then assumes which we may recognise as *chronic*, one apt to be of long and troublesome duration.

THE SYMPTOMS of sore throat are manifest to very ordinary observers. The groom knows that his horse has it from his manner of acting with his head with his stiff mode of carrying it. He protrudes his head awkwardly, and if pinched, or but slightly compressed even with the thumb and finger about his throat, instantly coughs, and afterwards throws up his head, so as to avoid if possible a repetition of the pinch. If the soreness be more than slight, or be severe, the animal will manifest difficulty in deglutition, and even cud his food and reject it rather than attempt to swallow it, which act he knows will cause him soreness and pain. On this account he will prefer soft or bruised food: indeed, hard and prickly provender, such as hay, he will frequently refuse altogether.

Sometimes the inflammation and consequent tumefaction of the membrane of the larynx is so great that the glottis becomes diminished to a degree to occasion shortness and difficulty in breathing; should which increase greatly, the opening may, through tumefaction of the membrane and secretion from it, become so contracted and plugged as to give us apprehension the horse, unless relieved, may be suffocated. In such cases, not only is the larynx affected, but the surrounding membranes as well of the fauces and pharynx and their investing tissues; at the same time the guttural pouches and salivary glands participate in the inflammation and swelling; of all which the sequel is not unfrequently abscess of one or both parotids, or it may be of the guttural pouches, or of the submaxillary tissue; the case turning into one of violent strangles.

Glanders, even, has been known to follow laryngitis. The membrane of the glottis, from continued or violent inflammation, becomes changed in its character. It becomes infiltrated (dropsical), permanently thickened and indurated, afterwards ulcerated; giving rise to a condition of parts either simulative of glanders, or even to glanders itself.

Cough, short, hard, dry and frequent, accompanies the disease in its incipient stages; though, as inflammation increases and the sore throat grows severe, the cough becomes faint and less frequent, and under extreme soreness of the throat becomes so suppressed as to be hardly noticed at all.

Nasal defluxion, when the disease assumes this violent or acute form, is scanty or not perceptible at all; though it becomes abundant and frequently most profuse at the height and towards the decline of the inflammatory action. In cases where it exists in profusion it is apt to be coughed up into the mouth, mingled with the saliva.

Fever will arise at the time the animal is labouring under violent action and annoyance within the throat, augmenting in proportion to the severity of the irritation. The animal will refuse for a time all food, will have great frequency of pulse, and heat of skin and mouth, and will in fact exhibit all the symptoms of high febrile commotion in his system.

CHRONIC LARYNGITIS is a disease which comes oftener under notice than the acute disease. I believe most of the troublesome, enduring, hacking coughs we are constantly consulted about to be attributable to some over-irritable or morbid condition of the larynx: at least, I think I have a right to assign such to be their seat when I find compression of the larynx instantly occasioning the cough, and causing that manifestation of annoyance—shaking of the head, running back, &c.—on the part of the animal, which clearly evinces morbid or abnormal irritability in the part. Another demonstration of the correctness of this opinion is the relief mostly obtained from the application of a blister upon the throat.

THE CAUSES of laryngitis may be sought for among those of catarrh and bronchitis.

THE EFFECTS of this inflammation are various, tending in violent cases, as I have already observed, to suffocation; in others, to that state of parts which is known to produce thick wind or roaring. Suffocation is liable to happen under convulsive efforts to breathe, either during the tumid infiltrated condition of the mucous membrane, or while the passages are loaded with secretion: it is under these circumstances that we are warranted in having recourse to the operation of bronchotomy.

SPASMS OF THE LARYNX are among the distressing symptoms to which laryngitis not unfrequently gives rise. Mr. Haycock,[1] views this symptom as of itself the disease; but this is not the case. It may arise from either inflammation or irritation, going on within, or directly acting on the larynx; or from a distant source of irritation acting upon the organ from an impression conveyed in a reflex manner by one or more of the numerous nerves which terminate within the tissues of the laryngeal apparatus. Mr. Haycock's description of it is a very good one: "Sometimes," he says,[2] "it manifests itself in a moment, as it were, with a most terrible severity—the animal begins to gasp for breath—the eyeballs protrude and present a wild haggard appearance—the nostrils

[1] 'Elements of Vet. Homœopathy,' &c. By Mr. Haycock, V.S. [2] Ibid.

are dilated to their utmost extent, the nose is protruded, and the neck is carried in a line with the back— the flanks heave with most excessive violence, and every time the poor beast inspires air, a sound is emitted which will vary in its character and intensity according to the rigour of the spasm. Sometimes it will be loud and shrill; sometimes a kind of scream; at other times like a loud twang from a trumpet," &c., At last, the spasm is either suddenly relieved, which is very rarely the case, or he falls very heavily to the ground, struggles for a few moments, and then dies completely asphyxiated.

THE TREATMENT of laryngitis is to be the same as that adopted for catarrh, with this exception, that the throat must be the part to which all local means are to be directed. In mild cases we may be content with fomentation and poultices, succeeded or alternated by giving all the encouragement in our power, through steaming, &c., to discharges from the nose. But in violent and dangerous cases nothing is so effectual as outward stimulation; blisters, and in particular the mustard poultice. In all cases of chronic swelling, with thickening and hardening of parts above the throat, and especially where there is any disposition to become protracted or chronic, nothing tends to bring about a crisis of some sort sooner than a blister.

Purgation would be serviceable could it be managed; but, in these cases, in general, we are debarred from administering medicine by the mouth. When foiled in that, the best plan we can adopt is, by frequent clystering, to keep the bowels at least in a soluble condition.

An attack of spasm could be met at the moment with no other remedy save the operation of tracheotomy. No time must be lost in slitting open the trachea at a convenient place and inserting into the aperture the tracheotomy tube.[1]

[1] This tube is described in vol. I of the 'Hippopathology.'

MALIGNANT OR PUTRID SORE THROAT.

(Laryngitis Maligna.)

My attention was first drawn to this sad and fatal disease, through the *'Veterinarian,'* by Mr. Thomas Proctor, V.S. Solihul, who kindly, in October 1850, sent me an extremely interesting account of it, from which I am about to take the remarks here offered to the notice of my reader:—

CATTLE as well as HORSES are subject to it, and in Mr. Proctor's practice, although "scores of cases" have presented themselves, they have all of them proved fatal.

THE SYMPTOMS differ from those of ordinary or catarrhal sore throat in the disease being sudden in its attack and rapidly running its course; the patient rarely surviving the third day; the entire system from the first sympathising, as is shown by the rapidity (100 per minute) of the pulse; and the general strength of the body failing. At first the salivary glands take to swell and are extremely painful to the touch. Then the throat generally commences swelling, and becomes sore, so much so, as the tumefaction increases, as to make it so painful to swallow that food and liquids too are refused by the animal. At length the throat becomes prodigiously swollen, and difficulty of respiration, with sonorous and distressing breathing, ensues, accompanied with fetor, which, as the complaint advances, turns in some cases so obnoxious that before death it is stinking in the extreme. The membrane of the nose is of a dark crimson colour. The countenance turns doleful and sharp, and even haggard, and with increase of all his anxiety and distress, the poor animal dies a victim to a disease which we appear to have no power even to arrest, much less to cure.

THE APPEARANCES AFTER DEATH are—larynx and pharynx in a state of inflammation, ulcerated perhaps as well, and covered with putrid discharges; root of the tongue ulcerated; considerable enlargement of the salivary glands, and of the surrounding tissues also. Sometimes inflammation and effusion are likewise discoverable at the base of the brain.

THE DISEASE IS CONTAGIOUS: at least the following facts,

which Mr. Proctor received from "good authority," would lead us to believe so :—"Two sturks were found dead in a field, or nearly so, with affections of their throats. The butcher was sent for to dress their carcases. His own horse partook of some grains mixed with some of the blood taken from the beasts; and in less than twenty-four hours afterwards he died from swelling of the throat, producing suffocation. A sow and nine pigs ate of the blood and grains, and were soon afterwards seized with throat affection, with sonorous breathing, of which all of them died. The others, after much trouble, eventually recovered."[1]

Treatment.—Fomentations and poultices of an antiseptic nature would be most proper, with tonics and good living. Tracheotomy might become necessary. Isolation and careful management are peremptorily called for.

NASAL GLEET.

Nasal gleet is the name here given to those discharges from the nose which are commonly preceded by some inflammatory or catarrhal attack of the air-passages, in particular those of the head; though there occur examples of their appearing without any such detectible precursor, originating, indeed, without any visible or apparent cause whatever: in most cases they are apt to continue long after all signs of inflammation have died away. Gleet is more likely to supervene after a chronic than an acute attack of catarrh, and to shew itself in an adult or aged horse rather than in the young subject. Sometimes the discharge comes from one nostril alone, more usually from both. Sometimes the submaxillary glands remain tumefied; sometimes they are not. The Schneiderian membrane, discoloured by inflammatory action, has become pallid and leaden-hued, but is free from all pustular or ulcerative indications. The discharged matters vary

[1] Also the son of the butcher, who assisted his father in the dressing, happening to have a scar on one of his fingers, fell ill afterwards with painful swellings on his hand and face, and was confined for some time from it.—'*Veterinarian*,' vol. xxiii, p. 572.

in quantity and quality in different individuals, and even in the same horse at different stages of the disease. The ordinary gleet consists of a matter more mucous than purulent, remarkable for its whiteness, about the thickness of cream, and in some cases is smooth and uniform, in others clotty or lumpy: in other cases it is yellow, and appears to contain in its composition more pus than mucus. At one time it will collect about the nostrils, and become ejected in flakes or masses, in pretty regular succession; at another, there is a good deal of irregularity in this respect, the running from the nose ceasing altogether for a while, as though the animal were cured, and then returning in double and treble force. Sometimes fetor is an offensive accompaniment of the discharge; at other times no fetor is perceptible. The health does not suffer in the least; on the contrary, it is one of the indications of this disease that the horse eats and drinks and has his spirits, as well as though he were quite free from complaint.

PATHOLOGY.—Formerly, these cases were regarded to be glanders: they were called *chronic glanders,* and many a horse has been destroyed under this false impression. That a case of the kind *might* not turn to glanders is more than I can pretend to say; but that, so long as it continues gleet, it is not glanders, I am fully persuaded; and to show that it is not, I have been in more than one instance successful in bringing the case to a favorable issue.

THE TREATMENT of nasal gleet may be at first simply medicinal: this failing, however, an operation becomes our only resource. A rowel inserted under the jaw is a simple and sometimes efficacious remedy in recent gleet; though it seldom avails much when the disorder has been of any standing. Blisters and setons do no good, unless there be some glandular swelling: then, that may be blistered, though without any great prospect of stopping the discharge, on the irritation of which it probably depends for its existence. Injections of various kinds up the nose or affected nostril are to be employed; though their success must depend upon the duration and nature of the complaint; for if it be of long standing, and

have its seat—as it then probably has—within the sinuses, the injections will do no more than temporary good, and perhaps not that. There are many different kinds of injections: alum, copper, zinc, lead, lunar caustic, &c. At a time when there is much fetor, chloride of lime, in the proportion of an ounce to the pint of water, makes a good injection. What I commonly use, and find to answer very well in general, is the kreasote injection, recommended some years ago by Dr. Elliotson: should that not be found to give satisfactory results, or to require a change, we may try the copper injection:

℞ Kreasotonis, ʒj;
Liquor. Potass., ʒij;
Aquæ Distillat., Oss.
M. pro injectione.

or—

℞ Cupri Sulphatis; Aluminis, āā ʒjss;
Aquæ bullient., Oj.
Solve pro injectione.

Either of these injections may be thrown up the nostrils with a four-ounce syringe twice or thrice a-day. I have on several occasions employed fumigation, and various medicaments in the gaseous form; but I cannot say I ever have experienced any great deal of benefit from them: in general I have found more efficacy in injections. The medicines which have appeared to have taken most effect, given internally, are preparations of copper and barytes, copaiba, cantharides, and the cubebs and Cayenne peppers. That which exerts the most speedy and decided operation is the balsam of copaiba: like all the others, however, it cannot be implicitly relied on; in some cases it will in a few days cause the discharge to cease temporarily or permanently, in others no such effect will follow its administration. I give it in ounce doses, rubbing as much linseed meal or oatmeal into an ounce by measure of the balsam as the latter will take up, and making the mixture into one or two balls, and administering this dose morning and evening at first, and, after three or four days, thrice a-day, according to the effects produced. Cantharides may be given, in five-grain doses, to begin with,

twice or thrice a-day; or it may be advantageously introduced into the copaiba ball. An ordinary gleet ball is this—

℞ Pulv. Cantharid., gr. iij;
Farinæ Lini vel Avenæ, ℥jss;
Balsam. Copaib., q. s.
Ut fiat Bol. bis terve die sumend.

Both cubebs and Cayenne peppers possess stimulant and styptic powers upon the mucous membranes: the former may be exhibited in ounce doses, mingled with copaiba; the latter in half-ounce doses, with the same, or with common Venice turpentine. Both the sulphate of copper and muriate of barytes have proved useful in these cases: the first stands handed down to us by our professional ancestors as one of the remedies they employed in various disorders in preference to most others; the other I can speak of from my own experience. Whether either of them possesses any anti-glanderian virtue, will be matter for future inquiry: at present I shall only say I believe that this preparation of copper is one of the most efficacious medicaments we have in regard to some anomalous affections of the air-passages; and that, as such, it will, on occasions, be our duty to employ it. I believe its operation to be greater in small and divided doses, long continued, than in large doses; and that it is better, both for the stomach and for its introduction into the system, that it should be exhibited in the form of solution.

Curative treatment.—For cases found to resist such obvious measures as I have been recommending, I have a plan of treatment to advise which in my hands has in two remarkable instances (published in the '*Veterinarian*' for 1846-7, vols. xix and xx), been attended with that success, if not *absolute cure*, which is well worthy of a repetition of trials. Being provided with a small *trephine* or circular saw—the one I have had made for the purpose incises a piece about the size of a sixpence. I operate upon the frontal bone with a view of making an aperture into the frontal sinus, as near as is safe to the medium line of the cranium. The sawing operation must be performed gradually and with moderate pressure upon the saw, since violence might thrust the incised

piece of bone back into the sinus, which on one occasion happened to myself, though no harm resulted from its remaining there: to get it out being impossible. The aperture made, at first clean tepid water may be syringed into the sinus, which, if the passage be unobstructed, will run out at the corresponding nostril mingled with some of the matters discharged. After this the kreasote injection may be tried, and repeated. After a day or two, not only does the flux from the nose become diminished, but effused masses of coagulated blood sometimes make their appearance, which may, in some cases, be extracted with forceps through the aperture. At other times, however, nothing of the sort happens, and the injections are persisted in for several days, perhaps weeks, before any remarkable change takes place. In favorable cases the gleet matter degenerates from a mucopurulent flux into aqueous or serous running, and that after a time but occasional, while the enlarged glands gradually subside. Notwithstanding such favorable change, however, which may or may not be the immediate result of our treatment, we must always, for the first at least, be in expectation of relapses. One morning the nose may seem all but dry, while the next or a few days after, the running will reappear as violently as ever, and the submaxillary gland will at the same time resume its former magnitude. Sometimes, however, after the injections have been used for some days, irritation will, from them, be set up to that degree to itself cause augmented discharge and glandular tumefaction; under which circumstance it will be necessary to discontinue them, at least for a time.

One thing it is very needful to be careful about from the first, and that is, that the hole made by the trephine does not speedily become closed up. I say, "speedily," because, ultimately, and before so very long, close up it will in spite of us. The way in which I oppose Nature's efforts is to fit a wooden plug or a phial cork into the opening. This for a time answers the purpose of counteracting closure, as well as shutting out air and dirt. In one of the two cases I have published, the discharge returning after I had

reason to believe that the animal was restored, I operated on the maxillary bone, below the eye, opening the maxillary sinus, and injecting it. This, however, did no good. To accomplish the cure, which I eventually did, I was compelled to have recourse to trephining in another place, the frontal sinus, for the second time. See the cases in vol. xv of the *Veterinarian*.

THE MODUS CURANDI here appears to be, the destruction of the lining membrane of the sinus, or rather the filling of the cavity perhaps, in the end, with effused matters, which ultimately become, it would appear, a sort of concentrated structure of bone, no longer yielding any discharge, all secretory apparatus being as it would seem annihilated. This, therefore, would appear to be the object of treatment, and the way to effect permanent cure, viz., to destroy all secretory tissue, and fill up the cavity of the sinus.

COUGH.

DEFINITION.—Cough is the sound produced in the throat by a sudden and violent expulsion of air from the lungs.

COUGH DIFFERS FROM ROARING in being the product of expiration alone, and in that expiration being of a convulsive nature: roaring results from impediment in breathing, and is most remarkable in inspiration.

PATHOLOGY.—From the circumstance of cough being present as a symptom in several diseases, and in some without being regarded, of itself, of other consequence than the annoyance it gives rise to, it has become a question among nosologists, whether, even when it appears to exist alone, it can with propriety be viewed as an idiopathic affection. Our observations certainly tend to erecting it, in certain cases, into a disease *sui generis*; although at the same time we are prompt to admit that it occurs much oftener as an attendant of some other malady. We have just seen that it constitutes one of the ordinary symptoms—and on occasions a very troublesome one—of catarrh; we also find it present in strangles, in bronchitis, and in laryngitis: it is also to be met with in pleurisy and in certain stages of pneumonia.

DIVISION.—This view of the subject enables us to make a division of coughs into such as are, *symptomatic* or *sympathetic*, and such as are *idiopathic*.

THE CAUSES OF COUGH have, some of them, been already pointed out: most of them may be said to be comprised in diseases of the air-passages and lungs; but to these are to be added others, which, from not being so demonstrable, have been less noticed. Gibson informs us, that "some young horses are subject to cough and slight fever when they are breeding their teeth, but especially before they cut their tushes:" an observation perfectly consonant with the irritation which I know teething occasions, and one confirmed by my own practice, and particularly when he speaks of the cutting of the tushes having *particular* influence. It is also remarked by some of the old writers, that "worms in the stomach and bowels" give rise to cough: among the moderns, Mr. Blaine is of this way of thinking. Hurtrel d'Arboval includes disorders of the kidneys and bladder among the sympathetical causes of cough. That cough in our own persons, among numerous other producents, may originate in disorder of the digestive organs, in particular of the stomach and liver, is no longer questioned by physicians; and that it may have the same origin in horses, for my own part, I think admits of no doubt.

Observation has long ago made us acquainted with the sympathies existing between the several mucous membranes of the body; and in no case is this stronger or more remarkable than in the instance of the air-passages and alimentary canal; a fact from which we may derive a solution at once of the connection between cough and disordered stomach or bowels, and worms, as also between cough and affections of the kidneys and bladder.

BUT COUGH MAY BE IDIOPATHIC; its seat being either the larynx or windpipe or lungs, and its existence solely dependent on some inflammatory or other morbidly irritative condition of one or more of these parts, and that condition existing by itself, or without connection with any other disease present at the same time.

Our prognosis, it will be inferred from what has been stated, in a case of cough, must not be abruptly or incautiously formed. We must endeavour to ascertain its origin and its duration, its nature, symptomatic, sympathetic or idiopathic: we must also pay attention to *the kind of cough*—the particular sound emitted—which in some cases will of itself bespeak its nature. From the bold sonorous cough, characteristic of the sound condition of the air-passages and lungs, we distinguish, by practice, the humid cough; the dry, hard, or short cough; the soft or feeble cough; the hollow cough; the intermittent cough; and the broken-winded cough.

The humid cough is that which commonly attends catarrh, strangles, bronchitis and influenza; and in some instances other disorders. It may, however, be idiopathic. It is accompanied with expectoration, which, when abundant, shows itself in defluxion from the nose, and is, in the act of coughing—which is often prolonged, and by mucus collected in the throat, rendered painful and annoying—ejected through the mouth, causing the animal to move his jaws and tongue about, slabbering out part and sucking in the rest of the expectorated matter, and swallowing it. In cases of sore throat and inflammation in the chest this becomes a weak or feeble cough.

The dry or short cough—independently of its being a sign of an inflammatory or unsecreting condition of the air-passages—may arise from sympathetic irritation; although I believe it will oftener be found to be idiopathic. Teething may occasion it. Disorder or irritation in the alimentary canal may generate it. How often is it that a young horse having what grooms call "a constitutional cough," is at the same time looking rough in his coat, and altogether out of health? May not this—which we are in the habit of ascribing to diseased lungs—be owing, in some cases, to disordered or imperfect digestion? I have observed that flat-sided, pigeon-breasted colts are the most frequent subjects of cough, as if malformation of the chest was also occasionally concerned in its production. But, every now

and then, a horse is brought to me with a cough of this description, looking in perfect health and condition, the cough seizing him only while out at exercise, or on his first leaving his stable, or when cold water is given to him. He may have had this cough for weeks or months, or even for years: in the latter case, it troubling him every winter. The cough may have originated in catarrh, or some inflammatory attack of the air-passages or lungs, or it may not be traceable to any such cause: it may be idiopathic from beginning to end, or it may become idiopathic after being for a time sympathetic. The probable seat of this cough is the larynx; I believe it to be often confined to the rima-glottidis. Any tumour pressing on this part might occasion it. In the absence of this, it is probably owing to congestion or thickening or other alteration of the membrane, and consequent morbid irritability of it. D'Arboval describes the cough of pulmonary consumption as small, *short*, feeble, and accompanied with a sort of wheezing.

THE HOLLOW COUGH.—A deep sepulchral sort of sound, something of a compound between a cough and a groan, emitted, according to the sensation the sound conveys, from the very inmost recesses of the air-passages. So peculiar is the sound of this cough, that, being once heard, it is not likely to be forgotten. Its seat, I believe to be the windpipe, or some of the larger bronchi. I have known several horses having it without its affecting their health at all. There was one lately in our regiment who regularly did his duty, and seemed no otherwise inconvenienced by it than at the time it was on him. In general it exists but at particular seasons.

INTERMITTENT COUGH is the name given to those fits of coughing with which horses are in the habit of being seized on a sudden, and oftener at work than during repose. The cough is a dry, hacking, half-suppressed one, is repeated several times in quick succession, and does not return again for some considerable interval. It is a cough that may endure a very long time. Delafond says it proceeds from pulmonary emphysema.

THE BROKEN-WINDED COUGH is the one emitted in the disorder we call "broken-wind." It is of itself so completely characteristic of that disease that we require no other test; and withal it is quite distinct in its sound from all other coughs. I defer all description of it until the subject of broken wind shall come under notice.

TENDENCY OF COUGH. — There being several diseases which are on occasions ushered in by cough, it is difficult to say, in the first instance, when a horse is brought to us with recent cough, to what it may owe its origin, or, symptomatically, be leading. It may be but the forerunner of simple catarrh; it may usher in laryngitis, bronchitis, pleurisy, pneumonia, &c. On the other hand, it may continue without the manifestation of any other disease, as a simple cough, only of present consequence insomuch as it proves troublesome and annoying, especially during work. In allowing this cough to run on, however, and particularly in suffering the animal to work with it, we run a risk of spreading the irritation already existing in the air-passages, and at the same time producing febrile disorder in the system. Should this not follow, we shall in all probability, by neglecting the cough, have it become "settled," or "established," or "chronic," and in that form more difficult than ever to remove; or, when removed, extremely likely to recur, and especially in the winter season. What may result from the continued irritation of chronic cough—one which is sometimes better, sometimes worse, or that disappears in summer and returns in winter—it is impossible to say: much will depend on the condition, sound or unsound, of the animal's lungs; a horse in whom those viscera continue healthy may have a cough for years, and never experience any ill effects from it; in another, with unsound lungs, it may lay the foundation for thick or short wind, or for pulmonary consumption. There is a notion abroad that a short cough is likely to "end in broken wind:" I cannot, however, altogether subscribe to this prognosis.

THE TREATMENT OF COUGH must be directed to the fountain-head of the malady, to the seat of disease or irrita-

tion to the existence of which the presence or continuance of the cough is owing. A cough, an accompaniment of catarrh, will only vary the treatment recommended for that disease, in inducing us to stimulate or soothe the throat, when probably without it we might not have deemed that necessary. The cough resulting from disease of the lungs, commonly slight and feeble, will require no especial attention; unless it should continue after the subsidence or disappearance of the pulmonary disorder, which it but rarely will be found to do. The cough often attendant on dentition will be treated with most effect by a soft diet, a gentle aperient, and the lancing of the gums over such of the tusks as are about making their way through. Suspected disorder in the alimentary canal or liver must be corrected before the cough—should it be supposed to be connected with such disorder—can be removed. Should worms be present, the case will require vermifuge medicine.

IDIOPATHIC COUGH WILL REQUIRE more special treatment. When recent, and there be signs of concomitant febrile action, such as increase of pulse, heat of mouth, dulness, &c. depletive and soothing means are indicated: aperient febrifuge medicine, mash diet, and so forth. The febrifuge ball may be given daily, until some slight impression is made on the bowels; actual purgation being not only unnecessary, but harmful. The animal should be forced—starved from water—to take demulcents for drink; and the best way to accomplish this is to hang up a pailful of clear, thin, well-made water-gruel, or linseed-tea, which is better still, in his box; supplying him from time to time with fresh, whether that be consumed or not, but not showing him any water. These soothing remedies are very likely to convert the cough into a case of catarrh, should that not be the natural tendency of the former; and this auspicious change will be still more likely to be induced by fomentations to the throat and steaming the nostrils. A stimulating application rubbed upon the throat after the fomentation will prove beneficial. For this purpose we may use the liniment composed of equal parts of liquor of ammonia and olive oil; or we may employ

the turpentine liniment which is recommended for sore throat in my account of catarrh, at p. 21. Should more counter-irritation still, be required, the throat may be painted with the Acetum Cantharidum, or a regular blister may be employed. For my own part, however, I prefer a sweating blister to these liniments: there is no occasion to remove the hair, and care should be taken not to rub in above a table-spoonful of the liniment of cantharides, lest it cause the skin to peel off.

IN COUGH UNATTENDED BY FEBRILE EXCITEMENT, and which, as far as can be ascertained, of itself constitutes the sole ailment, one of the following balls, from either recipe, may be exhibited morning and evening:—

℞ Camphoræ, ʒij;
Pulv. Scillæ, ʒj;
Pulv. Opii, ℈j;
Glycorrhyi, ʒij. M. ft. Bol.

℞ Extract. Belladonnæ, ʒss;
Farinæ, ℥ss;
Iperiacæ, q. s.
M. ft. Bol.

Bruise the camphor with a table-spoonful of spirits of wine; then add the remaining powders, and make them all into a ball with honey or treacle.

Before quitting this part of my subject, I would observe, that repose is absolutely necessary for the cure of cough: so long as the horse continues to be taken out, and especially in damp cold weather, so long shall we in vain administer to his cough. Loose in a box, he needs no exercise; on the contrary, he should be kept quiet, and be warmly clad, with even his legs bandaged with flannel, should the weather at the time prove cold.

DIET.—Change of food often proves of service to a horse having cough. In summer, green-meat may be substituted for hay, and no corn allowed the while. In winter, in lieu of corn, carrots or turnips, mangel-worzel, potatoes, or parsnips, may be given, properly cut, *i. e.* sliced.

IN CHRONIC COUGH—cough that has been neglected and that has from its duration, or habit of relapse, resisted such treatment as above recommended—I have often experienced benefit from the insertion of a seton in the throttle; a practice I often prefer in this case to a rowel under the

jaw. And when there is the least suspicion that the cough is kept up through any source of irritation within the thorax, a rowel may be insinuated in the breast; for with this counter-irritation I have known medicine to succeed, when, without such collateral aid, it has failed. The medicine best adapted for a case of this latter description is, after clearing out the bowels and setting the digestive organs to rights, the camphor and squill ball I have just prescribed; or, that failing, the belladonna ball may be tried. When both fail, a course of mercury may be recommended. Keeping the horse quiet in his stable is indispensable.

ROARING.

ROARING is no more a disease in horses than crying is in ourselves. It is but a symptom, and of itself so vague a one, that, without much careful investigation, it is often as difficult to say what disease or disorder is giving rise to it as to divine the cause of a person's grief.

DEFINITION.—Roaring may be defined to be, breathing with a loud and unnatural sound, under exertion of any kind.

THE SOUND or noise emitted varies under different unnatural conditions of the air-passages, and also under different degrees of exertion to which the animal may be put. With a view of elucidating the first of these assertions, I shall relate an experiment I made some years ago, touching the constriction of the windpipe. The second assertion rests upon facts known, I believe, to most experienced horsemen; viz. that roarers made to gallop very fast become whistlers: and, pushed to their utmost speed, lose even their whistling noise. These varieties in the sound or "roar," have given rise among horse-people to the epithets, "grunters," "wheezers," "whistlers," "high-blowers," "trumpeters," &c. The experiment I made is this:

I passed a ligature of broad tape around the windpipe at about one-third of its length down the neck from the head. The tape was at first drawn only moderately tight, and the animal roared when made to trot. Next, the pipe was compressed to about half its natural caliber: the animal then-

whistled. In both states the sounds emitted were found *loudest in inspiration.* At last, I drew the ligature as tight as I was able to do. In a minute afterwards, the animal, after staggering a good deal, fell down, struggled violently, and, suddenly throwing himself upon his side, expired in two minutes after he had fallen. I found the membrane lining the windpipe reddened, and covered with frothy mucus. The ligature had *not* completely obliterated the canal: I could still pass a crow-quill through the constricted part of it.

From this experiment we learn—that a certain diminution of the caliber of the air-tube produces roaring; that further diminution or contraction of its area causes whistling; and that a degree of constriction beyond this occasions signs of suffocation, which, if not relieved, end in the extinction of vitality. A whistler, therefore, I should call an intense roarer; a wheezer, I should say, is something short of an actual roarer. Be it remembered, however, that, although we are attempting such nominal distinctions, in a pathological view they must all come under one general heading, which, by common consent, at present, we denote by the appellation of "roaring."

WHAT IS THE CAUSE OF THE SOUND? The experiment just detailed shows, as far as it goes, that the roaring is to be ascribed to diminished area of the passage for the air to and from the lungs; and, in truth, this will be found to be the essence of the etiology of roaring. We appear to know little or nothing about roaring being liable to result from other altered condition—say, an unusually *dry* one from want of secretion, or from ulceration in the passage; though, to say the least about them, there seems to be room for supposing these to be causes. Deprivation of elasticity or pliability—as where parts become ossified—likewise have the effect of occasioning roaring. The various collected reports that have been made from time to time on the states of the air-passages of roarers, have shown that all of them have produced the effect in one of three ways, viz. either by contraction of the passage or its orifice; by distortion or

deformity, or want of elasticity in it; or by actual obstruction within it: and this difference of causation, together with the part or place in which it exists, will serve still further to account for the various *kinds* of—or rather sounds emitted in—roaring.

THE KIND OR NATURE OF THE SOUND, therefore, will be found to be referable—first, to the nature of the impediment or obstruction; secondly, to the degree or extent to which it exists; thirdly, to the situation of it. To illustrate this by example, we may expect a different sound from thickening of the membrane, or *general* diminished caliber of the passage, from what either ulceration, or ossification, or *partial* diminution or impediment, would produce; this sound will vary again, according to the degree of thickening, or contraction, or ulceration, or ossification; and, thirdly, it will undergo modification, according to the part whose lining membrane is thickened, or ulcerated, or ossified: according, in fact, as its seat happens to be the nasal chambers, the larynx, the windpipe, or the bronchial tubes. I do not mean to assert that all this can be realised in practice. Unfortunately for us, I am afraid we shall find our art not sufficiently advanced to connect the sound, in most cases, with the seat and nature of the cause; but I mean to contend, that, if we would set about the investigation as men of science, all these considerations must of necessity enter into our theorification.

UNDER WHAT CIRCUMSTANCES IS THE SOUND EMITTED?—When any sudden effort or exertion is made, or any hard or fast work performed—whenever, in fact, the breathing is so disturbed that the current of air through the windpipe is rendered rapid and voluminous. So long as the air passes in a slow and uniform stream through the pipe, as in ordinary breathing, no noise is heard, nor is any inconvenience felt by the animal; but the moment any rush of air is made, the contraction or impediment, whatever it be, opposing this augmentation of speed and volume, roaring is produced by the vibration of the air against the obstructing body. So long as a horse continues at rest, or goes but at a foot's

pace, or even but trots, although he be a roarer, no roaring, probably, is heard—no person would discover his imperfection: gallop him, however, and particularly up hill, and press him hard, and, as the dealers say, "you may hear him in the next parish." Heavy draft in harness, and that too up hill, is probably the severest trial you can put the roarer to. In general, any sudden act of exertion, such as a leap or jump, or gambol of any sort will produce it. Even fright, or sudden alarm of any kind, will elicit the noise. In fine, whatever induces a sudden and vehement sigh will be apt to make the roarer disclose his imperfection.

Is it a sound of inspiration or expiration, or of both?—Ordinarily, it is only in inspiration that the sound is heard. Under circumstances of great distress, however, as when a horse is galloped to bursting, and especially should it happen that he be one of the worst class of roarers, the sound is audible enough in expiration as well as inspiration.

The tests of roaring suggest themselves from a knowledge of the fact, that a horse must be made to breathe with a sudden effort, or else experience a degree of labour and difficulty in drawing his breath, before the sound can be elicited. For the purpose of producing this sudden respiratory effort, our common practice is to make a feint or threat to strike the animal; which indeed rarely fails (should he have the disorder) to call forth, involuntarily, the roar or characteristic grunt, and so confirm our worst suspicions. Should the animal not be a roarer, the alarm we create occasions no sound whatever in the breath. Next, we cough the horse: the protracted grunting or groaning of the cough being to an experienced ear equally characteristic, may, in conjunction with the former test, be received as pretty satisfactory. I regret, however, to be compelled to add, that the absence of these summary tests will not, *in all cases,* bear us out in pronouncing the horse *not* to be a roarer. In a case of this kind, my common observation to the gentleman whose horse I may be examining, is, "I do not find your horse roars either on being struck or coughed; but you must not take this remark as a certificate that he is 'perfectly sound' in

his wind. In order to satisfy yourself of that, you had better give him a 'splitting gallop,' and, if practicable, on soft ground or up hill: this is your only *sure* mode of detecting minor imperfections in wind." I have heard Mr. Sewell, the late Professor, say, "that the best trial we can subject draft-horses, suspected roarers, to, is to put them in harness, and compel them to drag heavy loads:" and I quite agree with him; it being in laborious draft in particular that the respiratory powers are called into play.

To CONCEAL IMPERFECTIONS IN THE WIND, a knavish horsedealer will, when he is showing you a roarer, take especial care that the horse both leaves and approaches you at a moderate pace, and does not strike into the gallop until he be removed to too great a distance for you to hear the roar. He will likewise, when dismounted, intimidate you, if he can, from approaching the animal: in fact, he will practise every device rather than suffer you to put the horse fairly to any reliable test.

DOES ROARING CONSTITUTE UNSOUNDNESS?—This is a point on which the same judge (Lord Ellenborough) has delivered two opinions; the latter upsetting the former one, and establishing roaring, for the time to come, as *unsoundness*. The first opinion was given in 1810. His lordship then said, "It has been held by very high authority, that roaring is not necessarily unsoundness, and I entirely concur in that opinion." In 1817, his lordship pronounced, in reference to a similar case, that, "if a horse be affected by any malady which renders him less serviceable for a permanency, I have no doubt that it is unsoundness. I do not go by the noise but by the disorder." And from that time to the present, roaring has been admitted, in court, to call for a verdict of unsoundness.

M. Huzard, jun., a French veterinarian, has penned the following sensible observations on this question:—"If roaring were an accompaniment of ordinary respiration, the evil would be discoverable at the time of purchase: but, in consequence of its requiring exertion to elicit it, the purchaser who does not put the animal to that test cannot become

conscious of its existence. In every instance, roaring detracts from the speed and duration of the animal's paces, and consequently depreciates him. Sometimes it renders the horse incapable of performing any (fast ?) work at all. A horse is most unquestionably returnable for it, *alias* unsound."

ROARERS, THOUGH UNSOUND, STILL SERVICEABLE.—We are not to imagine, that, because a horse is a roarer, he is altogether useless. There are numerous instances of roarers doing harness work very well, and some of their doing their duty even as hunters with little annoyance to their riders or distress to themselves. Indeed, to repeat what I said before, and I have heard the remark more than once from those who have hunted roarers, "the faster they go the less noise they make." A great deal, however, will depend on their condition. When that is hard and good, it is quite surprising what a difference it makes in their noise. Roarers are most of all objectionable as *fast* harness-horses. Coach-proprietors are so fully impressed with their incapabilities for the purposes they require—quick and laborious draft—that, in a general way, they refuse to purchase them at any price. The following reminiscences from Nimrod are at once so characteristic and rich in truth and humour, that I cannot forbear inserting them here. "I never purchased but two roarers, and they cured me of going to that market again. One nearly broke my neck at a fence, having entirely lost all his powers in the space of five fields; the other I christened 'the Bull,' for he could have been heard half-a-mile off if he got into deep ground. Notwithstanding this, I have seen two brilliant hunters that were roarers."

MARES SELDOM BECOME ROARERS, at least, in comparison with horses. This is a fact, I believe, too notorious among men of horse experience to admit of doubt; though it is one for which it appears difficult, if not impossible, to assign any satisfactory reason. However, as I am informed, so stands the fact.

ROARING IN MAN.—Of this, one instance only has come to my knowledge. I was out shooting one day with two friends, one of whom was quite a lad; when, as I was

walking by the side of the other up a hill, I suddenly heard a whistling behind me, occasioning me instantly to spring round with alarm, thinking there was a roaring or rather a whistling horse galloping close at my heels. My fright subsided, but surprise and curiosity took its place, at finding it was my young friend who was making all this noise in his efforts in climbing the hill. On laughing and telling him he was "a regular whistler," he informed me, he had, not long before, been the subject of a severe bronchitis, which had left this unpleasant impediment in his breath.

PATHOLOGY OF ROARING.—This includes the investigation of the morbid and other phenomena on which the existence of roaring depends: it is a part of our subject replete with interest, seeing that it is upon this knowledge that all our hopes and expectations of remedy must be erected. Unless we can arrive at a thorough insight into the cause of the evil we shall deceive both ourselves and our employers in attempts to remove it. To hear people talk about *the* seat and *the* cause of roaring, one would suppose that both might be included between the finger and thumb, and that it was either too mysterious ever to be developed, or was universally in one place. Such unscientific and narrow views as these it is that have led people to talk about the *cure* of roaring, as if some remedy were in existence at once to remove the evil. Such discourse may impose upon our employers; but, surely, among ourselves, if we aspire to be thought men of science, it must be nonsense in the extreme. Unless what I am going to relate be untrue, it must be evident enough, even to unprofessional minds, that the causes of roaring are many and various, and that, consequently, the remedies cannot but be something like proportionate in number, and oftentimes extremely dissimilar.

ROARING IS NOT A DISEASE, BUT A CONSEQUENCE OF DISEASE—of catarrh, strangles, influenza, laryngitis, bronchitis: to which Hurtrel d'Arboval has added, pleurisy and peripneumonia; when, I may remark, bronchitis is, as it generally is, a concomitant of those diseases. Now, let it be observed, that these are all inflammatory diseases of the mu-

cous membrane lining the air-passages, and that the ordinary consequence of their virulence or long continuance is—

THICKENING OF THE MEMBRANE, with occasional ulceration of it; and this it is that appears to constitute, in *young* horses, the ordinary cause of roaring. How many three and four-year-old horses are there passing from the dealer's or breeder's hands into stables, who, soon after their arrival therein,—particularly if it should be in the spring or autumnal season,—breed strangles or distemper, or else contract cold and sore throat, any of which disorders, in a severe form, settling upon the throat and windpipe, will be very apt to lay the foundation for roaring, by leaving behind them a thickened, perhaps an ulcerated condition of membrane, and most likely at the part where it lines the glottis; though the same may take place within the cavity of the windpipe. There is likewise reason to believe that similar alterations of structure, even within the branches of the windpipe—the *bronchial* tubes—may have the same effect in kind, if not in degree. In the course of time, the thickened membrane is found to undergo still further changes: from being simply thickened, it turns opaque and white, and acquires a leathery, indurated feel and texture—organic transformations which set all and every kind of treatment completely at defiance.

ULCERATION OF THE MEMBRANE OF THE LARYNX, particularly of that part lining the glottis, is very apt to follow an epidemic, or specific, or malignant inflammation of this membrane; and this ulceration will often assume a sort of chronic inactive form, in which state I have had reason to believe it has continued for years, or even to the end of the animal's life. This it is that has given rise to roaring being said to be present in glanders. Such a case of roaring, it is obvious, would require a treatment altogether different from most others.

METASTASIS.—Any inflammation about the throat or its vicinity, by extending to or settling upon the larynx or windpipe, may in the end be productive of roaring. In illustration of this, I quote the following:—

The late Mr. Coward, V.S., Royal Artillery, had, in a

horse of his own, the simple operation of bleeding succeeded by extensive tumefaction and suppuration of the jugular vein; and this was followed by abscess of the parotid gland, disease of the larynx, and permanent roaring.

BANDS OF COAGULABLE LYMPH effused into and running across the cavity of the windpipe constitute another source of roaring; but, I believe, a very rare one. The inflammation is the same, and its disposition the same, as in the former case; only instead of the lymph being effused into the interstices of the membrane, and thickening its substance (*interstitial deposit*, as it is called), it is poured forth upon its surface, where it assumes any form chance or circumstances may happen to give it, and, in the end, becomes organized, and part of the pipe itself, or rather of its membrane.

In the veterinary museum formerly belonging to my father is a preparation in which the muscle has been displaced by the formation of a cross-band of coagulable lymph between it and the posterior part of the tube, by which the interspace is divided into two passages, one large enough to admit a walnut, the other a hazel-nut. The horse it was taken from breathed with labour and exertion, and, even when but moderately exercised, roared aloud.

OSSIFICATION OF THE LARYNX, by which is meant the entire or partial conversion of its substance into bone, a change peculiar to aged horses, may exist either as a cause or a concomitant of roaring. The parts commonly found thus converted are the *thyroïd* cartilages; though the others, at a later date, may participate in the change. It seems to be the result of some chronic inflammatory action excited in the cartilages; and this I ascribe to the injurious constraint to which the larynx is so repeatedly subjected, and not to any of the causes which give rise to it in the membrane. We occasionally meet with partial, but rarely with entire, osseous conversion of the rings of the windpipe; nor do we often see bony accretion of them one to another. In the case of the larynx, whether the ossification be partial or complete, the part must suffer more or less inconvenience from loss of its accustomed elasticity and flexibility.

DISTORTION OF THE LARYNX AND WINDPIPE, there is every reason for believing, is a fruitful source of this vexatious disorder. Dissection is every day adding to the instances of it; and when we come to meditate upon the notorious fact that—

HARNESS-HORSES CONSTITUTE A LARGE CLASS OF ROARERS, —we shall probably regard these views as well founded. When we look around us, as we pass along through the streets of London, and count the numbers of fine high-spirited horses there are in carriages, waiting for hours and hours together for their masters and mistresses, and all the while reined up with their necks crooked in a form unnatural, and constrained, and painful even to behold, much more to be borne—as is sufficiently manifest to any one from the continual jerks up and down of the suffering animals' heads; and when we come to consider the constriction—nay, compression—that must all this while be exerted on the larynx, together with the constrained bend that must in most cases take place in the upper portion of the windpipe, can we wonder at these parts undergoing distortion? At first, it is true, the distortion is but a temporary grievance, the intervals of relaxation affording the parts, by nature highly elastic, opportunity of recovering their shape and tone to a great extent. Repeated and long-continued acts, however, of such violence, gradually enfeeble the elastic powers of the cartilages and their ligaments, and the result ultimately is, permanent deformity or distortion of the larynx or windpipe, or of both together.

THE TIGHT REINING-IN OF THE HEADS of young horses for any length of time together, and particularly of subjects whose necks have not, by regular gradations of tightness of the reins, been brought to bear the constraint with comparative impunity, is a practice at all times highly censurable, and one that has too often, in times past, given us reason to date the origin of roaring from the breaking of a colt, or his first lessons in the menage. Such harsh treatment, however, is now, in all well-conducted riding-schools, pretty well abolished; added to which, the bearing-

rein in harness is nothing like so generally in use, or applied with the severity it used to be in former days; all which leave much less ground for apprehension on this score. Unless it be in the case of a colt whose head is so unmeetly set on, or whose neck is so straight, so short and so thick, that, without a force and constraint likely to be productive of injury, there is no possibility of getting the animal's head into its "proper place."

Mr. W. H. Goodwin, late veterinary surgeon to the Queen, informed me that, during his professional residence at St. Petersburgh, his attention was especially drawn to several horses who, by himself and others, had previously been declared to be roarers, in consequence of their having got rid of their complaints in the menage. These horses, it would appear, roared in consequence of distortion produced by former unnatural flexure of the windpipe; and this distortion, the Russian system of equitation—which consisted in the elevation of the head and projection of the nose—was admirably adapted to counteract, and, in process of time, remove.

Wasting of the muscles of the larynx.—Some years have now elapsed since it was first discovered that the larynges of roarers occasionally presented the singular phenomenon of the muscles on one side being wasted away or absorbed, while, on the other, they appeared to exhibit a normal volume and redness, and strength of fibre. Since the discovery was made, every one almost has met with cases of the kind; though no person seems as yet to have given an explanation of this new piece of pathology. My view of the case is this:—

Horses in general, as every man in the habit of riding and driving knows, have what is called "a hard and a soft side" to their mouths: and there is no situation in which they are more likely to contract this, should they not possess it before, than in harness; for the animal is no sooner borne or reined up, than, in order to give himself as much ease as this constrained position admits of, he inclines his head to one side, and in that posture carries it, all the while bearing with the hard side of his mouth against the bridoon, and thereon

reposing, for ease, almost the entire weight of his head. The effect of this on the larynx is, that while one side is compressed, and cannot act, the other is left, comparatively, at liberty; or, at least, so far unconstrained, that by some extra exertion, the muscles on that side are enabled to perform their functions, while on the former no action can take place at all.

I had long framed this theory in my mind, when one day perusing Mr. Youatt's Lectures in the *Veterinarian*, I was not a little gratified to observe that my friend had been entertaining some such notions as my own, although he had not gone the same length in his explanation. His words are—"In the far greater number of cases there is distortion, rendering the muscles on one side useless, and, therefore, causing them to waste away. . . . . The wasting of the muscles, therefore, is the *effect*, and not the cause, of that which produces roaring."

Now that fashion bids us to leave our bearing-reins at home—and a very good fashion, when horses have been properly bitted, this is—we shall find, probably, some diminution in the number of harness-horses that become roarers.

THE LATE MR. J. FIELD has narrated THREE CASES of the dissection of roarers:—In the first case "the crico-arytenoideus muscle and two others on the left side were so pallid that he felt quite satisfied of the cause." In the second, "musculus arytenoideus sinister completely wasted." In the third (a bad roarer), "all the muscles belonging to the left side of the laryngeal cartilages wasted and pallid."

QUERY.—Are the muscles on the *left* side more subject to atrophy than those on the right? and if so, Why?

DEFORMITY OF THE LARYNX OR WINDPIPE, by which I mean original malformation of them, is included by the French veterinarians among the causes of roaring. I do not remember ever having met with a case of the kind; though I once saw a preparation which gave me great reason for believing that the canal of the windpipe might be mis-shapen even from birth.

It was a wet preparation. The tube of the windpipe,

instead of being circular, was triangular, the sharp angle being turned forwards. Behind, the flaps of the rings of the pipe overlapped one another much beyond what was natural. The lining membrane was thickened throughout its extent.

MECHANICAL OBSTRUCTION proves an occasional cause of roaring. A tumour of any sort, or any foreign body pressing against the air-tubes, or forming within their cavities, may, either of them, be productive of roaring.

THE HEAD MAY BE THE SEAT OF ROARING.—My old friend and school-fellow, Mr. James Turner, in 1837, sent a paper to the *Veterinarian,* the product of very accurate observation of a decided case of roaring in a horse sent to his Infirmary to be destroyed on account of lameness. His account is—

Having completely satisfied himself of the existence of the disorder—the noise elicited being "precisely that of a common roarer,"—and in one of its most aggravated forms,—he very carefully examined the larynx, trachea, and lungs after death, without arriving at the cause, which at length was discovered to be in the head. "The right anterior and posterior turbinated bones were enormously enlarged,"—"dilated,"—"not distended by any accumulated contents. . . . . Upon attempting to pass my finger," continues Mr. Turner, "down the passage, through the palatine arch, as a sound or a probe, it was opposed by the turbinated bones being almost in contact with the septum, owing to their dilatation." Subsequent drying of the head showed that that which in the recent state had appeared like enlargement or exostosis, was "owing simply to the dilation of every cell or interstice, all of which were perfectly empty." . . . . . "This horse's case may apply to hundreds. In all probability this permanent unsoundness was the sequel either of severe catarrh or strangles."

Science is indebted to Mr. Turner for the development of this new fact: although I cannot regard it otherwise than as an *occasional*—not a common—cause of the disorder.

Professor Sewell met with a case of roaring in which he found an exostosis growing from the cervical vertebræ, between the first two ribs, and pressing against the windpipe. The French authors present us with accounts of *polypi* within

the nostrils; a piece of ribbon within the chamber of the nose; a molar tooth displaced, and thrust into the same situation, producing roaring; but for my own part I never met with any cases of the sort.

PULMONARY COMPRESSION?—Hurtrel d'Arboval includes both pleurisy and peripneumony among the causes of the roaring: is such produced by *compression* or bronchitis?

A question has arisen, whether or not we are warranted in regarding the *lungs* as the seat of roaring. The subject being one on which individual experience is necessarily contracted, it is only by an appeal to practitioners at large that such a question can be satisfactorily answered. In my own mind theory would seem to reply in the negative: the following case, however, makes me stagger in this opinion. The case occurred to my late much respected father.

A horse was treated for violent roaring. The neck was repeatedly blistered; it was even fired; but no relief was obtained. So painful was it to hear the animal roar, when he was even gently led out of the stable, that tracheotomy was had recourse to: but without avail. At length, seeing the animal continued to suffer so much pain and distress in breathing, and that the case appeared altogether incapable of being relieved, it was determined to destroy him. On examination, no thickening of the laryngeal or tracheal membrane appeared, nor, in fact, any other disease of those parts. But the lungs were hepatized throughout their substance, and the smaller divisions of the bronchial tubes in many places so compressed that they were hardly pervious.

From the circumstance of the operation of tracheotomy not having any effect in this case, it is obvious enough the cause must have existed *below, i.e.* within the bronchial tubes: there cannot, therefore, it would appear, remain any further question about the seat of roaring occasionally being the lungs. In confirmation of this stands the testimony of Mr. James Turner, who says, "I have occasionally ridden some roarers, in which I have been perfectly convinced that the noise issued from obstructed bronchi within the lungs themselves."

NERVOUS INFLUENCE.—In the year 1826, M. Dupuy pub-

lished, in the 'Recueil de Médecine Vétérinaire,' an account of some extremely interesting experiments on this subject. He found that either compression or division of the eighth pair of nerves had the effect of producing roaring; and the rational explanation he gave of the phenomenon was, that as the inferior laryngeal nerves, which supply the dilator muscles of the glottis, are branches of the par vagum, of course those muscles would become paralyzed; while the superior laryngeal, going to the constrictors of the larynx, preserving their power, would contract and cause the glottis to be nearly closed, and thus occasion the animal to roar. Here is a new field opened for observation. We are rarely to expect division or destruction of continuity; but there are changes and accidents that may occasion compression, either of the par vagum or recurrent nerve, on one or both sides. Some French veterinarians have discovered, they say, little ganglions upon the nerve, compressing it. Youatt fancied the pressure of the collar or lower jaw might have the same effect. The formation of a tumour, any where in the course of the nerve, might, perhaps, do it. After all, however, I cannot say I augur any great deal of practical utility from this new light.

Spasm of the muscles of the glottis.—Vatel places roaring among "nervous disorders," though he admits there are but few cases in which it is referable to spasm. My lamented friend, Mr. John Field, whose opinion on every point of veterinary pathology was valuable[1], very sagaciously observed, that the frequent cause of roaring, in cases of ulceration of the rima glottidis, is "spasm of the glottis." "While the horse," says Mr. Field, "is suffering great pain from the passage of the air over these denuded surfaces, the instinctive action of the muscles, more powerful than the will of the animal itself, partially closes the air tube, and thus lessens the irritation. I have seen many cases of this kind, and by opening the trachea have obtained immediate relief. The roaring which supervenes during the development of glanders is precisely of this description." To prove the influence of

[1] See Proceedings of Veterinary Association, in the *Veterinarian* for 1837.

the recurrent nerve Mr. Field made the following experiment:—

"Having ascertained that the organs of respiration of a horse (used for farming purposes) were sound, I cast him, and laid bare the recurrent nerve of the off-side, and passed a ligature loosely around it: he was then allowed to get up, and, after a few minutes, galloped severely without evincing the slightest defect in his breathing. The nerve was then drawn out by the ligature, and one inch and a half of it excised; and immediately, on only trotting the horse a short distance, such a degree of roaring was occasioned, that, had the exertion been continued, he would soon have fallen. I kept this horse four years; and, though his breathing became much better, he continued a sad roarer: at the end of that time I destroyed him for the larynx, which exhibited the usual condition of wasted muscles on the side deprived of the influence of the recurrent nerve."

ROARING, HEREDITARY.—That roarers have both bred and got roarers, I believe there are instances enough on record to prove; but whether this be referable to some peculiar or faulty conformation, or can be regarded as the transmission of the disease itself, is a question which appears yet unsettled. For my own part, I should say experience seems to teach us, that, so far as conformation or liability is concerned, all diseases may prove hereditary; but I have no notion of morbid action being conveyed from parent to offspring unless through the medium of contagion or infection. That habits and vices, however, are so conveyed, there cannot remain a doubt.

Mr. Goodwin, whose observations in these matters must have considerable weight with us, has kindly informed me, in answer to my inquiries, that, to the best of his recollection, the mare called 'Mary,' by Precipitate, who was herself a roarer, bred a filly by Sorcerer, also a roarer, and that filly bred a roarer to Waterloo, called 'Black Jack.' In opposition to this, however, stands the following fact, for which I am likewise indebted to Mr. Goodwin:—'Taurus,' a celebrated racer, a roarer, has covered several mares, and their produce are

all turning out well and have won several races—in no one instance his get having proved a roarer; and notwithstanding that his own family were all notorious for the disease. Mr. Goodwin knows a mare who has produced four crib-biters, though covered by different stallions, and she herself not possessing the vice.

THE TREATMENT OF ROARING is an affair that will employ both our practical and theoretical research. As I said before, unless we can ascertain the *cause* of the evil, and make a shrewd guess at the nature and situation of this cause, we do little more than impose upon our employers, and upon ourselves too, in attempts to remedy it. Towards this end, the first inquiry to be made is, how long the horse has been a roarer. Secondly, whether the roaring followed catarrh, or cough, or bronchitis, or strangles, or distemper of any kind. Thirdly, whether the horse has run in harness, and is in the habit of being tightly reined up, and whether the roaring existed antecedently to his going in harness, or has come on since. Fourthly, by careful examination, to ascertain whether there exists any mechanical obstruction to account for the roaring; or any distortion, or deformity, or unnatural tenderness about the larynx or windpipe. Fifthly, if there be any reason for believing it to be nervous or spasmodic. Lastly, should there appear any chance of the horse being benefitted by treatment, to inquire what is his value or what value his master sets on him—and whether his owner is willing to give him up a sufficient length of time for requisite trial of treatment.

ASCULTATION, carefully practised, will prove very serviceable to us in discovering whence the sound proceeds, and leading, probably, to some better opinion as to what gives rise to it. The stethoscope may be used; but, in general, we shall do better without it. It will be an important step towards treatment to make out whether the cause resides in the head, or the larynx, or the windpipe, or lungs.

A CURE FOR ROARING is what—at least, in the common acceptance of the phrase—we do not possess; nor is it possible for a general cure to be included in any one individual remedy or special set of remedies. That which would tend

to remove it as the consequence of disease, would be entirely inapplicable in a case where it arose from distortion; while those means which seemed best adapted for a case of distortion would, probably, prove altogether inefficacious in one of mechanical obstruction. In fine, any remedy we may possess can only be suited to one description of disease: the art of cure consisting rather in the *adaptation* of the remedy than in the knowledge of it. The only pretensions we, as men of reason and science, can set up towards a cure, are such as are founded on the understanding we may obtain of the immediate cause of the roaring: all other boastings are downright quackery, and, worse than quackery, imposition.

I introduce what follows in this place for the double purpose of showing to what extent the public may be gulled by empirics, and what improvements our art has made, even within these very few years past. Clater, whose works surpass those of White by half-a-score of editions—*ergo*, according to his own account, just by so much *par excellence*—"The rapid sale of *twenty-three large* impressions of this work has established its character upon the *surest* foundation"—these are his words—Clater, I repeat, in 'Every Man his own Farrier,' 24th edit., recommends for the "Cure of Roaring" a few aniseeds and caraway seeds, and a little Dover's powder, mixed with the balsam of sulphur and the yolk of an egg!—altogether about as effectual as White's quills, ammoniac, and aniseeds must prove in broken wind. And yet these are two veterinary works which, for the best part of the last half century, have engrossed the attention of the British public! *Proh pudor!*

With a view of showing the different plans of treatment apart from each other, and of making it intelligible in what kinds of roaring they are respectively applicable, I shall suppose cases of the description that are most likely to come before us, and affix to each of them the proper treatment.

TREATMENT OF ROARING, THE ACCOMPANIMENT OR CONSEQUENCE OF INFLAMMATION.—Should the roaring be recent, and the horse have been lately, or be still, labouring under any inflammatory affection of the air passages—laryngitis,

bronchitis, strangles, influenza, catarrh, or even cough—it will probably be requisite to employ measures which may either have a tendency to withdraw any remaining inflammation or increased action, or to cause absorption of any effusions or deposits that may have taken place in consequence of such inflammatory action. Should emollient means, such as fomentation, poultice, steaming, &c. seem to have done their utmost, and continuance in them appears no longer advisable, issues, such as setons, may prove useful, either through or in the vicinity of the parts affected, on the score of local depletion or derivation. The tissues are likely to be resolved in suspected cases of consolidation, by sweating or else by full blisters; their repetition being indicated when neither resolution nor suppuration has been produced. Instead of blistering such places, however, where causing absorption appears to be rather the indication, ointments of a composition known to promote this are to be preferred. Either strong mercurial ointment with camphor may be well rubbed into the part, in due proportion to the extent of surface, twice a day; or an iodine ointment may be employed; with many practitioners, the two ointments in combination are highly extolled, and I believe with reason, since their efficacy in promoting absorption is universally admitted to be great. The simple and best ointment of this sort is that made with the chemical compound—

℞ Hydrarg. Deuto. ioduret, ʒss;
Adipis, ʒj. M.

This, mixed with an equal quantity of mercurial ointment, forms an excellent application.

Let this be well rubbed in with the hand once daily for three or four days in succession; when it will be found to produce a scurfy sort of slough of separated hair and cuticle. At this time the friction must be discontinued for a few days, though, as soon as the parts have returned to their former condition, renewed again. This will not infrequently succeed better than blisters, and not only here but in other cases of like chronic tumefaction, condensation, and induration of parts. The absorbent energies of the system may be further roused

by the exhibition of iodine internally: the hydriodate of potash, given in doses of 3j or 3ij once or twice a day, at the time we are employing the ointment. If this does not succeed, mercurialising the system seems to present itself as a resource; though I, for my own part, have little to say in favour of it. In regard to such treatment as this, however, although it holds out a prospect of success, in a case wherein the roaring is but recent and manifestly traceable to late inflammatory affection—which may be still concealed under the form of an occasional cough, a shortness or pursiness of breath, or some slight fever in the system, lurking about the air passages—it will not, and cannot, prove of any avail in a case in which the roaring has, from its duration, become established, and where all remnant of increased action has for some time past disappeared.

Excision of the cross-bands of coagulable lymph.—It is said—for its truth I cannot vouch—that once upon a time, a veterinarian in performing the operation of tracheotomy on a roarer, had the good luck to cut against one of these bands, and so, like a prudent man, excised it, and thus *par aventure* achieved a cure on the horse whom he had anticipated but to relieve. The circumstance was eagerly caught at as opening a new and successful field to experimenters, and the windpipes of many roarers were most mercilessly slit open in search of similar bands. Alas! so many disappointments followed, however, that the new operation was abandoned for the introduction of a practice which, if it does not offer the same glittering prospects, is, at all events, free from evils that *may* accrue from cutting and slitting-up the windpipe. In fine, this is an operation which, considering the extreme rarity of such cases, no man is justified in performing unless he can practise auscultation to that perfection that he can positively say, bands of lymph *do* exist, and point out precisely the spot of their existence.

Treatment of roaring from tight reining-in.—One cannot rationally entertain hopes of cases of even this kind, of any considerable duration. In time, as we have seen,

not only does the distortion of the larynx and windpipe become permanent and irremediable, in consequence of the parts losing all their wonted tone and elasticity, but changes of their structure take place: the muscles shrink and waste away; and the cartilage itself becomes altered—probably converted partially into bone. Should the subject be a harness-horse, and have been in the habit of being tightly borne up, let him for the time to come be driven without any bearing-rein at all; and, in addition to this, when in the stable, let him be bitted to the side-chains or straps, for a couple of hours, twice a-day, in such a manner that his head may be kept continually elevated, and his nose projected forwards, *à la Russienne*. This is also the best plan we can pursue in a case where the mischief has been occasioned by any injurious constraint of the head in breaking, bitting, or lungeing the horse.

Hopeless cases.—As such, in general, may be regarded all cases of long duration, arise from what cause they may. Also such as present any reason for believing to be hereditary, or dependent upon any original malformation of parts. Cases of distortion are equally irremediable when the distortion has existed so long as to destroy the original form and properties of parts, and in their place to have established fresh ones. Such can only be benefitted by—

The French treatment, which consists in the performance of bronchotomy or tracheotomy, as we more properly call it. They make a large aperture, and use a proportionably large tube,[1] so constructed and adapted that the animal can not only freely breathe through it, but do his work, even gallop, with it in his neck. Treated in this manner, there are instances on record of very bad roarers having been known to have been kept exempt from relapse for two or three years, and at work all the time.

[1] The tube I have used will be found described in the 1st vol. of 'Hippopathology.' Others are now sold which seem preferable.

BRONCHOCELE.

By *bronchocele* is meant hypertrophy, or a state of enlargement of the thyroid gland.[1] It is a disease which is rarely seen in horses. I have met with only three or four instances. In cattle and sheep it is likewise uncommon; but among swine and dogs it is comparatively frequent; and still more so, it would appear, in our own species, and in women in particular, about the age of puberty: a circumstance which has induced surgeons to believe it to be connected with uterine derangement. It is an old and well-established observation, that certain countries and localities are favorable to its production. In England, Derbyshire and Nottinghamshire have obtained this repute; on the Continent, Switzerland, the Tyrol, Valley of the Rhone, and others; and to that extent, to lead us at once to the conclusion, that influence of soil, or climate, or both, must have much to do with its production: an influence to which, we are assured by the French—who call it *goître*—animals are more or less amenable. Old medical writers ascribe its appearance in particular persons to that convenient *fons et origo*, "a scrofulous habit." Of late years, the disease has been thought to be hereditary; and so strong has appeared the evidence of this in dogs, that Youatt's forcible expression on this point is, "I am quite assured that it is hereditary."

In Horses, we pretend to know nothing further about it than that a tumour, seldom of any great magnitude, makes its appearance in the throat, just below the part we grasp to excite coughing, either directly in front or inclining to one side, having a circular or an ovoid form, and feeling soft and puffy and moveable, without any flinching or sensibility being evinced by the animal when pressing or squeezing it, and without being the occasion of the slightest inconvenience or disparagement to him, save what may be considered to

[1] For a description of this gland consult my 'Anatomy of the Horse.' Its connection with the trachea being intimate, will account for its diseases being considered in this place.

arise from its being regarded as an eyesore. The first case I ever saw occurred in the year 1822. The tumour was about the size of a hen's egg; but I remember my father telling me at the time that he had seen one before, in which it was much larger. A case occurred in my present regiment so late as September, 1844. The horse, the subject of it, named from the man of whom he was purchased, 'Dash,' was brought to me for having experienced a "fit of choking." My assistant at the moment gave him a few hornsful of tepid water, and the fit passed off. As I was feeling his throat, however, my attention became arrested by a fulness on the off-side, below the larynx, which I at first thought might serve to account for his choking fit. Examining the tumefaction further, however, convinced me that it was an enlargement of the right lobe of the thymus gland —a *bronchocele* in fact; though it did not appear to me to have anything to do with the choking. By rubbing the swelling daily for the space of six weeks with the compound iodine ointment, made as under, the swelling subsided, and the horse returned to his duty.

Treatment.—Should the tumour, on account of its volume, become the subject of medical treatment, I would recommend a trial of iodine. Supposing the case be recent, it might, in the first instance, be advisable to give a brisk purge; after which I would administer, daily, a ball composed of a drachm—which may be increased to two drachms—of iodide of potassium, and, at the same time, rub into the swelling as much of the following simple ointment as is equal in bulk to a small walnut, or, as above, with the compound ointment:—

℞ Potassii Iodid., ʒij;
Adipis, ʒj. M.

Which is rendered *compound* by the addition of ʒj of iodine. Should the case be a chronic one, and the tumour in consequence of its duration have become firm and hard in its feel, and the iodine fail to influence it, I would apply strong blisters upon it, or, as an ultimate resource, pass a seton over or even through it.

NASAL POLYPUS.

Polypus is the name given to an excrescence or tumour growing from a mucous membrane by a narrow part or neck, called its *pedicle*. It is a very rare occurrence in horses. But a single case has come under my own observation. It was brought to Mr. Field's infirmary. A red, flesh-like, globose tumour, having a smooth shiny surface, and being about the magnitude of an Orleans plum, depended out of the near nostril of the horse for the space of three or four inches, there being apparently quite as much or more of its substance within as without the nose. It originated, it was said, in a blow upon the part.

Vegetius has a chapter (xxxviii, p. 177) in his work on the subject "of a horse affected with polypus," wherein he says "the horse will be strangled by the stoppage of the passage of his breath. He will snore, and humid mucus will flow out of his nostrils. Manifold are the dangers of the distemper. I have nothing of my own to offer on the subject. A good article, penned by Youatt, appeared on it in the *Veterinarian* for 1831, under the signature of *T.*, from which I extract the greater part of what follows:—

The true polypus is attached to mucous membranes, and is usually found in the nostrils, the pharynx, the uterus, or the vagina. It usually adheres to some portion of the superior turbinated bone, or it has come from some of the sinuses connected with that body. It escaped, while small, through the valvular opening under the superior turbinated bone into the cavity of the nose, and there has attained its full growth. The polypus of the quadruped is not the compressible elastic fungous one (polypus elasticus), which is described by writers on human surgery as occupying the nostrils of their patients. The bleeding polypus is not known; but the small portion of bloody fluid that often appears at the nostril proceeds either from the vascular mucous membrane with which the tumour is surrounded, or from the membrane of the surrounding cavity abraded by long and violent pressure.

STRUCTURE AND ORIGIN.—Some polypi have a fibrous or almost cartilaginous structure, and others appear to be composed of various little tumours agglutinated together. They are formed originally under or within the membrane by which the nasal cavity is lined; but no better account can be given of the cause of their appearance than that of tumours in other parts of the body.

PEDICLE.—By some means, probably the increasing weight of the tumour, and being in a dependent situation, it is gradually detached from its base, and forces with it the soft and easily distensible membrane of the nose. As the polypus continues to descend, this portion of membrane is further elongated, and forms the pedicle or root of the tumour:—a root it is not, for it is no continuation of the substance of the tumour, but a mere duplicature of its investing membrane. How this may be with regard to the fungous bleeding polypus of the human subject, I am not able to determine. The twisting of the pedicle, and tearing it out by the root, may be a good practice with regard to the human being, but cannot be justified where the pedicle is a mere cord by which the polypus is suspended, and forms no continuation or part of its substance.

SHAPE.—The polypus, when it hangs free within the nasal cavity, is usually of a pyriform or pear-like shape. It is that form which it would naturally assume from the gradual distension of the membrane, pressing on every side of the tumour, and opposing its chief resistance at the base.

ITS WEIGHT varies from a few drachms to three or four pounds.

SYMPTOMS.—Some difficulty of breathing, apparently arising from obstruction of some of the air-passages. A discharge of mucus from one or both nostrils, sometimes highly tinged with blood. Occasionally, pure blood runs from the nose; and there is felt, by the hand placed before the nostrils, an unequal rush of air from one or both of them. Inspection in a full light, discloses, higher or lower in the nostril, the rounded base of a polypus.

CAUTION.—The veterinary surgeon must take care not

to mistake the cartilaginous prolongation of the anterior turbinated bone for a polypus, when he sees it spread upon the false nostril, and enlarged and prominent from the general thickening of the mucous coat; nor the prolongation of the posterior turbinated bone, not quite so much developed; nor any rounded clot of blood which may have escaped through the valve under the posterior turbinator, and be retained there by the separated fibrine. This has been done by men of some repute.

Treatment.—The horse must be cast, and the head fixed in a position to take the greatest advantage of the light. The operator must then try to lay hold of the polypus with his fingers or the forceps, or (for these tumours do not possess much sensibility) with the tenaculum. If he cannot fairly get at it by any of these means, he will let it alone. It will continue to grow; its membranous pedicle will become lengthened, and the polypus will descend and be easily got at. I do not know whether this polypus in horses—like the one in men—is influenced by damp and dry weather, so that on one day it is more prominent than on another.

Operation.—In bringing down the tumour for operation we must not use any great force. The pedicle being but a duplicature of skin, and not a portion of the polypus itself, may be divided anywhere. Besides, force would endanger the delicate gossamer fabric of the turbinated bone. The tumour brought down, must have a ligature passed round its pedicle, as high up as it can conveniently be placed. If the polypus can then be returned to the nose, the animal will suffer very little inconvenience; and in a few days it will slough off, and the pedicle will contract and gradually disappear. If it cannot be returned, after applying the ligature securely, we may excise it immediately, though it would be better to wait a few hours first. Should bleeding occur, the actual cautery may be resorted to. In very bad cases it may be necessary to slit up the ala or side of the nostril. The false nostril, however, had better not be cut through; it is so difficult to retain it afterwards for union. The incision should be carried along the lateral edge of the

nasal bone, beginning at its apex, which will give a flap convenient to turn down.

A BLEEDING FUNGOUS POLYPUS might require being detached by the forceps or by torsion. In operating thus, let there be no pulling at the root. The pedicle will then give way at the weakest part, and there will follow no hemorrhage, no lacerated membrane or detached bone, to produce malignant ulcer or cancer or glanders. Simple excision is never permitted, on account of the impossibility of stopping the bleeding without the cautery, whose application within the nose is both difficult and dangerous.

VATEL suggests plugging the nostril to arrest any hemorrhage after the operation, and, instead of slitting up the nostril, to trephine the bone. To this latter, however, there are many serious objections.

GOHIER relates a case of a horse who had in his left nostril a polypus as large as a turkey's egg, of a greyish colour and glossy surface, too high up to be reached with the finger, which prevented his breathing on that side, and gave rise to offensive effluvium, and to enlargement of the lymphatic glands, but not to roaring. Gohier slit up the nostril, and, with an iron rod with a notch upon its end, contrived to enclose its neck in the slip-knot of a ligature; in drawing this tight, however—which was of necessity done in an oblique direction—the pedicle was cut through. Little hemorrhage succeeded, although the tumour weighed twenty-four ounces. The slit nostril was sewn up, and cold water injected into its cavity. A copious discharge from both nostrils followed, with swelling of the lymphatic glands. This was met by proper treatment, and in fifteen days the patient was sent out of the hospital. Since then Gohier heard that the running had reappeared.

CHABERT, in his 'Veterinary Instructions,' relates the following:—A horse in a cavalry regiment had been gradually losing flesh, and was quickly and painfully blown at every little exertion. Fetid matter began to run from his off nostril, and the gland correspondent enlarged. The horse was supposed to be glandered by the sergeant farrier,—

there being no veterinary surgeons then in the French service,—and was treated accordingly. After a time, to the confusion and astonishment of the man, a fleshy substance began to appear in the nostril, and which rapidly increased in size. At length a great mass protruded, and the farrier cut it off. No benefit followed; the nostril was still stopped, the breathing laborious, and the horse daily became thinner and weaker. After the lapse of a twelvemonth the case attracted the attention of M. Tears, the surgeon of the regiment. He cast the horse, slit up the nostril, when he not only found it completely filled with polypus, and the septum narium bulging into the other division of the cavity; but, from long-continued inflammation and pressure, it had adhered to the membrane of the nose in so many points, and so extensively, that it was impossible to get round it, to move it. He contrived, at length, to pass a crucial bandage around it, and it was torn out by main force. Four considerable portions of the turbinated bones were brought away with it. The hemorrhage was excessive: he however filled the nostril completely with tow, and brought the divided edges of the false nostril together by sutures. In three days they were all torn out by the incessant attempts of the animal to get rid of the obstruction; but the horse eventually did well. The polypus weighed two pounds seven ounces.

CHABERT, in a case which he had himself, of a very large polypus, was obliged to make a hole in the frontal bone, which he contrived to cover afterwards with a leathern shield, attached to the front of both bridle and head-collar. For a long while after recovery the horse ran in a cab.

RIGOT relates a case in which the tumour remained stationary at first for a long time, and then suddenly took to growing. At last it became such a size that it occupied the whole cavity, pushing the septum into the other nostril, displacing the bones, and threatening suffocation. The nostril was slit up; the pedicle cut asunder close to the bone; and the cautery applied to arrest the hemorrhage, and *prevent the reproduction of the tumour*.

A CURIOUS CASE came some years ago before one of the Provincial Courts of France. A farmer purchased a four-year-old horse at a fair. A slight discharge was observed from one nostril, with some thickness of breathing. This was not thought extraordinary as it was the *strangle age*. The horse became worse, and at length could not be used. The case was tried. A veterinary surgeon deposed that there was a polypus in one of the nostrils, but so high up that it would have escaped his observation had he not been particularly directed to it, and that he believed it existed at the time of purchase. On this the court determined that the horse should be returned, although the term of warranty had expired, on the ground that it was one of those obscure cases of unsoundness the existence and nature of which could not have been discovered within the prescribed time.

HEMORRHAGE FROM THE NOSE.

EPISTAXIS — as the flux of blood from the nose is technically called—occurs now and then in horses; and when it does happen, the blood commonly comes but from one nostril: a circumstance which of itself may be regarded as an important distinction between epistaxis and *hæmoptysis* or hemorrhage from the lungs. There may be a stream of blood, or it may issue only drop by drop. In either case, it is very apt to collect within the chamber of the nose and about the nostril, where it occasions irritation, and causes the horse to snort and blow out clots of blood; and thus, by opening the sources afresh, is produced, renewed and augmented hemorrhage. As to the blood itself, its character is mostly arterial, its colour being generally a bright scarlet.

The CAUSE of the hemorrhage is sometimes constitutional, sometimes local and accidental. When the bleeding cannot be ascribed to any local irritation or injury, it is said to be *spontaneous;* under which form it may, in general, be referred to a surcharged condition of the capillaries of the Schneiderian membrane, either from determination of blood

to the head, or as the consequence of general plethora of the system. The injected reddened condition of the conjunctiva and Schneiderian membranes will go far to confirm this view of the case; added to which, there may be observable some unusual action of the carotid and temporal arteries; also, the subjects themselves will be found to be in high condition or loaded with fat, and in insufficient or irregular work. Troop-horses, brewers' horses, and horses kept for pleasure, are most liable to spontaneous hemorrhage. We hardly see it in very young horses, or in such as are poor and hard worked. The other form, *traumatic hemorrhage*, that which arises from injury, wound or lesion, occurs, perhaps, the oftenest. A blow upon the nasal bones, from a stick or the but-end of a whip, from any contusion, in fact, will be very likely to excite hemorrhage, and should a vessel of any magnitude become ruptured or wounded, the flux may be such as to endanger life; though I never myself saw a case of the kind. D'Arboval says, it may be occasioned by the pressure of the collar in laborious draught. We have often seen bleedings from the nostrils in the latter stages of glanders, but never to an extent to occasion alarm.

Does epistaxis ever prove fatal?—I never witnessed, nor do I know of any report of, such a case myself: D'Arboval, however, informs us that, should the animal die, on exploring the chambers of the nose we shall find more or less blood collected, and some of the clots so changed in appearance as to resemble pus.

Diagnosis.—When we see hemorrhage from the nose, our first inquiry should be into its source: whether it come from the nose simply, or from those important organs, the lungs. In hæmoptysis, the blood commonly issues from *both* nostrils, and comes away *frothy*, and in some cases mingled with *mucus*. Again, bleeding from the lungs is apt to create a great deal more irritation: the horse will be uneasy, breathe hard, and quick perhaps, and sometimes cough violently; and when he coughs, will throw blood up into his mouth: the more the head is depended, the readier the blood flowing out.

OUR TREATMENT must be such as is adapted to the circumstances of the case. In slight hemorrhages none other but repose and abstinence will be required. Should the hemorrhage be considerable, and appear to result from plethora, the grand object will be to lower the heart's impetus. We must, therefore, bleed largely, and from a large orifice in the vein. The best local treatment is dashing buckets of very cold water upon the head, or the application to the sides of the nose of ice or snow, when either can be procured. Should the blood issue from one nostril only, that cavity may be plugged up with tow dipped in a solution of alum; or, should the patient not be able to bear the plugging, the same solution—which I believe to be the best styptic—may be thrown up the nostril with a large-mouthed syringe.

In a traumatic case, the injury—whatever it be, wound or contusion—will require our first consideration, as being the immediate cause of the hemorrhage. In so far as concerns the bleeding, providing the loss of blood be not such as to create any alarm, the patient may possibly be benefited by it, in having to undergo less febrile and inflammatory action afterwards; should it, however, continue beyond this, we must inject and plug the nostril, and apply sudden cold, and bleed or nauseate, or both, according to circumstances. Such measures as slitting up the nostril, and applying the actual cautery or a ligature, supposing the vessel could be reached, are rarely, if ever, necessary.

In regard to internal medicines for protracted or frequently recurring hemorrhages, we may give, in pretty full doses, the oil of turpentine, for which practice we have no less authority than that of Dr. Copland.[1] In the *Lancet*, for July 11, 1826, is an instance related where prompt and decided benefit was conferred, in a case of hemorrhage from the bowels, by the use of Ergot of Rye, given in the form of Battley's Solution of Secale.

In hæmoptysis, hepatorrhœa, and hæmaturia, Mr. Rogers,

[1] Turn to his article, 'Hemorrhage from the Lungs,' p. 125.

of Knightsbridge, highly extols the employment of Acetate of Lead, in doses of ʒij, daily, if required, from which he adds, no fear of harm need be apprehended so long as its conversion into carbonate of lead is guarded against by the use, for its solution, of distilled water, or of common water to which acetic acid has been added. "I have never known," says he, "a case of hæmoptysis which has not immediately yielded to it."[1]

[1] The 'Veterinarian' for April, 1853, vol. xxvi, p. 193.

SECTION VII.

DISEASES OF THE LUNGS, PLEURA, AND DIAPHRAGM.

BRONCHITIS	EFFUSION
CONGESTIVE PNEUMONIA	PLEURO-PNEUMONIA
ACUTE PNEUMONIA	HYDROTHORAX
SUB-ACUTE PNEUMONIA	ADHESIONS
CHRONIC PNEUMONIA	HÆMOPTYSIS
CONSUMPTION	EMPHYSEMA—BROKEN WIND
ACUTE PLEURISY	SPASM OF THE DIAPHRAGM
CHRONIC PLEURISY	RUPTURE OF THE DIAPHRAGM.

Causes of Pulmonary Disease—Diagnosis—Percussion and Auscultation.

CHEST affections in horses bear even a greater proportion to the number of their other diseases than in our own persons. Putting accidents and lamenesses out of the question, we shall find a large majority of the cases presented to us for treatment to be diseases of the respiratory apparatus; and the most fatal of them to be those which attack the lungs and their enveloping membrane, the pleura. These diseases also evince in horses a rapidity of destructive course which is not so conspicuous in men. In our bodies, they are rather apt, by slow degrees, to bring their victims to their end; while they will hurry horses off even after but a few hours' duration, and in despite, too, of every measure that medical skill can devise. This, of course, on our part, calls for corresponding alertness and decision in our therapeutics; and the more so, seeing that it is not only required of us to save life, but to save organs, and in that normal state too in which they may be so fit to carry on their functions that the animal is able to do his work nearly or quite as well as ever. If he be left with imperfections in his wind, I am afraid we shall derive but little credit from his cure, even though we may have been the means of preserving his life.

PREDISPOSITION to pulmonary disease is observed to exist in horses of certain age, form, and temperament. Young

horses on becoming domiciled are incomparably more subject to it than such as are aged and seasoned. And horses that are high-bred and tenderly reared, and have light carcases, long legs, flat sides, and breasts so narrow that both fore-legs seem as though they "emerged from one hole," and who possess thin skins, are indisputably more susceptible than those of a different breed and opposite conformation.

The CAUSES OF PULMONARY DISEASE will, in a general way, be found in the air horses breathe and in the work they perform; in fact, they may be said to date their probable rise from the day the animal is taken into the stable and made the servant of man—in one word, from his period of *domestication.*

The AIR the horse is compelled to breathe while confined in his stable may be *cold* or *heated, moist* or *dry, pure* or *impure,* considered in relation to the atmosphere out of doors. There can be no doubt that either excess of temperature—cold or heat—must have an excitant operation on the membrane lining the respiratory passages; and yet it is a notorious fact, that horses usually enjoy vigorous health in frosty weather. Cold with damp, however, has certainly an unfavorable operation. Wet springs and autumns are commonly productive of a good deal of sickness. Is this to be ascribed to any direct effect upon the air-passages, or is it to be attributed to some operation upon the skin?—and particularly since these are the moulting seasons? In the latter case, the lungs become secondarily or sympathetically affected. Even here, however, we appear to require the presence of some stimulant—such as heat or foul air—before disease will show itself; for horses out in the open air during such insalubrious seasons, rarely, if they do at all, contract the prevailing malady. In a general way, and in regard to its direct operation upon the bronchial membrane, cold must be regarded as a predisponent to disease; and not so much cold by itself, as cold with humidity, or even a particularly drying cold: the probability being, that the effects are not owing simply to any sedative operation the cold may have on the membrane, but also to the operation it has upon it as

a surface emitting, and constantly covered with, a mucous secretion. Cold, then, with either more or less moisture than is usually contained in the atmosphere, being considered as the predisponent, our next inquiry must be after the immediate excitant. The late Professor Coleman was in the habit in his Lectures of attributing great influence to the foul air engendered in stables by effluvia from the dung, urine, and breath; and perhaps, in combination with heat, there exists no more fruitful source of disease of the respiratory apparatus: but I have my doubts whether foul air without heat be often productive of such effects. At the time I did duty with the army in the Peninsula, I remember well, that most of our stables, or places used as stables, were dirty and filthy in the extreme, being either without any pavement at all, or so badly paved that they were full of holes; and of course there was nothing like drains or sewers to carry off the urine: indeed, in many places they were all but roofless, and in most places in a dilapidated condition. In these situations the horses and mules of the army bred farcy and glanders and mange, but very rarely bronchitis or pneumonia or pleurisy. This corresponds with what is observed to be the effect of foul air on the human subject, viz. that it tends to engender *malignant* rather than common inflammations, of which typhoid, gaol, and putrid fevers are examples.

Cold—or wet producing cold—applied to the surface of the body may, however, by causing a reflux or congestion of the blood inwardly, have a sort of indirect operation in producing pulmonary inflammation. There can be no doubt about the correctness of this reasoning, nor of its occasionally happening in practice; but I do not myself believe that it happens near so frequently as is thought or represented; else would many more racers and hunters, and post and coach horses, and others, fall victims to thoracic disease than now are known to do. Our surprise is, how the poor slave who is galloped one hour until dripping with sweat and nearly exhausted, and the next half-hour stands tied to a post, exposed to the cutting blast or pelting shower, while

his master is engaged in business or pleasure, can possibly escape; for escape he probably would, even to the last, were it not that he had to encounter when he shall have arrived home—what to him may feel most comfortable, but what in reality excites disease in him, viz. his hot foul stable.

OVER-EXERTION or HARD WORK may induce pulmonary inflammation. The horse, whose case we have been imagining, may, the moment he shall have arrived home, or very shortly afterwards, experience an attack of pneumonia. Or, I will suppose another case, a very common one:—A gentleman shall purchase a four or five-year-old horse of a dealer, which at the time of sale is in fine, fat, sleek condition. Through ignorance or inexperience on the part of his new master, the horse is immediately put to work, and speedily afterwards is attacked with pneumonia, of which he dies. The gentleman brings an action against the dealer for the recovery of the value of his lost horse, and the result is that he obtains the action; though most unjustly, since, in all probability, the animal was in perfect health and soundness at the time of purchase, and lost his life entirely from the mismanagement of his purchaser. At the same time, no other blame than want of knowledge could morally be imputed to him. It was formerly the custom in the army to put all recruit-horses to severe work in riding-schools, and the consequence was, numbers became lost to the service: now, however, that a mild and progressive system of manege is practised, the mortality arising from this cause has quite disappeared. Any act of sudden or violent exertion, such as a "splitting gallop," or a "burst," is likely to cause a congested state of the lungs, under which the horse sinks asphyxiated, and in that condition, unless immediately relieved, dies. This is not inflammation, though a state very apt to be followed by inflammation, supposing the animal to survive the original shock.

INJURIES, mechanical or chemical, may prove the cause of pulmonary disease. It is possible that the enveloping membrane, or even the parenchymatous substance, may suffer preternatural extension and laceration from violent and

convulsive efforts for breath, under certain bodily exertions, such as racing, leaping, plunging, &c. Contusions from falls or blows upon the side may injure the pleura; fractures of the ribs or sharp instruments may wound the pleura, or lung, or both. And as for injuries of a chemical nature, in this light may be viewed the several pollutions the atmosphere of the stable receives from the effluvia of the dung, the urine, and the breath of other horses. Ammoniacal gas is said to prevail in the vapours from these excretions; and, consequently, there can be no question about the operation of such an atmosphere being highly excitant and creative of inflammation.

DIAGNOSIS.

Upon the diagnosis will the treatment depend.

In the study and observation of diseases of the pulmonary organs our chief aim must be to attain such intimate knowledge of them as will enable us not only to make the necessary distinctions between them, but to so far ascertain the nature and stage of each as to render us competent to treat it under the circumstances, to the best advantage, and at the same time give an opinion to be relied upon in regard to its result. Certain symptoms are common to almost all these diseases: that, however, which of all is, if not the most common, the most important, is altered or disturbed respiration. And there are so many degrees and kinds of alterations in the breathing, that they of themselves, by attention on our part, may be rendered of great value to us in the formation of diagnosis.

Respiration in health is shown by a placid, uniform, regular, and hardly perceptible motion of the flanks, at the rate, according to Delafond, of from 10 to 12 breathings a minute in young horses, from 9 to 10 in old; according to the late Professor Sewell, of from 4 to 8. If horses in the stable are referred to I cannot but regard the latter standard as much too low. Delafond has given us what he calls a "synoptical table of the different kinds of respiration," from which we may gather some useful practical observations, with-

out pretending to adopt all his finely-drawn distinctions. He makes a division of the different kinds of breathing, relatively, into—

1. Acceleration or retardation. 2. Depth of inspiration. 3. Difficulty of performance. 4. Modifications of these. 5. Accompanying sounds or noises.

FREQUENT RESPIRATION is common to all pulmonary diseases, and to most fevers and painful irritations; quick and intermittent breathing denotes sharp and colicky pains in the chest or belly; slow breathing is perceived in cerebral affections; and slow and irregular, in pulmonary emphysema.

DEEP INSPIRATIONS betoken confirmed hydrothorax; short ones, which constitute quick respiration, are signs of pleural or peritoneal or irritative pains.

DIFFICULT OR LABORIOUS RESPIRATION characterises acute laryngitis and bronchitis, pulmonary congestion, and all those cases in which obstacles in the air-passages, or other impediment, embarrasses the breathing.

UNEQUAL RESPIRATION has one inspiration deep, another not. It becomes IRREGULAR where the intervals are unequal; INTERMITTENT when the breath is held or suspended; INTERRUPTED, when that suspension takes place in the middle of an inspiration or expiration; interscinded, when suddenly arrested, and converted into a convulsive action of the flanks or catching of the breath. This last is present in broken wind, though it is in particular characteristic of pulmonary emphysema, and diseases of the heart and pericardium.

SIGHING RESPIRATION.—This kind of respiration, not mentioned in Delafond's account, is one which, strictly speaking, arises neither from difficulty nor pain in drawing breath, nor from any pain or irritation in any particular part, but from general excitement, or rather a *general feeling of distress*. It is characterised by a sort of sighing, grunting noise, and is indicative of great over-excitement with distress at the time, to end in a directly opposite state, one of depression, exhaustion, and death. It is peculiar to the over-marked horse. And it may be called—until we get a more appropriate name for it—*sighing respiration*.

PAROXYSMAL RESPIRATION, as we denominate it, is the occasional increase in the frequency and embarrassment of the breathing which is sometimes seen in horses labouring under bronchitic affections, more especially in the seasons of Influenza. At one time the horse is breathing with no more than ordinary or usual disturbance under the circumstances of his disordered state, while the next hour, or minute even, his respiration appears flurried, as though he had just received some fright or shock. Wait a short time however, and the commotion will subside. We believe this excitement to be *nervous*. It is not relievable by either venesection or æther or laudanum. It must have its spend, and then will gradually disappear.

The EXPIRED AIR is also worthy of our observation, as a farther test of the nature of the disease present. In all animals, its temperature—ascertained by holding the hand before the nostrils—is a little below that of the body. In frequent respiration, sympathetic fever, bronchitis and acute pneumonia, the breath will be *hot*. In all chronic diseases, and particularly in tubercular phthisis and in pleurisy, both acute and chronic, it will be *cold*. The breath, inodorous in health, may, under disease of the air-passsages or lungs, acquire certain odours. In pharyngeal affections, in caries of the bones, and vomicæ discharging through the bronchial tubes, the breath becomes *fetid;* but in gangrene of the lungs, even *putrid* in odour.

PERCUSSION AND AUSCULTATION.

For years past both these means of exploration of the cavity of the thorax have been practised by veterinarians as tests of the presence of water: it is only, however, since the brilliant lights thrown upon the subject by the immortal Laennec, that we, in common with surgeons, have derived much advantage from them; and even now it is to the practised hand and ear alone of the man of accurate observation and multifold experience, that percussion and auscultation will yield in hair-clothed animals their full products. On this account we prefer giving the practice of a French author,

Delafond, who appears to have had, and to have profited by, extensive opportunities of observation, to relying upon what little we have to offer of our own; since in our hands, to say the truth, the practice has not proved prosperous. We give what follows, from Delafond, more with a view of throwing out some guides in the way of practice for those who may be desirous of cultivating the science, than from any utility or real value we are afraid they will be found of. It has been observed, by some French writer, that to derive the fullest advantage from auscultation, the man ought to visit his patient (the horse) at midnight, when all is still and silent around him; and there is much truth in the remark, since it is most difficult to find time and place which during the day is free from sound or noise of some description or other. One thing is most needful in the commencement of the practice both of auscultation and percussion, and that is, to make our ear familiar with the sounds of health, the *normal sounds*, in order that we may run no risk of confounding them with the *abnormal* or diseased sounds.

Nasal Cavities.—The ear, applied to the nostrils of horses, even during repose, recognises such a sound as condensed air streaming through some hollow tube would produce; but through the parietes of the nasal chambers, or through the sinuses of the head, no sound whatever can be detected, either by the ear or the stethoscope; unless after exertion, and then a sort of snoring sound is heard in the former, while in the sinuses a soft murmur only is audible. A tumid condition of the Schneiderian membrane gives rise to the sound of thick wind, which, augmented, becomes whistling; and this may exist either on one or both sides. Sounds emanating from the larynx, windpipe, or bronchial tubes, or even from the recesses of the lungs, sometimes retain their force to that degree within the nasal chambers as to lead us to believe they arise there. Such mistakes are easily corrected by applying the ear by turns to the larynx, neck, and chest, the sound being greatest opposite to where it is produced. Snorting, which may be excited at any time by momentarily closing the nostrils, and which is occasionally thus produced to cause the ejection of matter from the nasal chambers, may be put in practice by way of further testing the seat of sound.

The Sinuses of the Head, tested by percussion, either with the finger doubled, or with a key or a piece of wood, or, what is better, with a small hammer and a light wooden shield interposed, yield in the young

horse but indistinct resonance; the sound is plainer in the adult, but loudest of all in the old: a difference no doubt ascribable to the changes the sinuses undergo with age. As the resonance of the nasal chambers is diminished by the presence of polypi, or the accumulation of pus, so is that of the sinuses by even but a small purulent collection. Purulent repletion completely deadens sound. At the same time, percussion becomes painful, and the frontal bone often convexed.

The LARYNX, in a state of health, yields but a faint sound to the ear. Under disease, however, we may with Leblanc regard the anormal sounds as consisting,—1st. In a *dry whistle*, which is the result of contraction, either from confirmation or compression, or of physical or vital lesion of the recurrent nerve. 2d. In a *humid whistle*, the consequence of a tumid membrane covered with mucus, which is sometimes intermittent and accompanied with a gurgling noise or mucous *râle*, as in acute laryngitis. 3d. In a *râle*, which may be either dry or humid, audible either at the beginning or decline of laryngitic inflammation.

The WINDPIPE yields but little to our listenings, unless it be at the superior and inferior parts. At its entrance into the chest, in the normal condition, is heard the sound of soft blowing, most prolonged during expiration. This respiratory sound, which is occasioned by the air returning from the bronchial tubes into the windpipe, we call, from its situation, *tracheo-bronchial respiration*. Frequency of respiration increases it. When liquids become effused into the bronchial tubes, *the mucous râle* is heard; and this is often accompanied by the *sibilous râle* and by the *sonorous râle*. In case of effusion of blood into the tubes, the *râle* is *spumous*.

The THORAX affords no information to the feel, except in the case of pleurisy, and then the animal sensibly flinches from pressure sharply applied against the intervals of the ribs. Oxen will even moan from the pain so occasioned. Neither *admeasurement* nor *succussion* of the chest produces any satisfactory results.

PERCUSSION of the THORAX means striking or tapping its sides with a view of judging, from the different sounds elicited, of the normal or anormal condition of the organs within. The chest is said to *resound* when the vibrations raised by the shock extend throughout the chest and the contained viscera; on the contrary, when they appear confined to the place struck, it is said *not to resound*, or that the sound is *dull* or *dead*. The shock occasioning the vibration may be *direct* or *indirect* in its application, it being in the latter case conveyed through some intermediate body: hence the distinction between *mediate* and *immediate percussion*.

IN the PRACTICE of PERCUSSION, Leblanc makes use of a small iron hammer and a wooden guard or shield, the latter covered with India-rubber upon the surface to be applied to the chest. The sound thus produced exceeds that elicited by any soft body, such as the hand, against the equally soft skin. Such an apparatus, however, is apt to raise *too*

sounds, and, in consequence, Delafond after many trials relinquished this —as well as another somewhat similar contrivance of his own—for the use of the hands simply. The parts to be sounded may be struck back-handed, with the knuckles; or both hands may be employed, one serving as the mediator. In fact, in animals, mediate percussion has advantages over immediate, not only on account of the external soft parts being thereby compressed, and themselves contributing to the sound, but also because we are able with more precision to test certain places where sound is but very indistinct, as around the cartilaginous borders of the ribs. Notwithstanding this, for the common purposes of practice, Delafond prefers immediate percussion, to be practised with one hand alone; and in performing it, he recommends attention to these rules, viz. First: Let the shock or stroke be given *perpendicularly* to the surface to be sounded: an oblique stroke would deaden the sound. Secondly: The ribs themselves are to be struck, and not the intercostal spaces, bones being better producers and conductors of sound than soft parts. Thirdly: In striking or tapping, the same force should be employed against every part. Fourthly: The same practice, in regard to manner and place, should be strictly observed on both sides of the chest, in order that any comparisons made may be correct.

PECTORAL SOUNDS will be found to vary according to the region of the chest percussed, the age of the animal, its condition, the full or empty state of its bowels, and its peculiar conformation and organisation. Even when all these circumstances appear alike, resonance may be considerably greater in one animal than another. The chest of the horse admits of being percussed either upon the right or the left side, from behind the shoulder as far as the last rib: with a view, however, of rendering the different sounds and their modifications distinguishable, it will be best to make some division of this space. Suppose we draw an ideal line, corresponding with the posterior border of the shoulder, and another in the direction of the last rib: the interval between these two fixed boundaries we divide by three horizontal lines into three equal parts, which we designate *regions*, superior, inferior, and middle. The superior region extends from the scapular line to the last rib, along the border of the longissimus dorsi, and includes the superior third of the superficies of the ribs. The inferior region is marked by a line running from the elbow along the superior border of the pectoralis magnus, the insertion of the external oblique muscle and cartilages of the false ribs, and comprehends the inferior third of the said space. The middle region comprises the middle third, between these two lines.

A DIFFERENCE IN THE RESULTS OF PERCUSSION of the chests of men and quadrupeds, arises from the circumstances of the one being *horizontal*, the other *vertical*, in position, and of that of the horse in particular having those large intestines, the cæcum and colon, as well as the stomach, conti-

guous to the diaphragm; whereas in man, the stomach *alone* partly lies within the boundaries of the chest: these hollow viscera necessarily affecting the sounds elicited by percussion of the posterior or inferior parts of the chest. Had M. Leblanc taken these anatomical differences into account, he would not have allowed himself to run into error as he has done.

The SOUND OBTAINED BY PERCUSSION is loudest in the middle region, between the 7th, 8th, and 9th ribs. From this to the 15th rib it diminishes; but again increases from this all the way to the last rib. Along the right superior region the sound grows louder from the posterior border of the shoulder to the last rib; whilst on the left side it gradually diminishes along the same line. This difference cannot be explained but from the circumstance of the arch of the colon projecting so far into the chest, this being particularly observable in long-carcased horses. It shows the incorrectness of Leblanc's general rule for ascertaining the nature of sounds, viz. comparing those of the two sides. In the inferior region, the sound obtained upon the 6th rib may be compared to that of the superior region behind the shoulder: this holds as far as the 9th rib, from which point to the last rib the sound gradually lessens, until it becomes abdominal. On the right side the sound is found somewhat duller, on account of being opposed by the liver. After all, however, what with the shoulder and the different muscles clothing the chest, and the cartilages of the ribs, which themselves afford little or no sound, there is really not more than a third of the chest of the horse available for the purposes of effectual percussion; a fact which may very well explain the little advantage veterinarians have hitherto derived from the practice of it. The chests of old animals afford more sound than those of middle-aged, and these latter than those of young subjects: differences owing to diminished density of lung and more stability of rib in the aged animal. Lean horses, or such as are empty-bowelled, afford more sound than fat ones, and such as have full stomachs

We are not to suppose that it is enough to have made ourselves acquainted with the variations of sound of the healthy chest, in order to understand those of disease: much practice is required to estimate the value of sounds; and, after all, percussion itself is often insufficient, unaided by auscultation.

The resonance of the healthy chest may be augmented, diminished, or annihilated. It is augmented throughout the posterior lobes of the lungs when they are emphysematous. Effusion into one pleural sac augments the sound of the opposite one: that lung being compelled to admit more air, becomes more resonant. It is diminished during congestion, inflammation of the parenchyma, and tuberculous phthisis, when much of the lung is diseased. The sound is lost or becomes dead under effusions. This deadness may be on one or both sides, or may be confined—as is

ordinarily the case if the effusion be recent or inconsiderable—to the inferior part. It will increase or diminish according to the progress or diminution of the effusion. There is no measuring the effusion by sound; but we may throw it by the position of the animal into a place where percussion can easily detect it. M. Leblanc observes that, taking absence or deadness of sound to indicate the presence of water, the lungs are supposed to be permeable; otherwise, the deadness might as much depend upon density of the pulmonary tissue as upon the presence of water; still, there is a method of ascertaining from which it proceeds, viz. by placing the horse in that position in which the fluid will accumulate in the fore part of the chest, and then, should the posterior part still utter a dull sound, we may conclude that the lungs are hepatized. Furthermore, the dead sound may be partial, owing to local pulmonary condensation, circumscribed indurations, &c. &c.

AUSCULTATION.

Auscultation—from *auscultare*, to listen—consists in the perception, by the *mediate* or *immediate* application of the ear, of the different sounds generated in the lungs, with a view of determining the normal or anormal condition of those organs, and, in the latter case, of aiding our opinion on their diseases.

MEDIATE AUSCULTATION is effected through the intervention of the stethoscope; *immediate*, through the direct application of the ear to the air-tube, or to the walls of the cavity of the chest. We prefer immediate to mediate auscultation for the following reasons:—1st, the stethoscope is extremely inconvenient to apply; 2dly, supposing, however, this were not the case, the stethoscope possessing no power of augmenting the sound, but only being the means of conveying it more directly to the ear, no advantage attends the use of such an instrument; 3dly, in human medicine, the application of the ear would prove objectionable both to surgeon and patient, hence by the surgeon the adoption of the stethoscope: this is not our case.

IMMEDIATE AUSCULTATION.—During examination the animal should be kept quiet: his attention being engaged by a little hay or corn. During the silence of the night is the auscultator's best time. The ear should be lightly and accurately applied. After all, should the sound remain indistinct, the respiration may be increased by exercise. The nasal cavities, the larynx, the trachea, and the lungs, are the parts to be auscultated; and the modifications of the healthy sounds must be well studied in order not to confound them with such as arise under disease.

The RESPIRATORY MURMUR is the normal sound heard within the parenchyma of the lungs during the entry and exit of the air, or rather at the time of their healthy dilatation and contraction. This sound is difficult to describe: once heard, however, in a young well-bred lean

horse, it is not likely to be forgotten: by exertion it may be rendered still more characteristic. In a state of health even, it will be found to vary with age, condition, temperament, and breeding. In the young it is strongest. In human practice, its intense sound in infants is designated *puerile respiration.* Leblanc proposes in young animals to call it *juvenile.* In the aged it is hardly perceptible. The disposition of the pulmonary air-cells in the young, adult, and old animals, as shown by Majendie, admits of satisfactory explication of these modifications. If in young animals the air-cells be more numerous and smaller, the sound ought to be stronger, from the air entering into more places and through more circuitous routes. If, on the contrary, as in the old, the air-cells be larger and less numerous, there must be less dilatation, and more free passage of air, and consequently less sound. Laennec's explanation is different from this. He supposes the air-cells not to be capable of equal expansion in the adult animal, in consequence of their sides becoming hard. The feeble murmur heard in pulmonary emphysema, wherein the air-cells are dilated or distended, favours our view of the question. In fat animals, cart-horses especially, and such as are of a lymphatic temperament, whose chests are covered with thick skins and abundance of cellular tissue, the respiratory murmur is scarcely perceptible. In these cases, one must have recourse to exertion. Drs. Chomel and Beau, the last in particular, have a notion, that the murmur is produced by the reflection of the shock the column of air receives against the fauces or glottis, back into the ramifications of the bronchi. But how can such a theory explain the supplementary murmur in one lung when the other is hepatized, unless it be by a sound more vesicular—stronger—in the healthy lung; and in the superior part of the lung when the inferior is no longer permeable to air. Besides, if tracheotomy be performed, and afterwards the nostrils sewn up, the murmur is still heard, although the animal is respiring through an aperture below the place where, according to M. Beau, the collision happens which produces the sound in question. The respiratory murmur will be found to vary according to the region of the chest auscultated. In the middle region it is heard distinctly behind the shoulder, increasing a little thence to the ninth rib, afterwards gradually decreasing to the last. Along the superior region the sound is quite distinct, as well as below and behind the cartilage of the scapula—behind a mass of fat lodged there in fat subjects. At this place we have invariably found the murmur louder than elsewhere, and we ascribe this to the passage of the air through the larger divisions of the bronchi, they being situated hereabouts: to it we give the name of *bronchial respiration;* thus making a distinction between it and the murmur. Along the inferior region the respiratory murmur again becomes distinct enough from behind the elbow to the ninth rib; whence it diminishes to the seventeenth, and is there lost. The sound is the same on both sides,

with the exception of the place on the left side which receives the heart's pulsation. We must take care not to confound the slight crepitating noise occasioned by the subcutaneous cellular tissue—which is called the *dry crepitous râle*—with the murmur. We must also distinguish the sounds of the bowels, which are characterised by their rumbling and travelling about from place to place.

MORBID SOUNDS.—Disease modifies the healthy sound in such a manner that the murmur may become *diminished, extinct, augmented, attended* or *superseded* by other sounds.

DIMINISHED MURMUR.—*Accumulated mucus* within the large bronchi—as in bronchitis—may temporarily lessen the murmur, though it returns after expectoration. *Capillary congestion* within the parenchyma, before the onset of inflammation, equally occasions a considerable diminution of the respiratory murmur, speedily succeeded by the crepitous râle, should the inflammation continue. The diminution may be partial or general: rarely the latter. Acute enteritis and peritonitis, and in general all violent abdominal pains, accompanied with a short quick respiration, occasion a notable diminution of the murmur. The same remark applies to all diseases about to end in death.

ABSENCE OF MURMUR is owing, in certain conditions of the lungs, to the non-penetration of air into the air-cells. This may be the result, 1st, of effusion into the parenchyma; 2dly, of induration; 3dly, of the presence and development of tubercles, or other accidental productions; 4thly, of displacement and compression of the lungs by fluid effused into the chest. The loss of sound may be partial or general. It will return on the air-cells becoming permeable again.

AUGMENTATION OF MURMUR will accrue from accelerated respiration after exercise. Should this happen during rest, it is likely to result from dilatation of the heart or large vessels; in which case the sound is loud, and is heard throughout the lungs. Should the sound be louder in one lung alone, or in places only of both lungs, it is owing to a morbid state of lung; it being in the latter case in general referable to non-permeability of certain parts of the organ. In such a case as this, it is probable that the healthy portions of lung in some measure compensate for the diseased parts, in admitting a larger quantity of air. For example, should the left lung become hepatised, the murmur in the right will become augmented; the same as partial hepatisations will cause an increase in the surrounding healthy parts of the same lobe. In all cases, this augmented sound takes the name of *supplementary respiration.* Again, the breathing becomes supplementary, and to a remarkable degree, along the superior regions of the ribs, in pleurisy affecting either both sides or one only, followed by effusion, at the time that the lung, still permeable, becomes pressed by the fluid into the upper parts of the chest.

RALES OR RATTLES is the name given by Laennec to such unnatural sounds as may attend the entry or exit of air through the air-passages. This term, which has been restricted in its signification to the noise heard in the windpipe just before death, must here be considered to apply in a general way to every anormal respiratory sound. In respect to the places whence proceed these pathological pectoral sounds, they have been classed as follows:—

Bronchial Sounds	Humid or Mucous Râle, Dry Râle, Bronchial Respiration.
Pulmonary Sounds	Crepitous Râle, humid or dry, Sibilous Râle, Cavernous Respiration.
Pleural Sounds	Guggling or gurgling Sound, Rumbling or grumbling Sound.

The MUCOUS RALE issues principally from the bronchial tubes. It may be compared in sound to the bursting of bubbles of air occasioned by blowing through a pipe into soapy water. It is caused by the presence of mucus or other fluid. Its existence will be temporary or permanent, according as the mucus or fluid continues or not within the tubes: sometimes it becomes converted into the sibilous râle. Cough excited by compression of the throat, by occasioning the expectoration or displacement of the mucus, sometimes extinguishes these sounds; at other times it creates them. Frequently an accumulation of mucus within one large or several small divisions of the bronchi will cause suspension of the respiratory murmur in the interior of the lung, leading one to believe the lung is hepatised: one only need trot the horse, however, to dissipate any doubts on this head. According as the air meets with resistance from the density of the secretions will the bubbles thereby created be large or small. Large bubbles ordinarily occasion a noise like the crackling of a pump-sucker falling after it has been raised. The same sound often accompanies the sibilous râle. It is observable in catarrhal bronchitis when plastic mucosities abound. This sound is heard most distinctly behind the shoulder, opposite to the large divisions of the bronchi: at times it is audible even at the termination of the windpipe.

The MUCOUS RALE WITH LARGE BUBBLES becomes perceptible in simple bronchitis and in the second stage of broncho-pneumonia. It is also created by the effusion of fluid into the bronchi, in consequence of destruction of the cartilaginous rings, either from mortification or the bursting of vomica or abscess into the pipe; in which latter case the râle becomes *cavernous*. *Small bubbles* are formed when the fluid possesses but little vicosity, or becomes frothy, as in hæmoptysis, and the râle

resembles the sound of frothing of beer in a large glass. Leblanc has given it the name of the *spumous râle.*

The DRY RALE is a sound extremely variable in its nature, being at one time engendered within the bronchi, at another, but the reverberation of a sound originating within the pulmonary tissue. It is comparable to a growling bass tone, mingled with deep supplementary respiration. This râle, always denotive of dryness of the bronchi, is especially manifested at the commencement of acute bronchitis: its duration is always very short. By some the *sibilous râle* is classed among bronchial sounds: in our opinion it more properly belongs to the pulmonary sounds.

BRONCHIAL RESPIRATION is the loud dry sound emitted by the air within the bronchial tubes at such times as some obstacle prevents its free passage into the air-cells. The sound resembles that produced by a rush of air through a tube of tolerable dimension, or the noise of sawing, or such as is occasioned by the rubbing of two planks of wood one against the other. The detection of this sound is easy, and at the same time of importance, from its being indicative of alterations, either in the lungs or pleura, tending to create obstruction in the vesicular tissue: there can be no doubt of its being occasioned by the rushing of the air in and out of the large bronchial tubes. It is less audible in expiration than in inspiration. In hepatisation of the pulmonary tissue the bronchial sound is heard along the line of demarcation between the hepatised part and that which is only yet infiltrated. It becomes augmented as hepatisation proceeds; diminished, with its absorption.

In effusion into the chest, it is as soon as the fluid has reached the height of the lower third of the cavity, and, consequently, as soon as the inferior border of the lung, from being inundated, becomes impervious to air, that bronchial respiration is discovered; and especially in pleuro-pneumonia, when the lung is hepatized and maintained in the fluid by false membranes, is the sound distinct. In the horse, both in recent and chronic effusions, the sound is ordinarily heard upon the same level at both sides; but in dogs and ruminants it is audible but on one side.

Acute pleurisy, at its commencement, is likewise characterised by bronchial respiration. In this case, it is synchronous with the small and short inspiration, and catching of the breath, owing to the sharp twitching pains the animal feels every time he dilates his chest; and it is accompanied with a general confused sort of noise which renders its detection extremely difficult.

PULMONARY EMPHYSEMA, in the latter stages, is also denoted by bronchial respiration, the murmur being hardly or not at all perceptible. Audible in inspiration, but more so in expiration, it has been divided into *ascending* and *descending* sounds. Almost always it is accompanied by both crepitous and sibilous râle.

In conclusion. Bronchial respiration being a constant unequivocal sign of important pathological alteration, it is that to which the practitioner should give his most special and undivided attention.

Crepitous rale.—Laennec has given this appellation to a sound which accompanies the respiratory murmur, and which he has compared to the crackling powdered salt makes when thrown upon some burning hot body, to the noise elicited by the inflation of a small dry bladder, or to that produced by the compression between the fingers of a sound lung distended with air. It suffices to have heard it once not to confound it with the other râles; and, besides, this râle is audible in inspiration alone, which at once distinguishes it from bronchial respiration. The crepitous râle has two modifications, important to be distinguished: it may be *dry* or altogether like the crackling of the bladder, such as we have described, or such as is produced by the inflation and compression of the cellular membrane of horned cattle: this is called the *dry crepitous râle*, or crepitation. On occasions, however, the crepitous râle possesses a degree of softness or humidity which renders it comparable to the crackling of a bladder slightly moistened. This is less distinct than the former, and has received the name of the *humid crepitous râle.*

The dry crepitous rale, or crepitation, is observable in interlobular emphysema of the lung, in partial gangrene—at least, in the parts surrounding the latter, and often in the extremities of the posterior lobes as well.

The humid crepitous rale is heard at the commencement of inflammation of the substance of the lungs. Should all murmur cease soon after, it is a sign of parenchymatous induration; its return indicates the resolution of the induration; and should murmur be heard around a part impenetrable to air, it denotes either resolution of the circumference of the indurated part, or that an areola of inflammation has been set up. In this last case the crepitous râle often continues; in the former one, it ceases. This râle is likewise manifest in intense bronchitis accompanied with some slight parenchymatous inflammation: we have often produced it also by injecting an irritating fluid into the bronchi. It is a common occurrence for this râle to be indistinct: when it is so, it becomes necessary only to momentarily excite the respiration to render it more audible. Should we be asked the question—How this râle is produced, and where? We answer—without entering into any minute and useless explications—that its source is the minute divisions of the bronchi and the air-cells; and that its occasion is, doubtless, the difficulty experienced by the air in making its way through these small tubes to the air-cells: added to which, it may in part arise from the distension of the cells.

Dry sibilous rale, or sibilation.—We have already observed, in speaking of the dry and mucous râles, that these sounds were the result either of the collision of the air with some obstacle in the bronchial tubes,

or of its rapid expulsion out of the air-cells. The sibilous râle issues from the bottom of the air-cells, and constitutes a shrill, dry, hissing sound, more or less prolonged and permanent. This râle is heard in pulmonary emphysema, both vesicular and interlobular, with dilatation of the extreme bronchi; and particularly during deep and distressful expiration. Its resonance through the bronchial tubes gives it strength and duration. At the entrance of the chest the râle is a grave sound; in the larynx and nasal cavities a shrill one; and in the open air is audible enough at a distance from the animal. Its intensity, doubtless, depends upon the extent of enlargement the bronchial tubes undergo. Many beginners in auscultation are apt, in large animals, to confound this râle with the nasal, laryngeal, or bronchial sibilation: careful exploration of the chest will prevent this mistake; inasmuch as the sound will always be found to be accompanied by the dry crepitous râle, bronchial respiration of a very loud character, and by catching of the breath.

Cavernous rale.—This râle, as is indicated by its name, can only proceed from some anormal cavity or *cavern*, within the substance of the lung, communicating with the bronchial tubes, and admitting air from them: this last condition being indispensable. Should the cavern contain any fluid, the air passing through it occasions gurgling or more or less ebullition, comparable to the noise produced by a current of air through a tube into a fluid in a vessel, from which it can only escape in part.

This gurgling, which itself constitutes the *cavernous râle*, is the more distinctly audible the more capacious the cavern is, and the nearer it is situated to the ribs. It is often accompanied by mucous and sibilous râles. When the fluid contained in the cavern comes to flow into the bronchi, and thence to be expelled by expectoration, the air, in passing into this cavity, ordinarily terminated by a cul-de-sac, should the cavity be near the ribs, gives to the ear an inordinately loud sound, called *cavernous respiration*. When the cavernous râle follows upon circumscribed absence of the respiratory murmur, it becomes the sign of distinction between the bronchial and parenchymatous structures under disease in that situation: this indication, in combination with such as are furnished by the discharges from the nose, and the air expired, may enable us to form some idea of the disease that has occasioned the cavern. One observation we would make here, to prove the importance of immediate auscultation, and that is, when the expired air is impregnated with the odour characteristic of gangrene, and the cavernous râle is distinct and circumscribed, we may affirm, during life, that such a lobe of the lungs is, in this part, the seat of an anormal cavity resulting from mortification. This râle is also one of the best indications we possess of morbid alterations in the lungs of our domestic animals.

Pleural sounds.—When fluid becomes effused into the pleural sacs, we directly imagine that it will discover itself by a *rumbling*, or by *undula-*

tion during inspiration and expiration: observation, however, proves that this is not always the case—that in fact, these signs become manifest only in certain states, as will be seen hereafter. We find an exposition of these symptoms in a case of hydrothorax published by M. Massot, which he recovered by tapping. "When the ear is applied," says he, "beneath the sternum, a dull, confused, drawling sound is heard, something similar to the noise made by rolling a cask containing liquid." This observation is confirmed by M. Dandrieu, in a case of carditis, with water in the pericardium of a cow, narrated by him in the '*Receuil de Médecine Vétérinaire*,' vol. iii, p. 488. "I applied," observes M. Dandrieu, "my ear against the left side of the thorax, and I heard a slight confused noise, which I presumed to be caused by a fluid already partly effused into the cavity of the pleura, and, perhaps, even into the pericardium." M. Leblanc seems to confirm both these accounts, when he says, in speaking of pleural sounds, that "at one time, kinds of rumbling (as of the bowels) are heard; at another, spumous sounds, if I may so express myself; at a third time, a gurgling sound: the first and last are ordinarily heard towards the lower part of the chest, supposing effusion to have taken place.

Experience has convinced me that the presence of fluid cannot with certainty be made out by these signs, except under two circumstances:—1st, when false membranes have been recently formed; 2dly, whenever gas becomes mingled with the fluid: whether it be generated by the fluid itself, be *exhaled by the pleura*, or get accidental admission into the cavity, the result is, that agitation produces froth; and then the spumous râle, combined with rumbling, becomes audible at the bottom of the thorax, and the less the quantity of fluid the louder the noise. Should there exist both fluid and false membranes, the sound becomes modified, approaching to rumbling, or rather to the gurgling of a bottle emptying itself while its neck is full, but much more feeble. This noise has always appeared to us to ensue whenever, with the effusion, there were present false membranes which had so formed or arranged themselves as to have small *areolæ*, or cavities of various capacities, into which the fluid entered during the act of respiration. In every case of hydrothorax without false membranes, and the presence of gas in the cavity, that has come under our observation, even when the like was produced by the injection of warm water into the chest, with the precaution to suffer the admission of as little air as possible, *we have on no occasion heard any sound produced by the fluid*. Moreover, it has long been an established fact in human medicine, that no sense of fluctuation, either by succussion or by auscultation, is detectable, except when gaseous fluid is mingled with the liquid effused: a case, be it remarked, extremely rare.

Such are the sounds afforded by the respiratory organs in horses: those of men furnish still more *on account of the voice*, which the surgeon having

the perfect command of, manages to render of the greatest service. The sounds denominated *bronchophony*, *egophony*, and *pectriloquy*, are all productions of the voice under various states of disease. In animals we lack this valuable aid.

We cannot conclude these observations on auscultation without remarking, in a general manner, that though of themselves of great importance, *they are not to be regarded as infallible:* they ought on all occasions to be coupled with the ordinary pathognomic symptoms; and *by the two*, considered together and relatively, ought the practitioner to be guided.

We must make ourselves well acquainted with the permanent existence of the different *râles*. Some sounds will be found to come and go, and become replaced by others quite of another character; or several sounds may exist at the same time. Notwithstanding all this, however, by patience, attention, and study, we shall be able, I think, to establish in our explorations of the chest, sure diagnotics of pulmonary diseases: our ear being previously well educated for the business. Practice will give us tact in auscultation, and perfection in the art will place us in a situation to estimate the advantages we possess over the person who refuses such aid.

DISEASE OF THE LUNGS.

Bronchial Disease of the Lungs, in young horses especially, is a frequent signal,—sometimes an accompaniment,—of catarrh and sore throat. The inflammation either extends from the nose to the throat, or seizes the latter at once, and from the membrane of the larynx descends along the windpipe upon the membrane of the bronchial tubes; or else, as happens often, all parts become simultaneously attacked; or even the inflammation may, by possibility, extend from the lungs upwards to the throat and nose. This is a form of disease very apt to become epidemic at the spring and fall of the year among young horses standing in stables, and often proves so general among them as to acquire the form of a contagious as well as an epidemic disease, and in that guise to obtain the name of *distemper* or *influenza;* though, in reality, there is no sufficient evidence of the disease being other than bronchitis in a severe and complicated form, attacking horses at an age and under circumstances of peculiar excitability.

BRONCHITIS.

DERIVATION.—Bronchitis is derived from Βρονχος or *bronchus*, and *itis*, signifying inflammation of the bronchial tubes.

SYNONYM.—Coleman confounded this disease with "Inflammation of the Lungs." Laennec has named it *pulmonary catarrh*, which, in point of fact, it is. In the epidemic form it is apt to assume, it sometimes acquires the name of *influenza* or *distemper*. In old works on farriery we find it described under the appellation of MOREFOUNDERING, a word evidently introduced from the French *morfonderment*, or *morefondure*.

DEFINITION.—Discharge from the nose; cough; sore throat; with shortness of breath, and febrile irritation, sometimes without antecedent shivering.

BRONCHITIS SO VARIABLE IN CHARACTER rarely exists unmixed with other diseases, and this renders it less likely at all times to attract attention than it would otherwise do: it so commonly enters into the composition of affections regarded as entirely catarrhal or pulmonary that it is apt to be mistaken or overlooked. It will, insensibly almost, follow catarrh, and as stealthily, unless narrowly watched, run into pneumonia and pleurisy, and sometimes other thoracic diseases.

KINDS.—Bronchitis may be said to be *pure* or *mixed*, though the former is a character it rarely assumes, being mostly complicated either with catarrh (*catarrhal bronchitis*) with laryngitis, or with disease of the lungs. It may be *acute* or *sub-acute*, and now and then it will become *chronic*. In the spring and autumnal seasons of the year—among young horses especially—it is very apt to present itself, complicated with other disease, in the *epidemic* form, and then constitutes part—and perhaps the major part—of the disorder prevalent at the time under the appellation of influenza or distemper.

The CAUSES of catarrh are the causes of bronchitis. The same membrane pervades all the air-passages, and, though

from its situation within the lungs it is less exposed than within the head, still is it much under the influence of atmospheric changes and noxious inhalations. Independently, however, of these causes, there are others which in a peculiar degree operate upon the bronchial membrane. It is well known that this membrane, so vast in its superficial extent, is closely allied in its function of secretion with the skin; and not with the skin alone, but with other mucous membranes of the body as well, particularly with the one lining the alimentary canal. Cold or wet suddenly applied to the surface of the body, especially when heated, checking or suppressing perspiration, may, on the principle of derivation, throw an inflammation upon the bronchial membrane, or upon that of the bowels, and the two irritations, bronchitic and gastro-enteritic, may exist simultaneously. It is this known sympathy between these two membranes which deters us from giving aloes or anything likely to irritate the bowels in bronchitis; being in very great danger of becoming troubled with diarrhœa, if we do, at the same time. Bronchitis may proceed from other disease of lung or pleura, though its ordinary concomitant or precursor is catarrh and laryngitis. Now and then it supervenes on strangles.

Catarrhal bronchitis is the ordinary form the disease assumes. The horse is said to have "taken cold," and begins to show signs of catarrh; his prevalent symptom, perhaps but now commencing, being sore throat, proceeding from irritation of the membrane of the larynx and fauces, which speedily spreads down that of the windpipe into the larger bronchial tubes, and occasions, in addition to the sore throat, shortness and oppression of breathing. The discharge from the nose, which at first is but slight, and of aqueous or muco-watery description, in three or four days becomes of a purulent as well as mucous nature, and is greatly augmented in quantity: the symptoms of catarrh and laryngitis gradually abating and merging into that short and laborious breathing which clearly denotes high bronchial and pulmonary irritation. Whenever he coughs, which he does more now, matter is thrown out in increased quantity from the nose;

so that when the head is hung down, the discharge, when very great, will pour out from the air-passages. This is all very favorable, since such fluxes will carry off the impending inflammatory action. The worst turn an attack of bronchitis can take is the insidious one which commences with some irritation about the throat, accompanied with sore and oppressed cough, and, without occasioning much discharge, communicates itself to the substance of the lung, and, may be, pleural membrane as well, and so changes its character into either pneumonia or pleuro-pneumonia.

BRONCHITIS WILL BREAK OUT WITHOUT PRECURSORY CATARRH.—The horse will suddenly fall ill, be seized with violent blowing and distressful breathing, and all at once will emit copious outbreaks of mucous matters from his nose, from which he will at the moment, perhaps, obtain some relief; though they may, should they occur often, prove so dangerous as to produce suffocation even. Commonly, however, these sudden and violent attacks soften down into ordinary bronchitis; though at times they run the opposite way, and end in pulmonic disease.

EPIDEMIC OR INFLUENZAL BRONCHITIS is attended with exceeding sore throat and profuse discharges from the nose, at the same time the latter are modified and varied in their character, being sometimes white, sometimes yellow, and even at times green in colour, according to circumstances: the green tinge being given to it either through malignancy or while the horse is feeding on green-meat. The disease is so much more asthenic than sthenic as sometimes to be attended with great weakness of loin and prostration of strength, and with low febrile irritation: the blood evidently showing that the pulmonary changes requisite for its healthy conditions but imperfectly take place, seemingly owing to the obstructed condition of the smaller ramifications of the bronchial tubes.

The PATHOGNOMONIC SYMPTOMS of bronchitis are—inordinate nasal flux, with reddening of the Schneiderian membrane, cough, sore throat, dyspnœa. Auscultation will assist us in our diagnosis. In place of the natural, soft,

and all but inaudible *murmur*, we shall perceive a distinct sound, a cooing sort of noise, arising from want of secretion within the tubes. When the secretion returns, and in augmented quantity, we shall distinctly hear the *râle* or rattle as it is called. These sounds will, of course, be present only in places where the disease is present, and in one or both lungs, according as the case may happen to be.

PROGRESS.—The disease in its acute form attains its height commonly about the fourth or fifth day, and after the sixth or seventh begins to decline, leaving the patient out of danger at the expiration of the tenth or twelfth. Should the case not go on favorably, however, about the fifth or seventh or ninth day, when acute, we may look for decline into pulmonic or pleuro-pulmonic disease, if not, in consequence of suffocation, into death itself. The signs of growing worse are—the respiration becoming very oppressed; the pulse quicker and fainter; the skin and extremities cold; the mouth cold and clammy; and the nostrils dry, lacking any moisture whatever.

The PROGNOSIS is in general favorable. Bronchitis is dangerous only when the secretions clog or obstruct the tubes; or in its

COMPLICATED FORMS, as when combined with other disease of the lung, and with pleurisy. Especially dangerous is it when combined with disorder of the mucous lining of the alimentary canal. In this latter case, in combination with diarrhœa, and when the inflammation is running high in the bronchial membrane, there is hardly a chance of saving the animal.

PATHOLOGY.—In the advanced condition of veterinary science of the present day, bronchitis is no longer confounded with inflammation of the substance of the lungs: the structures are entirely different; the tissues in which the inflammation is seated so different that different effects are produced, and different terminations come to. The bronchi, like the windpipe and larynx, are lined by a secreting membrane which inflammation or irritation may simply augment the secretion of, or may run so high in as nearly or altogether to suppress it; and these changes of action

will have proportionate results in the animal economy. The inflammatory attacks of the lungs to which young horses are so especially obnoxious, are very often cases of bronchitis; and even of such as are peripneumonia, bronchitis is a common precedent or accompaniment. In fact, there exist very few diseases of lung in which bronchitis is not, in some degree, present, either in a primary or secondary form.

The TERMINATIONS or consequences of bronchitis are such as to make us anxious to institute such treatment at its commencement as is most likely to lead to their prevention; it being, of all others, the most fertile source of those organic changes which in particular tend to shorten or impair the animal's wind. Roaring and thick wind commonly have their foundation laid in bronchitis. The bronchial membrane during the early stages of disease will be found in a state of congestion or turgescence; in the sequel it is very likely to become thickened in substance—*hypertrophied,* as it is called—in which condition the calibre of the bronchial tubes, the small ones in particular, will suffer considerable diminution, and consequently become but comparatively imperfect conductors of the respired air. In the larger tubes the lining membrane is furnished with follicles, which impart to it the true mucous character; but in the very small ones, as we approach the air-cells, it has been found to bear more similarity to a serous membrane, and on this account becomes still more disposed to take on the plastic or adhesive kind of inflammation which not only gives rise to hypertrophy, but occasionally to solid effusion and agglutination of the sides of the tubes, obliterating their cavities, and converting them into mere chords, the same as happens when inflammation is set up in the interior of blood-vessels; and this may even go so far as to block up and annihilate the air-cells. The effect of this will be to shorten or "thicken" the wind, to compensate for which the animal will make additional efforts in respiration, and the result is likely to be *dilatation* of the vicinous tubes and air-cells. It would appear that this process commonly commences in the smaller and makes way into the larger tubes, and from the circumstance of secretion

having been found pent up in the air-cells while the tubes were in a state of obliteration, and assuming that sort of aspect which tubercles and vomicæ are known to give to the lungs, Mr. Stokes[1] has ingeniously suggested that this "will go far to clear up controversy about the nature and origin of tubercles." Horses that have died of acute attacks of bronchitis, young, and otherwise healthy, have exhibited nothing on dissection save a turgescent and thickened condition of the bronchial membrane, with the tubes so filled with frothy mucous secretions as to give rise to the belief that the animal had been actually choked by it, or, as Dr. Elliotson has significantly expressed it, "drowned inwardly by mucus."[2]

The TREATMENT of bronchitis must of course, in a disease so various and versatile, vary and even differ with the subject, the violence, and the stage of the malady we have to treat. There was a time when this disease, confounded with other affections of the lung under "Inflammation," would have shared the ordinary treatment of bloodletting and rowelling, &c. Since the distinction, however, between the membranous and the parenchymatous or vascular disease, as well as from experience, we have learnt that horses, young ones in particular, do best when submitted to a comparatively mild and soothing mode of treatment. The encouragement of the flux from the nose which Nature herself has set up as a sort of issue or outlet for the disease, must constitute a very important consideration. Conducting a stream of vapour from scalded bran, or hay, up the nasal passages by means of a sort of linen tubular conductor—when the passages are not too irritable to bear it—affords great relief: if the linen tube cannot be endured, perhaps the steam rising from an open tub or pail, containing the steaming material, may be borne; and while this is being done, by having a body of water in the tub over which the horse is holding his nose, the throat may be being fomented. No time ought to be lost in opening the bowels moderately, either by clyster, or the exhibition of an aperient, consisting of not more than two or

[1] In his 'Treatise on Diseases of the Chest.'

[2] Dr. Elliotson's 'Lectures.'

three drachms of aloes, using the latter in case the clysters, which may be repeated morning and evening if required, be not themselves sufficient. There will be no fear of super-purgation from so small a quantity of aloes; or, if there should appear to be, let water-gruel be substituted for the horse's water, and hay given to him to eat, without bran. A rowel had better be inserted early in the disease; over which, upon the breast, as well as upon the sides, may be well rubbed into the skin the turpentine liniment, recommended for the throat in catarrh (at page 22.) This liniment ought to be re-applied morning and evening until the skin evinces sweating and matting together from it; if continued beyond this the hair will come off. In the most severe cases, no hesitation should be made, or time lost, in applying potent and extensive blisters to the sides, previously either singed or clipped. The box or habitation of the patient ought to be kept at a temperature not lower than 50° Fah., and he should be warmly clad, and have his legs kept warm with flannel bandages. This determination of blood to the skin may be assisted by medicine. Either Nitric Æther draughts, consisting each of three or four ounces of æther to a pint of tepid water, may be given twice or thrice a day, or the fever ball may be administered morning and evening; the same as is recommended for catarrh (page 22). So long as fever and irritative action continue, great reliance must be placed on the continuance of the *soothing* treatment—steaming and fomentation; but when once the disease has fairly settled down in the chest, and appears to be running its course therein, threatening, to a certainty almost, communication to the substance of the lung, we must place more reliance upon counter-irritation and internal medicine than anything else. Even here—in young horses, certainly, and in old ones we are disposed to think so too—experience does not warrant the use of the phleam. While, instead of continuing the use of the fever medicine at this stage of disease, when effusion into the lung or cavity of the thorax may be apprehended, I have administered with the best effects alterative doses of mercury, in combination with diaphoretic

and diuretic medicine. What I call the *Plummer's ball* (composed of—Hyd. Chlorid. gr. x; Ant. Oxy-Sulphuret. ℈j; Guaiac. ℈ij; Far. Avenæ, ʒiij; Terebinth. Vulg. q. s. ut f. Bol.) will prove of the greatest service, not by only very gradually, in the course of time, affecting slightly the mouth, and so promoting absorption to a great degree; but, at the same time, by producing copious diuresis, and in that way carrying off that which might otherwise be deposited within the parts immediately diseased, or into the cavities.

PNEUMONIA.

By PNEUMONIA—from the Latin—we wish to be understood to express, either the condition of *congestion* or that of *inflammation* of the lungs.

PATHOLOGY.—The lungs being organs at once *sui generis* and extremely varied structure, will be found to be subject to diseases numerous as compared with those of other viscera, and more diversified in their character. The bronchial tubes constitute one division of their composition; the air-cells, in which the tubes terminate, another portion; their blood-vessels, a third division; the inter-connecting parenchymatous substance, a fourth; which four integral and principal fabrics are again distinct from the cellular and pleural membranes. Having already described one prevalent disease of the pulmonary system—*bronchitis;* we come to one exclusively belonging to the pulmonary organ itself—*pneumonia;* which will be found to differ from the former, in being less painful and irksome to the animal, in consequence of the tissue in which it is principally seated being known to be possessed, either in health or disease, but of comparatively little sensibility.

On this account, so obscure are often the symptoms of pneumonia, whenever the parenchyma is exclusively affected, or principally so, that it not unfrequently becomes an affair of doubt in the mind of the attendant practitioner whether the lungs be actually suffering from disease or not: hence such cases have obtained the appellation of the *insidious* or *obscure form* of pneumonia. Should the bronchi, however, parti-

cipate in the inflammation—which is more generally the case—then some such symptoms as characterise bronchitis will arise, and the seat of disease no longer remain questionable. Supposing inflammation to have attacked the parenchyma alone, the *bronchial* blood-vessels may be regarded as those principally carrying on the disease; but there may, and often does, take place prior to inflammation, and sometimes without any consecutive inflammation, and especially after over-exertion, a *congested* condition of the large blood-vessels (the pulmonary) of the lungs: a case of which kind will show other symptoms, and require a modified treatment, from one of actual inflammation.

Division.—This difference in the pathology leads to the division of pneumonia into the *congestive* and *inflammatory* forms or stages. The latter admits of further division into *simple* and *complicated*, depending on the accompaniments—both of which are common—of bronchitis and pleurisy; the one case going by the name of *broncho-pneumonia*, the other by that of *pleuro-pneumonia*. A still further division of inflammatory pneumonia is required into *acute* and *sub-acute;* though these, of course, have reference but to *degrees* of intensity.

The symptoms of congestive pneumonia may supervene all at once, upon any act of sudden or violent exertion, or they may come on gradually. In the one case, the horse, in perfect health before, being put to some violent effort—whatever it may be, whether hunting, or racing, or over-fatigue of any kind—is now distressed for breath to that degree that it is evident, unless speedily relieved, he must die. In the worst cases of this description, the animal is all over in a tremor: a cold sweat bedews his body; there is no pulse to be felt; his extreme parts betray the coldness of death; his eye is frightfully wild with its pupil dilated, and, together with the boring of head and stupidity evinced by him, clearly denote the poor sufferer to be labouring under a species of delirium. Should this state of congestion come on in the stable, i.e. gradually, and some time after the cause is applied, the horse will shew it by at first appearing dull, and listless, and heavy-headed, and off his appetite; his respiration will

gradually become more disturbed and oppressed, partaking more of labour than of pain. The pulse will be full and quick, but probably so feeble as hardly to be perceptible. The ear applied to the chest detects no sound: the usual respiratory murmur is lost. The extremities—the legs and ears—have a cold, death-like feel; and in extreme cases the mouth is cold also, and the pupils more or less dilated. Cold sweats supervene; no pulse is to be felt; the animal gradually sinks, and in convulsions and delirium dies.

EARLY BLOODLETTING is the only remedy to save a horse in this state. The surcharged and distended pulmonary vessels must be relieved: the event will greatly depend upon the celerity with which this is done, and upon the extent to which we have been able to carry it. A large orifice must be made in the jugular vein; though from this the blood will seldom issue in any other than a tardy stream down the side of the neck, treacly in its consistence, and almost black in colour. So inanimate is a horse in this condition that it is as much as one man can do to support his heavy head, while another holds the blood-can to his neck. Blood must, notwithstanding, be drawn, until the patient shall begin to stagger from becoming faint: all hope of recovery being centred in this abstraction. Should he survive the paroxysm, the case will shortly resolve itself either into one of resolution and direct recovery, or into an attack of inflammation.

INFLAMMATORY PNEUMONIA may supervene upon the congestive, or it may come on by itself. In the latter case, it will commonly exhibit three stages or sets of symptoms; though the first stage may be, and often is, either absent or unnoticed.

The SYMPTOMS, in the first stage, will be such as are observed at the beginning of common fever and other inflammatory diseases: such as staring or erection of the coat, with cold extremities, followed, perhaps, by actual rigor; the horse "hangs his head" either in or under the manger, and has not eaten his last meal; has had for some days a short dry cough, which comes on when he is exercised, or after drinking; and is dull and dejected in countenance, and moves with great disinclination. To this succeed—fever, quickness of

pulse and heat of mouth, and injection of the membranes of the nose and eyes; and now, in the second stage, the breathing becomes disturbed, and the case quickly develops itself. The nostrils will be seen opening and shutting their wings; the flanks laboriously working up and down; since the disturbed breathing will be of a kind to indicate embarrassment or oppression rather than quickness or pain: whereas, in subacute cases, the flanks can hardly be seen to move at all, and then it is that the *nostrils* become an important guide to us. The pulse, at the beginning, is accelerated, and commonly distinct; but, as the disease proceeds, it is very apt to grow indistinct from fulness and oppression; from which, however, it recovers by loss of blood, and then again becomes perceptible, and often, compared to what it was before, possessed of strength. The ears and legs are colder than ever. The membrane of the nose is moist and reddened, and there is often to be perceived a sparing, yellow, slimy issue from one or both nostrils. The horse stands constantly in the same place and posture, often with his fore legs stretched out, and prefers having his head directed either to the door or to any open window there may be. He never offers to lay down; but from time to time casts a look backward at his heaving flank of a peculiar despondent character, which the experienced practitioner does not fail to recognise. The third and last stage is characterised by the respiration becoming quicker and more oppressed; the pulse also quicker, but less distinct; the coldness of the extremities continuing unrelieved; the membrane of the nose changing from red to a leaden hue; convulsive twitchings of the muscles of the surface; extreme uneasiness; lying down and rising again; reeling in his gait; haggard countenance; delirium; convulsions; death.

Auscultation, according to D'Arboval, detects a crepitating humid *râle* around the inflamed places, within a louder respiratory murmur than in other parts; where, as percussion indicates deadness of sound in the diseased parts, but resonance in others. There are cases, however, in which, from the inflammation being seated around the roots of the lungs, these tests are not present.

The MORBID APPEARANCES exhibited by the lungs in this stage are, an uniform arterial scarlet tint of the parenchyma, with a slight cast of yellow from the surface of any divided part; attributable to the exhalation of serosity into the interstices of the parenchyma, in particular around the borders of the inflamed places. The lung has lost its elasticity and crepitating property, and has increased in weight and density, but still swims in water. Its cut surface is frothy also. This accords with my own observation.

A horse came under my care for pneumonia on the 19th of March, in whom inflammation ran so high that several bloodlettings, &c. were required before it gave way. He was discharged "cured" on the 13th of the following month —April. A week afterwards, the same horse returned with a locked-jaw, of which he died on the third day from the attack. His lungs were now examined. On one side they were found quite sound. On the other, their substance was redder than natural, and there was slight interstitial effusion, augmenting their solidity, but not sufficiently so to sink them in water, or to warrant the application of the epithet "livery" or "hepatized" to them.

The PROGRESS of pneumonia will vary according to circumstances. Generally speaking, in a few days the disease will reach its height, and in a few days more evince indications either of gradually abating, and at length disappearing altogether, or of having set in to produce consequences likely to end in the destruction of life.

The FAVORABLE SIGNS are—abatement of the embarrassed and quickened respiration; comparative distinctness in the beats of the pulse; return of warmth to the extreme parts, moisture to the mouth, and secretion to the nose; swelling of the legs, which commonly commences in the hind ones; and sometimes of the sheath and breast (if the latter have been blistered or rowelled) as well; return of appetite; the coat becoming smooth and soft; rowel and blisters acting well, should either or both have been applied; the animal lying down and taking his rest.

UNFAVORABLY must be regarded symptoms the reverse

of these. The unabated continuance of the inflammation will be denoted by the unrelieved state of the respiration; by the continued frequency or indistinctness, or both, of the pulse; by the gloomy aspect of the case altogether. Should the breathing become on a sudden quickened and embarrassed; the pulse grow small and weak, and run up to a hundred or more; the legs remain cold; the mouth become cold; the eye acquire a peculiar desponding expression; the lower lip hang pendulous; the horse become uneasy; cast frequent and desponding looks at his flanks, and move from place to place, or lie down but rise again almost immediately, and begin perhaps to paw a little. Under such circumstances we may make up our mind that the scene before us will not hold out for long. In many cases of unrelieved pneumonia, particularly in the congestive form, the horse will maintain the standing posture up to the very last, and then suddenly drop down and die.

The TERMINATIONS of pneumonia, in the *congestive* form, are resolution, stagnation, and obstruction, followed by mortification. In the *inflammatory* form, the disease will end in reddening, more or less deep and patchy, of the lung, with effusion of bloody serous fluid into the parenchyma, and frothy matters into the air-tubes; or in consolidation and hepatization, succeeded by tuberculous formations and abscess, and ending in softening and degeneration.

STAGNATION OF BLOOD, consequent on the obstruction caused by the unrelieved distension of the blood-vessels, and their own inability to contract upon the column of blood, is the cause of death in such cases as succumb during the congestive stage of pneumonia. The accounts of horses dying in a few hours after attacks of what is miscalled "inflamed lungs," are cases of this character, and are not inflammatory in their nature. Their lungs are found gorged with blood, very dark-coloured, and, where congestion has existed for some days, really lax and rotten in their texture, and sometimes changed to that degree to be, in fact, gangrenous: hence the description given of them by farriers and grooms, and such people, as being "as black as their hats," and as

"rotten as a pear." The obstructed circulation through the lungs will account for the disorder we find manifesting itself in the brain, particularly in the last stages of congestive pneumonia.

HEPATIZATION is the term we apply to the change the lungs undergo in consequence of inflammation, rendering their substance, when cut into, liver-like or *hepatic:* instead of presenting a pale pink, spongy, light, and elastic interior, we find them reddened, solidified, and become heavy and consistent; and, instead of floating in water, we find they sink.

M. Rigot has well portrayed this change. "The hepatized lung appears to have, and on occasions really has, acquired increase of volume: its tissue is close; it crepitates no longer on pressure; on being cut, it does not present one uniform redness, but is irregularly shaded with rose, brown, and white tints, and at times with violet: these different colours, which give it a marbled aspect, are owing to portions of parenchyma remaining sound, mingled with blood, as well as to altered layers of cellular tissue. Cells are also to be perceived within the parenchyma occupied by the lobules of the lungs, which themselves appear converted into homogeneous amaranthine-coloured substances. Here and there, divided bronchial tubes, and large branches of veins and arteries, appear."—"The impermeability of the lung prevents us from hearing the respiratory murmur, by causing a dulness of sound on percussion opposite the decased parts, and this may happen at one single spot or in many places. A humid crepitous râle is heard around these places when they are in a state of inflammation. The respiratory murmur becomes louder in the sound parts than it was before; or in one entire lung, should the other be attacked by inflammation. The respiration becomes irregular and catching; the pulse tense, small, and wiry; the cough dry, though sometimes humid; the skin harsh. The horse does not lie down, or but for a short time, and upon the affected side."

Should the symptoms continue beyond the sixth or seventh day without any decided change, either for better or

worse, we may consider the inflammation to have assumed the sub-acute or chronic form, and the duration and termination of the case to have now become extremely uncertain. The critical days, in pneumonic cases in general, have appeared to me to be the third, the seventh, and the eleventh days: beyond this last, little hope remains, without relapsed crisis, for a favorable termination.

Diagnosis.—Pneumonia, in its true or inflammatory form, is very apt to be complicated with bronchitis and with pleurisy; though bronchitis may exist without the parenchyma being affected; and, but very rarely so, may, I believe, pleurisy. Bronchitis is characterised by the short, catching, painful breathing; by the frequent presence or precedence of sore throat and catarrhal symptoms, with concomitant irritation and soreness of the air-passages; while pneumonia is known to be absent by the sound condition of the lungs, as indicated by the respiratory murmur being everywhere audible. Moreover, in bronchitis, with the return of the secretion of the bronchi comes the mucous râle, and occasionally the sibilous râle. On the other hand, the characteristics of pneumonia are—absence of any symptom or direct manifestation of pain: the horse is spiritless, listless, gloomy; stands in one place and posture with his head dependent, and notices nothing; hardly condescending to raise it, though offered a handful of hay or corn, or perhaps he takes a mouthful, and retains it between his teeth without offering to masticate it, as though he had forgotten he had accepted it. Another marked symptom is, the death-like coldness and stiffness of the legs, and the difficulty there is in restoring warmth to them, and the still greater difficulty in retaining that warmth.

Prognosis, commonly dated from one or other of the critical days, is marked by a general abatement of the symptoms of pain and danger, with some attempt at feeding, and, perhaps, a disposition to lie down; with an inclination to some other posture or place than the one originally taken up, and which is in fatal cases persevered in to the last. This standing-place will often be in one parti-

cular corner of his abode, most likely with his nose towards some window or doorway. As soon as change for the better is about taking place, his heels instead of his head may be found in such situations, clearly indicating that his respiration is becoming freer, and that some return of appetite is coming over him.

TREATMENT.—I will take it for granted that pneumonia, in its congestive form, has set in; which being the case, it becomes the imperative duty of the practitioner, without any regard whatever as to the state of the pulse or the condition of his patient, to abstract blood the moment he is called in. Generally speaking, a large orifice in the jugular vein is to be preferred to a small one: in cases of imminent danger it is absolutely indispensable. The quantity of blood to be abstracted must be as great as the patient will bear; our surest guide in this, as in most other cases, being the effect which the efflux of blood has upon the pulse at the jaw. While the blood is flowing, keep you fingers applied upon the submaxillary artery. So long as you feel the pulsation strengthening, so long may the stream of blood be continued; but the instant the vessel collapses under the pressure of the fingers, and pulsation seems sinking, let the blood-can be removed, and the vein pinned up. Although bloodletting appears not only admissible but advisable, and even absolutely indispensable, in *congestive* conditions of pneumonia, yet in *inflammatory* diseases of the lungs is the practice, pursued in the best hands, so far altered as to admit of such abstraction only in horses who are high in condition and in work, and of certain mature age. In young horses, and horses labouring under influenza of any kind, letting of blood is positively denounced as harmful. Indeed, some good practitioners carry matters farther than this, and peremptorily forbid bloodletting *in any form* of pulmonary or pleuritic disease; though, I should imagine, they must make exceptions where *congestion* is the state of disease. In the influenzal kinds of pneumonia, or any other form of epidemic disease, there is little doubt but that a good deal of harm has been perpetrated by letting out blood,

which, as it afterwards turned out, in the sequel and termination of the attack, to be so much stood in need of by the animal.

MEDICINE.—Some veterinary surgeons administer early in this disease, after they have bled, a *stimulant;* and though such measures as bleeding and stimulation would at first view appear irreconcileable, yet I am disposed to think, supposing the disease to be in the *congestive* stage, that the practice is a good one. After bloodletting has relieved the overcharged pulmonary vessels, a stimulant may prove serviceable, by adding to their power of contraction. The stimulant commonly exhibited, and perhaps the best, is nitrous æther. From two to four ounces may be given in a pint of warm beer or water. It is a good practice, early also, to rectify the bowels, emptying the posterior ones, either with a slight aperient (two or three drachms of purging mass), or effecting the same thing, in the preferable way, by enemata of soap and water. The medicine I have found of most service under a regular set-in pneumonia, has been the alterative ball as recommended for bronchitis, made after the manner of Plummer's pill, or Pil. Hydrarg. Chlorid. C., twice or thrice a day, until the mouth become affected. Providing the bowels be solid or "set" there is no fear of disturbing them with it. And this it is that inclines me more to rely upon clysters than to run any risk from an aperient; since it is through the set and undisturbed condition of the bowels that we are enabled to push the Plummer's pill, which often requires some days before we are able to perceive any benefit arising from it. In its operation, it seems to augment the secretions in general, acting as a powerful diuretic, and finally to produce that change in the system so conducive to the return of normal function, while it is casting out the diseased one.

COUNTER-IRRITATION is a valuable adjunct in the cure of pneumonia; though it be one from which we are not to expect much operation so long as the inflammatory action continues to run high: an impression must be made on the fever in the system before any blister or rowel or seton will

freely act. The best form of counter-irritation is *blister*: rowels and setons are of little comparative use in the *acute* stage of pneumonia. The preferable situation for the blister is the breast; for it will take effect on that *muscular* part when no impression can be made upon the tense skin and bony substance of the sides; and I hold it to be good practice to insert a rowel in the chest first, and afterwards rub the blister in over the surface of the rowel. Should the first blister take no effect, another may be applied at an interval of six hours, and repeated after a similar elapse, when the parts still prove obdurate; or, the part may be first scalded with hot water, and then the blister be applied. The sides likewise may now be blistered, they being closely trimmed or shorn by way of preparation. Or, a mustard embrocation may be used instead of the blister. The practice of keeping blisters open or discharging, is not one that answers with horses: it is better to wash off one blister as soon as it has ceased to work, and, after a short interval, should it be required, apply a fresh one.

STIMULATING THE LEGS is a practice I am not in the habit of pursuing myself: I prefer, when it can be done effectually, hand-rubbing them; for I fancy that the turpentine, which most of these leg-stimulants contain, is apt to engender annoyance and irritation in the system, and, although it certainly warms the legs, to prove a source of discomfort to the patient. Still, it is my duty to add, that very excellent practitioners make it a rule to stimulate the legs whenever they continue cold; and a favorite application of theirs for the purpose is the turpentine liniment, for which a recipe is given at page 21.

REGIMEN.—Whether we hand-rub or stimulate the legs, they, all four, ought, from the onset of the disorder, to be encased in long rolls of flannel or serge. At the same time clothes must be put upon our patient, sufficient to keep his body warm without proving burthensome to him, or, should it be in summer, without overheating him. It is also a good practice, should the patient be bled, immediately after bloodletting, to put on some additional clothes; since it so

frequently happens that a copious sweat follows the evacuation, the encouragement of which I often have thought has proved most beneficial to my patient. No habitation is equal to a "loose box" for him; and one facing the south or south-west is to be preferred to another having a contrary aspect. A dry and ample straw bed ought to cover its floor, and a pailful of cold spring water be hung up in one corner of it. Last, but not least, let the patient's shoes be taken off: his feet being freed from restraint will, doubtless, add to his comfort. As to food, none at this time will be taken, or even looked at, probably; neither is it proper that any, for the first few hours, should be offered.

Mr. Sibbald relates a case of pneumonia of great danger, in the pressing stage of which he employed the actual cautery, drawing lines, with his iron, over the surfaces of the entire chest. In less than twenty-four hours, he says, the disease had given way. The horse, however, was marked for life.

SUB-ACUTE PNEUMONIA.

The epithets, *sub-acute* and *chronic*, are here used to denote subdued or milder forms of pulmonary disease, sequelæ very often to the acute; though cases do occur, which from the first assume these mild and lingering forms. With the exception of such attacks of acute pneumonia as by bold and early treatment are at once arrested, and supplanted by the return of health, and of such as rapidly continue their destructive course in spite of every measure we may employ to counteract them, all cases may be said to decline into the sub-acute stage prior to their termination, whether that be in the return of health, perfect or imperfect, in pulmonary consumption, or in death: here the sub-acute is to be regarded but as a mitigated form of acute pneumonia. The rage of the inflammation is past; the horse is no longer in any immediate danger; he appears and is better; his breathing is less oppressed; his pulse is less quick and more distinct; the body and extreme parts have, perhaps, become warm, or they may continue cold;

appetite has in some measure returned: still the patient mopes about his box, and is frequently found standing with his head in one corner of it, instead of being towards his manger: moreover, neither his blisters nor rowels act kindly; and there is that expression of countenance and general aspect of him altogether, which impresses us with the firm belief that his disease is far from being removed, and that, without—and unfortunately but too often with—very narrow watching on our part, even now we shall lose him.

PATHOLOGY.—The subdued or sub-acute inflammation now besetting the lungs is, we learn from experience, of that kind which tends to alter structure, and lay the foundation for morbid growths such as are never afterwards removed. Now and then pulmonary consumption dates its offset from this stage of pneumonia. More frequently, the alterations in structure are limited to a more firm and complete hepatization, to obliteration of air-cells and bronchial tubes, and to a conversion of the red hepatization into what is called *the grey and white indurations*, of which Delafond has presented us with the following description:—

THE GREY INDURATION seems oftener to *succeed* to the *red induration* or hepatization than to be simultaneously present with it. The parts so affected assume a yellowish or greyish tint; they have acquired weight and consistence; their granules are smaller and closer together; their parenchyma is easily lacerated; sometimes compression converts it into a sort of jelly, from which may be drawn out cellular filaments, thickened and indurated: incisions through these masses often discover either a black blood, or a semi-fluid, inodorous, greyish or reddish matter.

THE WHITE INDURATION is the result of still more advanced disease. In this, granules are no longer perceptible; the indurated parts are exceeding dense, and altogether impermeable to air; when compressed between the fingers nothing is squeezed out but a little serosity, without their suffering much diminution. At first view, we are puzzled to explain this disorganization: we, however, by means of

analogous facts, shewing its progress from growth to development—although the observations have not been made on horses—are enabled to arrive at some explanation.

The primary seat of these alterations would appear to be the inter-lobular cellular tissue; but, whether from inflammation of that tissue, or from the effects of inflammation in the parenchyma of the lung, or in the pleura, is still matter of dispute between Dupuy and Delafond. Infiltration into this cellular tissue—at first of a serous, afterwards of a plastic nature—is evidently the forerunner of the change: the reabsorption of the effused fluid, as observed by Delafond, being slower within the cellular tissue than within the parenchyma, it follows that the fluid, become organically allied with the cellular membrane, may continue long after the cessation of the inflammation of the parenchyma, and form plastic layers, and kinds of partitions inclosing the pulmonary lobules. I have observed, adds he, these layers grown thick and indurated, surrounding abnormal productions developed in the very heart of the lung—tubercles, for example—to resist the disorganization of these morbid tissues, and still remain walls of cavities containing the mollified matter. Sometimes, in the same situations, we meet with disorganized masses of lung resulting from partial gangrene. These layers or partitions, while they continue to increase their dimensions, so compress the pulmonary tissue that they atrophize it, render it light-coloured, dense, and impermeable to air. According to Delafond, therefore, the white and grey indurations would be approaches to pulmonary atrophy: we, however, think that this holds true in regard only to the grey induration, and that in the white induration, properly so called, the parenchyma of the lung has completely disappeared, through absorption, and nothing remains save the cellular tissue indurated. Let us not forget to add, that the white induration is not constantly met with around tubercles; on the contrary, under many circumstances, the pulmonary tissue surrounding these crude heterologous masses presents simply a reddish areola.

Be these explications as they may—and, after all, they possess no real interest save as part of physiological pathology—Delafond considers the presence of grey induration to be indicated by the long standing of the disease; by entire absence of respiratory murmur, without crepitous râle; by deadness of sound; dry cough; emaciation; evanescent hot skin, and harshness and adherence of it to the subjacent parts. The extremities of the lobes of the lungs are often thus effected.

METASTASIS.—Now and then—not often—metastasis in the bowels will take place; though I do not remember to have had more than one case of this description. The most common, and I may add, the most favorable translation of disease we can have, is swelling of the legs, mostly all four of them, the fetlocks being the parts most affected. Sometimes the breast, with the belly and sheath, will fill as well; all which is favorable for our patient, since the pneumonia ordinarily from this time declines. Not so very infrequently it happens, after inflammation of the chest has continued for some time, and such a change in the symptoms has taken place as to give us hopes that our patient will recover, that, on the next visit we pay, we find him with his legs drawn together under his body, "all of a heap," and unable to move. Too well does the experienced practitioner instantly recognise the cause of all this: he has succeeded in rebutting one enemy; he has now even a more formidable one still to contend with—viz., *fever in the feet*. To make use of the common expression on this occasion, "the fever or inflammation has fallen from the lungs into the feet." Another part into which the inflammation may "fall," even after the patient has been pronounced perfectly convalescent, is the fore fetlock-joints, or the flexor tendons and ligaments. I made mention of this in a case I sent to 'THE VETERINARIAN' in 1829; and the following year I had the satisfaction of seeing that the same had attracted the especial notice of my lamented friend, Mr. Castley, of the 12th Lancers. The attack is often so like a common "sprain of the back sinews," that in any other case it would be

pronounced to be such; and the horse may limp quite as much, or even more. In some cases only one leg will experience this; but it more commonly happens, I think, that after an interval of some days—in one case it was seventeen days—the other fetlock becomes attacked. The swelling at first feels puffy, as though its contents were fluid; is exceeding tender to pressure, and is often situated to one side of the flexor tendons in the leg, from which, in two or three days, it drops down to the fetlock-joint, gradually losing its puffiness as well as its tenderness. Regarding it as a sort of rheumatic metastasis, I have fomented and used cold lotions and bandages for it, and, on some occasions, have practised local bloodletting—from the plate-vein—for it, and at the same time have exhibited gentle aperient medicine: I am not quite sure, however, that I have done any good by all this. A case has lately occurred to me in which during convalescence both *hocks* became swollen, tender on pressure, and warm to the hand, causing the horse to have a stiff straddling gait in his hind parts, evidently arising from a translation or fresh attack of inflammatory action upon ligamentous tissues. In one instance it ended in anchylosis.

In the treatment of sub-acute pneumonia, although we may have got rid of the acute or dangerous symptoms, yet, even supposing the disease to have assumed this comparatively mild form from the beginning, are we not to imagine that in this mitigated condition it is harmless; so far from it, this is the form of all others in which inflammation, by continuance, brings about those alterations of structure—interstitial effusion, hepatization, induration, tuberculation—which are so much to be apprehended, not only from their indirect tendency to destroy life, but also, supposing they do not do this, from their rendering the lung more or less impermeable to air, and consequently so much the less perfect for the purposes of respiration, leaving the horse short or thick-winded, unthrifty, consumptive, valueless. The presence or continuance of inflammatory action is still to be met at every point, not with the same boldness of practice, but

with the same unremitting perseverance, until we are satisfied that what inflammatory or febrile action remains is but the decline of that which, from all appearances, is taking the turn to end either in the restoration of health, or some one or other of the terminations of inflammation. Venesection being, from prudential motives, withheld, the Plummer's ball will now become our great dependence, in combination with all the aid we can derive from the full employment of counter-irritation.

BLISTERS AND ROWELS AND SETONS are now especially useful. I would put a sharp and large blister upon the breast; or, a rowel may be inserted first, and a blister rubbed afterwards upon it. At this time also the sides may be blistered, or setons may be introduced into them. In my own practice, I depend most on blisters upon the breast, with the insertion of a rowel there; the sides being afterwards blistered: while, throughout the treatment, the ball must be continued thrice a day, or every eight hours, until either the mouth be affected or the symptoms sufficiently give way.

CHRONIC PNEUMONIA.

THIS is a kind or stage of disease in which, although fever may be, and commonly is demonstrably present, yet it is in that subdued or mild form which plainly foretels that the case is likely to prove one of considerable duration. There is no occasion for any immediate alarm about the life of the patient; and yet, since such important parts as the the lungs are the seat of disease, though it be of a tardy and lingering nature, it may be difficult or impossible to say what may be the issue. Chronic pneumonia may have been the continuation of that which in the beginning was acute, and afterwards became sub-acute: or it may, and often does, have its own origin, run its own course, and terminate in its own peculiar modes, as though it were a disease *sui generis*.

THE SYMPTOMS are often of such mild and indefinite cha-

racter as to require on our part a great deal of search and inquiry into the case to make them out. The horse is evidently unwell, and yet, to common observation, no particular ailment is demonstrable. There may be no perceptible heaving of the flanks; but little quickness of pulse; no manifestation of pain; and yet the horse mopes about, dull and dejected; fastidious in his appetite; seldom or never lying down; looking unkind in his coat; and out of health altogether in his general appearance. Watch his nostrils: in some of these cases I have found disturbed respiration to be detectible in their movements when I could gain no information from the flanks. At the beginning we must inquire about cough, and examine the nostrils narrowly, to ascertain if there be any expectoration from them.

Diagnosis.—Such symptoms as these will be sufficient to direct our attention to the chest as the seat of disease: now that we have percussion and auscultation, however, we need not stop inquiry here, but avail ourselves of their valuable aid to confirm our diagnosis, and afford us further information as to the particular seat and nature of the morbid action and alterations going on.

Terminations.—Chronic, the same as sub-acute inflammation, is to be viewed as a disorganising or destructive process, though it be of a tardy and tedious nature. It may end in hepatization or induration of the substance of the lungs: it is very apt, indeed, to run on to produce tubercles and vomicæ, and in this form bring the case under the denomination of what is commonly called *phthisis*, or "pulmonary consumption."

The treatment to be pursued in these obscure, latent, insidious chronic forms of pneumonia, is to be substantially the same as that recommended for the sub-acute stage; such points as there may be of difference will best come under consideration in treating our next subject, viz.—

PHTHISIS.

By *phthisis*—a Greek word, whose literal meaning is *corruption* or *extenuation*—is intended to be expressed the manifestation of certain constitutional changes, among the most remarkable of which is *emaciation of body*, consequent on the formation of tubercles and vomicæ within the substance of the lungs. It is a form of disease to which the horse is not obnoxious in an equal degree with man, inflammation in the animal's lung commonly assuming the acute character, and speedily ending either in destruction of life or in convalescence: whereas tubercles are for the most part the offspring of a tardy, latent, lingering form of inflammatory action, such as we have described under the epithet of "chronic." It is the opinion of some that the horse is not the subject of phthisis—not liable to such a disease. This question entirely depends for its solution on the views entertained of the nature of phthisis. If regarded as *scrofulous* in its origin, perhaps the horse is not its victim; but if as being a tuberculous disease, then is the horse's lung known to be too subject to tuberculous formations to resist the fact of his being, on occasions, the subject of pulmonary consumption. Still, there comes to notice the *kind* of tubercle necessary to constitute phthisis. Perhaps the *miliary* tubercle is the only one considered to be the genuine phthisical production. According to D'Arboval, horses and oxen afford more frequent examples of phthisis than sheep and dogs. And there are, he says, certain periods of life, in animals as well as in men, when the disease is more likely to make its appearance; which are, the several ages at which they arrive at the fourth, the third, and the half of the terms of their natural lives. Phthisis may be the sequel of pneumonia or pleuro-pneumonia, or even of some neglected catarrhal or bronchial affection: at other times it will come on of itself—as a disease *sui generis*—and insidiously steal on the constitution, making alarming advances before we become, perhaps, ap-

prised of its existence: old horses being the most frequent subjects of the former; young ones of the latter mode of attack. A young horse will undergo acute pneumonia or pleuro-pneumonia; and should he not sink in the congestive stage, or have his disease cut short by treatment, will die during the second or third or fourth week, with his chest full of water and intersected with albuminous effusions, and his lungs condensed and hepatized: but an old horse, with stamina to endure the conflict between disease and remedy, will hold out while tubercles and vomicæ are generating in his lungs, and, in the end, die of phthisis.

HEREDITARINESS AND PREDISPOSITION.—Is the *disease itself* hereditary?—or only the *predisposition to it?* Do tubercles, or the seeds or rudiments of tubercles, actually exist in the lungs at the time of birth? We seem to lack proof of this being the case; whereas we have had demonstration enough of horses "breeding the disease" in their constitutions. There are certain "makes" or forms of body, and there are also certain situations, in which the disease is most likely to be bred. The colt predisposed to phthisis is the one characterised by long legs and overgrowth; by narrow chest, and flat sides, and pot-belly; and altogether by an appearance of weakness and unthriving-ness; to which D'Arboval adds, by more spirit and eagerness than is compatible with his physical development. In such a constitution as inhabits a body so constructed, we know, by experience, that pneumonia is apt to end in phthisis. Whether the tubercles exist prior to any attack of inflammation, or whether they form in consequence thereof, I will not here venture an opinion. There are two situations observed to be favorable to the generation of phthisis, which are certainly in their nature very opposite: one is, low, wet, cold, poor pastures, or other localities, where the animals are almost constantly respiring humid air, standing in wet, exposed to cold, and withal are half-starved; the other situation is, living in warm and foul stables, wherein the atmosphere is of that impure character which is known to be offensive to the membrane lining the air-passages. I

have on more than one occasion remarked, when my regiment has had a remount of young horses, and one of the lot—looking thin and rough in his coat, perhaps, when purchased—instead of improving in flesh and condition with the rest, has continued in his unthriving state, that, although perhaps for some length of time he manifested no illness, yet in the end he became phthisical. In this instance, one would feel disposed to think that tubercles must have pre-existed in the lungs, and that the supervention of inflammatory action induced phthisis. On the other hand, it is notorious that old horses in the cavalry—who have undergone many vicissitudes since their enlistment, and who, up to the period of their death, at an advanced age, have been known to enjoy the best of health—end their days either by consumption or by glanders: in both cases the lungs exhibiting tubercles and vomicæ. While the former fact, therefore, would lead us to regard tubercles as either an accompaniment or a formation, *sui generis*, in the young animal, the latter leaves us little reason to doubt that they become generated while inhabiting the stable.

THE SYMPTOMS OF PHTHISIS are numerous and liable to considerable variation. They may be conveniently considered under three stages:—

In the first stage—in the curable one, if it ever be cured—it is often extremely difficult to pronounce upon. A horse is shown to us for being out of condition, rough in his coat, hide-bound perhaps, and, for all the pains taken with him having failed in improving his condition. Moreover, he is foggy or weak at his work, sweats with but slight exertion; he is heard to cough occasionally after his water, or when first brought out of the stable, and is found short-winded. This suspicious state of body may have originated spontaneously and imperceptibly—may appear as if it had been bred in the animal's constitution, grown with his growth and increased with his strength; or it may prove the lurking sequel of some pectoral inflammation going before, and, perhaps, passed off; or it may, *longo intervallo*, follow strangles. The state itself is of most uncertain duration;

it may last weeks or months: it has been known in young animals to continue years.

During the second stage,—1, the case more or less develops itself. The respiration, though it may not be perceptibly disturbed at the flanks, will probably be found to be slightly disordered by narrowly observing the nostrils; and if they do not afford us the required information, our ear, applied to the breast or side, may. 2. By this, or with our hand, we may also discover tenderness about the sides. The pulse will be found quicker than it ought to be. 3. A short dry cough is heard now and then. The appetite is fastidious: at one time very good; at another, indifferent; never quite lost however. The spirits, like the appetite, vary: one day, cheerful; another day, depressed. 4. Sparing issue of yellow matter from his nose. 5. He loses flesh every day; his hip-bones begin to project, and his quarters to lose their plumpness; and his skin all begins to become tense and adherent upon his ribs.

The third stage not only dispels all doubt—should any remain—concerning the nature of the case, but too plainly discovers to the practitioner that he is treating a disease under which, in spite of all he can do, his patient must in the end succumb. It is marked by increased embarrassment in the respiration; by fetid breath and mouth and stinking discharges from the nose; by a highly quickened pulse; by troublesome cough, and the occasional coughing-up of the expectorated matters through the nose and mouth; by great emaciation and debility; by partial separation of the coat, so that when but slightly twitched the hair comes off; by dropsical swellings perhaps of the legs, sheath, and belly; by complete loss of appetite; by general irritability, and a truly distressing, haggard sort of expression of countenance; by an irritable state of the bowels and great proneness to diarrhœa, which, once excited, in this state of extreme debility, is likely to carry our patient off.

THE POST-MORTEM APPEARANCES, as well as the symptoms, are liable to a great deal of variation. In some cases, according to D'Arboval, the "lungs are found *perished* as it

were—shrunk and dry and hard and tough, and particularly towards their borders; in others, they assume a dull, tarnished, reddish-brown aspect, and are hepatized." These, however, ought not to be considered as examples of phthisis. "The development of *tubercle* in the lung," says Laennec, "is, I think, the only kind of phthisis which we should admit;" and if we would avoid confusion of names and pathological differences, we cannot do better than subscribe to this demarcation.

THE DEVELOPMENT OF TUBERCLES in the lungs or other organs, occurs, according to Bayle and Laennec, under two principal forms:—that of *insulated bodies*, and of *interstitial injection* or *infiltration*. "Each of these presents several varieties, chiefly relative to the different degrees of development. The insulated tubercles present four chief varieties, which I shall denominate *miliary*, *crude*, *granular*, and *encysted*. The interstitial injection of tuberculous matter, or tuberculous infiltration, offers in like manner three varieties, which I term *the irregular*, *the grey*, and *the yellow*. Whatever may be the form under which the tuberculous matter is developed, it presents, at first, the appearance of a grey semi-transparent substance, which gradually becomes yellow, opaque, and very dense. Afterwards, it softens, and gradually acquires a fluidity nearly equal to that of pus: it being then expelled through the bronchi, cavities are left, vulgarly known by the name of *ulcers of the lungs*, but which I shall designate *tuberculous excavations*."—*Laennec's Treatise.*

BOTH OF THESE FORMS OF TUBERCLES are found in the lungs of horses. The miliary tubercles—which in their progress, by coalescence and conversion into one yellowish homogeneous mass, afterwards become the crude tubercle—are the kind commonly discovered in horses who die of phthisis: round or ovoid in figure, solid, firm, and uniform in substance, or exhibiting in their centres yellow or white spots, or else softened altogether in their consistence, according to the progress they may have made towards maturation. Now and then it happens, from coalescence

and simultaneous suppuration of masses of these tubercles, that large abscesses form within the lungs, and discharge their contents into some of the bronchial tubes, leaving cavities or caverns with irregular or anfractuous interiors, which Laennec has designated *tuberculous excavations*. More commonly, however, the tubercles suppurate individually, producing what are called *vomicæ*, that is, small abscesses in various parts of the lung. The other kind, the large yellow, or cream-coloured, or speckled, cheesy tubercle—that of Laennec's, resulting from infiltration—is also very often found in horses' lungs, and after pneumonia oftener than after phthisis; a circumstance which induces us to regard it as one of the remote consequences of inflammation: indeed, it appears ordinarily to supervene upon the morbid states of hepatization and induration; whereas, in the case of miliary tubercles, we are as often at a loss to account for their production as we are to ascertain their presence, it being well known that they may exist in a sort of dormant state in the lungs for years, without occasioning any disorder or apparent inconvenience to the animal. This need not excite surprise after perusing the following case:—

Mr. Hales, V.S., of Oswestry, was some years ago attending a cart-mare for a festered foot, and found it necessary to administer a second—she having already taken one—dose of physic. The day after this last dose, she died. She had not been dead above two hours when Mr. H., paying his usual visit, astonished at the event, was told in addition, and not very good-humouredly, that *his physic had killed her*. He inquired if it had purged her? The reply was, "No; it had not operated at all." Mr. H. then very properly proceeded to examine the mare. "Her chest being opened, the mystery was unravelled. It was deluged with pus; and there were then in the lungs several large abscesses, one of which contained at least *a quart of pus*. The case was plain enough—a large abscess within the lungs had burst, and suffocated the mare." "The gentleman to whom she belonged declared he always believed the mare to be as sound as any horse he had in his

possession. She ate her food to the last, and lay down very much to ease her painful foot."—VETERINARIAN, vol. v, p. 264.

THE DETECTION OF TUBERCLES, while they are small and hard and unirritating, is what even percussion and auscultation fail in accomplishing: their existence can only be made out by these tests, and then but imperfectly, when they are numerous and large, and occupy a considerable portion of lung. The diminished murmur of that part, and its want of resonance on percussion, may induce us to suspect what is the case. Tubercles are most commonly found in the anterior and superior portions of the lungs. Suppuration and tubercular excavation will be announced by the cavernous râle prevailing. The absence of the fatty or *nutmeg* liver in phthisical horses, though so commonly seen in men, tends to the confirmation of the opinion of surgeons, that in the latter it is owing to habits of spirit-drinking.

TREATMENT.—Pulmonary consumption, once established, is a disease without remedy: at least, we know of nothing that has the power to rectify or remove those morbid changes of structure on which its confirmed existence depends. In colts already predisposed from their make to consumption, or in such as have contracted the predisposition from the situations they have inhabited or the vicissitudes they have been exposed to, and who, perhaps, have the seeds of consumption already sown in their lungs, we unquestionably possess some power of prevention, by attending to them in a manner and with a care which their peculiar case may appear to demand. We may go still farther than this, and say, that when inflammation or febrile action has to do with the setting-in of the disease, we have the power of suspension, if not of arrest, in our hands. As I have had occasion to observe before, inflammation ought never to be suffered to lurk or creep about the chest of a horse: it is a part so apt to take fire and burn with a smothered heat, that it requires, in every case to which suspicion of the sort attaches, the utmost and narrowest vigilance on the part of the practitioner. Let him who has a young horse out of

health look to his chest: other parts will commonly announce their ailments plainly enough.

PREVENTIVE TREATMENT consists in not only avoiding every bodily exertion, as well as any mode of living that may, by any possibility, be likely to give rise to inflammation in a chest ill-adapted to bear it, but in removing the animal from any situation in which he appears unhealthy into one of another description. During spring and summer, a run at grass often proves of the greatest benefit in giving a healthy turn to an ill-conditioned consumptive-looking colt: in cold and wet weather, on the contrary, the removal of such a colt into a loose shed or box, and there keeping him regularly, but moderately, fed and exercised, and well supplied with water, clothing, and cool air, would be most advisable. As to

MEDICAL TREATMENT, I know none that is or can be of service save what tends to check or subdue inflammation in the chest; nor can we expect much good from that but in such cases as are in their formative or incipient stages. We must narrowly watch the progress of catarrh and cough and strangles and bronchial affections in subjects such as I have described; and where there appears the slightest reason to believe that inflammation, in however mild or latent a form, has entered the chest, we must without hesitation attack it by medicine, and by counter-irritation. Set the bowels in order by enemata, or some very mild aperient medicine, and then commence giving the Plummer's balls twice or thrice a-day, and continue so as to slightly affect the mouth; or, short of this, to produce amendment enough for return, if possible, to condition and work.

Insert a rowel in the breast; and if more be thought nccessary, blister that and the sides also. As soon as the animal appears convalescent—but not before we are quite assured that inflammatory action has subsided in his chest—should the season permit, give him a run at grass: if not, soil him in the stable. Indeed, that may beneficially be done while we are treating his disease, by giving green-meat when it can be got; otherwise, carrots, turnips, potatoes, &c.

PLEURISY.

By *pleuritis*, or pleurisy, is commonly understood inflammation of the pleura without inflammation of the lung: when both pleura and lung are involved in the inflammation, we denominate the case *pleuro-pneumonia*. At the time that I was a pupil at the Veterinary College these three diseases, or forms of disease, were included under the phrase "inflammation of the lungs." The lungs were supposed in all such cases to be the seat of disease; whether the pleura participated or not in the inflammation being never inquired into until after death. The French veterinarians were the first to call our attention to the distinctness of these diseases, and to instruct us how in practice we were to know one from the other; and in our own country no veterinarian took more pains to learn and demonstrate this difference than my ever-to-be-lamented friend, Mr. John Field.[1] Whether, in strict accordance with pathological definition, inflammation is ever fully developed in the pleura without extending to the lung, or *vice versâ*, is not a question I shall trouble myself to solve: all that it being necessary for us to know, in my opinion, is the fact, that, when inflammation is invading these parts, it is sufficiently predominant in one to induce us to regard that as the *main* or *principal* seat of disease, and to treat the case in accordance with such views; and that disease is rarely or never so uniform in its attack of the two parts as to lead us to believe that one is quite as much the object of care as the other. There are cases in abundance of pleuro-pneumonia, greatly more than of any other description: still, I contend, that, in almost all of them, we shall find either the lungs or the pleura to be the part primarily and principally affected; and as such, as I before observed, to be the especial object of treatment.

"Is pleurisy really a less frequent disease than pneumonia?

[1] Mr. Field read a paper on the subject to the Veterinary Society, which was afterwards published in the second vol. of the '*Veterinarian*.'

as Delafond affirms," asks D'Arboval: "we dare not assert so much. What renders it so much to be dreaded, is the fact of its so often spreading to the lungs, when, indeed, there is too much chance of its proving mortal; at least, cases of complete recovery are then very few indeed."

THE ORDINARY TENDENCY of an attack of pleurisy is the augmentation and accumulation of its natural serous or watery secretion, with or without the accompaniment of effusion of solid lymph or albuminous material. This is, moreover, particularly to be looked for when the disease, acute at the beginning, has moderated down in its violence, and especially is to be expected in the sub-acute and chronic stage of the disease. Both in the acute and chronic stages we may have suppuration; while in the former, when very violent and quickly fatal, we may have once or twice found the membrane in a gangrenous condition. When pus is poured out, the matter is commonly seen in flaky masses adhering to the surface of the membrane, or else floating about in the effused water. Cases have occurred in which it has collected and formed abscess in the side of the thorax.

GANGRENE, though very rarely, is now and then occurring as a termination of pleurisy. The cases I have met with have been remarkable for intensity of inflammation and severity of suffering. I will relate one.

In 1830, a four-year-old horse was discovered at seven o'clock in the morning, in his stable, sweating profusely; heaving hard and quick at the flanks, and puffing at an equal rate at the nostrils; pulse but very indistinctly to be felt; mouth hot and clammy; legs intensely cold; head hanging down, and countenance betraying serious illness; eyes and nose reddened, the latter moist with yellowish sanious matter; breath fetid, as well as mouth. When pressed upon the side, he flinched and turned his head, and evinced much soreness.

As soon as he was got dry and warm from the cold sweat he was in, he was bled; scarcely, however, had two quarts of dark thick blood flowed before he began to reel.

The treatment afterwards was such as is ordinarily pursued; but to no purpose. The pain he manifested was extreme. He would rub his nose against the rail across the door-way of the box, thrust his lips violently against it, and sink his eyes with suffering. He was twice seen to lay down, but immediately rose again. Towards the conclusion, a bloody issue appeared at the nose. Before death he became delirious, and expired in dreadful agony. Water within both sides of the chest—from six to eight quarts. Pleura intensely inflamed: costal portion every where most minutely and thickly injected; pulmonary portion likewise injected, but it had also become gangrenous—it exhibited a *green hue.* Lungs partially tuberculated; otherwise, and particularly in their interior, they were sound.

THE KINDS or forms of pleurisy are two—acute and chronic: one may follow the other; or the chronic kind, as well as the acute, may exist by itself. Although consisting, as far as we know, both in inflammation, they appear quite opposite diseases: one is full of activity and expressions of pain and irritation; the other comparatively painless, tardy in its progress, and apt to continue many weeks before it comes to any issue.

THE MOST LIKELY SUBJECTS for pleurisy are horses four and five years old, about completing their growth, and entering into the adult period of their lives, inhabiting warm stables, and living high.

CAUSES.—Any sudden or extra exertion, any exposure to cold, immersion in cold water of the legs or body while the skin is heated, or even a large draught of cold water at such a time, may be followed by an attack of pleurisy. Injury to the membrane, such as a broken rib, or a severe blow or fall upon the side, might be productive of a pleurisy; but this occurrence is rather unlikely to happen. By chemical stimulating matters introduced into the cavity of the chest, pleurisy has been artificially excited.

THE ATTACK OF ACUTE PLEURISY may be sudden; or there may be some previous indisposition, in which incipient form it may be confounded with pneumonia or even

bronchitis; though as soon as the inflammation has fairly set in,

THE SYMPTOMS commonly prove such as will dispel any doubts we may entertain of its similitude. The horse will begin by evincing uneasiness, and that will gradually increase until he come to manifest acute and poignant pain. And now he will heave, or rather pant, violently at his flanks, puffing and blowing in the same painful and distressing manner from his dilated nostrils, while occasionally he casts most piteous looks back at his flank, as if entreating the bystander to relieve him of the agony he is enduring. He is hot all over his body—actually in parts sweating with pain; and is in such a state of nervous irritation that he cannot be easy for a minute even; but is looking first one way, then the other, and every now and then pawing with his fore feet, or else laying down for a moment, to try if that posture will give him ease; but finding none, he is up again almost as soon as down. Pressure against the intercostal spaces occasions flinching and shrinking, and commonly elicits a characteristic *grunt*, with offers to bite. Often a cough is present, and this so annoys him by the pain it occasions that he, in efforts to suppress it, makes a sort of reiterated hacking or half-cough of it. The pulse is very quick, and has a firm wiry feel. The mouth is hot and dry. The pituitary membrane is reddened and humid; but there is no perceptible defluxion, unless some catarrhal or bronchitic irritation be present as well.

UNDER THE SUB-ACUTE OR EVEN CHRONIC FORM, pleurisy is quite different in its manifestations. Although we find, *post-mortem*, often almost equal intensity of inflammation in the membrane, we have during life no such violent and distressing symptoms as are indicated in the acute form. But, on the contrary, we have even dulness and dejection continuing from first to last. Even the respiration does not signify any or much embarrassment until shortly before death, when all the time the thorax is nearly or quite full of water. In fact, the only symptoms indicative of such being chronic pleurisy, is the tenderness evinced by pressure

on or pinching of the sides, the pathognomonic grunt, and the continuance of the respiratory murmur. This form of pleurisy I have found to be the one which ordinarily follows—when pleurisy does prove such a sequel—catarrhal, laryngeal, or bronchitic disease, in the epidemic form, *alias* that of influenza. Should there be the continuance of cough, it now becomes faint and sore, and now and then gives rise to the afore-mentioned symptomatic grunt.

AUSCULTATION detects the respiratory murmur, though not so distinctly as in health; while *percussion*, which evinces the characteristic soreness of the sides, yields distinct resonance.

The PROGRESS of acute pleurisy is rapid. Should no change take place within twenty-four hours after the disease appears at its height, we may rest assured another day cannot pass without the issue of the case becoming manifest, either in subsidence of the fury of the symptoms, or in such alteration of them as to render it but too evident that—what we have most to dread, namely—effusion, is going on.

The RETURN OF HEALTH is often as rapid and unexpected as the attack was sudden and unlooked for. We are called to our patient, distressed to the last degree by his complaint; we take a quantity of blood from him, and in a few hours afterwards we find him to appearance recovered.

The DIAGNOSTIC or distinguishing characters of pleurisy, are—1st, The general manifestation of acute, poignant pain. (Dr. Elliotson represents the pain in a pleuritic man to be "acute and stabbing.") 2dly, The particular or local manifestation of pain in one or both sides, when firmly pressed against, with the elicitation of the peculiar grunt. 3dly, The respiration, which is short, catching, painful, and puffy. 4thly, The breath, not feeling hot to the face or hand, presented to the nostrils of the patient. 5thly, The pulse, whose beat is quick, firm and wiry. 6thly, The cough, so frequent an attendant, which is hacking, reiterated, cut in two, as it were. 7thly, The symptoms of colic, which are often present. 8thly, and particularly in the advanced stages of the disease, percussion and auscultation.

Notwithstanding these tests, however, cases of pleurisy in a sub-acute form occur in which the diagnosis even in the primary stage is obscure.

Our PROGNOSIS in pleurisy must be guarded, it being a disease of highly dangerous tendency. If, however, we are called early to the patient, and succeed in abstracting a quantity of blood, we shall have a good chance of arresting the inflammation. Should it proceed in spite of bloodletting, though with diminished violence, there will still be great reason to dread some sinister result. Now and then, the disease hurries off the patient in the course of a few hours, in opposition to all remedial measures.

The TERMINATIONS of pleurisy are four,—*resolution, effusion, suppuration, gangrene.* That in resolution has already been disposed of: we will now consider

EFFUSION.—It is of two kinds,—*water* and *lymph:* the one being technically known under the appellation of *hydrothorax,* or water in the chest; the other, by that of *albuminous effusion, adhesions,* or *false membranes.* Although these effusions may exist independently, they far more frequently co-exist. When a horse dies from a pleurisy which has lasted any length of time, we expect to—and commonly do—find that appearance in the chest which an old veterinary friend of mine was wont aptly to depict by saying, "the cavity of the chest was hung with shreds of lymph, after the fashion of a *cobweb:*" and the comparison is by no means an unhappy one. These subjects will be continued under the headings—HYDROTHORAX and ADHESION.

PLEURISY RARELY CONFINED TO ONE SIDE.—We know this from practice; though experiment—as will be hereafter shown—proves that it is from *sympathy* often that the other side takes the disease.

The TREATMENT of pleurisy may be said to be comprised in the regimen and remedies which have been recommended to be adopted in pneumonia: there are, however, some points of difference in the application of such treatment, to which we would proceed to direct attention.

BLOODLETTING, I would set the same restrictions on,

as I have deemed it prudent to make in pneumonia. Young horses, and horses having pleurisy as the accompaniment or sequence of any epidemic or influenza, will not bear abstraction of blood, for the reasons which have already been urged in pneumonia. At the same time, I do not think we ought to withhold the phleam in cases of pleurisy occurring in horses in mature age, who are in work and condition, and whose powers are plethoric; though even here our practice has undergone a change tending very much to lower our estimate of the extent to which such abstraction ought to be carried. It should not be pushed to anything like the extremity it was wont in former days to be carried. Medicine and counter-irritation must be more relied upon. If I could abstract blood through local or topical means, I am not sure I should employ general abstraction at all. Surgeons have leeches at hand to apply; and we might shave the sides, and put on leeches too; but from the number we should require, and the cost incumbent, I fear the practice would not be found maintainable. There are also sufficient objections to any attempts at cupping the sides. By way of substitute for these objectionable and impracticable modes of drawing blood locally, D'Arboval speaks, with all the confidence of one who has frequently practised it, of the following method of obtaining blood from the chest:—"Let the inferior parts of the sides be shorn, and rubbed with hot vinegar until rubefaction be produced; then let hot mustard poultices be applied upon them, and kept on for two hours, or until such time as engorgement shall have taken place, which is to be scarified, and thus as much blood obtained as may be required. After the bleeding, the sides are to be covered again with mustard poultices. This local bloodletting may be repeated as often as is deemed necessary—four or five times within the space of twenty-four hours. Fomenting or steaming the sides with hot water will greatly increase the emission of blood; and a hot cataplasm will be found to give much relief whenever the pain is confined to any one spot." How far this French mode of procedure may be effectual or advisable, from

never having tried it myself, I cannot pretend to give an opinion. I think it, however, in desperate cases well worth a trial.

The MEDICINE we must rely upon is *mercury;* and the form in which I give it, and continue it until the mouth is made tender or the breath affected by it, is described under bronchitis and pneumonia. I prefer the Plummer's pill or ball to any other preparation, because there is reason to think it may act on the skin, whilst its diuretic action is great and manifest, and its salivative tendency, acting on another order of parts, is undoubted; nor have I ever had any reason to apprehend diarrhœa or purgation from its use.[1]

COUNTER-IRRITATION is, in the disease before us, a measure of great import. Its *early* and *effectual* administration is of the greatest consequence. In the height of inflammation, mustard plasters to the sides, repeated if they do not take effect, are highly recommendable. They act quicker and surer, and more sharply than blisters. At the same time, the breast may be rowelled, and blistered over the rowel. The mustard plasters will in some cases produce painful and copious perspirations, which will indicate the necessity of sponging them off with warm water, and clothing the horse afterwards well to encourage the diaphoresis: an operation, though annoying and painful at the time, which oftentimes much relieves the patient. With a view of arriving at the same end by different means, Mr. Field has for some years past been in the habit of practising DRY CUPPING in pleurisy. His cups are made of brass, are of the ordinary shape of the glass cups, and about the size—though in this respect they vary some little—of a common tumbler. Their application, which is effected by means of rather a large spirit-lamp, is the same as in human practice; only the animal requires being watchfully held, bridled by the head, lest he should spring up or fall and hurt himself, which is very apt to occur at the moment the cup seizes hold of the skin. In some cases, so many as

[1] An excellent mode of introducing mercury rapidly into the system is to place five grains of calomel upon the horse's tongue every hour.

twelve cups are applied upon the side at once. On no occasion are cups placed upon both sides at the same time. Before they are applied the coat is thickly greased with hog's lard. Ordinarily, the cups are kept on for about half an hour, in the course of which time it often happens that the animal manifests considerable uneasiness, and at length breaks out into a profuse sweat, seemingly from irritation. Mr. F. says, the relief obtained is in most cases too manifest to admit of question. Circular elevations, from effusion, remain in the skin for some time after their application; and when these have subsided, indented rings are still left where the cups have pressed; but they do not occasion any destruction of the coat unless the cups be kept on too long. In dangerous cases, three or four applications of them may be required in the course of twenty-four hours.

Mr. Simpson, V.S. Southampton, has, at the suggestion of Mr. Chapman, been in the habit of employing as an application to the sides or breast, even in preference to blisters, in cases of pleurisy, two drachms of tartarised antimony dissolved in two ounces of oil of turpentine. By repeating it, he finds he can produce with it "decided effect, even after blisters have totally failed."

EFFUSION.

Should our patient survive the fury of the first attack, and the inflammation so far abate as to come under the denomination of *sub-acute,* our apprehensions, though allayed on the score of immediate destruction, still remain so long as inflammatory action is going on, impressed as our minds are with the fact of there being but too much reason to dread that, after all, the case will end in effusion. This, as I stated before, is of two kinds,—*water* and *lymph;* and these, as I also observed, may exist either in combination or separately: most commonly they co-exist.

The WATER resulting from acute pleurisy is, in most cases, a beautifully clear, limpid, bright-yellow fluid, closely resembling the serum of the blood, though in some cases it

is rendered turbid by the lymph floating in it; while in others, it is red from being tinged with blood; and I have seen it of a sort of milky or whey colour, from the commixture of purulent matter (likewise discharged from the surface of the membrane) which will also occasionally communicate a bad odour to it. In many cases in which lymphy or fibrinous matters are found mingled with it, the fluid is of that albuminous character that, on being set by to cool, it will in a short time coagulate. Its quantity will vary in different cases from a few pints to several gallons. Commonly, some is found in both sides of the chest; now and then, however, it is effused but on one side. In general, the fluid being unconfined, gravitates to those parts of the cavity which are lowermost, such being the sternal or the costal region of the thorax, according as the animal happens to be in a standing or a lying posture. I have, however, seen the fluid, or part of it, walled in by the effused lymph so completely that, like the pus within an abscess, it was confined to one place. We will prosecute this subject when we come to Hydrothorax.

The LYMPH, when first effused, consists of masses of gelatinous or albuminous matter, impregnated with serous fluid, variously disposed; sometimes in bands or filaments athwart the cavity, from the lungs to the ribs, intersecting or partitioning the interval into several most irregular compartments, the whole, in its apparently deranged or fortuitous condition, resembling nothing so much as the hanging of cobwebs; at other times, in sorts of granulated or filamentous tunics, clothing both surfaces of the lung, and forming an entire interior lining to the cavity, and in many cases coating the exterior of the pericardium as well, such layers or coatings being what we are to understand by the appellation, *false membranes*. In addition to this are often to be perceived masses and flocks or strings of lymph floating about in the water, or from their weight gravitating to the bottom of the cavity. I believe this fresh lymph may become re-absorbed. In general, however, it remains, and acquires increased consistence, and undergoes a gradual process

towards organization. According to D'Arboval, "sorts of insulated portions of blood first make their appearance here and there within it, in which are discoverable little straight or flexuous canals, also filled with blood, terminating in culs-de-sac, and having no communication with the vessels of the pleura; from which, indeed, they are separated by a layer of lymph. In a more advanced stage is to be observed cellulo-fibrous layers, more or less dense, intersected through their most consistent parts by a variable number of parallel, rectilinear, and extremely slender vessels. At length the time arrives for these vessels to unite with those of the pleura, and from that hour the false membrane constitutes a part of the integral structure."

IN WHAT SPACE OF TIME MAY, OR ORDINARILY DOES, EFFUSION TAKE PLACE?—This is a question of vast importance to the veterinarian. Disputes and horse-causes are so apt to arise out of horses dying of pleurisy or pleuro-pneumonia, wherein we are liable to be called upon for opinions, which, if not received as decisive, must on all occasions be supposed to have considerable influence in the decision, that it becomes in us a bounden duty to make ourselves complete masters of the subject in all its various relations. We are requested to inspect the body of a dead horse—whom we may have seen during life, or may not—and we are summoned before a jury to give evidence on oath concerning the period of time such morbid alterations as may be presented to us would take in forming; or, in other words, to say from what antecedent date the commencement of the horse's disease is to be computed. This of all others is, perhaps, a situation the most trying, the most responsible, the most fearful, in which a veterinary surgeon can be placed.

Referring to my own practice and personal observation, I find, that, in one horse who died of a pleuritic attack in seventeen hours after he was seized, there were recent adhesions formed between the lungs and sides. In another case it appeared sufficiently evident that three gallons of water had become effused into the chest within three days. From numerous experiments, however, which have been

accounts for our meeting with water in the chest, pericardium, and abdomen—and head too, perhaps—in the same subject; of which there are many cases on record. It likewise furnishes a reason for unsuccessfulness from the operation of *paracentesis.*

PLEURO-PNEUMONIA.

Pleuro-pneumonia and *pneumo-pleurisy* are the names given to that extended inflammation which involves both lung and pleura; the one or the other of them being considered the more appropriate according to the part in which the disease predominates. I have before stated that the majority of cases of what, in common language, are called "inflammation of the lungs" belong to this compound class; an observation in accordance with that, I believe, of our best veterinarians. A French writer, Delafond, denies this, and by way of proofs brings forward fifty-five cases of horses that have died of disease of the chest, out of which twenty-seven were pneumonia, fifteen pleurisy, and but eight pleuro-pneumonia. However, he has very properly qualified his observation by remarking, that locality, constitution, and certain unknown agents—such as produce epidemics—may have considerable influence. Although I do not assent to Delafond's computation, yet his remarks must be admitted judicious, and his inferences sound:—"If experience," says he, "has proved that, *cæteris paribus*, pneumonia is more easy of cure than pleurisy, and that the two diseases united are more formidable and oftener fatal, is it not a reason why a veterinarian, jealous of his reputation, ought to be able to distinguish one from the other? But, how is he to acquire that diagnostical precision, unless through the valuable aids of percussion and auscultation? By these unerring lights, the practitioner will see his way sufficiently clear to employ this or that medicament, according to the nature, seat, and duration of the disease. Such alone constitutes rational practice. And, to go a step further, how much better a situation will he be in, then, to inform his employer of the probable result of the case?"

The SYMPTOMS of pleuro-pneumonia, as might be predicated, are those of pnuemonia and pleurisy combined, the one or other prevailing according as one or other disease predominates. Although some French writers have given descriptions of this, distinct from those of the other two diseases, I do not discover that they have succeeded in eliciting any pathognomonic signs, save such as are obtainable from percussion and auscultation.

The TREATMENT must likewise be of the same compound character, partaking of what is recommended both in pneumonia and pleurisy; making it bolder or more active, and modifying it, according as the case shall evince acuteness or chronicity, more of one disease than of the other.

HYDROTHORAX.

HYDROTHORAX, or *water in the chest*, is, as we have seen, a very common termination of pneumonia with pleurisy; it may also follow compound bronchitis, or it may occur without any discernible disease or inflammatory action whatever about the chest. As a serous membrane, the pleura may pour forth fluid into the chest in accordance with the same law by which other similar parts become dropsical, either from some constitutional diathesis, or from some local disposition. I repeat, this is possible, and has occurred; but it is a rare case indeed, compared to those wherein hydrothorax supervenes upon inflammatory action, and that of a sub-acute or chronic nature. There are, again, certain dropsical states of body in which hydrothorax, ascites, and hydrocephalus, all co-exist; and are accompanied by swelled legs, sheath, belly, &c. When inflammatory action within the chest, though subdued, is not removed, but continues creeping on, as is indicated by the pulse and other febrile symptoms remaining,—the patient not rallying as he might be expected to do, but feeding daintily, looking dispiritedly, or spiriting up for one moment (at the approach of anybody, or at the sight of food) to be again downcast the next—there is great reason to apprehend that the chest is filling with

water; on which account we ought to lose no time in seeking confirmation on so important a point.

SYMPTOMS, as follow:—Short, quick, laboured respiration; and yet not so strikingly manifest until there supervene the latter stages, at a time when the chest comes to be nearly full of water; when the distressed animal is seen to exert to the utmost every inspiratory power he possesses. Should the patient lie down, which is seldom the case, he cannot long remain lying; and the side upon which he lies is the one that contains the—or the most—water. D'Arboval says, the intercostal spaces are enlarged. The pulse, which is small and quick, as the disease advances becomes quicker and less perceptible, until, at length, it cannot be felt at all at the jaw. The horse, led out, steps with his fore-legs wide apart, and stiffened, and is often unsteady, reeling in his gait. The breast, belly, and sheath show dropsical swellings, which, by degrees, fall into the legs.

AUSCULTATION AND PERCUSSION.—Unless gas or air be present with the water in the chest, which can be but rarely the case, it is now ascertained, that—so far from any undulation or fluctuation or bubbling sound being perceptible, as so many have fancied they have heard—hydrothorax is denoted by an absence of all sound. There is no murmur, no resonance on percussion; in fact there can be none in such regions as are filled by water alone. The readiest method of obtaining a knowledge of the actual presence of water, is, to direct some person to tap with his hand one side of the thorax, while the practitioner closely applies his ear to the other side, directly opposite.

WATER IN ONE OR BOTH CAVITIES OF THE CHEST.—Touching this part of our subject, some new light appears to have been shed upon us by some French veterinarians. Rigot in 1827, Delafond in 1830, and Bouley in 1836, have invited our attention to the new fact of the mediastinum of the horse being so constructed as to admit of a communication between the two pleural sacs. They say,

The mediastinum of the horse possesses neither the aspect nor the texture of the pleura: it is thin, diaphanous, deli-

cate, composed of loose filaments, crossing one another in every direction, and forming a transparent tissue, bearing the closest analogy to the woof of lace. The areolæ, close together, and hardly perceptible in the young subject, grow larger with age, and soon render visible, here and there, a multitude of either round or irregular apertures, which establish a direct communication between the two pleural sacs. This is a peculiarity important to become acquainted with. It explains the gravity of chest-effusions in horses; it renders obscure and difficult of distinction the side affected in pleurisy, since the fluid runs from one cavity to the other, and thus gives rise to double hydrothorax. It is certainly *possible* for the fluid to pass through the natural openings, enlarged, of the mediastinum; but Delafond has discovered in eleven cases of pleurisy, that, in fact, there was a rupture of this frail partition. The same skilful veterinarian has remarked, however, that this communication is not invariably present, although there may be effusion in both pleural sacs. He has twice found it wanting.

The TREATMENT OF HYDROTHORAX is an affair of desperation. We have more chance of succeeding in attempts to prevent than to remove it: we must, therefore, endeavour to check the disposition, and avert the secretion. We must not suffer inflammatory action, however apparently trifling in degree, to lurk about the chest; but by continued medicinal and derivative measures persist in our efforts to subdue it, or to translate it to parts where it cannot do the same harm. In sub-acute and chronic pectoral affections, which, I repeat, are especially likely to end in effusion of water, we must continue to push the Plummer's ball: our principal object being now, more than ever, to increase the action of the several emunctories of the body—the kidneys, the skin, the salivary organs, &c. Gohier speaks in high terms of cantharides as a remedy for incipient hydrothorax. Knowing its active diuretic properties, I have often been induced to give it in cases of dropsy, and, I think, with advantage; but not in the large doses. Gohier gives from a drachm (*gros*[1]) to a

[1] A *gros* is equal to 3·82 grammes, of 15·348 grains troy, each.

drachm and a half daily, incorporated with double the quantity of turpentine and aloes, and a sufficiency of honey, divided into two or three doses, and finds it produces copious evacuations of urine, and, in some cases, slight excoriations about the mouth and inside of the lips. To these observations, D'Arboval very properly subjoins, that as cantharides is one of that class which we denominate irritating poisons, and is sometimes attended with very violent action on the bladder and mucous membranes in general, we ought narrowly to watch its operation. Debaux and Vaison have derived benefit from the exhibition of large doses of tartar emetic: from 4 to 6 drachms (*gros*) a day have brought hydrothoracic patients round into a state of convalescence in three days.

Paracentesis, or *tapping the chest*, has been, by different veterinarians, resorted to as a remedy where a quantity of water is known to have collected. The indications regarded in human medicine for urging the performance of this operation are, cases of *acute* hydrothorax, in which there has evidently been a *rapid* and copious effusion of water into the bag of the pleura. Lafosse, years ago, declared it to be a cure for hydrothorax consecutive on inflammation. He recommended that about half the fluid collected should be drawn off, and that then about the same quantity of vulnerary decoction should be injected. Two hours afterwards he draws off two thirds of the remaining water, but injects only one third. In two more hours he empties the chest, and throws in about $3\frac{1}{2}$ pints (2 *litres*) of the same decoction diluted. Gohier, from unsuccessfulness in many cases, and from often having seen it do mischief, has altogether relinquished the operation. Massot cured a mare, seven years old, by tapping.

This mare had, six months previous, been the subject of acute pleurisy, which left these symptoms:—skin dry, coat pen-feathered, gait unsteady, extremities cold, pulse slow, membranes pale and infiltrated; fits of coughing on the least exercise: pupils dilated, stupor, oppressive breathing, pain of the right side of the chest, elevation of the ribs,

with considerable œdema of the part, which accounted for the dull sound on percussion. The ear, applied above the sternum, detected a dull protracted rumbling sound, similar to what liquid within a rolling cask would make. The therapeutic means employed having proved of no avail, and the animal being threatened with suffocation, Massot decided on puncturing the chest between the 5th and 6th rib, behind and upon a level with the point of the elbow. Through this aperture six pints of limpid serosity first flowed; afterwards it came away yellow and thick, and, at length, like to coagulated albumen. A month after the operation the mare performed a long journey.

My own PRACTICE has proved unsuccessful. I have frequently performed tapping, and as frequently failed in any good result.

From one old horse I drew off ten gallons of water, seven quarts from the left side, and thirty-three from the right side. He died on the fourth day succeeding the operation, without having been in the least relieved by the evacuation. After death, six gallons more were found within the chest, and one quart within the pericardium.

In another case I drew twelve quarts of water from the left cavity; and, five days afterwards—the animal not having experienced any relief—five quarts were taken from the right side. By the last evacuation the symptoms appeared to have been aggravated. Death ensued on the third day after the last operation. Fluid was found within both pleural sacs, amounting altogether to three gallons, and there was mingled with it a quantity of purulent matter.

SUCCESS IN OUR OWN COUNTRY.—It now becomes my pleasing duty to lay before my readers some accounts of cases of success, and those of a most unequivocal description, which have occurred to British veterinarians. The first is one furnished to me by the late Professor Sewell.

On the 16th of August, 1824, a bay horse, five years old, was admitted into the Veterinary College for pleurisy. The attack had commenced the week before, and he had been bled and rowelled, and had taken laxative medicine. The

animal had much wasted in flesh, and, on being led to the stable, was observed to falter in his step, as though he was very weak. The respiration was oppressed and quick; the pulse 75; and the other symptoms present were such as to indicate hydrothorax. He was bled again; took aloes ℥ss; was turned into a cool situation; had his legs flannel-bandaged; and was ordered a light diet. The day following, when the ear was applied to one side of the chest while the other was struck, undulations were perceived most distinctly on the right side. A trocar was plunged into the left cavity, and about an ounce of fluid issued. But from the right, which was next penetrated, four gallons of serous fluid were drawn. Abatement of respiration and pulse followed the operation. The next day—the 18th—the respiration was less oppressive, the pulse 50, the bowels open, the appetite improved. The left side was tapped again; but without effect.—On the 19th the respiration tranquil, pulse 45—the right side was trocared again; two gallons more were evacuated. Green vitriol ℥ss given.—22d, General amendment; pulse 40. The right side once more tapped; but this time with no result. Repeat ball.—26th, Pulse 36: discontinue ball. From this period he gained flesh surprisingly fast.—November 7th, being considered sufficiently recovered to leave the College, he is discharged, "cured."—On the 7th of January following he experienced a fresh pulmonary attack while at straw-yard; but no symptoms of effusion appeared, and all passed off again. After this, he continued in health for two years, and was then sold.

The SECOND CASE OF RECOVERY is one highly creditable to the curer—Mr. Webb, of Whitechapel—"although not a *graduated veterinary surgeon.*" It is contained in 'THE VETERINARIAN' for 1835.

The horse belonged to Mr. Batley, of Whitechapel, who bought him at a country fair. He was eight years old, and cart-bred. On the 30th September, 1835, Mr. W. was requested to attend him. He saw him at nine o'clock in the evening. The conjunctive and Schneiderian membranes were highly injected; the extremities excessively cold; the

mouth hot and dry; the breath hot; the breathing laboriously quickened; the inspiration lengthened, and the expiration rapid. The fore legs were wide apart, and, as it were, immoveable: anxiously regarding his sides. Head protruded; nostrils expanded. Pulse 97, and oppressed. The cause of the disease was change from cold to heat.

TREATMENT.—V.S. ad ℔viij from a large orifice: as much as he would bear. Soon afterwards he appeared much eased. Seton in the breast, and one on each side; and to take calomel ʒss, nitre ℥j—flannel bandages. And in the morning to be led to my infirmary, the distance being short.—October 1st, Pulse 104. Repeat ball, with the addition of ʒij camphor.—2d, Better; pulse 85. Repeat ball with digitalis ʒss. Setons dressed.—3d, Pulse intermittent, from 60 to 75. Gave aloes and calomel, of each ʒss, digitalis ʒj, nitre ℥j, and dressed setons.—4th, Pulse lower, still intermittent. Ball repeated, and setons dressed.—5th and 6th, The same.—7th, All the symptoms suddenly abated, when, suspecting what had taken place, I had recourse to paracentesis. I trocared the thorax between the eighth and ninth ribs. From the left side one pint of serum was obtained; but from the right eighteen pints were abstracted.—8th, The animal being very much debilitated, I determined to give him tonic medicine. Blue vitrol ʒij, gentian ℥ss, ginger ʒss, twice a day. 9th, Tapped him again, and obtained from the right side five pints, but none from the left.—10th to the 16th, Tonic balls were given while he remained at my infirmary. Now at work; doing well.

The THIRD SUCCESSFUL CASE is one sent to 'THE VETERINARIAN,' in 1836, by Mr. Scriven, Aberford.

A bay horse, belonging to the Union Coal Company, was on the 5th of January attacked with inflammation of the lungs. He was bled; had ʒij of aloes given, and otherwise was ordinarily treated. On the 9th I saw him. The pulse was 60, hard and full; the heart bounding against the ribs; extremities cold; appetite much impaired. Draw four quarts of blood, and give nitre and emetic tartar,

of each ʒij, digitalis ʒj, in ball, thrice a day. Clysters occasionally; body and legs to be kept warm; mash and gruel diet.—10th, Much the same. Blister sides. Continue ball, &c.—11th, Pulse less full and intermittent; omit digitalis; continue other treatment.

16th, Pulse increasing. Very restless, pawing litter, and attempting to lie down, yet afraid to do so; fæces thin and fœtid. V.S. three quarts, catechu ʒij, digitalis and opium ʒss each, night and morning.—17th and 18th, Better. Pulse 54; dung firmer; appetite better. Nitre and emetic tartar, of each ʒij, night and morning.—22d, Very dull; appetite impaired; pulse increased; purging and fœtid fæces. Catechu ʒij, opium ʒj, chalk ʒj, in gruel, thrice a day. Starch injections.—23d, Still purging; appetite worse; becoming weak. Continue treatment, adding half a bottle of port wine to each dose.—25th, No better; losing flesh so rapidly as to extinguish all hope of recovery. Give night and morning chalk ℥j, catechu and opium each ʒj, Peruv. bark and gentian, of each ʒij.—27th, Purging subsiding. Appetite better. Discontinue the wine, but go on with the medicine.—28th, Purgation ceased. Appetite better, but has now great difficulty of breathing. Auscultation indicated great impediment in the right lung, and percussion elicited a dull sound. This night, on relating the case to Mr. Dick, he replied, from the account given, the continued purging and rapid loss of flesh, he suspected hydrothorax.—29th, Mr. D. went to see him, and became confirmed in his opinion. The effusion was chiefly on the right side; the left was nearly free. Paracentesis thoracis was at once determined on. A small incision was made with a lancet between the 11th and 12th ribs. The integuments being drawn aside, the trocar was introduced about four or five inches above the cartilages of the ribs, close to the anterior margin of the posterior rib, in an oblique direction, upwards and rather forwards. On withdrawing the trocar, the fluid appeared in a full and copious stream, which was allowed to flow as long as possible without the admission of air through the canula into the thorax. Eight

quarts were withdrawn, and the skin allowed to close over the wound. The horse experienced great relief, and immediately began to breathe more quickly. The fluid, on standing to cool, quickly coagulated. About three fourths of it assumed the nature of fibrine, and the remainder was of serous character. Give thrice a day ferri sulph. et resin. āā ʒij, camphor. ʒj.—30th, Eats better. Respiration more natural. Wound closed. Continue treatment.—31st, Auscultation detecting some fluid on the left side, paracentesis was performed; but scarcely a pint was abstracted. Continue treatment.

Feb. 3d, Pulse increasing; breathing more laborious; appetite declining; water re-accumulating in the right cavity. Operation again performed in the same intercostal space, but a little below the former opening. Five quarts were obtained in a full stream, which again appeared to afford great relief. Continue treatment.—14th, Pulse rising. Add digitalis ʒj.—16th, Pulse diminishing; respiration not so laborious. Omit digitalis. Continue iron, resin, and camphor.—21st, Very restless; abdominal respiration laborious. Regards his sides, and drily sighs. Pulse hurried and irregular; extremities cold; symptoms altogether betokening speedy dissolution. Paracentesis once more on the same side and intercostal space, but with considerable difficulty. Three quarts were drained off, but the stream was much impeded, either by the adhesions of the pleura, or by clots of fibrine plugging up the mouth of the canula. The patient experienced much relief again, and once more rallied. Continue medicine.—March 3d, Has had another relapse—has been exceeding weak, and has lain down for the first time since his illness; but this aggravated the symptoms so as even to threaten life, so that he only lay for a few moments at a time. He then rose in a staggering manner, and constantly regarded his flanks, as if pointing out the seat of pain and imploring relief. Paracentesis again on the right side, anterior to the latter puncture. This was followed by a copious flow of a turbid whey-like fluid, seemingly a mixture of pus and serum,

which had a very offensive smell. It was allowed to flow as long as it would without the admission of air through the canula into the thorax. Eight quarts were drawn, from which the horse experienced more relief than from any previous operation. Continue treatment.—5th, Appetite amended, and has lain down two or three times. Treatment as before. — 7th, Improves gradually; appetite increases; lies down frequently without seeming disturbance. Treatment continued.—12th, Feeds well, and rests well. Continue remedies.— April 22d, Doing well. Mr. Youatt saw the horse on the 19th June following: he was then at work, and apparently well.

Some important deductions are to be elicited from these cases. They have been narrated in detail with a view of, altogether, affording such a connected and faithful history of hydrothorax, its progress, its varieties, its changes, and the manner in which it has been cured by paracentesis, as is to be surpassed only by actual observation of the cases themselves.

To perform paracentesis we require a *trocar*, and one longer and larger than surgeons use, who are very particular about it being a *fine* trocar. The canula of the trocar I have, measures four inches in length and five sixteenths of an inch in diameter. That part of the thorax which is the most dependent, the most conveniently come at, and where no mischief can ensue from perforation, is to be chosen for puncture. I have generally myself operated between the eighth and ninth ribs, close to their cartilages. Mr. Dick operates—at least Mr. Scriven did—between the eleventh and twelfth ribs, about four or five inches above their cartilages. The spot being determined on, the integument is be drawn to one side, either by an assistant or with the operator's left hand, and through it, in a state of tension, is to be pushed, with a rotating motion, the point of the trocar, keeping it obliquely directed, upwards and inwards, as you proceed. Some make an incision through the skin with a lancet first; and I think it very advisable, on account of the facility it gives to the introduction of the trocar.

The moment the trocar has cut its way through the wall of the side, which will be felt by the cessation of resistance, the stillet is to be withdrawn, leaving the canula within the wound, through which it must now be pushed as far as it will go, or until fluid runs out in a copious stream. Though the water may gush out at first, it seldom continues flowing long in a full stream; often, indeed, its stream becomes interrupted, or altogether arrested, either by the lungs coming against the mouth of the canula, or some flakes of lymph collecting about it or flowing into it, to remove which it becomes necessary, from time to time, to pass a whalebone or iron probe through the canula. From one or other of these causes, it has happened that no water has followed the introduction of the trocar, even though the cavity perforated has been all the while full; as a general rule, therefore, do not withdraw the canula when no fluid issues, until quite assured that it is fairly within the cavity, and that its mouth is free from all obstruction. When the cavity is so nearly emptied of its water that fluid only issues in jets each time the lungs expand, the canula ought to be immediately withdrawn, else, during the intervals while no water is flowing, air will be apt to rush into the chest; and air within the thorax is said to do harm, and therefore we must avoid it. The valvular covering afforded by the return of the skin drawn to one side will effectually close the wound after the operation.

HYDROTHORAX IS NOT NECESSARILY INCURABLE.—The cases I have related prove this. Under what circumstances have we most chance of curing? Let us consult our cases again. We find that in all of them the water was confined to *one*—and that the right—side: the quantity in the left cavity was too inconsiderable to notice. This then—as appears in theory, so in practice—constitutes a favorable indication. We find again—with the exception of Magot's case, in which the quantity of water was inconsiderable, and which, after all, looks like a relapse—that two of them were tapped in the second, the other in the fourth week after attack: none, therefore, could be called old or chronic

cases. The secreting membrane could in neither case be said to have acquired any *habit* of secretion or any materially altered organism. *Age* may have some influence: Mr. Sewell's patient was five years old; Mr. Trapp's eight. *Stamina*—healthiness of constitution, and in other respects—must have great influence. All these circumstances—and there are others—ought, I repeat, to be taken into consideration in dealing with a case of hydrothorax.

ARE WE JUSTIFIED IN OPERATING IN *every* CASE?—This is a question somewhat difficult of solution. On the one hand, we are told that instances are to be adduced in which re-absorption of the effused fluid has been effected by treatment, and that, as there is great danger and but little chance of success attendant on paracentesis, we are certainly not justified in operating until every other means has been tried. On the other hand, the advocates for the operation tell you, that, unless you draw the water off *early* in the disorder, you have not the same chance of success. "If," says d'Arboval, "we saw nothing in a dropsy beyond the unusual circumstance of water existing where there ought to be none, it is reasonable enough that we should let out the fluid, and thus perform the cure. But of what use can paracentesis be when the dropsy is dependent upon affection of the heart or large vessels, while the cause remains? In the case of acute pleurisy, do we not, in the act of puncturing the chest, as well as by exposing a membrane, already in a state of intense inflammation, to the contact of air, create fresh irritation? And, should the case be chronic, do we not run the risk of converting it into acute, and thus destroying our patient? In a word, paracentesis is an operation too perilous, and too often fatal in animals, for us to dare to countenance it. And besides, notwithstanding we may inject, there is the inevitable inconvenience attending it, of the pulmonary organs, in consequence of being no longer compressed and sustained by the surrounding fluid, falling suddenly into a state of collapse, a change bordering on death." For my own part, where we have attended a case sufficiently to put our treat-

ment to the test, and where, in defiance of such treatment, it has gone on to produce hydrothorax—and such a hydrothorax as must inevitably end in the death of the patient, and that very shortly—I do not see what other reasonable course we have to pursue than to operate. It is true, we have but very slight hope of any good result: but, having done all we can, like a drowning man, we are glad at last "to catch at a straw."

Treatment after paracentesis.—Should the quantity of water abstracted be considerable, I should advise the encircling of the thorax with some very long bandage or roller, with a view of giving support to the contained viscera; perhaps a broad circingle would be the thing. The compression must be only such as can be borne; and should it be found to inconvenience the animal, it ought to be immediately removed. In a medical point of view, there are several objects to be fulfilled:—the watching of the inflammation, the support of our patient, the prevention of fresh effusion of water. When mercury, during the progress of the disease, has had its full trial, I think the tonic-diuretic plan seems likely to best answer. I would give preparations of iron or copper, in combination with emetic antimony, digitalis, gentian, turpentine, cantharides, &c. Either of the following balls may be given, morning and evening, providing there be no inflammatory symptoms to interdict it:

℞ Ferri Sulphat. . . . ʒiss	℞ Cupri Sulphat. . . . ʒj
Cantharid. . . . . ʒss	Pulv. Digitalis . . . ʒss
Gentian. Rad. . . . ℥ss	Antimon. Tart. . . . ʒij
Theriacæ q. s. ut f. Bol.	Terebinth. Vulg. q. s. ut f. Bol.

In cases where great debility is left behind, not even tonics but *stimulants* may be required. Mr. Scriven gave his patient port wine. Under similar circumstances, I am in the habit of giving malt liquors—porter or ale. Here, also, a nutritive but soft or easily digestible diet ought to be allowed.

arterial character and frothy, attended with more or less irritation, coughing, or snorting, and perhaps interruption to the breathing; and every time the horse coughs or snorts fresh quantities are ejected, and often through the mouth as well as nose, and mingled with these ejections will sometimes be found various mucosities. The blood does not run in one uniform stream, as in epistaxis, but is influenced by the respiration and position of the head and neck. The other distinctive signs between the two hemorrhages will be found under epistaxis. In some cases the hemorrhage is attended or followed by febrile disturbance, the breathing proving more or less embarrassed, the pulse quickened, the mouth hot, but the legs deadly cold, or one is cold while another is warm.

TREATMENT.—The cases we have in general to treat being such as arise from plethora, and over-action or excitement, we must seek for a remedy which will reduce fulness of blood, and abate over-action and excitement. This is to be found in bloodletting. This is an evil to be met by its like—*similia similibus.*

When the condition and powers of the horse are such as will bear it, we may at once abstract a quantity of blood, with the two-fold view of temporarily fainting or depressing the animal, and permanently lowering his constitutional powers; but should he be already in a state of low condition, or have become so reduced by repeated hemorrhages, should bloodletting notwithstanding seem advisable, our object must be to abstract as large a quantity of blood in as *short* a time as possible; in order to produce the required approach to syncope, without detracting any great deal of the vital fluid in the present weakly condition of the system. To do this, we should make a very large orifice in the vein; or, what is better practice, draw blood from both sides of the neck at the same time. After bloodletting, take all clothes off the horse, and let them remain off, and dash ice-cold water against his sides and breast: indeed, ice itself applied to them, could it be obtained, would be likely to do good. Empty the bowels by injections: Rodet recommends "lave-

mens d'eau pure *très froide,*" with which, and bloodletting, he says he has had great success. Let his diet consist of nought but bran-mash and cold water. Keep him constantly tied and racked up, so that his head be elevated; and do not suffer him to lie down, or move about, or be in any way disturbed. The medicine given with the best effect in man is the superacetate of lead in combination with opium. Turpentine, also, is highly recommended in human practice. And Dr. Copland says the balsams, so extolled for the same virtue, owe their efficacy to the turpentine they contain.

BROKEN-WIND.

The appellation "broken-wind" is apt to convey, to an unprofessional or unequestrian mind, a meaning very different from that which we, from education, professionally attach to it; and there can be no doubt, I think, but that those who first gave this appellation to the disorder did so from the circumstance of the horse affected with it being observed continually to be *breaking wind,* in the vulgar sense in which we ordinarily use the phrase; although the late Professor Coleman, whose theoretical ingenuity was proverbial, was wont to turn the word "broken" to his account, while discoursing on his favorite theory of ruptured air-cells, by saying, that those who gave the name to the disease evidently must have known that something—the lung, most probably—was *broken.* Judging, however, of the pathological knowledge possessed by the old writers on farriery by what is displayed in the works they have left behind them, I must repeat my opinion—and this opinion seems to be confirmed by a disgusting operation they sometimes performed for the disease—that in the *flatus* passed from behind will be found the derivation of this remnant of the cant phraseology of farriery. Be this, however, as it may, it is a name by which the disease is still universally known amongst us; and the only way I see of forcing it into direct application, is, either to admit, with Professor Coleman, that it implies the *rupture* we find in the lung, or to deem it indi-

cative of the peculiar—double or *broken*—sort of respiration that denotes broken-wind. So that, in fact, it may either imply a symptom, or else be significant of the pathological condition in which we commonly find the lungs of broken-winded horses after death.

The DISEASE ITSELF—for as *disease* we are bound to consider it—is so self-evident, so palpable to demonstration, that almost every person conversant with horses[1] is able to detect it; and well enough knows, when it does exist, how valueless the subject of it becomes compared to a sound-winded horse. Notorious, however, as its existence is, yet have the opinions concerning its seat and nature been, from very early times up to the present, both numerous and discordant: indeed, no malady has given rise to such a variety and conflict of opinion as the one before us.

HISTORY.—I shall pass by, unnoticed, all the ancient part of the history of broken-wind—seeing no other purpose its introduction here could serve save that of curiosity—in order to be able to come at once to the theories of its nature in vogue among veterinarian pathologists of the present day. For those prevailing on the continent, we have the best authority in citing from Hurtrel D'Arboval:—

CONTINENTAL THEORIES.—According to this writer, these may be ranged under four heads:—1st, Pulmonary Inflammations; 2dly, Nervous Influence; 3dly, Lesion of the Diaphragm; 4th, Pulmonary Emphysema.

PULMONARY INFLAMMATIONS, in their *acute* form, are not to be regarded as forerunners of broken wind; it is only when they are *chronic*, and are productive of certain morbid alterations or disorganizations, that they can be so viewed. Acute pneumonia, however intense, however extended, is never known to terminate in broken-wind. Chronic bronchitis, accompanied with thickened membrane and mu-

[1] The French veterinarians, Godine, Dupuy, Demoussy, Delafond, D'Arboval, assert that sheep and oxen are subject to broken-wind; and that in them it is occasionally dependent on lesion of the heart. I cannot pretend to offer any opinion on this point myself; but my friend, the late Mr. Youatt, has assured me, he never saw nor heard of such a case.

cosities, has, by Rodet, been placed in the first rank among the causes of broken-wind; while Delafond regards it as but of secondary importance. It is conceived to occasion broken-wind by the violent fits of coughing accompanying it. The air violently forced out, meeting with (mucous) obstruction in the passages, by the re-action of its impulsive force, is driven back into the small bronchi and air-cells, which may thereby become dilated, or even ruptured. This double result has been observed by Laennec, and adopted by Godine, Rodet, and Delafond. It is possible, also, that, through ulceration and perforation of the bronchial membrane, air might get admission and create an inter-lobular pulmonary emphysema. All these explications, however, fall to the ground in cases wherein no emphysema has been observable; of which there are three reported by Rodet.

NERVOUS INFLUENCE. — This, which originated with Dupuy, is, in D'Arboval's estimation, the most accurate opinion of any. Some abnormal condition, but little known, hardly suspected even, of the pulmonary nerves, preceded by such circumstances as in connexion either with the lung, the stomach, or other part, or through sympathy, are capable of altering the structure of these nerves, or of influencing their functions. Both Dupuytren and Dupuy have remarked symptoms resembling those of broken-wind in cases of compression or section of the pneumogastric nerves.

LESION OF THE DIAPHRAGM. — Girard, jun., in 1822, remarked symptoms of broken-wind in a horse whose dissection afterwards shewed that a portion of omentum had insinuated itself through an opening in the diaphragm into the chest. In another case, treated by Dendry, a knuckle of intestine had got similarly lodged. From these and other recorded similar cases, nothing, after all, can be elicited which throws any light on broken-wind.

PULMONARY EMPHYSEMA, if not the most influential, is the most frequent of the proximate causes. It constitutes also the most elaborate of the opinions; one to which the labours of Laennec and Andral have added very little.

Delafond's account is the best veterinary one, although he has confounded dilatation of the air-conduits with the extravasation of air. We shall transcribe it:—

The AIR-CELLS are little transparent vesicles or culs-de-sac, having partitions of dense cellular tissue, by which they are united into small masses or lobules, rendered distinct by the looser cellular tissue which surrounds them, and connects them with other lobules. In domestic animals the form and number of the air-cells vary, not only with the species, but in individuals of the same kind, according to the age and to the part of the lung they occupy. In young horses and in foals they are small, and closely grouped together, which gives gravity to the lung, and at the same time elasticity; but with age they become dilated, atrophied, and and in part destroyed, which renders the lung lighter, less elastic, softer, and of a paler colour. The air-cells are more numerous in the centre of the lung than at the extremities; but are most capacious and at greatest interval within the anterior lobes. This distribution explains why the respiratory murmur is more audible in the middle of the lung.

ENLARGEMENT OF THE AIR-CELL has been observed to the extent or more of a pea. But the cells are very rarely found enlarged in every part of the lung: the anterior lobes, and borders, and mediastinal portion of the right lung, frequently exhibit them; and in the middle of the sound lung are here and there found dilated air-cells; and often these two latter conditions are combined. When *the dilatation of the cells is general*, the lungs, on opening the thorax, appear as if they had been inflated. The atmospheric pressure collapses them only to about one third or one fourth of their volume. They are of a pale rose-colour, elastic, and extremely light; and more buoyant in water than sound lungs. In general, their cells have acquired the volume of a millet or hemp seed, and particularly in the anterior lobes, and along the posterior and inferior borders of the lungs. The parenchyma, on being cut, collapses only to the extent of the incision; and there is no effecting a perfect collapse of it without incising it in every direction.

Squeezed between the fingers, it crepitates, and emits upon the surface numerous little globules of air. If attempts be made to collect this air underneath the pleura, it escapes into the interlobular cellular tissue, and becomes collected into small bladders between the lobules.

In the second kind of dilatation of the air-cells—that which is *local* or partial—when in the anterior lobes they present a sort of rumpled semi-inflated appearance, of a pale rose colour, and consist interiorly of air-cells dilated to the size of a pin's head, or from that to a millet seed. Deep incision, laying open a bronchial tube, collapses them; but pricking with a pin does not. Circular compression upon any part effects perfect collapse, the air escaping into the bronchi. The mediastinal lobe of the right lung, thus affected, presents similar characters; but when the local dilatation occupies the borders of the lungs, it shews itself in extensive, not prominent, rose-coloured irregular eminences, and the parts appear swollen, and inwardly display very distinctly the air-cells become enlarged and more transparent. The lung pits from the pressure of the finger; and the act of pression, dispelling the air, occasions slight crepitation. Inflation of the entire lung causes the corrugations and eminences to swell before the remaining sound portion receives the air.

In the third kind, or *broad-cast* air-cell dilatation, slight elastic eminences are perceptible, paler in colour than the sound parts, and varying in magnitude from a lentil-seed to a hazel-nut or walnut. These eminences are spread about upon the surfaces and borders of either one or both lungs. Sometimes they are very numerous: Delafond has counted as many as thirty-five upon the surface of both lungs. Like the large corrugations, they collapse by incision; and when the lung is gently inflated through the windpipe, they swell and rise towards the surface before the surrounding parts become inflated. The middle of the parenchyma is not exempt from these alterations. To demonstrate this, expose the whole lungs to the air for twenty-four or thirty-six hours, and afterwards incise them in all directions. The

incised surfaces, commonly of a reddish-black, are marked with bright red spots, variable in size, of which the most superficial communicate with the exterior eminences. They are occasioned by the chemical action of the atmospheric air, remaining within the dilated air-cells of the globules, on the colouring matter of the blood effused into the surrounding tissue.

With the three kinds of dilatation just described, we sometimes meet with dilatation of the small bronchial tubes running to the lobules increased in their volume. These minute divisions, unprovided with cartilaginous rings, have been discovered double the diameter they are in a sound state. The membrane lining them is pale, thin, and coated with a clear and plastic mucus.

Now and then we find a middle-sized bronchial tube dilated, which is supplying several morbid lobules. This especially happens in emphysema resulting from chronic inflammation of the mucous membrane, accompanied with abundant secretion; and these dilatations are attended with separation of the cartilaginous rings, and with paleness, ulceration, and even perforation of the internal coat. In this case, the bronchi, and particularly such tubes as are dilated, contain a white, plastic, inodorous mucus.

Whether it happen that one or more air-cells become suddenly ruptured from some effort, or whether the same happen to air-cells already dilated and attenuated, or whether the breach be the result of ulceration and complete perforation of the membrane, air makes its escape into the interlobular cellular tissue and produces emphysema. If in this condition the lungs be examined soon after death, the pulmonary lobules will be found more or less isolated, in consequence of the extravasated air separating them from one another. This stream of air may be made by pressure to pass from one cellule to another, and to form bubbles or vesicles, of an indefinite shape, and of volume varying from that of a lentil to a nut, or even to a large hen's egg. They occupy particularly the borders and extremities of the lobes, and often have the pleura for their boundary, which

itself becomes raised by the air underneath. Pierced with a pin these little bladders, as well as some of the neighbouring vesicles, empty themselves completely. Moderate insufflation of the lung expands simultaneously the pulmonary vesicles and meshes of the cellular tissue; more force sends the air underneath the pleura, and produces large bladders along the borders and extremities of the lobes.

Inter-lobular emphysema is often combined with air-cell dilatation, sometimes with bronchial dilatation, rarely with varico-aneurismal dilatation of the small vessels underneath the pleura.

THE ENGLISH HISTORY OF BROKEN-WIND will be found meager compared with the continental. Most of our earlier writers on farriery derived their explications of its pathology from human medicine; while the moderns, with few exceptions, have embraced the doctrine of emphysema.

THE DOCTRINE OF RUPTURED AIR-CELLS, according to Mr. Bracey Clark, originated in this way:—"In the year 1795, being engaged in the dissection of a grey mare sent to the Veterinary College to be destroyed on account of this complaint, on opening the chest, the lungs appeared free from inflammation, being very white: and, as they appeared free from redness and increase of colour, the general concomitant of disease, we were led for awhile to consider the lungs as not the seat of the disorder, as others had done (for several pupils were present at the dissection). On cutting into their substance, no inflammation was perceivable. On examining them more closely, we observed a small bladder or vesicle on the outside of the lungs, in the external investing pleuritic coat: this was conceived by some who were present to be a tubercle, and that tubercles might be the cause of broken-wind. Suspecting, however, from its appearance that it was not solid, but contained air, it was punctured, when it immediately subsided. This instantly suggested to the writer (Mr. B. Clark) that the lungs were actually in a state of *emphysema*, or that air was contained in a state of extravasation within their substance; and which not only seemed evidently the case in this instance, but which we

have since fully verified by examination and dissection of a considerable number of cases of broken-wind, and found it to be a constant appearance. This extravasation of air in the substance of the lungs, is, perhaps, occasioned by rupture of the air-cells, as suggested by Mr. Coleman at the time; unless it be formed in them, and thrown out by some morbid operation of the blood-vessels, as sometimes happens in the intestines and vagina: for the exact way in which this emphysema arises has not yet been ascertained."

THE LATE PROFESSOR COLEMAN'S THEORY OF BROKEN-WIND.—"This is a disease which, in all probability, is sometimes present in man, but has hitherto been unattended to. In horses it is a very common disease; and though I am not aware that its nature has ever been described by any author, yet it would appear that those who called it *broken-wind*, thought that something was *broken*. It is a rupture of the air-cells, in consequence of which an extravasation of air takes place into the fine cellular membrane which connects them together, and this at once explains the characteristic symptom; which is, that the animal occupies considerable time in performing the act of expiration, but a very short time in inspiring. If you observe attentively the flanks of a horse under this disease, you will perceive that he is a long time in contracting or drawing them up, during which he is expiring; that act being accomplished, however, the flanks fall almost instantaneously into the successive act of inspiration. The horse is, in fact, a length of time in squeezing out the extravasated air from the reticular membrane, where it has not the same easy egress it had before, into the bronchi; though, notwithstanding this act is attended with so much difficulty, it is evident that the vacuum formed within this membrane is as easily restored to an equilibrium as before any rupture had taken place.

"It is very common in this disease for horses to discharge air from the rectum: the same circumstance, however, is observable in roarers and thick-winded horses, but not in the peculiar manner in which it occurs in broken-wind. This circumstance has given rise to a very ridiculous operation, viz.

that of making an *artificial anus*. Here, the effect is mistaken for the cause, this being produced simply by the efforts such horses make to enlarge the cavity of the chest by the descent (receding) of the diaphragm; which, of course, makes additional pressure on the bowels, and thereby causes the expulsion of wind. Another very common result is, that such horses dung a great deal on first undergoing exertion; which like the former, however, ceases the moment the breathing becomes less oppressed.

"On examining broken-winded lungs, we find the surface, externally, assuming all the appearances of health; though, if compared with lungs in a normal state, we shall find them specifically lighter, arising from their containing a quantity of air, which the last expiration of the animal was unable to rid them of."[1]

Mr. CHERRY, the Principal Veterinary Surgeon to the Cavalry, happening in the year 1823 to have a strikingly well-marked case of broken-wind in his infirmary at Clapham, was kind enough to inform me he would have the horse destroyed any day I could be present.

Accordingly, I attended, and no sooner was life extinguished than we removed the lungs, trachea, and larynx from the body, and submitted them, as yet steaming with vital vapour, to close and careful examination. The general aspect of every part was that of perfect health, save that the lungs were paler—being of a light pink hue—than they generally are at this time of life—eight years old. The pleura was everywhere in apparent health, except in those places where it was elevated, by air underneath, into vesicles; there, it was opaque and whitish, giving the vesicles the appearance of so many white tubercles. The vesicles were most numerous and conspicuous upon the anterior lobuli; but both lungs had, in every part, a crackling emphysematous feel, and the air they contained could be readily made to traverse their substance by compression. They were remarkably buoyant in water, particularly the anterior lobes. When inflated, the air appeared to distend

[1] Professor Coleman's 'Lectures' at the Royal Veterinary College.

the parenchyma; but, what seemed very remarkable, *it neither increased the number of the vesicles, nor enlarged those already existing.* After inflation, the entire lung became still paler, and crackled more when squeezed with the hand. This Mr. Cherry thought arose from the rupture of more cells; I had, however, and still have, my doubts on that point. The bronchial and tracheal membranes, though of their natural colour, were *much thickened.* The membrane covering the arytenoid cartilages was *likewise thickened, and studded with little hard papillary eminences.* There was no alteration in the *form* of the trachea.

Mr. Cherry has since examined another very decided case of broken-wind, destroyed at the request of the owner on Mr. Cherry's own premises, in which he found perfectly analogous appearances.

Feb. 14*th,* 1843, H. P. Bks.—Col. Cavendish ordered his black mare to be destroyed, on account of incurable lameness in her feet, particularly in the off fore one. She was, in fact, foundered from navicular disease. She had had a cough for several years (being now above 16 years old); and the last time I examined her, on account of her lameness, I, hearing her cough, pronounced her to be *going* broken-winded; since which, although her cough leads to that opinion, there has been no *decided* movements of the flanks, to warrant any conclusion. About 5 o'clock this afternoon she was shot. Her lungs were preserved, and next morning examined. They had not collapsed like healthy lungs; but presented the pale pink hue, and had the true emphysematous character of broken-winded lungs; though the emphysema, which was greatest in the anterior lobuli, and more in the near than in the off-lung, did not prevail to that extent which in more advanced or confirmed cases it is found to do. There was some appearance of thickening, with opacity and whiteness, about the membrane lining the trachea and bronchial tubes; but it was not in the latter of a very decided character. The larynx was not preserved.

In the foregoing pathological accounts, two morbid

states demand our particular attention: these are, *emphysema of the lungs*, and *alteration of the membrane lining the air-passages*. It is the former, however, which has—perhaps from its presence being more constant and uniform—in an especial degree attracted the attention of veterinarians, of our own country in particular; and to that degree that some —among whom stood prominent the late Professor Coleman —have unhesitatingly asserted, that emphysematous lung constituted the pathology of broken-wind. In this advanced state of science, however, we dare not hasten to such a conclusion before we have examined and well weighed in our minds some facts which appear to militate against this theory. That broken-wind, or a disorder undistinguishable from it, may arise, and yet

EMPHYSEMA NOT PRESENT, we have unquestionable authority for affirming: in France, we have Godine, Volpi, Rodet, D'Arboval, and Delafond; in England, Professors Sewell and Dick, Messrs. W. Smith and Hallen; and we may now add, Mr. Gloag, Veterinary Surgeon, 11th Hussars, who, in 1851, committed to paper some admirable "Thoughts" on the subject, which will be found in vol. xxv of 'THE VETERINARIAN.' Even Delafond, who is the greatest French advocate for the emphysematous theory, avows that, out of fifty-four broken-winded horses which he examined, he found forty-five with emphysema, including dilatation of the air-cells of the lungs; whence he concludes that only about *three fourths* of the cases of broken-wind are of this nature, leaving one fourth to arise from other causes. Although the fact, that symptoms of broken-wind may issue from other pathological conditions appears irresistible, still are we left in a position fearlessly to pronounce, that the ordinary and by far the most uniform lesion present with the disease, is emphysema.

DOES EMPHYSEMA EVER EXIST WITHOUT BROKEN-WIND?—Yes, of one description, but not of the other. For emphysema of the lungs, which was first observed by Dr. Baillie, but afterwards more fully investigated and explained by

Laennec, is, according to the latter, of two kinds—vesicular and interlobular. *Vesicular* or *pulmonary* emphysema consists either simply in the dilatation of the minute bronchi and air-cells, or in the rupture of the parietes of several contiguous cells, and their consequent dilatation into one; *interlobular*, in the infiltration of air, in consequence of rupture of the membranous partitions between the lobules of air-cells, into the cellular tissue interposed between the lobules, and connecting them together. Mr. Stokes,[1] however, has very properly objected to the simple *dilatation of the air-cells* being so classed, "inasmuch as emphysema is not the principal characteristic of the disease, and though a frequent yet by no means a constant complication."

Laennec says, the dilated cell, though it commonly does not exceed a millet-seed, may reach the magnitude of a cherry-stone or French bean;[2] Dr. Townsend, however, in more than one hundred dissections which he made of emphysema, "never, except in one instance, saw the air-cell dilated to the size of a garden-pea." In the majority of cases, such cavities are formed by several cells being thrown into one, in consequence of their delicate partitions being overstrained or ruptured. In this manner, one entire lobule may become one (single) cell; or the interlobular partitions may themselves be lacerated, "and their respective lobules thrown into one large cavity, which usually reaches the surface of the lung and forms a projection under the pleura."[3]

I have myself on several occasions met with vesicles on the surface of the lungs—owing to the presence of air underneath the pleura, and the consequent elevation of the membrane—which were not influenced by inflation nor removable by pression; nor would the air they contained support combustion. These were, none of them, cases of

[1] In his 'Treatise on the Diseases of the (Human) Chest.'

[2] In an excellent article on 'Emphysema,' in the 'Cyclop. of Pract. Medicine.'

[3] The best method of demonstration in these cases is to dry the lung; previous to which, if requisite, it may be inflated.

broken-wind, nor was there any interlobular emphysema present. How, then, are we to account for the existence of these sub-pleural vesicles? In reference to man, Laennec explains their offspring by finding them to be dilated air-cells *protruding:* "that this is the case," he says, "is proved by the circumstance that we cannot force the contained air by pressure of the finger to leave its place." Whether such cases as the following be of this description, I must leave to be determined. Dr. Baillie thought that the air within them was secreted.

The FIRST CASE in which I perceived these surface or pleural vesicles, was that of a bay horse, who had, during a run with the Surrey fox-hounds on the 9th November, 1822, been over-ridden by his master, the late celebrated Captain Harvey, of Eltham, from which, on the fifth day afterwards, he died. The cavity of the pericardium contained a pint of fluid. The right lobe of the lungs was sprinkled with large, white, soft tubercles, was of a pink colour, and *presented several large bladders of air,* which raised the pleura from the surface.

The SECOND was a horse admitted into the infirmary of the Ordnance at Woolwich, on the 5th February, 1823, with symptoms of disordered bowels. His disease was never made out. He died on the 1st of June succeeding. The liver proved the chief seat of disease. Twenty ounces of water were found in the pericardium. One lung was remarkably pale—quite bleached in appearance; the other had its usual healthy aspect. *Both right and left lungs presented several bladders of air upon their surface, two or three of which were as large as apples cut in halves.* The pleura of the vesicles was cleanly and completely detached by air from the lung; the connecting cellular membrane having been absorbed. *The integrity of the lung in these places appeared to be unimpaired.* Inflation of the lung to extreme distension produced no visible alteration in the vesicles, although the experiment was several times repeated. One circumstance alone appeared to render it probable that the air might have come out of the lungs, and

that was, that, by pression, the vesicles could be rendered lax, although no air escaped externally.

Now, although these might have been cases of emphysema, certainly the interlobular extravasation was not present, neither were the subjects themselves broken-winded.

THE INTERLOBULAR OR TRUE EMPHYSEMA, Dr. Townsend informs us, "may be easily recognized in the dead body, by the transparency of the interlobular partitions, which contrast strongly with the dense structure of the intervening portions of parenchyma. Instead of the scarcely perceptible thinness which they exhibit in the normal state, these partitions, in a state of emphysema, are distended to the breadth of two or three lines, or even in some cases of an inch. They are generally widest at the surface of the lung, where the distension of their delicate cells bears an apt resemblance to a string of glass beads."—"When the disease continues to extend, the air passes from one interlobular partition to another, until it reaches the root of the lung, from whence it soon extends to the mediastinum, and thence spreads all over the trunk."—"Sometimes the air escapes into the cellular tissue which connects the pleura to the lung; forming bubbles of air, which may be pushed along the surface by the finger; by which circumstance they may be distinguished from the vesicles that are formed in *true* (?) pulmonary emphysema, as the latter are prevented from being displaced in this way by their interlobular partitions. Laennec explains this extravasation of air as dependent on rupture of air-cells: in most extensive cases of this disease, however, no such rupture has been detected; and rupture of cells constantly takes place without a particle of air getting into these partitions." This is the form of emphysema which we must continue to regard as inseparably connected with broken-wind: we have no fact before us to show that this has ever been observed in any but a broken-winded horse; although we appear to have evidence to prove that symptoms of broken-wind may exist, and yet the lungs be sound and free from emphysema.

Still, with Delafond, perhaps, shall we be justified in coming to the conclusion that, in three cases out of four, emphysema is to be found. And with this, let it be observed, it is very common to meet with thickening, or otherwise altered condition, of the membrane lining the air-passages. Indeed, Laennec has ingeniously shown how these morbid states are connected; an explanation which has been adopted by Delafond, though condemned by D'Arboval on account of broken-wind being proved to proceed from other causes.

ASTHMA and BROKEN-WIND have been compared, some regarding them as bearing "a close resemblance," while others maintain their identity cannot be established. It would be an easy matter to prove both parties either right or wrong, or, under varying circumstances, both right and wrong. The two disorders resemble each other in the circumstance of their proximate causes not being always the same; but they will be found very unlike in their symptoms and effects when their proximate causes are dissimilar; and yet extremely alike when those causes are identical, as the following account, extracted from Martinet's Pathology, will show:—

"EMPHYSEMA OF THE LUNGS (ASTHMA) is characterised by habitual dyspnœa, recurring by fits, which are exceedingly irregular in their periods of return and duration, and are subject to be increased by any cause, however slight, that affects the respiration. The movements of the thorax are irregular, and habitually unequal; *the inspiration is short, high, and rapid; but expiration is slow, incomplete, and as it were graduated: there is thus a manifest difference in the duration of the two movements.* During the fits the respiration becomes convulsive. On percussion the chest emits a sound more clear than in the healthy state; but this unnatural resonance is not given equally at all points, as the disease seldom extends to the whole lung. When the affection occurs at both sides, we experience much difficulty in estimating this increase of sound, as we have then no subject of comparison; and

again, when only one side is affected, there is another source of error: we may mistake the sound side, as being less sonorous, for the diseased one; but this is soon rectified by auscultation.

"*There is a constant cough returning in fits, usually dry, or accompanied by a viscid, transparent expectoration.* When the emphysema is of long standing and extensive, the intercostal spaces become expanded, and the thorax is rendered prominent, and rounded on one or both sides, according as the affection is single or double.

"In all the points occupied by the emphysema the murmur of respiration is very weak, or altogether suppressed. During full inspirations, and sometimes during expiration, we have a '*râle sibilant,*' resembling the sound of a small valve, or a '*râle sonore,*' imitating the cooing of a dove. The contrast between this marked resonance of the thorax, and the feebleness or total abstinence of the respiratory murmur, constitutes the distinctive character of this disease."

Surely, these remarks are not only applicable, but cannot fail to prove of very great service to us in our examinations of cases of broken-wind, supposed to consist in emphysematous lungs.

ARE THERE OTHER PROXIMATE CAUSES OF BROKEN-WIND? We are hardly advanced enough in our inquiry to answer this question. French authorities give us *nervous influence, pulmonary inflammations, lesions of the heart,* and *lesions of the diaphragm.*

PROFESSOR SEWELL was of opinion that broken-wind consisted in structural or functional derangement, and consequent loss of power, of the muscular fibres traversing the trachea and encircling the bronchial tubes, in some portion or the whole of their course.

PROFESSOR DICK, in company with Mr. Hallen, V.S. 6th Dragoons, examined a mare after death who had for years been affected with broken-wind, and could discover *no apparent lesion* which could by possibility bear on the complaint. Was this *nervous* broken-wind?

Mr. Gloag says: "In two cases of broken-wind which were destroyed for the profit of examination, after the most careful scrutiny, I did not detect emphysema." And in another instance—"the only anormal appearance I could discover was partial hepatisation of the right lung."

Causes.—"Why *horses* are especially liable to broken-wind," said Professor Coleman, "is, I think, to be accounted for by the fact that he is the only animal (probably?) which can be compelled to perform exertion on a full stomach; indeed, one of the most common causes is, riding or driving a horse hard who has previously drunk a large quantity of water. Being obliged to breathe quickly, and feeling some impediment in inspiration, he endeavours by a violent effort to remove it, in doing which the air-cells give way. It is a rare circumstance to see a post or coach horse broken-winded, unless so when purchased; and yet, neither of these horses go gently at first, and have their speed augmented as they proceed, as every horse ought to have; but, on the contrary, many of them are compelled to start and continue at the rate of ten or eleven miles an hour. You will naturally ask why such horses do not go broken-winded. The answer is, it is ascribable to the mode of feeding them. Each horse is probably allowed 20lbs. of oats a day, but not more than 5lbs. of hay; and again, they are not watered previous to their going to work. Such a mode of feeding is not only a palliation, but also a preventive of broken-wind. Farmers' and millers' horses are most disposed to this disease, because they feed them largely with hay and chaff and mealy food, which blows them out enormously, and then they are worked without discretion. The most effectual way of breaking a horse's wind would be, to procure a horse that was a great feeder—one that would consume about 35lbs. of hay in the course of the day; and, after having suffered him to eat as much as he chose—more especially if you were to put a little salt with it—and giving him as much water as he would drink, riding or driving him hard for two or three miles. I should not object to buying a horse as a hunter, myself, which was but *slightly* broken-

winded; since, by attention to feeding him, he might be got to do his work."

THE ORDINARY, IF NOT INVARIABLE PRECURSOR of the disease is *cough*. Nothing is more common than to hear connoisseurs observe that "such a horse has a *broken-winded cough;*" and too often this turns out to be a truthful prediction. The cough has that character in its low sound and imperfect development which seems to indicate want of power in the organs producing it. It is not quite a broken-winded cough, but has a great similitude thereto. The thickening so often observable in the bronchial membrane might give rise, if in an irritable condition, to cough; but it would not occasion a broken-winded cough. No: the probability is, the changes causing broken-wind are already beginning—there probably already exists *slight* or limited rupture of air-cell, the amplification or extension of which it is that becomes necessary to the full symptomatic development of the disease.

TURNING A HORSE OUT TO STRAW-YARD, where his keep consists of straw and rubbishing hay, is another alleged source of broken-wind,—a situation where he would not be able to break his wind in the manner described by Coleman. Having his water before him, he would not be likely to distend his body with drink; neither would he exert himself, or be likely to cause himself any pulmonary lesion. It is, therefore, difficult rather to explain this case, supposing all the circumstances be correctly stated. "Nimrod" (the late Mr. Apperley) has stated there are few or no broken-winded horses in France; and, on the authority of Mr. Gloag, I may add, that, in India, where the horses live on grass torn up by the roots, broken-wind is a disease hardly known. Mr. Gloag asks, "Was ever a case of broken-wind known among horses that had never left the grass-field?"

IT IS DIFFICULT OR IMPOSSIBLE TO RECONCILE THESE FACTS *as they stand*. Perhaps the surest way of coming to some understanding concerning them, is, to add as many more of any value as we are enabled to collect to

them. I believe, myself, that broken-wind is a much-less-frequently-met-with disease than formerly. I can avouch that it prevails little among military horses; its occurrence is not anything comparable to that of roaring. And it seems to be less prevalent among high than low bred horses. Coleman's theory accords with what is observed in human kind. Dr. Townsend informs us that "the great majority of cases (of interlobular emphysema) seem to result *from some sudden and violent effort of the respiratory muscles,* as in the forcing pains of child-birth, in raising heavy weights, in hooping-cough, &c." For the most part, broken-wind affects aged horses: rarely do we see it in young ones. D'Arboval says he never met with a case prior to the sixth year of age, and believes that mares are more disposed to it than horses. The following is a case of its occurrence early in life, as well as of its progressive development:

A gelding was passed by me at three years old, for my regiment, sound in every respect. The second winter afterwards he experienced an attack of chronic bronchitis, a prominent symptom of which was cough, which proved obstinate, and remained after all the other symptoms had disappeared. Although considered "cured," he was not suffered to do any work in consequence of the cough hanging about him. In the ensuing spring, during the blowing of a keen easterly wind, the cough became increased to that degree that I again submitted him to medical treatment. After a time, I perceived there was some agitation of the flanks, not of a character to denote anything like pneumonia, but such as evidently portended the approach of broken-wind. And what appeared to confirm this prognosis was, that his appetite and spirits continued undiminished, although his cough, which came on by fits, was now of that violent and convulsive character that it almost choked him, and withal so loud that it could be heard at a very considerable distance. By degrees, however, after a time, it became both less loud and less troublesome; and in the end degenerated into the feeble, short, husky, pathognomonic

cough of broken-wind; in which disease, at the expiration of a month from the commencement of the second attack, the case terminated. Ultimately, the horse was cast and sold, *broken-winded.*

CHANGES OF WEATHER have some such effect on the broken-winded horse as they have on the human asthmatic. During the fogs of autumn and the dry easterly winds of spring, and even in sultry summer weather, the animal's breathing is apt to be more disturbed, and his cough to be more troublesome, than at other times. I have seen broken-winded horses panting for breath in their stables under exacerbations of this kind; when, at another time, their respiration has been so tranquil, that, unless our attention had been drawn in an especial manner to them, we should hardly have suspected they were so disordered. Catching cold—the supervention of catarrhal disorder—will also induce an exacerbation.

SYMPTOMS.—There are two which in an especial manner characterise the disorder, and render it manifest to any person who has once paid attention to them; viz. the *respiration* and the *cough.* Expiration is an act tardy and protracted; inspiration, one facile and quick. Watch a broken-winded horse breathing. You will see the flank and posterior ribs, after being gradually drawn up, fall all at once, and with the belly quickly expand; but this act of expansion—inspiration—will be cut short by the subsidence of the parts once more; while the act of subsidence—expiration—will be followed up by one of contraction, by which the flanks and ribs will be forcibly drawn up again to their utmost. So that expiration is, in fact, a *double* action; the effect—as Mr. Blaine has happily explained it—of the muscular powers being called to the aid of the elastic or ordinary expiratory agents. The French have designated this peculiar flank-movement by the fantastical names of *coup de fouet, double tems, contre tems, soubrésaut:* we might fairly call it *jerking respiration.* Considering the lungs to be emphysematous—of which both D'Arboval and Delafond admit this kind of breathing to be pathognomonic—these

phenomena admit of ready pathological solution. The extravasated air is tardily and with difficulty forced back into its proper channels; to effect it, the lungs require additional and even supplementary compression: but, when once this has been accomplished, fresh air readily *rushes* in to occupy the vacuum, larger than ordinary, which is created by the dilatation of the chest. The *cough* is more than short; it is half suppressed or chopped off, as it were; and so feeble, that at any distance it is hardly audible: frequently, it is followed by a wheezing sound in the throat, and then puts one in mind of an asthmatic man. At the beginning of the disease—and indeed on certain occasions afterwards—cough is apt to be very troublesome; to come on in fits, particularly during exercise, or after drinking. When the disease is once established, and there exists no particular excitement, the cough is *solitary*, as well as short and feeble, *i. e.*, the horse coughs but once at a time.[1]—*Indigestion*, also, is a prominent symptom. The horse has a voracious appetite, and yet is in lean condition. Though a voracious feeder, he is nothing but an ill-conditioned hide-bound looking animal.[1] And well he may be; for if we examine his dung we shall find it looking like so much chopped hay, mingled with oats and husks, altogether evincing a most imperfect digestion. Out of this likewise arises that remarkable *flatulence* of bowel which is the occasion of the tumid, tense, tympanitic belly, frequently pendent from weakness, and which is, moreover, often so annoying in another way—one from whence, as I said before, the disorder appears to have derived its name. When the horse is first taken out of his stable and put to exercise or work, the ejection of wind, simultaneous with every effort he makes, or even with his cough, together with the occasional voidance of fæces, is in some cases very offensive: it, however, affords him relief in his breathing, by making room for the recession of the diaphragm, and to the degree that, after he has once "emptied himself," he will work on with very little inconvenience to himself or annoyance to his master.

[1] Vide Gloag's 'Thoughts on Broken-Wind,' in 'The Veterinarian' for 1852.

All this is owing to the increased power the expiratory muscles—the same as are employed in discharging the fæces—obtain over the retaining power, or *sphincter ani.* And in inveterate cases, so violent and frequent is the employment of this supplemental power, that the sphincter at length becomes, from continual forced dilatation, weakened to that degree that the anus is seen as often open as shut; nay, sometimes dilated to an enormous extent, exposing to view the interior of the bowel; the anus itself, from loss of power, advancing and receding with every expiration and inspiration the horse makes.—The *skin* also indicates the failure of the digestive powers: it becomes harsh and dry, perhaps hidebound; the coat likewise grows long and rough, and pen-feathered; all adding to the generally unhealthy aspect of the animal.—"When one lung only is emphysematous, or is much more emphysematous than the other, the intercostal spaces become wider, and it yields a clearer sound on percussion. If both sides are affected equally, the whole chest yields a very distinct sound, and exhibits a round globular outline, swelling out on both sides; and this conformation is so remarkable as to render the existence of emphysema evident from simple inspection."[1] Will this observation, concerning the altered form of the chest, not apply to horses?

After the fullest investigation of the subject, practically, and after consulting all the best veterinary authorities, both British and Continental, I must confess myself forced to come to the conclusion, to counsel my reader still to adhere to the theory, that *emphysema of the lung* is the pathology of *true* broken-wind, and that the emphysema is of the *interlobular* description. To what extent horses are liable to that spurious form of emphysema, called *vesicular*, which consists in *dilatation* only of the air-cells, and how far the same may tend to induce broken-wind, I am not at present, myself, prepared to say: I can only repeat, that Delafond includes both kinds of emphysema in his proximate causes of the disease. That gross and irregular feeding,

[1] Townsend's 'Account of Emphysema in Man.'

violent exercise on a full stomach, with chronic bronchial irritation as well perhaps, are the common fore-runners and producers of this emphysematous condition of lung, there can be no doubt; and I look upon Laennec's explanation[1] —since adopted by Delafond—of the manner in which bronchitis leads to emphysema, although it is ridiculed by D'Arboval, as the most plausible theory we yet have on this part of our subject. I also believe that the indigestion, so common an attendant on the disease, may precede it, and prove the origin of it. In regard to broken-wind arising from other causes, I am of opinion that a disorder analogous to it—perhaps indistinguishable from it—does on occasions present itself, though, in the end, this may not turn out to be what we have been in the habit of regarding as genuine broken-wind: there will not, I apprehend, be found to be in its origin, course, and termination, *precisely* the same series of phenomena; notwithstanding, I repeat, the symptoms may be so similar, that, by our ordinary tests of observation, we fail to make out satisfactory differences between them. The time seems fast approaching when we shall be enabled to diagnosticate in the living animal between emphysema of the lungs and rupture of the diaphragm, and other lesions whose symptoms simulate those of broken-wind; and then—but not till then—shall we all come to some unanimous opinion touching the pathology of the latter.

By PERCUSSION AND AUSCULTATION we may, probably, be enabled to achieve this great desideratum. According to Delafond, "The pathognomonic signs of pulmonary emphysema are, 1st. The interrupted respiration; weak respiratory murmur; loud resonance of the thoracic parietes; rubbing sound; sibilous and crepitous râles. 2dly. The simultaneous existence of all these symptoms in many parts of the lung indicates general vesicular dilatation and interlobular emphysema. 3dly. Weak respiratory murmur during expiration, rubbing sound during inspiration, anormal resonance of both sides of the chest, are more especially the signs of simple vesicular dilatation, confined to the anterior

[1] Given at page 169.

lobes, or of dilatation throughout the pulmonary tissue. 4thly. The dry crepitous and dry sibilous râles, deeply interrupted respiration, very loud resonance, and extreme dyspnœa during exercise, are the especial indications of interlobular emphysema. 5thly and lastly. The presence of dry crepitous râle and loud resonance, located in one or more parts of the lung, announce local vesicular dilatation in those places."

TREATMENT.—No disease more completely evinces the revolution science has effected in veterinary medicine than broken-wind. Our professional forefathers, mistaking the effect for the cause, conceived the disease to consist in distension of the bowels with air, and thought that, by affording additional facility for the emission of this, they cured or palliated the complaint. Accordingly, what did they do?—nothing less, as we have already seen in Coleman's account, than absolutely make an artificial anus for the more free escape of this redundance of wind. In the operation the sphincter ani sometimes got divided; and the poor animal, unable to close his fundament, became ever afterwards a most loathsome spectacle, and but too convincing and disgusting a proof of the ignorance and barbarity of his medical attendant.

BROKEN-WIND IS ITSELF AN INCURABLE DISEASE. Notwithstanding, it is one whose effects in most cases admit of palliation, and generally in two ways:—either by administering to the complaint itself, or by putting the bowels into that state most favorable to the animal's breathing. I shall therefore consider the treatment under two heads, —*medical* and *dietetic*.

MEDICAL TREATMENT will be required at such times as a paroxysm happens to be induced by any concomitant catarrhal or febrile affection. Bloodletting to a small amount may be advisable in cases in which any congestion or inflammatory action prevails in the lungs. In cases where there is more local than general irritation, and when the animal can afford to lose a little blood, we may try what the French veterinarians recommend,—opening the spur-

vein. Aperient medicine—small doses of aloes, also *enemata*, always prove serviceable. Should there be any flux from the nose, encourage it by steaming the nostrils, provided the animal can bear it without becoming harassed in his breathing. After the bowels have been opened, I would administer some sedative or alterative. Digitalis has been found effective in temporarily quieting the respiration: indeed, so tranquil does the breathing become in some cases under its influence, that the horse appears as though he had got quite rid of his disorder. With the cessation of action of the remedy, however, his symptoms all return. The French give opium with the same intention. Where any bronchitic irritation or disease was present, and the horse could be laid up for awhile, the best medicine would be the Plummer's ball,[1] once or twice a day.

Dietetic.—Solleysel is said to have cured a broken-winded horse by confining him for eight days in a barn with plenty of hay, but without water or drink of any kind. In modern times, these experiments have been repeated by Rodet.

He shut up a sound-constitutioned glandered horse, who had become broken-winded, and gave him hay only, depriving him of all drink. He was fat in condition, winter-coated, his pulse was 36, and his inspirations twelve a minute. The first three days he did not appear to suffer much, notwithstanding he became hollow in the flanks, and tucked up. The fourth day he sought everywhere for water, licked the hands and clothes of his attendants, gaped often, and was unusually lively. Though the pulse and respiration remained unaffected, the animal began to fall away, and his coat commenced coming off. On the fifth day, whenever he moved, his joints cracked, a symptom which continued increasing afterwards. His flanks were now quite drawn up; his appetite failed him, the pulse continued 36, but the inspirations sank as low as eight a minute. The mucous membranes were reddened and injected, and there was a flux from the left nostril which continued

[1] For the recipe for this ball, see p. 99.

augmenting to the last; but there was a strange diminution in the swollen gland, and which became afterwards still more striking. On the sixth day, still losing flesh. Eighth day, the gland ceased to diminish; the horse dejected, and looking thinner; was very weak, had left off eating, and no longer lay down; nasal flux abundant, and sticking about the nostrils. Tenth day, six inspirations and thirty-six pulsations a minute. The horse staggered in walking, and refused to eat. Seeing that he could not in this state long survive, water was brought. He drank, and immediately recovered his appetite. He regained his *embonpoint* with the same rapidity with which he had lost it. For some days afterwards the nasal flux had much diminished, together with the inflammatory action, and the movements of the flanks had lost their *soubresaut*. But in four days more, all the symptoms of broken-wind had returned. The horse was destroyed, and his lungs showed general emphysema.

By PROPER FEEDING, and *by condition*, it is that we render our broken-winded servant, while free from exacerbation, of the greatest service to us. By a judicious plan of regimen, in respect to exercise or work, and feeding and grooming, the animal must be got into the best possible condition. All his grossness, all redundant fat about his body and bowels, must be got rid of, so that nothing remains but sheer hard muscle; and when this—which is real *condition*—shall be attained, the horse—be he broken-winded, or roarer, or otherwise defective in his "pipes"—will do his work with so much comparative facility and comfort as no longer to appear like the same animal. The air of his stable should be temperate and pure. His food should be of that kind which will not greatly distend his bowels or be hard of digestion, or prove astringent in effect; at the same time it must be nutritive, and such as he can work upon. Take great care that he do not over-fill his stomach, and that he get no water to distend his bowels; none, at least, on the eve of his being required for work; but only sufficient water and food to maintain his powers, and these given some two or three hours before his work is likely to commence. The

object of all this is, that his respiratory powers—above all, his *diaphragm*—may play as unencumbered as possible; while, at the same time, his body is lightened, and his stamina supported. Give him a peck and a half of oats a day, and not more than six or seven pounds of hay, and let that be moistened with water, and be of the best upland quality—no clover, nor sainfoin, nor lucern hay, nor, in fact, any gross and filling rack-meat—and let him have his hay *after* he has done his work, and, for the most part, his water too. Beans are good for him; and so are carrots and turnips. Yet has it often been remarked, how well broken-winded horses work when fed on green food, even of almost any description—vetches, clover, lucern, &c.; which at first appears like a paradox to the above: but, no!—this arises from the easily digestible and laxative properties of the recent vegetable, insomuch that it remains but a short time within the stomach, and is, during any bodily exertion, speedily ejected out of the bowels. It must be borne in mind, however, that green food would not be admissible to a horse required to be kept in *hard* condition. To horses much troubled with flatulence, and who, from the appearance and offensiveness of their dung, are evidently the subjects of indigestion, I know of no food that in general seems so suitable as carrots: other roots—such as Swedish and common turnips, potatoes, and mangel wurzel—may likewise be given, and it will be found, I have understood, a great improvement to boil or steam them first. Finally, let the pace be slow and moderate at the beginning: by degrees, as the horse empties himself, it may be increased, in which manner are the animal's fullest powers, with least embarrassment, called forth. Exercise or work of some sort is so important that it cannot be remitted for a single day without his food filling and so harassing the broken-winded horse.

Nimrod informs us that, in the stables of the fast coaches, horses are only allowed half a truss of hay (28 lbs.) each for seven days,—but that they get a bushel and a half of corn (about 60 lbs.) each, besides;—and that a broken-winded horse is now scarcely heard of among them. "I

have taken some pains," continues Nimrod, "to ascertain this fact by my own personal inquiries. One proprietor, who has nearly fifty horses at work—many of which are in as fast coaches as any that travel on the road—assured me, lately, that he had not a broken-winded horse in his yard; whereas, before he stinted them in their hay, he generally had *one in five* in that state."

WHY CANNOT WE CURE BROKEN-WIND? This question is extremely likely to be put to us—and by *surgeons*, too; for Laennec says, interlobular emphysema is curable—he has seen "several recoveries from it." And Dr. Budd, who presented a paper to the Medical and Chirurgical Society on *Vesicular* Emphysema, says, in regard to the *interlobular*, that it is the result of an accident—rupture of the air-cells —most commonly caused by deep and rapid inspiration, "and which is, generally, *a very trifling injury*." And, again, Dr. Townsend's words on the same part of our subject are—"fortunately, however, the diagnosis is not a matter of much practical importance, as in slighter cases (in which alone any ambiguity can exist) *the air appears to be always absorbed, and the interlobular partitions gradually return to their natural state.*"

There surely must be some mistake about this lesion. Either we must be terribly out in our pathology, or these medical philosophers must be in error. The difference of the animals never can make this difference in results, the causes being admitted to be similar. We have no notion of the "absorption of air," and "the parts gradually returning to their natural state." With us it is, once broken-winded, for ever broken-winded. Delafond, indeed, speaks of the *possibility* of cicatrisation of the torn air-cells, in cases where they have been ruptured by violence, through rest and depletive measures; but he adduces no fact or case to make us believe it possible; nor, for my own part, have I ever witnessed or heard of such a thing.

If I mistake not, our attention was first called to this subject by the celebrated Nimrod, the late Mr. Apperley. In his admirable 'Letters on Condition,' so long ago as the year 1825, he remarks, while discoursing of treatment after a hard and long run,—"When a horse is very much exhausted after a long race with hounds, a noise will sometimes be heard to proceed from his inside, which is often erroneously supposed to be the beating of his heart, *whereas it proceeds from the excessive motion of the abdominal muscles.*" This interpretation of the "noise" was shortly afterwards disputed by Mr. Smith, of Woodhouse, who ascribed it *to the heart.* In a subsequent letter, however, Mr. Apperley, having in the interval met with another case, argues that the noise, from the situation in which it is heard, cannot possibly proceed from the heart, unless, indeed, as he adds, "the heart lay where it should not lie;" but—repeating his former opinion—is caused by "a convulsive action of the abdominal muscles."

In 1831, Mr. CASTLEY, with his mind directed to the subject by the foregoing observations of Mr. Apperley, sent a paper to THE VETERINARIAN, wherein, although he had never seen but one "well-marked instance of it," he appears to have hit upon the true explication of the phenomenon; which is, that the "noise in the inside" is owing to "spasmodic affection of the diaphragm." In Mr. Castley's case, the prominent symptom was "a convulsive motion or jerking of the whole body, accompanied by a dull thumping noise, audible at several yards distance, and evidently proceeding from his inside. The beats appeared to be about forty a minute. On placing my hand over the heart, the action of that organ could be felt but very indistinctly: the beating evidently came from *behind* the heart, and was plainly to be felt in the direction of the diaphragm. Again, placing my hand upon the abdominal muscles, the jerks appeared to come from before backwards. There was no pulsation to be felt at the submaxillary artery."

Mr. Brown, V.S., Melton Mowbray, in 1833, published three "well-marked cases" of it. The first was that of a young mare taken up from grass and driven slowly thirty-five miles in one day, with a stomach filled with three pecks of oats. The second, that of a horse who "had been living in a state of rest for some time, and was forced to sudden and violent exertion with his stomach full of grass." The third had not undergone any exertion, save that of "rolling and pawing" from an attack of gripes. Mr. Brown referred them all to "spasmodic action of the diaphragm."

To Mr. Sinclair,[1] V.S., Morpeth, spasms of the diaphragm occurred in a case of trismus. "There was a loud beating in the region of the diaphragm, which could be heard at a distance of ten yards, and not synchronous with the pulse." It was "accompanied with distressing cough and profuse perspiration." The case did well, treated by opium and digitalis, and keeping the bowels open.

Mr. Tombs,[2] V.S., Pershore, saw a five-year-old mare, who for some days had been out at grass, that became suddenly seized with quick and laborious respiration, quick pulse, and shivering, which symptoms were treated by venesection and an aperient. "In the evening, violent palpitations of the diaphragm came on, which was discovered by a tremendous and loud noise inside the ribs, as though a man was in the thorax beating the ribs with a hammer: the noise proceeded principally from the left side, midway between the spine of the back and the ninth rib. Pulse almost imperceptible." Venesection and opium, and stimulating liniment to the side and extremities, with aperients, perfectly cured the case.

Mr. Gutteridge,[3] V.S., Carmarthen, was called to a mare who, on her arrival in the Gloucester mail, showed great uneasiness, frequently attempting to stale; pulse 90; "and there was a violent beating on the near side, which could be heard at a considerable distance. Her side was much convulsed; and, on placing my hand over her heart,

[1] 'The Veterinarian' for 1835. [2] Ibid., 1835. [3] Ibid., 1836.

its action could not be clearly felt." Venesection—which it became necessary to repeat—aperient medicines and opiates, recovered her.

The SYMPTOMS, collected from the foregoing cases, are—violent palpitations against the ribs, loud enough to be heard at a distance of some yards, producing a convulsive motion or jerking of the whole body, unconnected with the pulsation of the heart, sounding posterior to that organ, in the region of the diaphragm. Indeed, the pulse at the heart is rarely perceptible, nor is it often to be distinctly felt at the jaw. The horse is in great distress for breath. From time to time he breaks into a profuse sweat; and, in some cases, a harassing cough is an accompaniment.

CAUSES.—Over-fatigue and exhaustion, especially of the kind caused by hunting or hard work, on a full stomach. In some instances it has come on at, or after being at, grass. In one case it proved an attendant on locked jaw.

PATHOLOGY.—That the *seat* of the disorder is the diaphragm, both its locality and peculiarity of symptom appears to render highly probable; while that the affection is in its nature "spasmodic," I think is forcibly argued, as well from the character of the symptoms, as from the sudden manner in which the disease attacks and quits the patient. After all, however, it appears, Mr. Apperley was not running into vast pathological error when he pronounced the disorder to be in the abdominal muscles. For, supposing the diaphragm to be in a state of spasm or convulsion, how could the breathing be carried on if it were not for "the excessive motion of the abdominal muscles?" Upon the action of the diaphragm, ordinary tranquil respiration almost entirely depends; and when this agent is incapacitated or deranged, but for those necessary and powerful auxiliaries—the abdominal muscles —the breathing must become suspended, and the animal die. The "distress" of the patient is occasioned by this dread of suspension; "the jerkings of his body," by the efforts he is making with his abdominal auxiliary powers to counteract it. We know that one of the ordinary causes of spasm is over-action; we need, therefore,

feel no surprise that spasm should seize the diaphragm after such labour as that muscle must have been performing during a severe run with hounds. Mr. Brown's and Mr. Tombs' cases show that it may supervene upon colic, and upon certain states of the stomach and bowels produced by green diet. In conclusion, the spasm may prove the result of inflammation of the diaphragm.

The TREATMENT to be pursued must be entirely regulated by the nature of the case. Should the case be one of the "over-marked" description, and there be signs of exhaustion and decline of the vital powers, we ought to combine stimulants with our antispasmodics. Incomparably the best antispasmodic is opium; we should therefore give, immediately, either the following ball or the drench:—

℞ Opii . . . . . ℈j	℞ Opii Tinctur. . . . . ʒj
Ammoniæ sub-carbonat. . . ʒiss	Spirit. Æther. Nitric. . . . ʒij
Pulv. Anis. . . . . ʒiiss	Aquæ Tepid. . . . . Oj
Syrup. Zingiberis, q. s. M. et Bol.	M. fiat Haust.

In such a case as this, after re-action appears to have taken place, should the spasm continue, bloodletting can be practised only to save life, should it ever seem requisite; but in a case where exhaustion is not present, blood may be drawn, and the sedative medicine—the opium—either with or without the ammonia and æther, given at the same time. Warm clysters ought to be resorted to; and, could it be had, a warm bath would be likely to afford great relief. Should the case appear to be anywise connected with colic, I would, above all medicines, give the gripe aperient drench, thus composed:

℞ Decoct. Aloës	ʒj
Tinct. Opii	ʒij
Spiritus Æther. Sulphuric.	ʒiv
M. fiat Haust.	

This drench must not be repeated. Let either the antispasmodic ball or drench be given a second or even a third time, if required, at intervals of three or four hours; care being taken to keep the bowels soluble by injections.

RUPTURE OF THE DIAPHRAGM.

It is not many years since this lesion was added to our nosology. For calling his attention to it, as well as for showing its connection, in similarity of symptoms at least, with broken-wind, I believe the veterinary surgeon to be indebted to an estimable, now deceased, friend of mine, Mr. Thomas King, late surgeon at Barnstaple; with whom, while dressing for Mr. Travers at St. Thomas's Hospital, I had the good fortune to become very intimately associated. Shortly after leaving the hospital for private practice—having while there, as it would appear from his acquaintance with me, imbibed a taste and liking for veterinary pursuits—Mr. King sent me, I think it was in the year 1825, the following communication, which I, three years afterwards, published in one of the earliest Numbers[1] of THE VETERINARIAN: in fact, almost immediately after I had originated that Journal.

"A little mare of my father's was many years since ridden rather sharply for half a dozen miles. This was in summer; consequently she was in all probability full of grass. Be that as it may, she soon after exhibited the symptoms of broken-wind. At length, she died rather suddenly, whilst standing in the stable. I ought to have mentioned that the cough was the most curious apology for a cough you ever heard: it resembled nothing so much as the short breathing of a child under pulmonary inflammation. On examination, it was found that the diaphragm was lacerated on the left side through its whole extent, throwing the two cavities into one. The laceration appeared recent; but I should think it must have been in part old: what should you say? The lungs were dark-coloured and collapsed; the edge of each lobe to such a degree that those parts were not inflatable, though air could be made to pass when they were cut through. No air underneath the pleura pulmonalis. Heart and large vessels quite healthy. Posterior surface of the diaphragm on the left side showed

[1] In vol. i, page 101.

signs of former inflammation: its peritoneal covering had become altered in texture, and was here and there studded with coagulable lymph. The examination was made by my father.[1] I wrote him a long list of observations on the case; but I shall not send you any until I have heard what you have to say: so remit me your thoughts on the subject."

In the same volume will be found three other cases, all furnished by that ever observant and communicative practitioner, Mr. Cartwright: before I notice these, however, I must give the particulars of one that occurred to Mr. Hayes, V.S., Rochdale, which—though curious altogether—possesses some characters corroboratory of the suggestions prompted by Mr. King's case.

A horse experienced an attack, while at grass, partaking of the nature of jaundice, which was subdued by bloodletting, and aperient and sedative medicine. Being recovered, he was ridden for a week, and then turned to grass again: it occurring in the month of August. Nine days afterwards, the animal's services being again required, he was taken up, and found broken-winded. Notwithstanding this, he was ridden for three weeks more, and then again was taken ill with "marked anomalous symptoms of pleuritis and enteritis." In five days he was again quite recovered, and was once more ridden. His owner, however, by the advice of a blacksmith, now gave him an ounce of saltpetre, night and morning, to cure his broken-wind. This produced acute inflammation of the neck of the bladder, of which he died. On examining him, the lungs appeared sound. A portion of cæcum had protruded through a rupture in the diaphragm; forming a pouch within the chest, which had also become ruptured, and suffered its contents to escape within the thoracic cavity. The rupture in the diaphragm was near its inferior part, about five inches above the middle of the sternum; and was two and a half inches in extent, with its edges sloughed off—quite smooth and circular. The liver was gangrenous. All the guts highly inflamed.

[1] Who is also a surgeon.

The stomach almost black. The bladder, including its neck and urethra, all gangrenous. Small calculi within the neck of the bladder. Notwithstanding all this disease of the viscera, the horse continued to eat during the intervals of cessation from pain, which lasted about ten minutes each time; though these were followed by fits of extreme agony of half an hour's duration and upwards.

A case similar to the foregoing has recently occurred in my own practice: it will be found in vol. xxvi of THE VETERINARIAN, April, 1853. A troop horse was brought to me for having hurt himself "behind," by—it was reported —"falling down in his sleep:" a story I did not believe. I heard afterwards, he had slipped up at the Horse Guards. The horse showed no other symptom save that of dragging lameness of his hind parts, which afterwards became excessive. Ten days succeeding his hurt, while under treatment for it, the old horse was seized with "gripes," which resisted all remedy, and caused his death in seven hours. The diaphragm was found ruptured; and through the rent had passed, into the thorax, the stomach and part of the duodenum, causing *hernia* besides. The stomach was distended, and had at its fundus burst. The duodenum was, by being displaced, twisted. For full particulars the Journal can be consulted. M. Langwnard also reports a case of strangulated inguinal hernia, in which, after death, was discovered a rupture of the diaphragm.

The nature of Mr. Cartwright's cases may be gathered from the observations he has appended to them, which run as follow:

"The mare—the first case—had been most severely worked for the last four or five months, and, lately, whilst labouring under considerable catarrh. Her owner was in the habit of knocking and kicking his horses about, and driving occasionally at a greater rate than their strength admitted of, and it is probable that her rib—which after death was found fractured—was broken by such ill-usage, and that peritonitis likewise was brought on by her being kicked in the abdomen. Over-exertion and her excessive

coughing had caused partial rupture of the diaphragm, which was completed on the day she was exercised, or soon after."

"The second case I attribute to excessive and repeated coughing; for the fibres of the diaphragm in each case seemed as if they were drawn from each other, being tapered out at their edges to the mere thickness of a wafer."

To these two cases Mr. Cartwright adds a third, in which rupture of the diaphragm appeared to have been caused by parturition, happening in a broken-winded mare, while at pasture, and at a time when her bowels were distended with green food and flatus.

THE NEXT COMMUNICATION on the subject comes from the pen of Mr. Hales, V.S., Oswestry; and it will be found a valuable one, not only for the sensible remarks by which it is accompanied, but on account of its teaching us a new fact—that it is possible for the diaphragm to become "extensively and fatally ruptured by its own vehement muscular contractions, in a horse previously in perfect health."

During the unparalleled hot weather of July, 1825, a four-year-old mare was put to a carriage, with three others, to go, post, from Oswestry to Shrewsbury—eighteen miles. In general she was led in hand; but this day one of the postilions—about twelve stone—rode her, and they went a quick pace. After doing this, she was put to work another carriage back to Oswestry. She reached within a mile and a half of her journey's end, and then became so much distressed, that she was taken out of harness, and with difficulty got to her stable. Mr. Hales being from home, an hour elapsed before he saw her. "She was breathing with great difficulty—not in that short quick way that characterises inflammation of the lungs, but each respiration was produced with great effort, like a person labouring under a severe fit of convulsive asthma." "I am free to confess," continues Mr. Hales, "that the peculiarity of the breathing both surprised and puzzled me, as I had never seen anything like it in the horse before, nor have I since; but, knowing

that the mare had undergone dreadful fatigue, it was set down as a case of exhaustion, or *over-marking*, as sportsmen term it." In half an hour she died. There was a rent in the diaphragm, extending from the ensiform cartilage to the perforation through its tendinous portion for the vena cava. The lungs and other viscera were sound. Neither stomach nor intestines were found loaded with food. Another practitioner of the town related a similar case to Mr. Hales.

Mr. CARTWRIGHT MENTIONS AN ANALOGOUS INSTANCE.—A coach-horse, twelve years old, dropped down dead, going at the rate of ten miles an hour. "The rupture (in the diaphragm) was so large that a man's head could easily pass through it, and was near the ensiform cartilage, extending as much on one side as on the other. It was the muscular part, and some part of the muscle seemed to be torn from the tendinous portion. It was evidently a recent affair, as there was not the least disease about it."

Pursuing our inquiries on this interesting and comparatively novel subject, we come to a case narrated by Mr. Price, V.S., Rochester:

It was "a noble-chested cart-horse, aged, very free in his work, and the day never too long for him." He had continued working with a severe cough for a fortnight, his appetite being good; but at length was taken "seriously ill." A smith was then sent for, who took away five quarts of blood; and, next day, the same quantity. On the third day Mr. Price was called in, who "found respiration extremely laborious, and the animal showing great uneasiness by incessantly moving about; pulse 50, and hard." Next morning the pulse was 90, and soft; and the respiration still more difficult, which, observes Mr. Price, "I should have thought impossible, had I not seen it; the animal being considerably tucked up in the flanks, and showing altogether great distress." Mr. Price bled: the blood was "very dark, and without any separation of its constituent parts." The horse died on the seventh day. The diaphragm was found "ruptured on the near side, as large as a crown-piece: its anterior surface presented one mass of inflammation, and

might be considered in a gangrenous state. It was so rotten, that it came off in bits between the finger and thumb. The lungs were perfectly collapsed, but otherwise healthy," as were likewise all the abdominal viscera.

THE THROES OCCASIONED BY DIFFICULT PARTURITION may end in rupture of the diaphragm. Mr. Thomson relates a case of this description,[1] in which the muscle was discovered "ruptured almost from side to side, *across* its fibres."

RUPTURE OF THE DIAPHRAGM AFTER DEATH.—On French authority,[2] I am now going to report two cases which would appear to establish this among other facts connected with our present investigation.

A coach-horse ran his chest against the pole of a carriage, fractured two of his ribs, and opened the intercostal arteries, from which blood poured into the correspondent side: death ensued twelve hours afterwards. He did not manifest after the accident, or, indeed, had he at any previous time shown, anything symptomatic of ruptured diaphragm. His carcass was examined fifteen hours after death. The belly was then exceedingly distended. The diaphragm was found ruptured on the right side through its upper part, not far from its tendon; the laceration was very irregular, and measured four inches in length. The arch of the colon completely closed the breach. The fibres of the muscles were corrugated and collected into parcels. The colour of the lacerated fibres was the same as the rest of the muscle—a livid deathlike hue; their edges were nowise tumefied. Not a streak of blood appeared upon them, nor was a drop effused into the abdomen.

An adroit and experienced horse-gelder had a young horse die suddenly after the removal of the first testicle. He sent to the Lyons Veterinary School for assistance, and some pupils went and examined the carcass. Although the horse had been dead but twelve hours, the belly was found exceedingly distended. They found the stomach ruptured towards

[1] 'The Veterinarian' for 1835.

[2] 'Report of the Proceedings of the Royal Veterinary School at Lyons,' during 1831.

its left curvature, and the diaphragm lacerated through the fleshy part of its right side. The diaphragmatic lesion had given vent to no hemorrhage, nor were the lacerated edges at all tumid. The divided fibres were irregular, collected into unequal parcels, and their colour the same as that of the other parts.

I leave these cases to the consideration of my reader and the test of future observation. Whether they be or be not proofs sufficient of the fact they are intended to demonstrate, they have at least this value: they will serve to caution us against hasty and inconsiderate decisions on occasions when we meet with rupture of the diaphragm in the *dead* body, and are not altogether satisfied about the symptoms during life having been such as to indicate it.

The DEDUCTIONS to be drawn from the foregoing and other analogous cases, are, that rupture of the diaphragm is by no means unlikely to follow acts of extraordinary exertion, efforts of any kind, and particularly upon a full stomach, or rather when the bowels are distended with green or other food likely to generate gas. A fast gallop, straining draught, a heavy fall or blow upon the side, violent fits of coughing, even the throes of parturition, have all proved the occasion of it. The diaphragm, being in itself the ordinary and principal respiratory agent, any act said to "break the wind" of a horse, seems quite as likely to produce laceration of *it* as rupture of the air-cells; a circumstance which, connected with the resemblance in the symptoms of the two lesions, will very well account for such cases of broken-wind as are said to consist in ruptured diaphragm; though, in truth, they are not broken-wind: at least not the disease which in our pathology answers to that name. While the whole body is in action or convulsed, the diaphragm, as D'Arboval has pertinently observed, becomes the *point d'appui* of the muscular system, in which state of contractile resistance, its fibres must especially be liable to be rent. Coupled with these causes of rupture, we must not forget what has been known to happen—and what may often happen in such cases—after death, when,

from *post-mortem* gaseous emissions, the bowels become distended and forced against the diaphragm and abdominal parietes to a degree to threaten bursting. I have seen the recti muscles split and torn in this manner, as well as the fasciculi of the diaphragm; and therefore, I repeat, it requires, in this tympanitic state of the dead body, extreme caution in pronouncing upon such lesions.

SYMPTOMS.—Cases have occurred in which nothing has appeared to indicate disorder, and yet after death the diaphragm has been discovered, ruptured. Other cases have manifested such extraordinary agitation in the breathing that the disease has appeared at once distinguished from all others. This incongruity, probably, is to be accounted for by the nature, direction, and extent of the lesion in the muscle. On occasions, the disorder has so resembled broken-wind that very good veterinarians have mistaken it for that disease: hence one reason for the discrepancy of opinion concerning the pathology of the latter. The respiration and cough must furnish us with the main clue to the lesion: and should symptoms of colic be present as well, we may suspect that some abdominal viscus—intestine or omentum, or even liver—has got into the rent in the diaphragm. Should it become strangulated there, it will probably give rise to symptoms such as indicate strangulated hernia elsewhere.

The LESION, or rupture in the diaphragm, may occur either in its fleshy or its tendinous portion: the former appears to have been the most frequent seat of it, and in particular in the vicinity of the ensiform cartilage. In one case the muscle was split quite across. Tumefaction, reddening, infiltration of the lacerated edges, indicate that the lesion is a recent one; absence of these signs, together with smoothness and roundness of them, show that it is of some standing. Jagged, bloody, unchanged edges, with considerable distension of the abdominal viscera and parietes, and this latter having taken place in the interval between death and examination, will render it probable that the rupture has happened *post-mortem*.

THE RELATION TO BROKEN-WIND which this lesion bears,

is of great importance to us—not that we have any power to remedy one more than the other, but—that we may be enabled to establish such a diagnosis between them as shall guard us from mistaking two pathological conditions so totally different in nature from each other as rupture of the air-cells and rupture of the diaphragm. There can be no doubt but that they have been too often confounded, and hence one reason for the discrepancy of opinion concerning the nature of broken-wind. The principal diagnostics must be, the respiration and cough : at the same time, every other collateral inquiry should be instituted likely to throw light upon the case. Should colicky or hernial symptoms supervene, its nature will admit of little doubt.

SECTION VIII.

DISEASES OF THE HEART, PERICARDIUM, AND GREAT BLOOD-VESSELS.

General Observations on the Action of the Heart.

THE class of diseases we are now about to consider may be regarded as the least advanced of any of veterinary medicine,—a circumstance not to be ascribed so much to their comparative rarity as to their existing undiscovered, or rather, being confounded during life with other diseases, and in particular with pulmonary affections, with which they will be found in practice often to be combined. Indeed, it is only within the present century that even surgeons have been able to boast of much knowledge in this branch of nosology. Antecedent to the time of Laennec, cardiac disease in man was but seldom detected—if discovered at all—until that stage of the malady was passed when remedy might or could have proved effectual: to auscultation it is that surgeons stand principally indebted for enabling them to make out disease of the heart, especially in its primary and incipient form; and to the same influential auxiliary must veterinary surgeons have recourse if they would aspire to anything approaching the same perfection of art.[1] In our own days, as authors who

[1] "In heart disease, although we dare not speak with certainty without the aid of auscultation, a tolerably accurate diagnosis may nevertheless be made from the careful investigation of symptoms."—*Todd on 'Diagnosis,' Lancet*, Oct. 29, 1842.

have taken great pains to investigate the subject, both by experiment and practice, stand eminently the names of Williams, Elliotson, Hope, Stokes, Watson, and Latham in our own country; to which distinguished list we may add those of the foreigners—Louis, Andral, Corrigan, and Bouillaud. Dr. Hope, whose labours have not only greatly augmented the previous small stock of knowledge existing, but have been attended with the important results of correcting errors concerning the action of the heart, into some of which even Laennec had fallen, and which, through his great authority, had become extensively propagated and believed.

In order that we may be able to recognise and appreciate the sounds and sensations conveyed to the hand or ear by the action of the heart under disease, it will be necessary for us to make ourselves acquainted with those indications of its movements in a state of health, it being by comparison of the two that we shall best in the living body discriminate between the normal and anormal condition of the organ. By the hand applied flat against the ribs of the left side, immediately behind the elbow, the impulse of the heart is plainly enough felt, and its pulsations as easily numbered; but if the ear be applied, or a stethoscope used, two successive sounds, followed by an interval of silence, are heard. "The first motion," says Dr. Hope, "which interrupts the interval of repose, is the auricular systole. It is a very slight and brief contractile movement, more considerable in the auricular appendix than elsewhere, and propagated, with a rapid vermicular motion, towards the ventricle, in the systole of which it terminates rather by continuity of action than by two successive movements. The ventricular systole commences suddenly, and terminates in the diastole, which is marked by the second sound. Synchronous with the systole are—the first sound, the impulse of the apex against the ribs, and, in the vessels near the heart, the pulse; but, in vessels at some distance, as the radial (or submaxillary), the pulse follows at a barely appreciable interval."—"The *rhythm* of the heart—that is, the duration of the several parts of this series—which

constitute what may be called *a beat,* is the same as described by Laennec: viz. 1. The ventricular systole occupies half the time, or thereabouts, of a whole beat. 2. The ventricular diastole occupies a fourth, or at most a third. 3. The interval of ventricular repose occupies a fourth, or rather less, during the latter half of which the auricular systole takes place."

This brief exposition, from Dr. Hope, of the action of the heart, will prepare us for that practical study of its movements in a state of health which it is absolutely necessary for us to institute before we can take due cognisance of those present under disease. Laennec directs this study to be conducted under four views or heads:— 1. The extent over which the actions of the heart can be heard. 2. The shock or impulse communicated. 3. The nature or intensity of the sound. 4. The order or rhythm. In our examination we must take care that the animal be in a state of perfect quietude, and entirely free from any suspicion or alarm concerning our presence or doings with him.

The extent to which the sound of the heart's action is audible will vary, even in health, according to the make and *embonpoint* of the subject under examination. In lean and narrow-chested horses it may be heard upon the right as well as upon the left side, and upon the latter over a large superficies: on the other hand, in such as are circular-chested and fat, the sound will be confined to the left side, and to the spot directly opposite the heart. Exercise or agitation of any kind will augment the sphere of sound; and during those violent beats of the heart called *palpitation,* their influence will extend even beyond the chest, to other parts of the body. "By *hypertrophy,* the impulse is increased, but the sounds diminished."—"By *dilatation,* the impulse is diminished, often to the extent of being imperceptible." "By hypertrophy with dilatation, the contractions of the ventricles give a strong impulse"— "abrupt, dead, violent blows, which strongly repel the hand."[1]

[1] For most valuable information on these points consult Laennec and Hope.

The diseases of the heart and its appendages naturally range themselves into three classes: those affecting the pericardium; those affecting the substance of the heart; and those affecting the lining membrane, and valves of the heart and great blood-vessels.

PERICARDITIS.

The pericardium is by no means infrequently the seat of inflammation. In opening horses that die of pleuritic disease, nothing is more common than to find effusions of fluid and lymph within the pericardiac cavity, as though the one membrane had morbidly sympathised with the other. "Redness alone," Dr. Hope says, "does not afford conclusive evidence of pericarditis, as all serous as well as mucous membranes are liable to vascular injection from various causes independent of inflammation." The effused lymph is mostly disposed in layers upon the internal surface of the sac, and upon the exterior of the heart, giving additional substance to the one, and often a complete coating to the other, and, in some instances, forming adhesions between the two. In this manner, the pericardium may be increased in thickness to an enormous extent. The lymph assumes the same albuminous character as it does in the chest, and, on being cut into, while recent, displays a honey-comb sort of texture, having its interstices loaded with a yellow serous fluid: in fact, putting on the same appearance, only that it is more concrete, as it does within the chest, and undergoing—should it remain—the same changes towards organisation. In process of time, and when it exists as an additional lining to the pericardium, it grows close and firm, and becomes attenuated in substance, and turns of a white colour. In one instance I found it converted into a substance of the nature of cartilage, about an eighth of an inch in thickness. A French V.S. (Delalande) describes a strange appearance of the pericardium in a cow who died of the disease. It had acquired "extraordinary size," and

was attached around "by *carno-ligamentous*" substances. One part of its exterior was "of a lardaceous fatty character;" another, "glandular;" and another, "carcinomatous." It contained three gallons of "brown serous fluid, resembling, in fetor and colour, human excrement dissolved," &c.![1]

Pericarditis may assume either the *acute* or *chronic* type. It may exist as an idiopathic affection; but in most cases it will be found to be secondary—consecutive on pleuritic inflammation. That it may, at least in a chronic form, commence by itself, and run its course alone, is in some measure proved by the cases of hydrops pericardii which every now and then present themselves unaccompanied by disease of other parts.

The SYMPTOMS of pericarditis, as an idiopathic or isolated disease, I am afraid we must, with D'Arboval, admit "have not yet been determined on." And he adds, "It cannot be distinguished from *carditis*, which is uniformly fatal." Even in man, with all the advantages surgeons possess in being orally informed of the pains and feelings of their patients, the diagnosis of pericarditis has always been considered extremely difficult and doubtful. "Dry cough; hurried respiration; palpitation of the heart, the impulse of which is sometimes violent, bounding, and regular, though its beats may, at the same time, be unequal in strength; at other times it is feeble, fluttering, and irregular; pulse always frequent, and generally, at the onset, full, hard, jerking, and often with a thrill." Such are the symptoms, applicable to the cases of horses, which Dr. Hope gives as characteristic in man; and such, probably, it will be wise in us to set before us in practice until, from actual observation on our own part, we shall be in a situation either to reject, alter, or confirm them.

Mr. PRITCHARD, V.S., Wolverhampton, with laudable zeal for the promotion of our art, so long ago as the year 1833, furnished THE VETERINARIAN with some practical communications on this subject, which we shall find it ad-

[1] 'Veterinarian,' vol. xiv, p. 436.

vantageous to revive on the present occasion. His observations relate particularly to

HYDROPS PERICARDII.

This implies the stage of pericarditis when effusion is taking or has taken place, and the membranous sac is supposed to contain watery fluid, and probably lymph as well.

The SYMPTOMS of this affection, apart from pleurisy and pneumonia, Mr. Pritchard informs us, are "well marked." They are, "palpitation of the heart. The carotid arteries beat forcibly, and are readily recognised in applying the finger to their course in the neck. There is a good flow of blood through the jugulars; a copious return of blood through the neck, when the state of the pulse is considered; the surface of the body and extremities are warm; and these latter symptoms continue until within one or two hours of the horse's death."—"In addition to the above symptoms, there is such an expression of alarm and anxiety in the countenance of the animal as no other malady produces."—"The respiration is but little disturbed."

The FLUID COLLECTED in most cases resembles the serum of the blood. Sometimes it is red, from being tinged with exuded blood; at others it is turbid from lymph floating in it; not unfrequently it is sero-purulent in character, and looks like so much whey. Now and then we find pus in flakes mingled with it. In quantity it varies considerably, from a pint to a gallon or more. The horse generally sinks from other disease, or from constitutional irritation, before the cavity be filled. I recollect, however, a case of a cart-horse, which occurred while I was a pupil at the Veterinary College, whose death, without any previous sign of illness, took place quite suddenly and unexpectedly, in whom the pericardiac sac was found distended to that degree of plenitude with fluid, that the heart had absolutely become inundated and choked in its action.

The PATHOLOGY of this dropsy, so far as our present investigations have gone, would appear to admit of various

explication. Either inflammation or increased vascular action might be assigned as its cause, and this frequently co-exists with disease in the pleura; or, it may be consentaneous with that dropsical diathesis of body, under the constitutional influence of which all the serous membranes—those of the chest and abdomen, and head too perhaps—are pouring forth augmented secretion. Rarely, I believe, will this dropsy prove dependent upon disease or disorder of the pericardium alone.

RUPTURE OF THE PERICARDIUM.

Mr. G. M. Marshall, of York, relates a case of this description. He was summoned very early in the morning, in August, 1838, to a case of tetanus. Being acute and highly dangerous, he continued in attendance until the evening, when, on entering the stable, he all at once heard "a thumping sort of noise," which, he found, was occasioned by a strong spasmodic action of his (the patient's) heart." In a few minutes after, the horse died. The heart was found "much enlarged, and the *pericardium ruptured.* There was no blood in the heart."[1]

CARDITIS.

Inflammation of the muscular substance of the heart may be either general or partial: at least, this is the division made of it by Laennec, who nevertheless adds,—"There perhaps does not exist on record a satisfactory case of general inflammation of the heart, either acute or chronic:" —"unless, indeed, we choose to consider the word *inflammation* as synonymous with (discoloration or) *alteration* or *disease.*"—"pus must be considered as the most unequivocal indication of inflammation."

Veterinary records do not appear to furnish any such cases as would, according to the above definition, be regarded as carditis.

[1] The case will be found in 'The Veterinarian,' vol. xiii, pp. 140-1.

It appears to me that cows are more the subjects of heart disease than horses. Mr. CARTWRIGHT describes a case in the XIIIth vol. of 'THE VETERINARIAN,' in which "the heart beat most violently, and there could be heard 'a sort of rustling noise about it.'" And in cows, as well as horses, it seems sometimes to be the result of metastasis, and to possess the character of rheumatic inflammation.

Several continental veterinarians have treated the subject in their works, with the usual routine of symptoms, causes, and treatment; but the perusal of their accounts turns out to show—what would appear to be the case in human as well as horse medicine—that the "symptoms and diagnosis of *true* carditis are so little different from those of internal and external carditis that nothing precise can be advanced under this head." This is said by Dr. Copland, and I believe it applies with as much force to horses as to men.

ENDOCARDITIS.

INFLAMMATION OF THE LINING MEMBRANE OF THE HEART, implied by the above heading, if we except pericarditis, with which it is often combined,—owing, it is said, to the almost contact and connection of the external and internal membranes through the muscular interstices of the heart,—appears to be the form assumed by disease in this part of the horse, in preference to carditis, which latter is not only rare in existence, but mysterious in its detection and development. Endocarditis would appear to be, sometimes, an accompaniment, if not an origination, of disease of the valves.

The SYMPTOMS of the presence of endocarditis, so far as we have been able from our own practice, and that of others, to collect them, appear to be—violent palpitation of the heart, by which we mean, quick- and violent beating, amounting to what might be called *thumping* of the heart against the ribs, shaking the entire framework of the body, and rendering the heart's pulsation visible even at some yards' distance from the animal; while the pulse at the jaw, temple, &c., indicates no such commotion. Sometimes this

agitation of the heart is at first no more than occasional, though it afterwards becomes perpetual. Consonant with this, when the valves are affected, will be observed regurgitation of blood into the larger veins, as seen in the jugulars at their entrance into the thorax, causing them to pulsate, or leap, as it were, from their places, and even to become contorted. The respiration is not affected at times, but only in paroxysms—not constantly, or not at first. Febrile symptoms will supervene upon, or prove concomitant with, these; and, as the inflammation in the heart progresses, will grow alarming, the disease being a very dangerous one, and likely to end in death.

I subjoin some cases which will illustrate what has been said about the symptoms.

Mr. Simpson, V.S., Southampton, relates a case in The Veterinarian for 1834, in which this affection appeared extremely well marked after death, with, to say the least of them, strong indications of its presence during life. In the commencement, the case manifested symptoms of abdominal pain; next, the respiration became greatly disturbed; and that was succeeded by a remarkable change in the action of the heart (from simple frequency) to three or four beats in succession, so violent as to shake the whole frame, and render its movements visible even at many yards' distance; with intervals of quietude of five minutes or more; the pulsation of the submaxillary unaffected all the while. Afterwards the violent beating became constant. Before death its force decreased, but never again down to the natural beat. *Autopsy:* Both lungs inflamed. About a pint and a half of serum in the pericardium. External surface of the heart sound; lining membrane highly inflamed, "the left auricle and ventricle being covered with spots of ecchymosis, and the whole surface of the cavities on the right side being discoloured by inflammatory action."

M. Mercier, in The Veterinarian, vol. xv, p. 229, relates a case of endocarditis, in which was found ulceration of the lining membrane of the heart. The case was rendered remarkable after death by the existence of a

fibrinous clot, filling the right cavity of the heart; and during life by the pulsations of the heart being unusually strong, and by being connected with *articular* affections of the fore foot and scapulo-humeral joints, successively producing consecutive lamenesses. M. Bouley, commenting on this case, says that when an irritating fluid is injected into the sac of the pericardium, through a puncture on the left side between the cartilages of the 6th and 7th ribs, articular pains manifest themselves in one or more limbs, while inflammation is developing itself in the serous membrane covering the heart; and often these pains become so great that the animal finds it impossible to perform locomotion.

DISEASE OF THE VALVES OF THE HEART.

Some remarkable instances of this disease stand on record. It would appear that such disease may be combined with endocarditis in one of its (chronic) stages, which perhaps accounts for my having found this disease in connection with rheumatic affections of the joints; at the same time it may exist uncombined, *sui generis*.

I had a troop-mare, who had previously suffered from influenza, seized some weeks afterwards with a renewal of illness obscure in its character; nor was it until one day, watching her over the half-door of her box, meditating on her case, that I observed very extraordinary pulsations, much more than the ordinary regurgitations noticed, in both her jugular veins, near their disappearance in the thorax, causing not merely remarkable saltation of them, but really some contortion of their canals.[1] Entering the box, and applying my hand to the left side, I found the heart pulsating against—actually *thumping*—the ribs in a manner I seemed to have no recollection of before, with, in the intervals, a tumultuous sort of sound, destroying the rhythm of the heart's actions. The respiration was disturbed, *but only at times*, growing in the intervals tranquil and calm again.

[1] If there is any symptom detectible, pathognomonic of this disease, it is probably this.

After death, the heart exhibited signs of endocarditis, and was hypertrophied. The VALVES, however, were the parts principally diseased. They showed, in great perfection, that kind of disease described by authors on human medicine as *condylomatous sarcoma*. The membranous substance of the valves was altogether changed into thickened wart-like growths, presenting cauliflower or fungus-like edges; resembling very much what one now and then sees in warts with ragged edges growing from the (human) penis, or rather from the prepuce. One of the three semilunar valves at the mouth of the aorta presented a bunch of the magnitude of a walnut; the excrescences on the remaining two being of the magnitude of good-sized peas. Upon these two valves the unnatural growths proceeded from the convex or ventricular sides, their concave or aortic surfaces still being, at their attachment, membranous; but of the valve principally diseased, not any vestige of its original membranous tissue remained. The BICUSPID VALVES were in a similar state of disease, but in them the morbid change was in a less advanced stage. They were, however, both of them, more than treble their natural thickness, their under or ventricular surfaces having the tubercular, condylomatous feel; their upper surfaces and their attached parts being to appearance healthy. The TRICUSPID VALVES, around their floating borders, were at least four times their ordinary thickness; and from the ventricular or inferior surface of two of them—from one more than the other—were growing excrescences of the same kind as those before described, of the magnitude of large peas; their superior (auricular) sides presenting, as in the former case, their normal aspects. The semilunar valves of the pulmonary artery bore no marks of disease. The endocardium exhibited the same red streaks and spots, indicative of inflammation, as had been observed upon the reflex pericardium. The entire case will be found in THE VETERINARIAN, vol. XIX, p. 1, *et seq.*

ENLARGEMENT OF THE HEART AND ITS CAVITIES.

Leblanc has published some 'Recherches' on the Diseases of the Heart of the principal Domestic Animals,[1] commencing by what he calls completing the anatomy of the heart, by taking the dimensions of its various parts; and afterwards studying the anatomical characters of its lesions in a great number of animals.

In a mare 15 hands high, from 10 to 12 years old, he found the walls of the left ventricle to be 1·5985 inches, and the thinnest part of those of the right to be ·5985; and that the capacity of the left ventricle amounted to 10 cubic inches, and its interior surface to 26 square inches (English). He found the relations between the heart and the size of the animals too variable to pretend to draw any comparisons between the two. In taking measure of the heart, he has adverted to its being either hot or cold at the time, because the hearts of animals a few hours after death, and of such as are still warm, are more voluminous than such as have been dead twenty-four or forty-eight hours. In horses (two entire and five not) he found the weight of the heart to range between little more than 4lbs. to nearly 9lbs.; the thickness of the right ventricle to range from 0·009 to 0·044 of a metre,[2] that of the left ventricle from 0·035 to 0·052; of the right auricle from 0·008 to 0·015; of the left auricle from 0·07 to 0·018; and that of the septum cordis from 0·032 to 0·042.

Almost all the lesions of the heart found in man are to be met with in horses; and they exist in the ratio of about 1-20th, according to Leblanc's computation,—one made on 150 animals, comprising horses, oxen, and sheep, all whose hearts he had carefully examined within the space of a couple of years: it being understood that all diseases, both cardiac and pericardiac, were taken into the reckoning.

[1] 'Résumé de quelques Recherches, relatives à l'étude des Maladies du Cœur des Animaux Domestiques,' par H. Leblanc. 1840.

[2] A French metre is 39·37100 of an English inch.

. This is a term introduced from the French into medicine, to signify what in numerous instances we in former times expressed by the words *over-growth, enlargement,* &c. It is meant to denote an exuberance of growth from excessive nutrition, causing an augmentation of natural or normal substance and volume. It would appear that almost any organ or tissue in the body may become hypertrophied or anormally augmented in volume and power, and yet preserve its normal functions sufficiently performed not to occasion any alteration in the animal economy; of which the spleen is a remarkable instance. It is only when inconvenience is thereby produced that we look upon hypertrophy in the light of a disease. On the present occasion, hypertrophy is used to denote an augmentation or thickening of the substance of the heart; in order for us to have correct notions of which, we should understand what the weight and dimensions of the heart are in the normal condition of the organ.

The magnitude and weight of the heart in health will vary with the size of the horse: it will usually be greater in a large than in a small horse, and in an entire horse than in a mare. In horses of ordinary size, its weight seems to vary from about 7lbs. to 9lbs.; in a state of hypertrophy it has been known to weigh 13lbs. I am not certain, but think it possible, that bleeding may influence its weight. Eclipse's heart is said to have weighed 14lbs.: it must have been hypertrophied. Something also will depend upon the quantity of exertion the horse may have been accustomed to.

Hypertrophy occurs in one of three forms:

1. SIMPLE HYPERTROPHY, or *hypertrophy without dilatation,* consisting simply in thickening of the walls of the heart, without any alteration in the dimensions of its cavity.

2. HYPERTROPHY WITH DILATATION, the most common form, in which the walls are thickened and the cavity dilated.

3. HYPERTROPHY WITH CONTRACTION, in which the walls are thickened and the cavity diminished.

One or two, or even all four, of the cavities of the heart may be hypertrophied. In the last case, the entire heart has been known to acquire double its natural volume, and upwards; a rare occurrence, though one which, when it does happen, is, according to D'Arboval, invariably referable to emphysema. The ventricles oftener become hypertrophied than the auricles, "because," says Dr. Hope, "they are exposed to a greater variety of exciting causes, and because the auricles are remarkably protected by the auriculo-ventricular valves." Hypertrophy is frequently complicated with chronic inflammation of the external and internal membranous envelopes of the heart.

The SYMPTOMS of hypertrophy in horses are, I am afraid, but too little known to warrant any attempt at separate description of them. The following cases will prove our surest guides in practice. I believe the first ever published in this country emanated from

Mr. PRITCHARD.—He was called to attend a three-parts bred six-year-old mare, employed in a posting establishment in Wolverhampton. "Her pulse was hard, with sufficient dilatation of the submaxillary artery; respiration laborious; membranes of the eye and nostrils vascular; surface of the body and extremities warm; off her feeding.—Mr. Pritchard "listened to the heart; its contractions were powerful, loud, and regular; but the organ was evidently much oppressed." Notwithstanding active and judicious treatment adopted by Mr. P., the mare died, owing to his not being sent for earlier. On examination, in the pericardiac sac was found a small quantity of healthy fluid. "The right side of the heart was considerably enlarged, particularly the right ventricle, and without the softening of the walls. It was a fine specimen of hypertrophy of the right auricle and ventricle." The lungs were apparently too large for their cavities, which contained but little serous fluid. They were very heavy in hand, and, when cut into, were found, throughout, œdematous.

Mr. THOMSON, V.S., Beith, N.B., published, a few months afterwards, the following case:

In March, 1833, Mr. Thomson had a horse belonging to Mr. Orr, Carse of Lochwinnoch, brought to him for examination. He was lame, apparently in the shoulder; he groaned when backed, and showed unwillingness to turn round or even move. Pulse irregular and quickened. Mr. Thomson, from the superficial examination he had, was inclined to regard it as a sort of rheumatism or founder. Venesection, purge—returned home. Mr. T. was summoned next day, and found him in the most pitiable condition,—standing with his fore legs wide extended; nostrils dilated; breathing quick and laborious; eyes sunken, pupils dilated, looking back and sighing; countenance hopeless. "Pulse had a most peculiar irregular motion, and the undulation of the jugular veins was extending up to the roots of the ears. He expired shortly afterwards. *Autopsy.*—Considerable inflammation of lungs, and pleura, and pericardium, the latter greatly distended with red fluid. The heart of enormous size, and greatly inflamed; both auricles and ventricles full of blood; parietes relaxed, and chordæ tendiniæ lacerated. The valves did not approximate to do their duty. Foramen ovale dilated. The whole mass weighed thirty-four pounds. The horse had been some time in Mr. Orr's possession, and had worked (but neither quick nor laboriously) constantly on the farm."

Mr. HARRISON, V.S., Lancaster, in 1836, sent an account of a case to THE VETERINARIAN, which turned out to be hypertrophy of the heart. The subject was "an aged bay coach-horse," whose state altogether was that of extreme dejectedness, with "a very peculiar expression of eye," and a countenance "wild, haggard, and pitiable." Pulse from 70 to 90, soft, and, at times, "in an almost collapsed state." Respiration perfectly tranquil, and no signs of pain betrayed. Partial cold sweats and tremors occasionally. Extreme parts cold. One bloodletting at the very beginning had been borne to the extent of four or five quarts: but, twelve hours afterwards, on attempting a second, the blood—which was so light-coloured that it hardly stained Mr. Harrison's linen—came away tardily, and, by the time

two quarts had flown, signs of syncope appeared. On the seventh day he died. Large vesicles of air were found upon the surface of the lungs, which exhibited throughout "a very light pink colour." The right ventricle of the heart greatly dilated; the correspondent auricle not so much. The left cavities not much altered. In the abdomen a large tumour was discovered, attached to the posterior and inferior surface of the diaphragm, extending eighteen inches laterally, five inches superiorly, and being four inches thick. It proved to be composed of clots of blood.

A brown horse, aged, belonging to Sir Watkin Wynn, was found unwell after hunting, and died the following morning, at 6 o'clock. On dissection, I found nothing to account for his death, save that his heart proved hypertrophied; an affection one would imagine hunters to be, from the exertion they undergo, especially subject to: excitement, either of body or mind, being recognised as one of the chief causes of hypertrophy.

DILATATION.

By dilatation—which is also called *aneurism of the heart*—is signified, increase of capacity of any one of the cavities. When the parietes are attenuated, the dilatation is said to be *simple;* but when, although dilated, they have preserved their natural thickness, it is *dilatation with hypertrophy.* In relation to this affection, Dr. Hope says—"Although I have seen the muscular substance healthy in every form and degree of it, in general it is not so. For, when the dilatation is great, and the parietes are feeble in proportion to the quantity of blood which they have to propel, the muscle is usually more or less softened and flaccid, and in some cases of a deeper red, in others paler or more fawn-coloured than natural. The deep-red dye is attributable to venous engorgement of the muscular substance, resulting from stagnation of blood within the heart. The softening is sometimes so great, that the substance readily breaks up under pressure of the fingers."—"Simple dilatation seldom

affects one ventricle without the other."—"Dilatation of the auricles scarcely ever exists without more or less thickening of their parietes.". We must take care to distinguish between *distension* and dilatation of the cavities. "When merely distended, they are found enlarged, firm, and tense; but these conditions almost entirely disappear when the blood is pressed out through their natural apertures. On the contrary, when truly dilated, they have no appearance of tension, are more or less flaccid, and the enlargement persists after the blood has been evacuated."[1]

Dr. Copland makes the following pertinent observations on the subject. "When the auricles are protected by a natural state of their valves, and of the auriculo-ventricular orifices, the ventricles may be dilated without the former being materially affected; but when the auricular valves are diseased, so as to occasion interruption to the passage of the blood from the auricles, or when the auriculo-ventricular openings are dilated, so as to permit regurgitation from the ventricles, then the auricles become dilated, although rarely without some increase in the thickness of their parietes." Dr. Hope has, with truth, remarked that "change in the capacity of the cavities of the heart may result, not only from obstacles in the circulation, but also *from debility.*"

Leblanc mentions a case of dilatation of all four cavities of the heart of a horse. Vezelesse gives an account of a heart of enormous volume: it measured a foot from base to point, and ten inches from point to summit of the ventricles; its parietes were weakened by attenuation, and several of its fleshy columns lacerated. MM. Riss and Meyer have published a case of dilatation with rupture of the right auricle of the heart of a horse: the cavity was at least double its ordinary amplitude, and its walls attenuated to that degree, that, in the place where the rupture took place, they were not thicker than a sheet of paper.

One of the best accounts of dilatation the veterinary annals of this country afford, is contained in a case communicated to THE VETERINARIAN, in 1834, by Mr. PRITCHARD.

[1] From section i, chapter ii, of Dr. Hope's Treatise.

Mr. Pritchard was requested to examine a six-year-old mare, on account of falling away in flesh. He found her poor and lean on the rib, with belly large, and coat unhealthy; although she had been for several weeks in good pasture, where she, otherwise, appeared tolerably well and lively. Pulse 84, rather hard and irregular. The impulse of the heart indicated a change in its structure, by a loud and sonorous stroke, recognised on the right side of the chest nearly as forcibly as on the left. Its beating was regular; but an unnatural rhythm, a throbbing palpitation, accompanied the stroke. The blood in the jugular veins met with considerable impediment. The regurgitation observed in these vessels at the bottom of the neck, slight in horses in health, was in this mare considerable, and extended up the neck even to the head. The belly and legs were slightly œdematous. At length, diarrhœa attacked her, and carried her off. The pericardium was thinner and more capacious than ordinary. The heart appeared unusually large and flabby; lymph was effused into the cellular substance around its base; the right auricle was very much enlarged, being three times the size of the left, and its walls thin; the right ventricle was dilated, but not at all in proportion with the auricle; the left auricle was not dilated, but the left ventricle was much enlarged, and its walls, especially at the extreme of the apex, so thin that Mr. Pritchard felt a little astonished that it could have contracted without rupture, for it was not more than one eighth of an inch in thickness. The heart weighed ten pounds, and measured in circumference, at the base, two feet seven inches. The lungs were perfectly healthy. Mucous lining of the bowels tumid from serous engorgement. Absorbents of the large intestines loaded with red-yellow lymph; but near to the receptaculum chyli, with blood. The thoracic duct contained principally blood, but was not much dilated. The liver was in a state of sanguineous engorgement, weighing nearly thirty pounds. There was extravasation of blood into the parenchyma.

A most extraordinary case of dilatation or aneurism of

the left ventricle of the heart, is related in vol. XIV of THE VETERINARIAN, by Mr. HARRISON, V.S., Southport. The subject was a cart-mare, nine years old, who, from her youth, had been in the habit of drawing heavy loads, on which occasions her spirit seemed to exceed her strength, though she had always maintained her health, notwithstanding that, for some months before her death, she had not thriven as heretofore. Though apparently quite well, for the first time in her life, after a hard day's ploughing, she refused her food, and appeared very weak, for which she was bled, which made her still weaker. When Mr. Harrison first saw her she was scarcely able to stand, and, while he was in the act of feeling her pulse, she staggered and fell. The pulse, after she was down, was very small and weak, and it was not, with any accuracy, to be counted. She became comatose, with her respiration nearly suppressed, as though she were dead. When she came to, the breathing was shorter and quicker than natural. Mr. Harrison had her destroyed. The stomach was found in a state of *collapse;* but her disease was in the heart. "The left ventricle proved in such a state of dilatation that it almost filled the left cavity of the chest, usually occupied by the lung, but which latter had gradually become absorbed, to accommodate itself to the increased size of the ventricle, and this (absorption) had proceeded so far, that the lung did not exceed the size of the breadth of one's hand, and this remnant was situated at the most posterior and superior part of the chest. The brain was perfectly healthy."

OSSIFICATION OF THE HEART.

Mr. HENDERSON, V.S., London, has in his museum a remarkably fine specimen of this disease. The parietes of the right auricle are converted into osseous substance, rendering that cavity but a passive receptacle for the blood: the current must have continued without any, or with hardly any, fresh impulse into the ventricle. All that Mr. Henderson knows about the case is, that the horse from which the

heart was taken dropped down dead, in emaciated condition, in a dust-cart.

A case of ossification of the right auricle is reported in the *Récueil de Méd. Vét.* for Sept. 1840. It occurred to M. Barthelemy. The horse, small in stature and weak in appearance, worked in a public carriage, but only for five months, before he was found incapable, though only five years old. He had no cough, though it was found that his respiration and pulse were much quicker than in health, and that the slightest exercise proved sufficient to put him out of breath; though even then, the motions of his flanks were but increased in number without being rendered irregular. At length he was sent into infirmary, and died there on the sixth day, with symptoms of pneumonia in both sides. There were found abscesses and vomicæ in the lungs, with hepatization and grey tubercle, quite sufficient to account for death. But the heart also was diseased. It was so voluminous as nearly to fill the entire cavity of the pericardium; and its left auricle was ossified, and strongly adherent to the pericardium by white fibrous bands. It was double its natural size, and its ossified walls proved more than one third of an inch in thickness. The auricular septum was sound, and the auriculo-ventricular valves had not a spot of ossification. The ventricles were not sensibly enlarged.

AIR IN THE HEART.

Dr. Hope[1] received from Dr. Forbes, of Chichester, the following communication:—"I yesterday examined a boy who had died suddenly, after being affected for years with all the symptoms of extreme dilatation of the heart. I found the organ very large, from dilatation of both ventricles, and *both were distended with air*—in all, eight or ten ounces. There was no particular putridity, the boy having been dead only thirty-six hours." The Doctor informs us that a similar case is recorded in Simmons' 'London Medical

[1] Chapter iv of Dr. Hope's Treatise.

Journal' for 1785; and adds—"As air in the ventricles is incompatible with the maintenance of life, it must, in these cases, have been generated, or conveyed there, after death."

In 1837, without being aware that any similar observation had been made either on man or animals, I sent the subjoined account to THE VETERINARIAN:

A horse, three years old, was taken unwell after the ordinary mode in which a febrile catarrhal attack commences. He was off his feed; dull and dejected; and his pulse was increased to about 55. He took three drachms of aloes, and lived upon a bran diet, and was ordered to be kept quiet in his stable. The day following he was removed from his stable into a box; but nothing further was done, the medicine appearing to be about acting on the bowels. The morning of the third day he purged: water-gruel was now substituted for water for his drink. He ate his hay, and appeared to be doing well. His pulse continued between 55 and 60; but was grown so feeble at the jaw that more than ordinary attention was required to perceive the beats of the artery. I saw him alive for the last time at one o'clock, on this (the third) day. At five o'clock, p.m., he had drunk a pailful of gruel, and still appeared going on well. At half-past six, p.m., he was found dead in his box; having, from the position of the carcass, evidently fallen quite suddenly, and, as it would seem, died without a struggle.

Being fully prepared to meet with some post-mortem appearance out of the ordinary way, more than usual pains were taken in opening the body. The sternum was carefully removed by sawing through the cartilages of the ribs, without cutting into or disarranging the pericardiac membrane. No sooner was the pericardiac case opened, than out protruded the heart with a very unusual sort of jerk, it appearing as though the bag containing it were too small for it, and it were pressing for liberation. Denuded of its bracing membrane, the heart plumped up—the right ventricle in particular, which now lay uppermost—appearing enormously distended, the tumefaction conveying to the pressure of the fingers the sense of fluctuation. I myself,

as well as my friend, the late Dr. Campbell, who was present at the examination, opined, either that fluid blood or air must be within. I cut into the ventricle transversely, near its apex, with a scalpel, and, to my surprise, a quantity of air burst forth, the parietes of the cavity instantly after collapsing precisely in the manner a distended stomach or intestine would have done; and what adds to this similitude is, that the escaped gas had a fetid odour. This was followed by a copious efflux of fluid, grumous, ill-conditioned blood, which, as it flowed, bubbled and frothed as though air had been mixed up with it. The parietes of the right ventricle were unusually thin from the dilatation they had undergone; while those of the left ventricle were in altogether an opposite state—extraordinary contraction and density, almost to the obliteration of its cavity. The auricles both contained blood; but there was this difference—that, in the left, the coagulum was unusually small and firm, while the blood in the right was very loosely and imperfectly coagulated. The coagula in the pulmonary veins were perfect, but soft and black, and easily lacerated. The right lung was dark-coloured, and in places exhibited incipient hepatization: the left lung was in a perfectly sound condition.

RUPTURE OF THE HEART.

This sad and fatal lesion arises in one of two ways:—it may either be the result of mechanical force, or it may be the product of ulceration.

ANY VIOLENT ACTION OR EXCESSIVE EXERTION may prove the occasion of rupture in a heart perfectly sound and healthy. I recollect, some years ago, during one of the racing meetings that used to be held annually at Woolwich, one of the horses, who had vehemently contested, and lost only by half-a-neck, a heat, suddenly falling and dying just after he had passed the winning-post; whose body I afterwards examined, and therein found the heart, burst: I think it was the right auricle that had given way—the animal had literally died of "a broken heart."

In my regimental predecessor's time, one of the troop-horses, intended to mount king's guard, from the same cause, "dropped down dead" on the parade.

Of RUPTURE FROM ULCERATION there is a case related by M. Gaullet, in the *Recueil de Médecine Vétérinaire*, which appears to afford an example:

A horse, seven years old, had experienced within a short lapse of time three or four fits resembling those of epilepsy, the prominent symptoms of which were:—stiffness of the fore limbs, with spasm and tremor of the muscles of the shoulder and arm; the eyes much turned inwards, the opaque cornea alone being visible; the animal moved with so much difficulty, that, if compelled to stir, he fell and lay for half an hour in a state of rigidity, grinding his jaws; then arose again, and fed as though nothing had happened. For a month before he died, this horse was treated for pulmonic disease; in the course of which, they took him out for a little walking exercise. In his walk he met with rather a sharp ascent, which, for want of breath, he could not climb. Some days afterwards the same attempt was renewed, but with no better success. An hour after his return to his stable from this last journey, the horse was seized with his former symptoms, fell backwards, and remained down for half an hour, with his neck in a state of tetanic rigidity. Fifteen days after one of these fits, he died. The abdominal viscera, the pleuræ, and the lungs, were sound. About the middle of the right ventricle of the heart was discovered a small fistulous aperture, with smooth borders, and from one to two lines in diameter, through which issued a pale sanguineous fluid. Within the ventricle, communicating with the aperture, was a longitudinal rent, an inch and a half in extent, but diminishing in breadth towards the opening outside, which was surrounded by whitish and slight tumidity, half an inch in circumference.

Along with the above, M. Gaullet communicated an analogous case to the Central Society of Agriculture. The horse experienced great difficulty in moving, with especial inconvenience on the left side, and no one could divine the

cause. Twenty-five days after the attack he died. The right ventricle presented an old rupture, which showed for some breadth the commencement of cicatrisation.

POLYPUS OF THE HEART.

A case of this is related by Mr. KAY, V.S., Pontefract, Yorkshire, in the sixteenth volume of THE VETERINARIAN, p. 555, occurring in "quey" (or steer) calf, 13 months old, which gave no pathognomomic symptoms of its disease until the fourth day, when Mr. Kay, "after a careful diagnosis of the case, arrived at the conclusion, from the irregularity of the circulatory system, that something abnormal must exist in the fountain head of circulation. Next day, the pulse grew very feeble and irregular; great prostration of strength, with partial paralysis of the hind extremities, &c. The case went on a week longer, and then the calf died. When opened, "cutting into the substance of the heart, Mr. Kay discovered a *polypus* adhering to the interior of the muscular parietes of the right auricle;" and there was a similar substance in the right ventricle, "adhering to the muscular substance of that cavity, which, when removed, weighed from five to six ounces." "On conversation with the owner, Mr. Kay was informed, that he had lost, previously, two calves about the same age, and both out of the same cow, exhibiting the same symptoms previous to death."

TUMOUR OF THE HEART.

Mr. SHENTON, V.S., Bakewell, Derbyshire, has in the twenty-fifth volume of THE VETERINARIAN, related cases, both in the cow and horse, of the above. In an old cow he was called to, whose case from the first was "hopeless," and who shortly died, he found, though the lungs were "in a perfectly normal condition," when he came to open the heart, "growing from the septum ventriculorum," a large tumour, the size of a common breakfast-cup. Attached also to the tricuspid valves and chordæ tendineæ were numerous other

growths of a similar nature, varying in size from a common large pin's head to a horse-bean. They were all distinctly fibrous in their nature, and could be torn into shreds the same as a piece of macerated tendon. In the centre of the large growth the process of suppuration had commenced. The other cavities of the heart contained no trace of any abnormal products.—(VETERINARIAN, vol. XXV, p. 1.)

In the same volume, Mr. SHENTON relates a similar case occurring to a horse. He was sent for to a black filley on account of lameness; a month afterwards, he was recalled to her, and then found her at grass in emaciated condition. He considered (she being still lame) the case to be one of rheumatism. Ten days after he had been called in a second time, being about to leave his patient, "somewhat puzzled as to her case, when, on observing her walk towards the door, I was struck at seeing the blood at each pulsation *regurgitate in the jugular veins*, as high as their bifurcations. It directly occurred to me that there must be some obstruction offered to the free course of venous blood through the right side of the heart; and the more I thought about this, and examined my patient for it, the more firmly I was convinced that such was the case. I then left her, hopeless." A fortnight afterwards Mr. Shenton was informed that she had been "found dead in her box." "I went the following day and examined her. With the exception of two or three enlarged mesenteric glands, nothing was found until we came to the *heart*, which presented nearly the same appearance as in the former case, only that the *tumour* was attached to the *yielding*, and not to the solid wall of the ventricle."

ANEURISM OF THE AORTA.

Although aneurism is by no means an uncommon disease in our own bodies, in horses it is comparatively rare; so rare, that it scarcely has become an object of veterinary practice. Nevertheless, as extraordinary occurrences, accounts of cases must be at all times interesting to the Veterinarian, and as such I give those that have come under

my own observation, together with some others, of which there are several to be found scattered through the pages of THE VETERINARIAN.

The first I shall notice is a dried preparation belonging to my father's museum, at Woolwich, a very fine specimen of aneurism of the thoracic aorta. In shape, and indeed in magnitude, it may well be compared to a gourd of ordinary growth. Through the bottom of the aneurismal sac are two large circular apertures, where, evidently, it had burst into the cavity of the chest. In several places the sac is much attenuated, and appears—as far as one can judge in its dried state—to have been in an ulcerated condition at the time of death. Whether the sac is formed of the dilated or augmented coats of the vessel, or is composed of adventitious coatings, it seems impossible, correctly, to determine: its appearance most favours the latter supposition. No other history attaches to the preparation than that "it was brought from the slaughter-house."

Mr. Field has in his museum in London a preparation of the same kind as the one described above, and in most respects very similar to it.

Mr. Bowles, V.S., Blanavon, in 1841, sent Mr. Morton, of the Royal Veterinary College, a specimen of ossified aneurism of the posterior aorta, a little anterior to the first lumbar vertebra, taken from a mare that died of ruptured spleen.

Herr Böhling (or Röhling), from four cases he relates of aneurism, comes to the following conclusions:—Aneurism of the large arteries, in any of the cavities, particularly the aorta or mesenteric, may be ascertained by certain signs, through which a sure diagnosis may be established. The surest of these signs is the *pulsation of the parts.* Besides this pulsation, there is another symptom equally of importance, which is the *slow pulse;* or, as sometimes happens, an intermittent pulse. All we can add to this is, that, in our opinion, it little augments our knowledge of the mysterious existence of aneurism of the aorta or mesenteric arteries.

The following cases occur in the foreign journals:

In the 'Journal Pratique' for September, 1826, are two reports of aneurism by M. Chenard. A mare was led to him having fistula. She could hardly, he observed at the time, drag her hind legs after her. She had no sooner got into the stable, than she fell on her haunches, and never rose again. She was bled and purged, but died on the sixth day. Internal tunic of the aorta highly inflamed; and immediately behind the emulgent artery was a true aneurism as large as a hen's egg. Just below was an aperture in the vessel which protruded in the form of a pedicle, and communicated with another tumour, of the size of a child's head, full of fibrous matter, laminated. A similar clot filled the artery posterior to dilatation. The membranes occupying the spinal marrow in the lumbar region were also highly injected, and the marrow itself was softened and surrounded by a serous fluid.

Another mare, usually full of animation and energy, suddenly, and without assignable cause, became spiritless and incapable of work. This continued for some months, when attention was directed to her loins. She turned with difficulty; shrank from pressure on the loins; was costive; and voided her dung and urine with straining and pain. She was treated for nephritis, and got better; but after a very little work every symptom relapsed. Two months afterwards her hind legs commenced swelling, and this went on to produce ulcerations, all which subsided again. One day she was seized with cramp in the near hind leg for a quarter of an hour. In two months again she got so well as to be considered fit for work. She performed one journey; but had hardly commenced a second when she on a sudden lost the use of her limbs, then fell upon her off side, uttering dreadful cries. She continued for two days paralytic in her hind parts, then died. The posterior aorta at the root of the emulgent artery was dilated to double its ordinary caliber, and a tumour, osseous above and cartilaginous below, communicated with the aorta by an aperture the size of a nut, having attenuated edges. The aneurism ended abruptly near the origin of the crural artery. The

internal coat was ulcerated where the ossific process had taken place, and a clot completely blocked the dilatation, and the posterior divisions of the aorta as well, and extended even to the origin of the renal arteries. The membranes of the spinal marrow were also highly inflamed above the lumbar region; and the marrow itself was softer than natural, and covered with bloody spots.

The subjoined case occurred in 1826 at the College at Alfort:

A mare was brought in very lame from a sinus in the foot, perforating the long flexor tendon, which was treated for three weeks; when one day, while the foot was being dressed, the mare suddenly reeled about, threw up her head, and fell down. No sooner was she down than her nostrils and chest and belly and flanks were all in convulsive action for breath; her limbs became stretched, and her eyes rolled in their orbits. The jugular was opened instanter; but drops of blood only issued. In this very act, death closed the scene. The pericardium was found prodigiously distended with coagulated blood, looking at first like hypertrophy of the heart. This coagulum weighed five pounds. The trunk of the aorta was extensively ruptured at its base, and the lesion was evidently the result of attenuation of its coats.

ANEURISM OF THE ILIAC ARTERY.

The late Mr. KING, V.S., Stanmore, showed me a dried preparation—a specimen of an aneurismal tumour, communicating, as it seemed to him (for there was much confusion of parts), with the external iliac artery; if not with that, with the gluteal. The aneurismal sac was composed principally of the parts immediately adjacent. In several places it had become ossific: indeed, so large and evidently spreading were some of the patches of osseous matter, that, had the animal survived any great while longer, there is little doubt, ultimately, the whole sac would have become converted into bone. The history of the case was—A horse, not worth

much, was casually brought into Mr. King's yard with a tumour equal in volume to a large pumpkin, and of an irregularly ovoid shape, upon the postero-superior part of the quarter. Finding it fluctuated, Mr King, by way of experiment, punctured the swelling with a lancet. A gush of blood followed the puncture. Compresses of tow, cloths, bandages, &c., were immediately applied. In the end, however, the animal became reduced, and died.

ANEURISM OF THE RENAL ARTERY.

Aneurism of the left renal artery, as large as the aorta, was found by M. Chouard in a horse, who was destroyed on account of a carcinomatous affection of the left kidney For an account of the case see "Nephritis," Hurtrel d'Arboval's Dictionai

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