G. H. Dadd V.S.

THE AMERICAN

CATTLE DOCTOR:

A COMPLETE WORK ON ALL THE DISEASES OF

CATTLE, SHEEP, AND SWINE,

INCLUDING

EVERY DISEASE PECULIAR TO AMERICA,

AND EMBRACING

ALL THE LATEST INFORMATION ON THE CATTLE PLAGUE AND TRICHINA.

CONTAINING ALSO

A GUIDE TO SYMPTOMS,
A TABLE OF WEIGHTS AND MEASURES, AND
A LIST OF VALUABLE MEDICINES.

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PREFACE.

AMERICANS rank high in the estimation of the scientific world for their genius and industry in the great work of intellectual, moral, and scientific improvements. See what has occurred in the arts of printing, electrotyping, etc. The eloquence of the great literary magicians of the New World, the honored graduates of free institutions and free schools, no sooner falls from their lips than the phonographist transfers it to paper, the nimble fingers of the compositor puts it into "form;" next the "battery" deposits on the face of the type a more durable coating of copper, and "Hoe's press" sends off "impressions" with almost magical rapidity. No less surprising are the wonderful feats performed by American mechanics, in the construction of fast yachts and steamers, which often pluck a laurel from the so-called "Mistress of the Sea;" and old "Uncle John" gives us due credit for perfecting a race of fast trotters that can beat the world of horse-flesh.

Improvements in every department of Science and Art are constantly treading on the heels of improvement; yet, as regards the science of Veterinary Medicine and Surgery, America seems almost the last among civilized nations to put her shoulder to the wheel. What can be the reason? Her youth may be offered as a plea for excuses. The daughter of the Old World has not yet, in this department, arrived at years of discretion; she is yet in her teens. Her sons have borne the heat and burden of the day in establishing their liberty, in founding cities, extending commerce, and in taming the wild face of soil, by uprooting the giant oak, and in clearing away the forest, so that the husbandman, with plow and harrow in hand, might follow on, and next impregnate mother earth with germs for fructification, which, in the day of the harvest thereof, might be gathered and garnered for the benefit of man and the inferior orders of creation.

And long ere the woodman's ax ceases to vibrate its clear stroke-notes in the ears of the new settlers, a giant enterprise is in contemplation. Space and distance must be comparatively annihilated; the iron horse, with his lungs of steel and breath of steam, must have his highway and byway, and the result is, the choice spirits of progression have been earnestly engaged in dotting a vast surface of United States Territory with a magnificent net-work of railway and telegraphic wire; and various other enterprises, with which the reader is familiar, have so occupied the American mind, that the Science of Life, as it applies to animals, has been almost at a stand-still.

In the prosecution of these objects, so essential as they have proved in the economy of an infant republic, it is not surprising that our science should fail to receive attention, and that America should be in the rear of the veterinary squadrons of the Old World; yet, notwithstanding this seeming indifference, veterinary science does, in some parts of this country, occupy as high a platform as that which obtained in England, about seventy years ago, when the Apostle of Mercy, St. Bel, first landed on British soil.

The science which we here advocate is as valuable and charitable to nature's menials, for the purpose of ministering to their physical wants, relieving their aches and pains, and of prolonging their lives, as that practiced on the more noble of created life; and, at the present day, testimony can be produced going to show that among us can be found "good Samaritans" who are always ready to minister to the wants of the inferior orders of creation—a work as acceptable to the God of Nature, and as creditable to manhood, as when the welfare of one of us is concerned. And should we estimate the science in exact ratio to the value and usefulness of the legion host of domestic animals that have been reared in this country, and those which, without regard to cost, have been imported, to whose welfare it directly contributes, the reader will readily perceive that it is entitled to the consideration and support of a nation of husbandmen.

It must be borne in mind that a knowledge of the principles of veterinary medicine can not be acquired without diligent study and close application. It is only the property of the industrious and devoted student.

In order to acquire the necessary tact, skill, and experience for the practice of our art, some of the shining lights—the early disciples—have spent the May-day of their existence in solving its problems, and, when near its close, have declared, with a modesty indicative of true genius, that their education was yet incomplete.

Such testimony goes to show that there is no republican nor royal road to veterinary knowledge. In fact, after a man has perseveringly pursued the routine studies of the most popular collegiate institutions, he may still be found "wanting."

Let us contemplate for a moment the superior advantages which human practitioners have over our craftsmen, both as regards their scientific qualifications and the superior means at their command for ascertaining the character, location, and intensity of the various maladies peculiar to the human race. For example, the practitioner of human medicine, if he has been a faithful and industrious student, enters upon the active duties of his profession, having acquired a valuable fund of knowledge of anatomy, physiology, pathology, and other necessary branches of study; and, having disciplined his mind in the regular school, and in that of experience, he is expected to be able to rejoice in the possession of a well-trained mind, which enables him to understand and interpret the physiological laws which preserve health and life in the constitution of organized beings; also to comprehend the why and wherefore of disease; to be able to institute sanitary and other regulations, and to select suitable medicinal preparations, in view of meeting the various indications of each and every form of disease. And when a man becomes the subject of sickness, and the doctor is called upon to exercise his skill, the latter receives valuable aid, in view of making a correct diagnosis, from the patient and his friends. Each can be questioned, and their responses throw considerable light on the history and nature of the malady. Now, as regards the latter advantages, they have no parallel with the men of our craft. Our patients are deprived of the power of speech, and we can only judge of the state of their health, and the nature of their maladies, by signs revealed or elicited through physical exploration. We have other difficulties to encounter of no less magnitude. For example, our patients are often located in situations unfit for a *well* animal to reside in, and they do not always receive that attention from their owners which the urgency of the case demands. In fact, the good nursing, kind attention, etc., which often proves of so much value in the restoration from sickness of one of our race, is often denied the inferior creature; and other matters, too numerous to mention at the present time, tend to show the advantages which our brethren of a sister science have over us, and how necessary and important it is that a practitioner of our art should be thorough master of his profession. It is a lamentable fact that the great majority of our husbandmen have not hitherto realized that the superstructure of veterinary science rests on the same intelligent basis as that of human medicine; but such is really the case. In the language of the lamented PERCIVALL, we are assured that "whether we prescribe for a man, horse, or any animal, the laws of the animal economy are the same; all require the same treatment," that is to say, the propositions for restoration are all founded on the same intelligent basis.

The importance, therefore, of educating men for the profession, and of furnishing reliable works for study, is very evident; and the necessity is further illustrated in the daily experience of those persons who, as a matter of necessity, are obliged to do the best they can for the sick and dying of their flocks and herds, having no knowledge of those advantages which a thorough course of training affords. Such persons must, necessarily, feel that they are groping in darkness, and when a ray of light does flit across their medical path, it only serves to make them better acquainted with their own want of skill. Persons thus circumstanced, unable to procure the services of a good veterinary surgeon, in consequence of a scarcity of the "genuine material," are often compelled to assume the responsibility and risk of medical attendant; and, no doubt, they prescribe with good intention and honesty of purpose, but disease and death has the vantage of them, for they know not the modes of pathological warfare, nor are they acquainted with means best calculated to insure a favorable issue; and they will certainly hail, as a great blessing, any and every effort to improve our veterinary literature, and thus diffuse knowledge so sadly needed.

It is well known that prior to the introduction of a rational system of veterinary medicine in the mother country, millions of domestic animals were annually sacrificed at the shrine of ignorance; but science came to the rescue, and now some of the disciples of St. Bel, Coleman, their co-workers and kindred spirits, can, by the aid of their vast materia medica, their anæsthetic agents, scalpel, etc., accomplish unheard of wonders. We are now working to dispel the awful cloud of ignorance and superstition which has too long lingered around the stable and barn. We aim to illuminate the dark spots that have existed for many hundreds of years, and to obliterate the false theories that have been handed down to us by the Egyptians and Arabians, and the modern jugglers of this science.

There never was a period in the history of the United States when the services of educated veterinarians were so much needed as at the present time; for the live stock of this country do not enjoy immunity from those pestiferous epizoötic maladies which have formerly operated as a withering simoom on the enterprise of British husbandmen in the breeding and raising of live stock. For example: the people of the Western States complain that a disease occasionally makes its appearance among cattle, to which they have applied the name of "trembles," or "milk sickness," and it has so scourged both the superior and inferior orders of creation, that the former have often abandoned the old homestead, in view of seeking a location where there seemed to be some prospect of enjoying immunity from the pestilential scourge. A contagious and infectious disease often prevails among swine, carrying them off by hundreds and by thousands, yet many of us are in the dark regarding its cause, nature, and treatment. Typhoid affections, puerperal fever, apoplexy, and dropsy of the brain are just as prevalent here as in England. Miscarriage or abortion is fearfully on the increase. Diseases of climatic origin are more rife in this country than in England. This is, perhaps, owing to the diversity which exists in the climatic temperature of our vast territory, and to our various faulty modes of management. In fact, there is scarcely any disease known to veterinarians of the Old World but that has prevailed in the New.

We must have reliable text-books and educated surgeons, in order to understand the nature and treatment of the diseases incidental to domestic animals. It is not only a matter of national, but of individual, policy and interest; and should we view the matter with the eyes of business men, we shall see that such enterprise must surely pay.

Persons who have paid any attention to the rise and progress of veterinary science in this country, are painfully aware of its great imperfections, and the author's object in preparing this work is to endeavor to lessen and remove them, by giving the reader the benefit of an experience which extends through a period of twenty-five years.

In view of furnishing reliable information, and of showing how little of medicine is required for the treatment of various forms of disease, a number of cases, recorded in the author's note-book, are introduced in various parts of the work. These cases may, perhaps, also give the unprejudiced reader juster views of the relations of nature and art to diseases; for it is a notorious fact that very many well-instructed persons of all classes have hitherto exercised a blind faith in the medical art for the cure of disease, when it is a fact well known to those who practice rational medicine that Nature possesses vastly greater powers than Art in curing diseases. What is here meant by nature, is the conservative power inherent in the living body. For a better understanding of this subject, the reader is referred to the works of Sir JOHN FORBES, OLIVER W. HOLMES, and Professor BIGELOW.

In view of aiding nature in the cure of disease, the author has introduced to the reader's attention a new class of remedies, viz.: Fluid Extracts of a sanative character. They have proved more safe and efficacious in the practice of rational medicine than all the other heroic arms of physic.

These remedies have been carefully tested for several years by the author, and those students who have, from time to time, placed themselves under his instruction, and the result has been very satisfactory; otherwise, they would not be recommended in this work.

Finally, the author feels it due to himself to state that the almost constant occupation of his time, professionally, has given him less opportunity than he desired for the production of this work, yet he entertains a hope that he has not labored in vain; and thus this mite is cast into the common treasury of Veterinary Science.

G. H. D.

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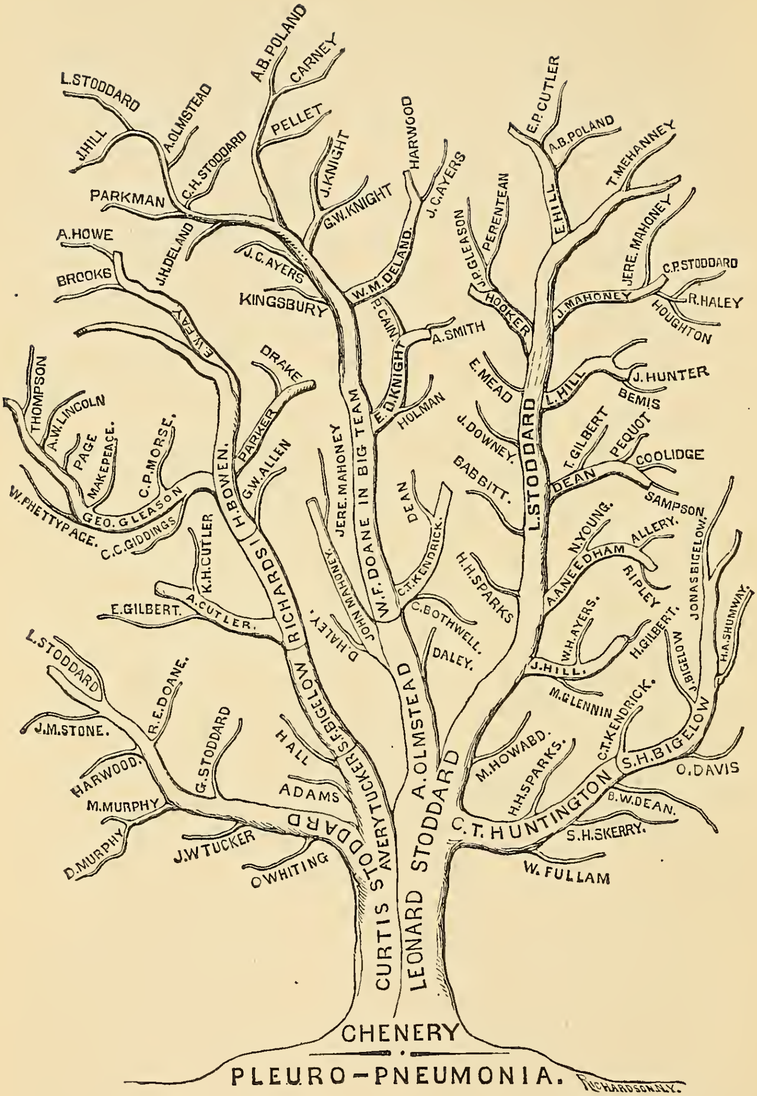
DADD'S

AMERICAN CATTLE DOCTOR.



EXPLANATION.

The above cut represents the geneology of pleuro-pneumonia, as it occurred in Massachusetts, a few years ago. It commenced with Mr. Chenery's herd, and spread in the above order. The names are those of the parties whose herds took the disease by infection or contagion. (See article Pleuro-pneumonia.)

THE

AMERICAN CATTLE DOCTOR.

SECTION I.

THE RINDERPEST, OR CONTAGIOUS PLEURO-PNEUMONIA.

Origin of the Disease in Massachusetts—Spread of the Disease—The Cattle Plague in Kentucky.

Origin of the Disease in Massachusetts.

IN the early part of the spring of 1859, Mr. W. W. Chenery sent to Holland for three cows and one heifer. They arrived in Boston on the 23d of May. Two of the cows were found to be in very bad condition. The first died at the end of a week, and was buried; the second one died two days afterward, and was also buried. About the 26th of June the third cow was found to be sick; she died the 29th day of June. The next cow found to be diseased was taken sick in August. This cow was imported from Holland in 1852. She died in about a fortnight from the time she was first taken. The disease then spread among the rest of the herd owned by Mr. Chenery, of which he lost a large number.

I examined the two cows that were landed sick. They did not appear to manifest any symptoms of pleuro-pneumonia, but seemed to have suffered terribly from the effects of the voyage. They had got down during the latter part of the voyage, and the external surface of the body was so bruised and abraded that some of the bones were visible. But perhaps Mr. Chenery's own history of the origin of the disease in Massachusetts may be the best that can be given, which I here present to the reader:

BOSTON, MASS., *March* 7, 1860.

DEAR SIR: In compliance with your request, I take pleasure in furnishing you a succinct account of my last importation of cattle from Holland, and also of the disease that subsequently prevailed in my herd at the Highland Farm, in Belmont, as is now generally supposed, in consequence of that importation.

It may be remarked that I had previously made two importations from Holland, and the extraordinary superiority of the animals received from that source, in comparison either with our native or any of the foreign breeds heretofore imported, induced me to increase my stock of Dutch cattle by further importations, rather than await the natural increase from those already imported. Accordingly, in December, 1858, I transmitted an order to my correspondents in Schiedam, Holland, instructing them to employ a competent person expressly to proceed to the north of Holland and make selections of the best animals that could be obtained, without regard to the expense. Following my instructions, four cows were procured from Purmerend and the Beemster, and were duly shipped at Rotterdam, on board the barque "J. C. Humphreys," which vessel sailed from that port early in April, and arrived here on the 23d of May, 1859.

Upon examination, the cows were found to be in an extremely bad condition—very much bruised and emaciated—one of them, as the mate of the barque stated, not having been on her feet during the twenty days preceding her arrival, while another one was totally unable to walk, and these two animals were accordingly carried to the farm in wagons. The remaining two were driven out. Deeming it impossible for the first-mentioned cow to recover, she was, on the 31st of May, slaughtered, and on the 2d of June following the second cow died. At that time, in common with every one knowing the facts in the case, I was so fully persuaded that the bad condition of these animals was caused by neglect on the voyage, that I libeled the vessel, and went through a course of one hundred and fifty dollars' worth of law in my endeavors to obtain indemnity for the loss; but the law is uncertain, and the barque went on her way. My mind, however, remains unchanged with regard to the treatment the animals received on the voyage. The third cow of this importation seemed to be doing well until about the 20th of June, when she became sick, and died in ten days after. The fourth cow, "Lady Beemster," has, down to this time, shown no indications of sickness, but is, on the contrary, in a thriving condition.

Early in the month of August following, symptoms of disease were observable in the Dutch cow, "Lady Louise" (imported in 1852). She died on the 20th of the same month. About this time several other animals were taken sick, in rapid succession, and then it was that the idea was first advanced that the disease was identical with that known in Europe as "epizoötic pleuro-pneumonia." From that date every possible precaution was taken to prevent the spread of the supposed distemper, strict orders having been given that no animals should be allowed to leave the farm, nor any strange cattle to come upon the premises. A temporary building was erected, in a pasture at considerable distance from the farm barn, to which the animals not infected were removed, and disinfecting agents were used about the premises, etc.

The following extract from my letter-book, in answer to an application for stock during the prevalence of the disease, will serve to show my views with regard to it at that time: "I am at present obliged to decline any applications for stock, owing to an epidemic disease in my herd. The disease is that known as 'pleuro-pneumonia,' and I have already lost seventeen head, and have ten more very sick. I am using every precaution to prevent the disease from spreading, and you will, of course, see the propriety of my refusing to allow any animal to leave the farm until the infection has ceased."

It is manifest that the means used to prevent the spread of the distemper have so far proved eminently successful, inasmuch as, notwithstanding I have lost some thirty animals (nearly half of my whole herd), there has not been a single case of the disease elsewhere in the neighborhood of my farm.

As there seems to be an impression abroad that the disease in my case was confined exclusively to the Dutch stock, I would remark that such is not the fact; that, on the contrary, they have, comparatively, been more exempt from it than any other breed. It is not, however, confined to any particular breed, or to any age or sex, as the full-grown ox, the mature cow, and the young calf have been alike prostrated by it; and of the animals lost, five were thorough-bred Dutch, five Durham, one Ayrshire, one Guernsey, two Jerseys, five Devons, two natives (all the natives on the farm), and the remainder were grade Dutch.

There has been no new case of sickness in my herd since the death of the mammoth cow "Lady Washington," which occurred on the 8th of January, and I am, therefore, induced to believe that, so far as my animals are concerned, the disease has run its course.

From the foregoing remarks, it will be perceived that some months ago, when the disease was raging, I believed it to be infectious or contagious; but I confess that more recently the conviction has forced itself upon me that it was of an entirely local character; that the lungs of the cattle had become diseased by breathing carbonic acid gas, generated in the cow-house in consequence of insufficient ventilation. The recent developments with regard to the spread of the disease in North Brookfield and vicinity—in tracing its origin to the calves that went from my farm in June last—together with the information I have just received in a letter from Holland upon the subject, will, I fear, force me back again to the belief that it is the veritable European scourge.

With regard to the treatment of the disease, I can only say that several of our most eminent veterinary surgeons have availed themselves of the opportunity to study the disease, by *post mortem* examinations and otherwise, and are, doubtless, competent to give valuable information upon the subject. My own private opinion, based upon costly experience, is, that whenever an animal becomes really sick with this distemper, the best teatment is to slaughter and bury forthwith.

In concluding this long letter, I beg to say that, if it shall prove that through my efforts to improve the breeds of neat cattle, I have been the means of introducing this disease into the country, I am sure no one can possibly regret it more sincerely than myself. At the same time, I feel some consolation in believing that, provided the disease can be restricted to any thing like its present limits, the benefits conferred by the introduction of the Dutch cattle here will more than outweigh the losses incurred by the introduction of the disease.

Respectfully,

WINTHROP W. CHENERY.

SPREAD OF THE DISEASE.

The disease was introduced into North Brookfield from Belmont. Mr. C. STODDARD, a young man of North Brookfield, purchased of Mr. CHENERY three calves. After arriving (by rail) at North Brookfield, they were driven toward the place of destination (about five miles). On the way, one of the calves was observed to falter, and at the end of the journey seemed to be quite sick. In two or three days, the father of the young man took the calf away to his own barn for treatment. In this barn were about forty head of cattle. The calf growing no better, the son took it back again to his own residence. In about ten days it died. Soon the senior Stoddard observed that one of his oxen was sick; it soon died. Two weeks after, a second was taken sick and died. Finally, in the course of a short time he had lost eight oxen and cows. Young Stoddard lost no animal by the infection at that time. He sold, however. eleven heifers, and retained nine of the most valuable himself. These nine were four oxen and five young cattle. The four he took to his father, three of the others to his uncle, and the remaining two he left with his father-in-law. It was finally discovered that wherever these animals went they scattered the infection, without a single failure, showing that the disease was of a contagious character. It turned out, finally, that the herds of both father and son were badly diseased. Out of the nine formerly belonging to the son, seven were the subjects of pleuro-pneumonia. The elder Stoddard lost fourteen of his animals before the commissioners for the extirpation of the pest were appointed. The elder Stoddard kept about eight oxen, which he employed in teaming. He was drawing some lumber, and stopped over night at a neighbor's named Needham. The disease was communicated, and Mr. Needham finally lost his whole herd. Many died, while others were destroyed by order of the commissioners. Finally, Mr. Stoddard sold an animal to Mr. Woodis, of New Braintree, who had twenty-three fine cows. Seven or eight died before the commissioners got there, and the whole herd had to be condemned. Next, Mr. Stoddard sold a yoke of cattle to Mr. Olmstead. At the end of five days they had infected the whole herd. Finally, these cattle came into the hands of Mr. Doane. They were put in with twenty-two yoke of cattle, and employed a day and a half in moving a building from Oakham to North Brookfield. It was afterward proved that the whole of these cattle took the infection. Belonging, as they did, to eleven different herds, they carried the infection to eleven different farms, and thus, by contagion or infection, the cattle for miles around became the subjects of pleuro-pneumonia. The disease assumed such proportions that the commissioners had not funds sufficient (ten thousand dollars) to perform the operations required by law—namely, extirpation. And here it may be proper to inform the reader that the commissioners had no power to order an attempt at medicinal treatment. They were ordered to extirpate the malady—to kill and bury all infected herds; and this has, finally, proved to be, both in this and other countries, the cheapest way of getting rid of contagious pleuro-pneumonia.

The following is a brief record of the autopsies made by veterinary surgeons employed by the State of Massachusetts:

Autopsy 1.—This cow appeared badly. She coughed, but, it was said, ate well. The posterior lobe of the lung adhered to the diaphragm, was indurated, and contained a cyst, in which was a very small quantity of pus and a mass of detached lung of the size of a quart measure. This was connected with the main portion of the lung by bronchi, some of which had been cut off in such a manner as to admit air into the cyst. The mass was offensive, friable, and, on incision, did not present the bright, mottled, organized appearance of similar masses lying in air-tight cysts. There was no serum in the chest.—Dr. MARTIN, April 12, 1860.

Autopsy 2.—An ox, 7 years old. The lung was extensively and firmly adherent in various parts, and almost "as hard as a stone." On incision, there was found a large cyst, containing pus and lymph.—Drs. DADD and THAYER, April 19, 1860.

Autopsy 3.—A steer, 3 years old. The owner said that this animal was but slightly, if at all sick. The left lung was adherent to the pleura costalis and diaphragm. On incision, there was found, in the middle, a large cyst, containing pulmonary tissue. The right lung was adherent, but its substance healthy.—Drs. DADD and THAYER, April 19, 1860.

Autopsy 4.—A steer, 2 years old. Marked adhesion of the posterior superior portion of the lung to the diaphragm. Some consolidation of the lung. The right lung contained a cyst, in which was a mass not entirely separated.—Drs. DADD and THAYER, April 19, 1860.

Autopsy 5.—A cow, 8 years old. The owner said that this animal was one of the most healthy in his herd. At the apex of the left lung was a very large slough. There was also red hepatization.—Drs. DADD and THAYER, April 19, 1860.

Autopsy 6.—An ox, 7 years old, owned by Curtis Stoddard, and exposed to the Chenery calf during the illness of the latter. The superior anterior portion of the right lung was much enlarged, and contained a large cyst, in which was a quantity of pus and a mass of detached pulmonary tissue. Left lung adherent to the diaphragm.—Drs. DADD and TYLER, April 20, 1860.

Autopsy 7.—The anterior lobe of the right lung adhered to the sternum. A portion of the pulmonary tissue was separated and contained in a cyst.—Drs. BATES, DADD, and THAYER, April 21, 1860.

Autopsy 8.—A yearling heifer. Much serum was found in the chest, and the pleural surfaces were extensively adherent. The substance of the right lung was completely marbled, some parts having suppurated, while others were only indurated.—Dr. TYLER, April 27, 1860.

Autopsy 9.—Killed a cow which had been sick nineteen days. She was feeble; had but little appetite; diarrhea, cough, and shortness of breath; hair rough, etc. Percussion dull all over the left side of the chest, with absence of normal respiration. The left pleural cavity contained several gallons of serum. Over the costal pleura was a firm layer of lymph, resembling the velvety parts of tripe. The whole lung was indurated, especially at its base, and brittle, like liver. No pus. Right side and lung healthy.—Dr. MARTIN, April 11, 1860.

Autopsy 10.—Killed a cow, 10 years old. Sick since January. Dullness over the left side. On opening the chest, there flowed from it a stream of fetid matter as thick as tar. Strong adhesions to the ribs. In the lung was a large tumor, enveloped in a cyst, or sac. Right lung indurated.—Drs. DADD, THAYER, and TYLER, April 19, 1860.

Autopsy 11.—Killed a calf, 3 weeks old. In the right pleural cavity was a quart of serum. Lymph, easily separated, was spread over the surface of the lung. The left lung adhered to the ribs, sternum, and pericardium.—Drs. DADD, THAYER, and TYLER, April 19, 1860.

Autopsy 12.—Killed a cow, 10 years old, which had been sick three or four months. The posterior superior portions of the right lung adhered so strongly to the ribs and diaphragm, that the knife was necessary for their separation. On opening the posterior part of the lung, a detached mass was found, very soft, surrounded by pus, and contained in a sac. Left lung healthy.—Drs. BATES, DADD, and THAYER, April 21, 1860.

Autopsy 13.—Left lung healthy, but slight adhesions to diaphragm. Right lung firmly adherent to the diaphragm. In it was found a mass of consolidated lung, not entirely separated.—Drs. BATES, DADD, and THAYER, April 21, 1860.

Autopsy 14.—Killed a calf, 4 weeks old. Right lung inflamed. Left chest filled with serum. Lung covered with lymph.—Drs. BATES, DADD, and THAYER, April 21, 1860.

Autopsy 15.—Killed a cow, 9 years old, and mother of the calf. In the right lung was a cyst of the size of a pullet's egg, filled with pus. The left lung contained a small cyst, filled with the same. Heart flabby.—Drs. BATES, DADD, and THAYER, April 21, 1860.

Autopsy 16.—Killed a stag that was in the "big team." Three months before, he had been sick for four weeks, but had recovered, and had been working very hard. Serum in the right pleural cavity. Lung indurated, and adherent throughout so strongly to the ribs and diaphragm, that it was necessary to cut or scrape it off. In this lung was a small cyst.—Examined May 9, 1860.

Autopsy 17.—Killed the other stag. Left lung useless. Serum in the chest. Right lung in the acute inflammatory stage.

These stags were taken December 3, 1860, in exchange for a yoke of oxen sold at the same time to William F. Doane, and kept with Olmstead's diseased herd. They were in the "big team" December 19.—Examined May 9, 1860.

Many other autopsies were made by members of our sister profession, human medicine, and the disease was always found to be seated within the chest. It was not of so formidable or malignant a character as it has proved to be in some parts of Europe, and probably this is owing to the fact, if fact it be, that in the transplantation of the disease from Holland to this country it has undergone some modification.

From my own experience, I am led to believe that the Holland cattle inherit in their systems an idiosyncrasy or predisposition to pleuro-pneumonia, and that when the circumstances are favorable for its development—namely, impure air and bad management—the latent disease to which, by virtue of their constitution they are liable, is thus fanned into a flame. Being in its character contagious, it then spreads, according to the laws, or after the fashion which govern or obtain, in other epizoötic contagious maladies. This must have been the case as regards Mr. CHENERY'S herd. Before his Dutch stock left Holland, they were carefully examined by competent surgeons, well acquainted with the national disease pleuro-pneumonia, and a clean bill of health was rendered. It was also ascertained that the malady was not then prevailing in the localities where the animals were purchased; hence it manifested itself in the manner here described. The same is true as regards its introduction into the Cape of Good Hope. The animal was in perfect health on leaving Holland, but on arriving at the place of destination manifested the disease, and communicated it to others.

The history of the disease in South Africa is quite interesting; hence I introduce the following testimony, as given before a committee of the Legislature of Massachusetts, by Rev. D. LINDLEY, lately a missionary in South Africa. He said:

"The disease, whatever be its name, and it has different names, was introduced into South Africa a few years ago. It was introduced from Holland, imported in the body of a bull. A gentleman in Cape Town, wishing to improve his stock, made that importation, and with it that disease which has been to South Africa the severest scourge that has ever fallen on its property interest. It was about six weeks after the animal landed (he having been on board the vessel on the passage about two months) before any sign of sickness appeared in him. At the time, it was not suspected that the disease was the lung contagion, so long known in Holland. However, he died. He communicated that disease to a considerable number of cattle, and before the people became aware of the evil that threatened them, it had scattered about them very extensively.

"The question may arise in the mind of the committee, Why was it not at once exterminated there, as you propose to have it here? The answer to this question will be found in this statement that I must make, in order that you may understand the circumstances of that country. You will imagine New England, and a great part of the United States, divested of its woods, its forests, leaving, here and there, thickets and jungles, and a grass country that is without fences or any inclosures, and all this country spread over with cattle by the thousand (for the property of the inhabitants of the country consists in cattle and in sheep). I have seen 1,600 in one herd, but generally the herds are from one hundred to five hundred. In those parts of the country where the lions and tigers have been exterminated, these cattle are allowed to roam, night and day, where they please, and they wander considerable distances, sometimes miles around. In addition to that, all the produce of the country that is brought to market, whether to supply the city of Cape Town or Port Elizabeth, or other towns lying along the coast, is brought down from the interior in large wagons, drawn by oxen. All the goods imported into the country and taken inland are conveyed on these wagons, drawn by oxen; and to each wagon the custom of the country gives six pairs of oxen.

The country is large, it being from Cape Town to the extremity of any civilization in the interior, twelve hundred miles, and across the plains to where I live, twelve hundred miles more. Well, this country is passed through, up and down, crosswise, and backward and forward, by hundreds of wagons and thousands of cattle every day. They have no railroads, no rivers—no other way of transporting goods from one point to another but this ox-wagon. Well, they are great sheep-raisers in this country, having five to ten thousand sheep in a flock, and I have seen as many as fourteen thousand in one flock. Their clips of wool are all sent down in these wagons to the coast.

"In a country of this kind, where there are so many cattle, and where every thing is done by means of cattle, and they are traveling night and day, there is no possibility of killing out this disease by extirpation. The seed had been so widely disseminated before the people knew what the matter was, that such a system was looked upon as hopeless, and the Government adopted no measures to stay it, and every man was left to look out for his own interests. I will say that, after it had got fairly spread abroad to a considerable extent, the inhabitants very generally resorted to inoculation; and I will say, in passing, that we are indebted to that for about all the cattle we have left. We should have been flat on the ground, and no man could have got to the coast with his products or returned with his merchandise. Inoculation has saved us what we have, after six years. The disease was still at work when I came away, but it was more under subjection. It has killed hundreds and thousands of cattle, and I can assure you, gentlemen, that where it has come into a flock it has not left more than five out of a hundred. I was happily surprised when I heard Dr. Loring state that in the past year, in this State, not more than twenty per cent. had died.

"With us, when an animal is known as having the disease, we look upon it as already dead; and I can affirm, without hesitation, that where it has got into a herd of cattle, not more than five out of a hundred have been spared. Occasionally one has passed through, and has not had the disease at all; and a few, on the other hand—two or three in a hundred—have recovered, and no more. I know of one man who had five hundred head of cattle. The disease got in among them, and, finally, he had but five left. If I speak with emphasis, it is because I have had sad experience; and I have been afraid that the good citizens of Massachusetts might not be aware of the evil that I do most firmly believe threatens their property interest more than any thing that ever threatened it yet.

"The disease has spread in every direction from Holland, and by contagion. I will give you facts on this matter of contagion. Well-meaning men—men of science, and who hold high and influential stations—said it was not contagious; that it was impossible for a lung disease to be contagious, and, through their influence, some herds suffered that might, to my certain knowledge, have been saved. One of the commissioners appointed was a man of some science, and he said, 'Poh! poh! it can not be contageous,' and the cattle were left, and the consequence is, it has spread over all the country around them.

"I will tell you how the disease came to my particular neighborhood. A native went out as a peddler, over the Cathumba Mountains, into the interior, nearly three hundred miles. There he took cattle in payment for goods. He brought down a herd of oxen to the eastern coast. While on the way down, some of his oxen became sick, and he quietly put them out of the way; for he could travel one or two days, perhaps, and not see a single person, and the dead cattle were not likely to attract attention. He had that failing which we can pardon in others, as we see it in ourselves, that he cared a little more for himself than he did for his neighbors. He put the sick oxen out of the way, and brought down the rest and sold them. They were bought by a gentleman who had about one hundred and twenty oxen. The peddler's cattle, looking apparently well, were put into that herd. Presently the disease broke out. It was in that instance that this doctor had the influence to prevent the slaughter of that herd, because he said the affection was not contagious. These cattle were running about in the neighborhood—out on the plain twenty miles square, without fence and without tree, save here and there a bush—where were grazing thousands of cattle, and they ran just where they pleased. From this flock the contagion was communicated to all the cattle in the region. Oxen were traveling through the country every day (at least a hundred passing in a day), and in that way it was carried widely through the country. Until it was brought from a contaminated region in the interior by these oxen, the disease had never been within three hundred miles of us. I might give a thousand facts just equal to this, but I am mentioning what occurred in my neighborhood.

"The disease had not crossed to the northward, to the Ungani River, until this happened: A man wished to convey a boat from Port Natal to a place about sixty miles to the northward. He put tne boat on a wagon, and took his six yoke of oxen to draw it. He traveled one day, and camped just outside of a village through which he had passed. In the morning he found one of his oxen sick. He had camped on a piece of ground where cattle grazed every day, and in a place where the people had thought themselves safe. Finding his ox sick, he quietly took him and his mate out of the wagon, and, leaving them there, started on. These oxen remained through the day, and mixed with the many cattle owned in that village. The second day after they had been there, it was discovered that there was a sick ox in the field. The inhabitants were all out at once. They killed the ox, and, from the description, they saw that he had the disease they had dreaded. They immediately inoculated their cattle, and saved a goodly number of them. Now, in regard to that, I wish to make this statement. I made a statement which was honestly reported, I suppose, but mistakenly as a statement, that they had saved ninety per cent.; in some instances not more than thirty per cent. Between this and ninety is probably the average percentage saved. In this case, I mentioned that there was a clear, distinct instance where the sickness had been brought from the interior three hundred miles, and in the last case it was carried twenty miles. In another instance, two natives were trading, and brought the disease from the country where they went, two hundred miles, and set it down in a perfectly healthy region, in a herd of about eighty cattle, and there it spread, and they were every one carried off.

"Another fact, and one with which I had to do myself. A native, a stupid heathen, was working for an Englishman in an infected region. He took his pay in cattle—two calves, I think, a year or a year and a half old. He carried them into a healthy district, where the disease had been kept out, and within twenty miles of which it was not known. Presently these calves fell sick and died, and the cattle with which they were placed began to be sick. I had in my service a young man belonging to that village, which was twelve miles from where I lived. A messenger came to this young man to say, 'Your cattle are sick.' When I heard that, I began to inquire if any cattle had been brought from within the infected region to his kräal. They said such an one (meaning the native before mentioned) had been working with a man, and taken two head of cattle for his pay. He came back, a little more than two months ago, with these cattle, and they took sick and died, and now our other cattle are sick. I saw at once what the matter was; for I knew that the region where these two cattle were taken from was wholly contaminated. I said, 'Your cattle will all die; you ought to tell your neighbors to keep their cattle away from you.' I asked him, further, if his cattle had mixed with other cattle, and he said, 'There are three kräals that have mixed with ours; so it was too late, and the result was, they all died. I told the young man whom I sent to go and warn the neighbors. He did so, and they took their cattle in the opposite direction to grass, and for two years before I came away not a single herd of the cattle around them had taken the disease. Just those that were exposed to the contagion, and no others, died. The neighbors' cattle continued in a state of perfect health for two years after those four herds (one hundred or one hundred and thirty head) had died, right out there in the heart of a healthy region, a region as large as a county.

"I can not doubt that the disease was communicated by contagion, and that if the animals can be cut off, the disease will be kept off. It was kept off in the region in which I lived in this way. The chief with whom I have lived occupies a considerable extent of territory, and he is fortunately fortified on one side by a range of mountains, and on the other by a precipice some hundred feet in height. He had assembled his tribe for another purpose, and, wanting my advice in reference to some political difficulties, he sent a messenger to tell me of his trouble. I went to him, and, after that matter was settled, I took occasion to tell him that the sickness was within some forty miles of us. I told him what the disease had done and would do, and I said to him, 'There is just one thing to do, and that is, to keep your cattle where they are, and not allow any to go out or come in.' The people there love their cattle, as they say, better than they love their lives. They took the alarm, and every effort that was made, on the part of any one, to bring cattle into the country was immediately and stoutly resisted. The intruder was met with spear and shield, and threatened with death and destruction to himself and his cattle if he came a step further, and so was made to go back. Only half a mile off, within sight of these cattle, dead animals were lying unburied that had been exposed to this contagion. The disease was brought there by the oxen of an individual who had been into the interior, and when he came home his oxen died. They communicated the disease to all the cattle in that neighborhood, and I never saw more complete destruction. There was not a single head left in all those kräals. Those cattle came up to within half a mile of our boundary, and you could look down and see herds of them lying dead. That was three years ago, and yet, when I came away, the disease had not got one inch over that line.

"These are facts that I have seen and know; and in that country, if you should ask us, 'Is the disease communicated by contagion?' we would say 'Yes,' and we should just as soon doubt that the sun made daylight. There are thousands upon thousands of facts to prove it. We have no more questions to ask on that subject. You will see how widely the disease might spread in a country like that, where cattle are so abundant, where the travel is continued day and night, and where thousands of oxen are on the road every twenty-four hours. It has been to that country a great scourge. Thousands and hundreds of thousands of cattle have died, and many of the people have been made poor by the ravages of the disease, and the only hope they have of securing a comfortable subsistence, and recovering a comfortable position in respect to property, is through sheep. They have given up all idea of grazing cattle, and are now turning their attention to sheep; for the disease is so widely spread, that they have no hope that it will ever be exterminated.

"I do not know that I have any thing further to state. I might repeat hundreds and hundreds of facts of precisely this character. If I have appeared earnest in my statements—somewhat as if I was making a speech, which is, perhaps, my profession—I hope you will not attribute it to any other motive than a wish to make you fear as I think you ought to fear. Massachusetts has enacted some glorious history, whereof you have famous monuments, and I hope that pluck will not be wanting now."

From such evidence as the foregoing, there can not be any doubt regarding the contagious element of the disease.

The Cattle Plague in Kentucky.

The Cattle Plague of Kentucky is known in Texas as "Texas Fever." There are, at the present time, about one hundred thousand head of cattle pastured along the eastern and north-eastern limits of the State of Louisiana, destined for the markets of the Mississippi. They are detained where they are by the statutes of neighboring States, which forbid their being driven through them before the 10th of November, the reason being a disease called the "Texas," or cattle fever, which prevails in the summer months, and is contagious.

Some of these Texas cattle were brought into the State of Kentucky early in August, 1866, and shortly after the disease made its appearance, the details of which were communicated to the "Lexington Observer and Reporter" in the following letter:

Scott County, Ky., *September* 1, 1866.

Col. L. J. Bradford, *President of Kentucky State Agricultural Society:*

Dear Sir—This section of the country has been much disturbed, in the last few weeks, owing to a frightful disease which has made its appearance among the cattle, killing many, making some blind, and otherwise affecting a large number. There was no disease among the cattle of these interior counties prior to the introduction of a large lot from Texas by General R. Gano. It has been asserted, and believed, for a long time, that the Texas cattle would propagate a peculiar and destructive disease. Missouri, in consequence, established a cattle quarantine, and, I believe, passed a prohibitory law; hence, for some time, that State has not been visited with this fatal malady. Kentucky has it now, and there can be no doubt, in the minds of those who have been informed of the facts, that it was introduced by the Texas cattle.

Reason.—My mother-in-law, Mrs. James K. Duke, who lives nine miles from Lexington and four from Georgetown, in this county, on one of the best and most beautiful farms in the State, on which no disease of any kind had ever occurred, took upon pasture, the 28th of June last, over three hundred of these Texas cattle. None of her own ran with them. They remained until the 3d of August, looked healthy, and grazed well. Within five or six days after they had been taken away, a lot of Kentucky cattle (a great many raised on the farm) were turned on the pasture which had been occupied by the Texas cattle. No danger was apprehended, but, within a week or ten days, it was discovered that the disease had broken out among them. Attention was immediately given. All were removed from the pasture, and the sick separated from the well. Two or three died almost immediately.

External Symptoms.—Dull, stupid, stiff; separation from the herd; drooping of the head; disinclination to eat; trembling, cramping, staggering, falling, and, in many cases (I do not know that there is an exception), compression of the jaws. Some are made perfectly blind—none on this farm, but on an adjoining one, that of Mr. Charles Herndon, whose milch cows, calves, and a few steers were affected first in the eyes (some in one, some in both); and it was a week or ten days after the disease manifested itself in this way before these or others began to seriously sicken and die.

Internal Symptoms, as far as Observed.—Blood, very black and thick; heart, only slightly affected; lungs, perfectly sound and healthy; the manifold, or second stomach, very much contracted, with the fecal matter, hard, dry, and compact; the paunch, or first stomach, almost empty, and with no apparent change; bowels, contracted, nearly empty, and extremely costive; bladder, generally containing only a small quantity of thick, high-colored urine. In a few cases they discharge a considerable quantity of bloody urine.

Up to the present time Mr. Herndon has lost eight or ten out of a lot of twenty-five or thirty; Mrs. Duke, with a herd of seventy-five, has lost twenty. Another neighbor, Mr. James Kenney, where only Texas cattle remained, lost two. A gentleman near Oxford, Scott County, lost twelve; another near Midway, Woodward County, lost sixteen, from turning on a pasture where the Texas cattle had been but one night and part of a day. Many others have died in the wake of these Texas cattle, yet it is a remarkable fact that the disease has broken out nowhere in a malignant form save where these imported cattle have been. On the farm of Mrs. Duke, her milch cows and calves, which were kept near the house, and in the central part of the place, and not allowed to mix with these foreign cattle, or run on the pasture where they had been, are and have been free from, the disease, and milk and butter used all the time.

What is the Disease?—I think it is nothing less than the cattle plague, of which we have heard so much of late as raging with such terrible fatality in Europe. In England it is called the rinderpest; in Russia, cattle plague; in Mexico and Texas, the Spanish fever. The symptoms are very similar. In almost every case thus far it has proved fatal. The rinderpest could not be worse.

How is it Communicated?—Dr. J. Burden Sanderson, of England, discovered that the blood of the animal affected with cattle plague contained the poison of the malady, so that serum obtained from it would give the disease by inoculation. Now, how did these Texas cattle communicate this disease, when they were apparently healthy? Spanish fever is an endemic disease of Texas, and cattle have been for years dying with it, sometimes, in certain localities, prevailing as an epidemic. No disease, however, even in the form of epidemic, is always fatal; but I am sure, from the natural course of things, the discovery of Sanderson, and from facts herein given, that some of those Texas cattle had this disease in their systems, and brought it to Kentucky, so that the poison has inoculated our cattle and produced the disease from which they are now suffering.

Our grasses seem to have had the effect to eliminate the poison through their kidneys, bowels, and, perhaps, through the lungs, which, being deposited on the pasture, was left ready for the first that followed after them. Our Kentucky cattle, of course, not being acclimated, are readily susceptible to the infection of the poison, and have suffered accordingly. The disease is entirely distinct from any we have ever had in the State before—attacks suddenly, affects singularly, and kills in almost every case. One who has ever seen a case can point out the cattle affected with it as soon as they begin to sicken.

Thus far, Mrs. Duke has lost twenty out of twenty-six cases. On the 25th of August she commenced feeding green corn. Since that date only one has died—five getting well, and no others sickening. Every case, with the exception of blindness at Mr. Herndon's, one case of purging at Mr. Kenney's, and two of bloody urine, were affected precisely alike; so much so, that the description of one would answer for all, the symptoms being more uniform than in any epidemic I have ever seen or known. The fact that this disease has been brought here by Texas cattle I regard as perfectly certain, no such disease having ever appeared here prior to their coming into the State, and none occurring, so far as can be ascertained, save where they have been.

It is well known that they introduced the same disease into Missouri for several consecutive years, and the State was only relieved of the pestilence by the Legislature passing prohibitory laws, making it a heavy penalty to bring a single one into the State. It is true they come here seemingly healthy, but may they not, as I suggested before, bring it in their systems, and, through the effect of grasses upon their bowels and kidneys, deposit the poison upon our pastures by their urine and dung? The theory that the disease is communicated through the feet, or by the ticks, I think fallacious, and will not discuss it. Their feet are healthy, smooth, and sound, and the ticks on them can be found almost anywhere in Kentucky. I have seen them often.

Prior to using the green corn, I am informed, by Dr. A. B. Duke, that salt and ashes, soda, sulphur, copperas, bleeding in the mouth, neck, ears, and tail were resorted to without any good effect; but it is not conclusive that green corn will be of any material service. It was only an experiment, did good in a few cases on Mrs. Duke's farm, but has not yet checked the cases on Mr. Herndon's. It is impossible to give a remedy so soon. It requires much experience and experiment, and it would be well for farmers in Kentucky to look into the matter and prepare for it.

An Agricultural College has been established near Lexington. Would it not be well to have Veterinary Surgery studied—in fact, have a special chair for that profession? Many young men will study it, and it is as important as any other. The diseases of cattle, horses, hogs, and sheep are as little known and understood in Kentucky as though stock never did suffer from disease. Kentucky has long been known and noted as a cattle or stock-breeding, raising, and feeding State. If she would maintain prominence, and protect her greatest interest, she must establish quarantines and pass laws shutting out this terrible pestilence from her borders, and prepare for the cure and relief of her fine stock.

Most respectfully your obedient servant,

G. Clay Smith.

The following is my reply to the above:

Chicago, Ill., *September* 13, 1866.

G. Clay Smith, Esq.:

Dear Sir—Through the kindness of R. W. Carroll & Co., of Cincinnati, I am in possession of an article, over your signature, having reference to the "Cattle Plague in Kentucky." I have carefully perused the article and compared the symptoms, as described, and find that the disease bears no analogy to the rinderpest in Europe, nor the pleuro-pneumonia of Holland, which was imported into Massachusetts about six years ago, where I had ample opportunities of studying it, having been appointed by Governor Banks as surgeon to the commission appointed to extirpate the pest.

The Texas bovine malady, just introduced in Kentucky, is peculiar to the breed of Texas. In that country the disease has acquired a home in the constitutions of animals bred and reared there. The disease lurks in the breed in a latent form, and, when circumstances are favorable for its development, it manifests itself, and becomes both contagious and infectious; and thus it spreads after the fashion of the rinderpest and other bovine epizoötics.

Your suggestion in regard to establishing a special chair for Veterinary Science in the Agricultural College of Kentucky is a move in the right direction. The husbandmen of Kentucky have great interests at stake in the ownership of a vast number of some of the finest stock in the world. They are subject to most of the diseases that afflict the superior orders of creation, and the theory and practice of veterinary medicine and surgery rests upon the same intelligent basis as that which obtains in human medicine. It makes no difference whether we prescribe for a man or an animal, the laws of the animal economy are the same; each one is susceptible, and can be benefited by the same plan of treatment. Hence the need of veterinary schools of learning in the United States for the instruction of those who shall engage in the practice of our art. The science has been sadly neglected in this country, but a period has arrived when we must have educated men to prescribe for our flocks and herds. Humanity demands it—our own interests reiterate the demand. Thousands upon thousands of valuable animals die annually, prematurely and unnecessarily, in consequence of a want of knowledge of the nature of the disease and the *modus operandi* of medicine. I know of no better locality in the United States than Kentucky for the establishment of a rational system of teaching veterinary science at an Agricultural College; and permit me, dear sir, to urge you to use your efforts for the above purpose. Such an undertaking, if successful (and I have no doubt of it), will reflect great credit on you, and finally crown your State with the laurel of veterinary fame.

Yours respectfully,

G. H. Dadd, V. S.

Causes.—There is a great deal of doubt in regard to the manner in which infectious and contagious principles invade the economy, yet I think we shall not miss the mark in contending that it is chiefly through the medium of the lungs that they are introduced into the system; and, finally, the pernicious substance is absorbed into the blood, which it, more or less, quickly vitiates, and thus occasions the subsequent symptoms. All contagious diseases differ from one another. Every one possesses its own peculiar powers, by which, when they have come into bodies favoring their action, through the proper channel of communication, they every one procreate their own distinct form of disease by a constant and uniform law; hence the contagion of rinderpest produces its specific effect on the system, spending its force principally on the respiratory organs. The virus of glanders will not produce any other disease than glanders. The same remarks apply to rabies, scarlet fever, small pox, etc.; so that the virus of Texas fever produces that disease and no other. The agents through which the virus is most readily concocted are animal emanations, or secretions, particularly the effluvia arising from the excretions of infected animals, and that arising from the carcasses of those that have died of the complaint. Hence, all that succumb to the same should be buried or burned.

When a large number of animals are crowded together, and the disease makes its appearance, the location may be designated as the center of infection. In that event they need more space, and must have it, or the disease will run riot among them; yet the *cordon sanataire* must be drawn around them, for, if fresh cattle come within breathing distance, the chances are that the malady will spread.

Treatment.—In regard to the treatment of this malady I have but little to offer. Medicine has but little control over diseases of this character, yet I should recommend isolation, pure air, and a free use of chlorate of potass, hyposulphite of soda, sulphate of iron, and ginger. Take of

Powdered chlorate of potass...........	3 oz
Powdered hyposulphite of soda........	4 oz.
Powdered sulphate of iron............	2 oz.
Powdered ginger	7 oz.
Mix.	

Dose, one ounce, morning and evening; to be mixed each time in half a pint of flaxseed tea.

SECTION II.

DISEASES OF THE ORGANS OF RESPIRATION.

Croup—Laryngitis—Bronchitis—Inflammation of the Lungs—Hoose or Common Catarrh—Epizootic Catarrh—Consumption—Pharyngitis (Sore Throat)—Pulmonary Apoplexy—Pleurisy, and Description of the Pleura.

Croup.

THIS disease is generally supposed to occur among young animals, but Claude relates a case of false membranes in a nine-year old ox. Young calves are frequently attacked with "laryngitis," and very many die from obstruction in the air-passages. These, after death, are found to be occupied by semi-organized lymph. Such cases are known to veterinary surgeons as membraneous croup, and, in the latter stages of the disease, the false membranes are found to occupy the intestinal canal, as well as the air passages.

Symptoms.—The animal is observed to be in imminent danger of suffocation; there is some discharge of morbid matter from the nostrils, yet it is evident that the respiratory passages are fast filling up with the morbid secretion. The only chance of saving the animal is to perform the operation of tracheotomy; but this operation, in order to be successful, must be performed in the early stage of the disease, or when false membranes are confined above the point selected for the operation; for when the obstruction exists at or about the lower end of the trachea, in the vicinity of the bronchial tubes, the case is hopeless. The only medicine of any value, in the early stage of this affection is

Glycerine	2 oz.
Tincture of lobelia	2 dr.
Water	2 oz.

A second dose may be given at an interval of two hours. If the patient does not improve, and the danger appears imminent, tracheotomy must be performed.

Laryngitis.

This disease often commences as an ordinary cold; but soon the throat becomes husky, followed by prolonged sonorous respiration. The respiration soon becomes quickened, and, finally, the patient may die of suffocation. Laryngitis consists of an inflammatory affection of the submucous cellular membrane of the larynx, often ending in œdematous laryngitis. This is one of the most dangerous of all diseases, for, after œdema has once set in, the animal is liable to die of asphyxia (loss of pulse) at any moment.

Symptoms.—Commencing, as it often does, as an ordinary cold or sore throat, it has some symptoms in common with the latter. The animal protrudes the nose, so that the head, instead of being pendulous, is thrust forward, and he very rarely turns his head sideways. The region of the throat is usually tumefied and tender, and pressure on the larynx occasions great distress. These symptoms, associated with the alarming character of the breathing and livid appearance of the visible surfaces, will enable any one to determine the true nature of the disease.

Treatment.—The first object is to endeavor to prevent effusion. In this view, I recommend that the patient be carefully drenched with the following:

Fluid Extract buchu	1 oz.
Chlorate of potass	2 dr.
Water	3 oz.
Mix.	

At the end of three hours, repeat the dose. In the mean time bathe the jaws and throat with a strong infusion of lobelia; then apply a cold-water bandage around the jaws and throat. The body and limbs should be well rubbed with a wisp of straw, so as to keep up an active circulation on the surface of the body. An enema, composed of soap and water, may be thrown into the rectum. Should the symptoms become more alarming, the services of a veterinary surgeon will be required, to perform the operation of tracheotomy, which consists in taking a circular piece of cartilage out of the trachea, and inserting therein a common tracheotomy tube. If the disease be confined to the parts above the seat selected as the place of operation, the animal may yet be saved. When the disease passes into the chronic stage, we have a purulent discharge from the nostrils. This discharge may be modified by giving a few doses of the following:

Tincture of matico....................	2 oz.
Syrup of garlic........................	8 oz.
Sweet spirits of niter.................	2 oz.
Mix.	

Dose, two ounces, morning and evening. The throat should be rubbed occasionally with a small quantity of tincture of blood-root or hot vinegar. It often happens that chronic laryngitis ends in thickening, or altered structure, of parts within and around the larynx. Should this be the case, the patient should be put on a course of iodine. Twenty grains per day of iodide of potassium may be given in a small quantity of water; and the region of the throat should be anointed every night with the following ointment:

Powdered iodide of potassium..........	2 dr.
Simple ointment........................	2 oz.
Mix.	

Description of the Larynx.—The larynx is seated at the upper part of the windpipe, to which it is joined. It occupies that part known as the throat, between the broadest part of the angles of the jaw. It is composed of several cartilages, which are under the control of the laryngial muscles. These cartilages are so contrived as to be movable on each other, in various directions.

The first cartilage is named *thyroid*, or shield-like. It forms the most extensive part of the larynx, and protects the other parts from external injury.

The second cartilage is named *cricoid*, or ring-like cartilage. It overlaps the first ring of the trachea, or windpipe, in the form of a helmet.

Thirdly, there are two ewer-shaped cartilages, termed *arytenoid*. They are found on the upper and back part of the trachea. They form a canal which leads to the glottis.

The fourth cartilage is named *epiglottis*, in consequence of being situated upon and over the glottis. It is the door-keeper of the larynx, and every particle of food or drop of water which the animal swallows must pass over it. If it fail to perform its function for a single moment, when the animal is either drinking or eating, death is sure to follow. But the ox is rather more favored in the mechanism of the epiglottis than the horse. The epiglottis of the horse is just adapted to the caliber of the glottis, he being a non-ruminant; but in the case of the ox, the rough, unmasticated particles of food have to be returned to the mouth for a second mastication. This would peril the life of the animal if he had no other protection than that found in the larynx of horses. The fact is, the epiglottis of cattle, instead of being confined to the caliber of the rim of the glottis, overlaps it, and this securely protects the parts from the accidents which may occur in the process of remastication.

The larynx is lined by a membrane very susceptible to irritation. It is abundantly supplied with excretory glands and orifices, for the emission of a secretion peculiar to itself.

Bronchitis.

Bronchitis is a disease of the bronchial mucous membrane. In its early stage, the term acute has been applied to it; this having subsided, it assumes a chronic type. It is very rare that this is a primary affection, for it is generally preceded by cough or catarrh, or else is an accompaniment of an abnormal condition of contiguous tissues. Its existence may be demonstrated very readily by applying the ear to the trachea, in the region of the point of the breast-bone, the peculiar sound differing from that in any other part of the trachea, having what is termed a sibilant, or whistling sound.

Treatment.—The treatment will be about the same as that recommended for common catarrh, with the addition of a counter-irritant to the sides of the chest. A little mustard and vinegar will answer the purpose. A bronchial difficulty, of a very alarming character, sometimes prevails as an epizoötic, and this must be treated the same as epizoötic catarrh.

Description of the Bronchial Tubes.—The bronchial tubes are a continuation of the trachea. It having entered the thorax, becomes forked or bifurcated. They are constituted of several pieces, making up so many segments of the circle, overlapping each other so as to admit of extension and contraction in the respiratory acts. These are connected together and invested by an elastic cellular substance, which imparts to them both strength and elasticity. A further subdivision of the bronchial tubes takes place as they penetrate the substance of the lungs, so that they become very numerous. As they proceed onward their caliber continually grows less, until they end in the extreme ramifications known as air-cells. The bronchial tubes are lined by a membrane common to the trachea.

Inflammation of the Lungs.

Inflammation of the lungs, known, also, as pneumonia, is not usually so prevalent among the bovine as it proves to be in the equine species, excepting, however, milch cows, located in unventilated milking establishments. In such locations diseases of the lungs are often fearfully prevalent, raging, at times, as an enzoötic affection, which generally proves fatal when a large number of animals are confined in a small space.

Among horses this disease is often occasioned by laborious work and feats of speed, which produce rapid and sometimes distressing respiration; but among cattle, whose powers of speed and endurance are not often put to the test, we may reasonably infer that the exciting causes vary in their general character.

The stimulating and morbid action of an impure atmosphere may produce this disease by first creating irritation on the lining membrane of the respiratory passages. It has also been noticed that this disease frequently appears among cattle that have been driven a long distance, and have also been compelled to go hungry and thirsty for many hours. Fortunately for the poor brute, this disease is not so painful as bronchitis, pleurisy, and laryngitis; and, after having passed through the acute stage, it assumes a sort of mild, subacute, or chronic type, which, apparently, appears less dangerous than the acute kind; yet, after all, is more so, as it is apt to terminate in altered structure, hepatization, induration, and tubercles.

Pneumonia, now and then, terminates by metastasis; that is, by translation of the formidable lung difficulty to one equally formidable, which locates in the feet, known to veterinarians as laminitis (fever in the feet). Among cattle, however, this termination is rather rare, yet very frequent among horses. When the disease does not take this course it often ends in "resolution," which signifies a return to health, without leaving any perceivable evidence of altered structure; so that, after awhile, the animal may become sound as ever.

Pneumonia is divided into several forms or stages, but, as they all have reference to its degree or intensity, it seems unnecessary to refer to them. It may, however, be proper to inform the reader that pneumonia may exist either as a state of congestion or of inflammation. Congestion signifies a distended or plethoric state of the blood-vessels of the parenchyma of the lungs, and slow motion of blood. Congestive pneumonia sometimes sets in as suddenly as that which is termed "inflammatory," and among cattle the former is most prevalent. In the congestive stage the symptoms are those of embarrassment, the blood courses through its channels sluggishly, and there is not the activity of heart and lungs which is perceivable in pneumonia.

Symptoms.—The symptoms, in the early stage, are such as are generally observed at the commencement of any inflammatory affection; namely, coldness of extremities and shivering fits; loss of appetite; labored respiration, quick pulse, slight cough; mouth hot and clammy. The animal will not lie down, and refuses to move; the head is extended, perhaps drooping, and the fore-legs stand wide apart. As the disease progresses these symptoms vary, and the appearance of the membrane of the mouth, nose, and eyes vary also, from the color of bright scarlet to that of a leaden hue. In the congestive stage, the pulse is more voluminous, yet less active, and the visible surfaces are highly congested. A cough, slight or active, as the case may be, is usually noticed; it is a sort of deep-seated, half-suppressed cough, and sometimes is the first symptom which attracts the owner's attention to the ailing animal.

Treatment.—I have little faith in the heroic remedies so highly recommended by YOUATT and others, and even by myself only a few years ago. I now have more faith in Nature and in regimenal means, and find that more cases are cured in this way than by the old method. It is very important, at the commencement of the treatment, that the patient shall be placed in a clean, comfortable location, where pure air abounds; for, under such circumstances, the condition favorable to the operation of Nature in the cure of the malady are secured. Should the animal labor under accelerated respiration and full, strong pulse, I should administer one ounce of powdered niter in a quart of cold water; after which, four ounces of the liquor acetate of ammonia may be given, every four hours. This agent, also, should have a quart of cold water added to it at every dose. The brisket and sides may be rubbed with a portion of the following: Powdered mustard and strong vinegar, enough of each to form a thin paste. When mixed, a small quantity of oil of cedar may be added. This application should be repeated two or three times in the course of twenty-four hours. Nauseants are next administered, in view of relaxing capillary and muscular constrictions, and this is desirable, as such conditions tend to equalize the circulation of the blood, and prevent an undue quantity accumulating in the pulmonary organs.

In cattle practice, having had a case of this character under treatment, I prefer to administer the nauseating remedies by the anus; hence, a couple of quarts of infusion of lobelia may occasionally be thrown into the rectum. Considerable of the active principle of lobelia will be absorbed within this gut, and, under the circumstances, it is much better to introduce the medicine into the system in this way than by the stomach. The proportions of the lobelia to the water are—

Lobelia (herb)........................	2 oz.
Boiling water.........................	2 qt.

When cool, strain, and it is fit for use.

It may be necessary to give a dose of medicine; if so, I should use the following:

Glauber salts......................	12 oz.
Ginger.............................	1 dr.
Warm water.........................	1 qt.

It should be known to all husbandmen that a disease of this character, located in such important organs as those of respiration, is very prostrating, and operates very unfavorably on the inherent vitality of parts; hence, so soon as the activity of the morbid phenomena is somewhat subdued, all active medication should cease.

The affection is likely to continue for some days, and all we have to do is to try to keep the patient alive while the disease is running its course. Careful nursing, pure air, and light diet are the remedies. After the first twenty-four hours, I pay little attention to the pulse, but more to the patient, for I can conceive of but two conditions in this disease. One I call *acute*, the other *chronic*. The very moment the acute condition subsides, it merges into the chronic, and requires life-sustaining agents. After the first twenty-four hours, I generally resort to the following medicine:

Glycerine	8 oz.
Powdered bloodroot	4 dr.
Powdered golden seal	1 oz.
Water	4 oz.
Mix.	

Dose, one table-spoonful, to be smeared on the tongue night and morning.

Management of the Patient while under Treatment.—As I have already intimated, a full supply of pure air must be insured; for a practitioner would be more likely to save an animal in the open air (provided the weather was not too cold or tempestuous) than in the unventilated cow-house. Should the limbs at any time be cold, they are to be hand-rubbed and bandaged; the body being in the same condition, must also be clothed. I should also give the chilled patient some warm ginger-tea, or any other non-alcoholic stimulant or carminative, in view of arousing the action of the heart and capillaries, by which means the red arterial and life-sustaining blood would be forced to the external surface and extremities, imparting to them a genial warmth, and thus insuring an equilibrium of the circulating fluid. The patient should be furnished constantly with a bucket of pure, cold water. When morbid thirst prevails, the water must be acidulated with either lemon-juice, cream of tartar, or acetic acid. Any symptoms of debility or lassitude are to be opposed by a few doses of some vegetable tonic. Tincture of golden seal, or tincture of matico, in ounce doses, every twelve hours, are the best remedies that I am acquainted with.

My experience in the treatment of this formidable disease is, that in ninety-nine cases out of one hundred, the patient dies of a meddlesome medicinal disease; in fact, he dies *secundem artem*. In view of furnishing a logical argument to support this theory, I refer the reader to Youatt, Percivall, and others of the orthodox stamp, (very learned men,) who are apt to place too much confidence in art, to the exclusion of Nature.

It is my opinion, after many years study and practice, that diseases are not cured by art; but art may so modify the diseased condition that the recuperative powers of the system can thereby induce salutary changes, without which they can not so readily be effected. Thus art, when understandingly applied, may be said to aid Nature in the cure of disease.

Hoose, or Common Catarrh.

Cattle, as well as horses, are subject to a catarrhal affection, known among English farmers as "hoose." This consists of a defluxion from the nasal cavity, accompanied with cough, loss of appetite, and loss of flesh. In popular language, it is nothing more than a common cold, induced by the ordinary causes, such as exposure, errors in diet, and management. It generally appears during spring, or toward the latter part of autumn, when the temperature of the atmosphere undergoes the most sudden changes; and it generally selects its subjects; for many animals, subjected to the ordinary causes of cold, enjoy immunity from the same; hence, I infer that a predisposition to this affection is hereditary, and manifests itself at periodical intervals, without the intervention of the common exciting causes, although they may prove operative in developing a latent disease.

I conceive that it sometimes has an hereditary origin, from the fact that some breeds are more subject to it than others. In some cases, however, this hereditariness exists only so far as the animal is of a peculiar temperament, so that, when removed from a warm to a colder region, it is apt to contract catarrh. This is the case with many of the Alderney breed of cows imported into the northern region of the United States. Ere they have been here long, they have an attack of catarrh, which often runs into the chronic stage, and ends in consumption.

Symptoms.—The first symptom which the farrier will observe, is loss of appetite. Succeeding this are febrile symptoms, such as quick pulse and respiration, heaving at the flanks, dry muzzle, glairy discharge from the nostrils, reddening of the visible surfaces. The limbs are generally colder than usual, and the hair loses its glossiness and appears roughened. The animal will occasionally snort and discharge more or less of glairy mucus, and some soreness of throat may be observed. Such are the early and most noticeable symptoms of this disease; and this is the most proper period for the animal to receive attention, in order to prevent the malady running into the chronic form; for, should it do so, ten chances to one if the case is not called "horn-ail," and thus the poor animal has to submit to a routine of barbarisms, such as boring horns, letting daylight, pepper, and turpentine into the frontal sinuses, much to the annoyance of a sick brute, and very significant of the ignorance of the itinerant cattle-slayer.

Treatment.—The treatment depends somewhat on the condition of the patient, as regards the preponderance of fever or debility. A high-fed animal, abounding in morbific material, and necessarily of a febrile diathesis, must have aperients. Eight ounces of Glauber salts, dissolved in warm water, and sweetened with molasses, may, without the least danger, be administered, followed by a liberal supply of warm, sloppy, bran-mashes; and, should the pulse be voluminous and excessively active, thirty grains of powdered niter may be added to the above, which, in all probability, will reduce the action of the heart. In the mean time, we keep the patient quiet. Withhold all fat and muscle-making food, and allow the patient to breathe a pure and cool atmosphere; for a cool atmosphere is, perhaps, a better sedative than niter, and certainly more requisite; and, after the medicine shall have had time to traverse a portion of the intestinal surface, say a lapse of five or six hours, an enema of Glauber salts may be given, in the proportion of half a pound to half a gallon of water.

In the early stage, and having a plethoric subject under treatment, it may, by some persons, be considered necessary to resort to the fleam; and some highly-educated physicians decide this to be the best course. There may be cases, occurring in pampered and stable-fed animals, which demand a prompt use of the above instrument; but the author has never seen a case of catarrh which, in his judgment, demanded the abstraction of blood. Bleed by the bowels, if there be need of depletion. This is my doctrine. Catarrh, whether it be simple or epidemic, in one feature resembles influenza occurring among horses. It is a prostrating disease, inducing debility. However, I have no desire to force my opinions on any man. Try sanitive medicines; if they have not the desired effect, the judicious practitioner has no other remedy.

We have now only to keep the patient alive while the disease is running its course, and this is accomplished by means of "good nursing." There are a great many remedies that might be recommended, in view of hastening convalescence, but "good nursing" supplants the whole. A sore throat may accompany the malady, and, if so, I recommend the following:

Olive oil	6 oz.
Oil of cedar	1 oz.
Spirit of ammonia	$\frac{1}{2}$ oz.
Tincture of capsicum	1 oz.

Mix.

Apply a portion to the throat twice daily.

In order to promote a discharge from the nasal outlets, we resort to vapor, which may be generated by dropping water or vinegar on a hot brick; and to insure the full effect of the same, I envelop the head with a cloth or blanket, so as to direct the current of vapor through the nasal passages. In view of promoting a nasal discharge, a small quantity of bayberry bark (pulverized) may occasionally be blown up the nostrils, from a quill or a hollow tube of paper. The after-treatment will depend upon the observable symptoms. While a febrile diathesis continues, we depend on sedatives and aperients. In the chronic stage, tonics and alteratives are indicated, and must be resorted to, in view of warding off a chronic cough and its consequences.

Epizootic Catarrh.

Epizoötic catarrh is infectious, yet animals having once had an attack of the same may enjoy immunity from it thereafter. It usually appears and spreads over various parts of the country when great variations in the weather are noticed. It generally appears in the spring, and disappears when the weather becomes warmer and more uniform.

Symptoms.—The symptoms of epizoötic catarrh, in the early stage, do not differ materially from those alluded to in the preceding article (common catarrh). In a very short time, however, the animal begins to grow very weak, and becomes debilitated. Tumors form in various parts of the body, emitting, when pressed, a crackling sound; the glands in the region of the throat are enlarged; the neck, stiff; the odor from the breath and feces is very offensive; the animal loses flesh very fast, and, unless relieved, will surely die.

Causes.—The direct causes of this, like that of any other epizoötic and endemic affection, are involved in obscurity. Speculation is rife as regards the causes of cholera and the potato rot, which probably have analogous origins, but it is very difficult, if not impossible, at the present time, to define the precise character of the morbid germ which, "like a little leaven," leavens the whole body.

Treatment.—The principal objects in the treatment of this malady are to sustain the vital powers, and thus guard against the subsequent prostration and decomposition which, under the orthodox treatment, is sure to occur. The proper mode of treatment is to drench the animal with the following:

Tincture of matico....................	1 oz.
Hyposulphite of soda..................	6 dr.
Powdered golden seal..................	2 dr.
Warm water............................	1 pint.

Having administered the above medicine, anoint the throat and all tumefied parts with a portion of the following counter-irritant:

Oil of cedar..........................	1 oz.
Oil of sassafras......................	$\frac{1}{2}$ oz.
Cod-liver oil.........................	6 oz.
Mix.	

Apply by means of a small piece of sponge. Should the breath become fetid, and the odor from the evacuations almost intolerable, as is often the case, very powerful antiseptics will be needed, to arrest the morbid fermentation. The most efficient and valuable article for this purpose is pyroligneous acid. A couple of ounces of the same may be given in a quart of oatmeal gruel, every four hours, until the odor is exterminated. The diet should consist of well-salted, scalded shorts, sliced carrots, and parsnips. In the absence of rumination, give a drachm of powdered golden seal and half a drachm of carbonate of soda, twice in twenty-four hours.

Consumption.

This disease, as it appears among cattle, is supposed to be the sequel of other diseases of the respiratory apparatus, and some writers contend that phthisis is the termination of chronic disease of the lungs, characterized by the formation of tubercles within the substance of the lungs.

Symptoms.—The most notable symptoms are emaciation, debility, cough, fever, and purulent expectoration. Expectoration, however, is a feature of this disease, more marked in the human subject than among horses and cattle; yet, in the last stages, we occasionally observe nasal discharges of a purulent character. In diagnosing this disease, it is necessary to make ourselves acquainted with the history of the case, and the physical conformation of the animal; for, if the patient be the subject of neglected catarrh, bronchitis, or any other pulmonic or pleuritic difficulty, we have the data for an intelligent diagnosis; provided the physical conformation corresponds to that which physiologists regard as susceptible of phthisis; namely, a lean, lank organization, associated with an active, nervous temperament.

Referring to PERCIVALL for evidence on the subject now under consideration, I find that he considers a colt having long legs, overgrowth, narrow chest, flat sides, pot belly, and an appearance of weakness and unthrivingness, a capital subject for phthisis. A cough occurring in such an animal, of a feeble, painful, hoarse, rattling, or gurgling character, shows conclusively that disorganization of the lungs has commenced. The cough will also be accompanied by a sound which gives us an idea that it is deep-seated.

Causes.—Aside from the well-known direct hereditary causes which are known to exist in breed, there are others operating insidiously to produce disease and altered structure in the lungs. The climate may be prejudicial. I have known this disease to make its appearance among cows unsuited to our New England climate—the Alderneys, for example. On the other hand, if cows be removed from a warm, comfortable location, or barn, to a region involving a material difference in temperature, a derangement of the respiratory system is very apt to occur. It may appear at first under the guise of a simple bronchial affection, which insidiously steals on until the substance of the lungs is affected. Animals shut up in close and hot stables, where they can not obtain sufficient oxygen to vitalize or decarbonize the blood, are apt, after a short time, to die of tuberculated lungs; or, perhaps, a worse form of disease, known as infectious pleuro-pneumonia, soon terminates their wretched existence. Impure air is at all times operative in exciting pulmonary affections. The least deviation from purity may occasion very serious difficulties; therefore, it should be the business of the farmer to see that his cattle have constantly an abundant supply of pure, uncontaminated air—the breath of life.

Treatment.—In the first place, the patient must be removed to a comfortably warm and well-ventilated barn. Should the weather be chilly, a blanket may be thrown over the body; and it will be expedient, also, to clothe the limbs, up to the knees and hocks, with strips of flannel. By this means we promote cutaneous and subcutaneous circulation, and every drop of blood invited and maintained at the surface in the extreme vessels tends to prevent internal congestions. Without proper attention to these matters, we might as foolishly attempt to raise a dead cow to life. Next, the patient, whose appetite is almost sure to be impaired, should be fed on that kind of food which contains more carbon and nitrogen than common hay; namely, oatmeal. In case of a complete suspension of rumination (loss of cud), a due proportion per diem of oatmeal gruel, sweetened with some saccharine matter, may be administered from a bottle. Every morning the patient should have four ounces of the best cod-liver oil. This can be continued until its action is made manifest by purging. Every evening, give the patient a dose of the following:

Powdered phosphate of lime..........	3 oz.
Powdered bloodroot..................	1 oz.
Powdered bayberry bark.............	4 dr.
Powdered sassafras..................	2 oz.

Divide the mixture into sixteen parts. The above is, according to my experience, the most rational method of treating this disease; but the farmer must not feel disappointed if he fails in arresting it, for it frequently baffles the most consummate skill.

Pharyngitis (Sore Throat).

The term pharyngitis signifies inflammation of the membrane lining in the pharyngial inlet, or funnel-like entrance into the œsophagus, or gullet.

Symptom.—The diagnostic symptom of this affection is as follows: The subject is unable to swallow, and thus the food taken into the mouth is apt to be returned by the nostrils. This happens occasionally, although the passage of the nasal inlet is much smaller than it is in the horse. On exploring the inferior region of the throat, from ear to ear, considerable swelling or tumefaction is encountered, yet the pharyngial muscles appear to be constricted. It generally appears among cattle as a simple local affection, yet it often accompanies other diseases of the respiratory character, and whenever it does appear as a local malady, it is apt to merge into something else. It is a very distressing affection, and the animal gets but little relief until suppuration commences; then a free discharge takes place.

Treatment.—Let the animal's throat be rubbed twice daily with

Oil of cedar	1 oz.
Cod-liver oil	6 oz.
Spirits of ammonia	2 dr.
Mix.	

Keep a sloppy bran-mash before the patient, or some flaxseed tea, into which stir a small quantity of powdered niter of liquorice. This will relieve the cough, if any be present, and tend to lessen irritation of the lining membrane of the pharynx. When the patient begins to expectorate, or has the least discharge from the nose, give

Balsam of tolu	2 oz.
Sweet spirits of niter	3 oz.
Mucilage of gum arabic	8 oz
Mix.	

Dose, one wine-glassful, twice daily.

Description of the pharynx.—The pharynx is the commencement of the tube known as the œsophagus, or "gullet." It is a funnel-shaped cavity, lodged between the mouth, gullet, and windpipe. The pharynx is composed of muscular and membraneous tissues. The most important muscles which enter into the composition of the pharynx are the constrictors. They give the membrane forming the funnel-shaped sac a complete covering, and their function is to force the food beyond the action of the tongue, into the œsophagus. The pharynx is divided from the mouth by the soft palate and the epiglottis; therefore, except in the act of swallowing or coughing, there is no direct communication. The interior of the pharynx is lined by a membrane having within its structure a vast number of minute glands, with excretory ducts, from which a viscid or lubricating fluid issues. This lubricates the pellets of food, so that, by this process, their passage into the œsophagus is insured without the casuality of friction.

PULMONARY APOPLEXY.

This disease occasionally appears among cattle in the Western States. It attacks animals irrespective of age, sex, or condition.

It is generally sudden in its attacks, and death frequently ensues in the course of a few hours.

Symptoms.—The pulse and respirations are very much accelerated, the former sometimes running as high as 110; an augmented salivary secretion is observed to run from the mouth; the tongue is much swollen; so, also, are the eyelids, and tears run down each side of the face; various parts of the body are swollen and congested; the stomach is distended with gas, and the evacuations are profuse and watery. *Post mortem* examinations reveal a highly-congested state of the lungs; in fact, they are engorged with blood, and the muscles in the region of the tumefied parts are in a similar engorged condition.

Treatment.—No time should be lost in administering the following drench, for it will preserve the tissues against decomposition, and, perhaps, save the animal:

Pyroligneous acid	12 dr.
Water	1 pint.
Tincture of matico	1 oz.

Repeat the dose after a lapse of six hours, and rub the tumefaction occasionally with

Oil of cedar	1 oz.
Tincture of capsicum	2 oz.
Tincture of bayberry bark	4 oz.
Mix.	

It appears that in this disease there is a morbid impulse directed to various parts, which results in local accumulations, rendering the parts turgid. Then the blood is thrown out of the capillary vessels, and sometimes they suffer a rupture, which accounts for the engorgement and extravasation.

As there is generally some effusion present in this malady, some good may be accomplished in acting slightly on the kidneys; yet, as the pulse and respirations are both accelerated, the ordinary diuretic (sweet spirits of niter) is not admissible, for the simple reason that it is too stimulating; therefore I recommend the use of common niter—half an ounce, every four hours, to be given in a little water. The tumefied tongue should be rubbed often with table salt. The animal does not require any kind of food until amendment takes place. The best drink for the patient is cold water, to which a little table salt may be added.

Pleurisy and Description of the Pleura.

The delicate, transparent membrane which lines the cavity of the thorax, or chest, is duplicated as an external tunic on the lungs, and forms a partition called *mediastinum,* which divides the cavity of the chest into two equal parts, termed right and left cavities of the thorax. It is, therefore, a reflected membrane. That portion which gives a lining to the chest is termed *pleura costalis,* and that which invests the lungs is called *pleura pulmonalis,* although, at all points, they are precisely similar in structure and function. The pleura is called a *serous membrane.* It is dense, shining, and transparent; its texture is penetrated by blood-vessels, nerves, absorbents, and exhalents. The minute ramifications of the arteries give origin to a vast number of exhalents; and these furnish a serous or watery vapor, which is distributed over every part of the pleura, and thus all friction and irritation is prevented. In the disease known as hydrothorax (dropsy of the chest), the effused fluid found in the cavity of the thorax comes from the exhalents. The absorbents play a very different part. Their function is to absorb or drink up any superabundant serum or blood that may be found in the chest. The functions of these vessels, however, are limited; for when, in consequence of disease, augmented serous secretion takes place, the absorbents are unequal to the task imposed on them, consequently the subject of hydrothorax often dies with his chest loaded with water.

Symptoms.—This disease is generally ushered in like other febrile affections, by fever and trembling of the fore extremities. The cough accompanying pleurisy is painful, and the animal tries to suppress it as much as possible. The breathing is not laborious, but short, the intercostal muscles not admitting of their usual extension and contraction without intense pain. The diaphragm has to perform the respiratory movement, without the aid of the former muscles. . If slight pressure be made on the intercostal spaces, between the ribs, the animal will evince symptoms of intense pain. If a person attempts to back the patient, the latter will moan or grunt, and be very unwilling to move. The patient stands with his fore-legs wide apart, and seldom, if ever, lies down. On applying the ear to the sides of the chest, a slight sound, resembling that of friction, is discernible. This is probably occasioned by the presence of effused lymph on the pleural surfaces. The pulse is generally quick, tense, and small. These are the principal symptoms of pleurisy in its early stage. They will vary as the disease progresses, or become complicated. The minor symptoms, such as loss of cud, etc., are not worth noticing, as they are present in various other forms of disease.

Treatment.—Give two drachms of fluid extract of gelseminum every four hours. This acts as a powerful sedative, and will soon afford much relief. In the mean time, let a preparation of mustard and vinegar be applied to both sides of the chest and breast. The patient should now have one ounce of powdered chlorate of potass, dissolved in flaxseed tea or thin gruel. This may be given morning and evening. Should the animal refuse to drink it, give it as a drench, by adding to it one pint of water. In view of mitigating the cough which may be present, and of relieving pain, the patient may be made to inhale an ounce or so of sulphuric ether from a sponge, the latter being merely covered with a towel, except that part which comes in contact with the nostrils. It would not be proper to completely etherize the animal, but merely to stupefy him for a time. This will have an antispasmodic effect, and may be repeated, or not, at intervals of four hours, according to the nature of the effects produced.

It will be proper to administer an occasional enema, and this should be of an antispasmodic character; therefore an infusion of lobelia is recommended. The very moment the animal appears to be relieved of urgent symptoms, the treatment should not proceed on the same principles. The intention should be to guard against debility and hydrothorax, two mortal enemies to the bovine species. Golden seal and buchu are the best remedies to prevent the one and guard against the consequences of the latter. They may be given in the following proportions:

Powdered golden seal..............	2 dr.
Tincture of buchu..................	4 fluid dr.
Hyposulphite of soda...............	3 dr.
Water..............................	1 pint.

This quantity is sufficient for a period of twenty-four hours. The animal appearing much better will be the signal to discontinue all medical treatment.

SECTION III.

DISEASES OF THE DIGESTIVE ORGANS.

Description of the Œsophagus—Foreign Bodies in the Gullet—Œsophagotomy—Laceration of the Œsophagus—Aphthæ—Description of Stomach—Rumination—Bloat—Distension of the Rumen with Food—Gastro-Intestinal Inflammation—Dentition of Cattle—Synopsis of Dentition—Suspended Rumination, or Loss of Cud—Inflammation of the Bowels—Invagination of Intestine—Diarrhea—Chronic Diarrhea—Gut Tie—Internal Rupture of Oxen—Flatulent Colic—Spasm of the Bowels—Constipation of Bowels.

Description of the Œsophagus.

THE œsophagus, or gullet, extends from the mouth to the stomach, and passes down the left side of the neck, outside of the windpipe, between the two first ribs, and then runs backward, along the upper part of the thorax, until it reaches the diaphragm. Having passed through the latter, it enters into the mechanism of the digestive canal. It is composed of three coats. The outer one is made up of cellular substance, and admits of much distension. The middle one is muscular, and composed of two layers, arranged spirally, and running in opposite directions; that is to say, the fibers wind round the gullet, in contrary directions. This allows or aids the food which has been masticated to pass down the tube into the first compartment of the stomach, viz., the paunch, and, by a reverse action of the other set of spiral muscular fibers, the pellet (cud) ascends into the mouth for remastication. The inner or third coat is similar in structure to the pharyngeal membrane, or that which lines the pharynx, yet it is so arranged as to admit of considerable distension.

Foreign Bodies in the Gullet.

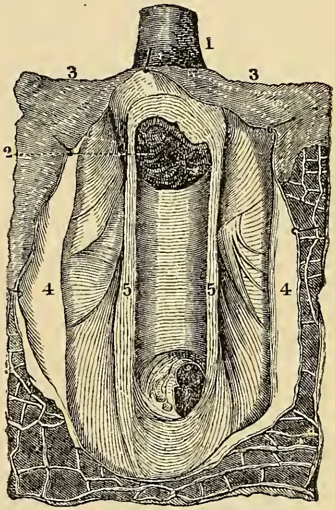
When an animal attempts to swallow a substance too large for the caliber of the œsophagus, it becomes impacted in the same, and the creature is said to be choked. On examining the left side of the neck, the foreign body can be both seen and felt. When an accident of this character occurs, half a pint of olive oil should immediately be administered. This will lubricate the internal surface of the œsophagus, and aid us when attempting to force the impacted material toward the stomach. Before any attempts are made to introduce the probang, some efforts should be made to manipulate the obstruction, and thus force it downward. If it can be felt, yet can not be moved by external manipulation, there is very little chance for the animal; yet we are not without resource. The probang is our remedy. This is to be introduced through the mouth-piece into the œsophagus. Some slight degree of force may be used to push the obstruction downward. If that fail, no time should be lost in futile efforts, and an operation must be performed termed œsophagotomy.

Œsophagotomy.

This operation is performed as follows:—Place the animal in the trevis, or cast, and etherize him. Then make an incision over the region of the obstruction, through the skin and subcellular tissues. The œsophagus will then be seen. The only vessels in this location that are of any consequence are the jugular vein and common carotid artery; but there is no danger of wounding them when the œsophagus is distended. The obstruction having been found, an incision is to be made through the coats of the gullet sufficiently large to admit of the extraction of the incarcerated body. So soon as this desirable object is effected, the edges of the gullet may be closed by sutures or stitches, one end of which should be cut off close to the knot, and the other left long enough to hang out of the external wound. The integuments are then to be brought together by another set of stitches, taking care to leave a small orifice at the lower part of the neck, for the escape of any morbid matter. The wound, with the exception of this orifice, should be well coated with collodion or liquid cuticle. For a few days after the operation, the patient should be kept on a light, sloppy diet, sufficiently seasoned with common salt to prevent fermentation. In the course of a fortnight the wound will be quite healed.

Laceration of the Œsophagus.

This accident very frequently occurs from the objectionable practice of attempting to force a foreign body, such as an apple, potato, or turnip, that the animal has greedily attempted to swallow, down the œsophagus into a more dilated part of the digestive apparatus, by means of such rude instruments as a whip-stock or common stick, in lieu of a proper instrument, known as a probang. The operator sometimes succeeds in removing the obstruction, but soon a swelling is observed in the region of the neck. The animal evinces signs of pain, and symptoms of suffocation ensue. In such cases it is evident that the œsophagus is ruptured. The following, from the author's case-book, is introduced in view of showing the folly of forcibly removing such obstructions:



SECTION OF A COW'S STOMACH.

Explanation.—1, A portion of the œsophagus, or gullet; 2, The terminating portion of the gullet; 3 3, Lining membrane of the first compartment of the stomach; 4 4, Portions of the lining membrane of the second compartment of the stomach, dissected and raised, so as to show the muscular mechanism beneath it; 5 5, The lips of the demi-canal, which are the boundaries of the groove. At the lower part is the entrance into the third compartment of the stomach, termed "many-plies."

October 10, 1855.—Saw a cow, at Feltonville, the property of Mr. Welch and others. The animal had calved about ten days previous, and done well. Two days after parturition she was purchased by another man for the above party, and driven to her new home. On the way thither she *picked up an apple and got choked.* The apple was discovered in the upper half of the œsophagus. The attendant tried to manipulate it either one way or the other, but, failing in this, he procured a whip-stock, and forced the foreign body toward the rumen. This induced convulsions, and the subject threw herself violently down, with the whip-stock in her throat. This feat she repeated several times, to the imminent danger of limb and life. She shortly, however, recovered, and appeared to do well, and the next day, I believe, was received by the above firm. After a brief space, she appeared to be "ailing," and the owners, thinking the apple was the cause of the same, gave her a full dose of oil. Soon afterward inverted peristaltic action took place, and, whenever she attempted to swallow fluids or solids, vomiting or regurgitation took place. This was her condition at the same time I saw her—ten days after the first attack. I prescribed alkalies and counter-irritation. Next day she appeared better; that is, the vomiting had ceased. She was then drenched with Glauber salts and spearmint, and during the next day received several alkaline injections, and such other treatment as the urgency of the case seemed to require. Notwithstanding this, she died on the third day from my first visit. The owner, in accordance with my request, notified me of the death, and I made an autopsy. The heart, lungs, liver, spleen, pancreas, kidneys, stomach, and bowels all appeared in a healthy state. They presented, however, evidences of debility, in the condensation and pale aspect of their tissues. The omentum-caul was exceedingly dense, scarcely thicker than a piece of writing paper. Tracing the œsophagus internally from the mouth to its termination, or base, there were no symptoms of laceration or inflammation; but in the dilated portion of the same, which is contiguous, and receives food after primary mastication, I found a mass of juvenile corn-stalks, about the size of a man's fist, and twice the length of the same—seven inches. This part being considered as the termination of the œsophagus, and commencing link of the stomach, was distended beyond its ordinary capacity, and in a high state of gangrene (mortification), and particles of corn-stalk were protruding through its disorganized and lacerated tissues. This accounts for the death; but the reader will probably want to know something about the cause, and may, possibly, say that the whip-stock was the exciting one. This would appear, on first thought, as a rational conclusion, because many valuable animals, both in *this* and the *mother* country (as records show) have been destroyed by lacerating the œsophagus with the above or some such instrument; and we might reasonably assign the cause of death to the same, and thus terminate this article. But my readers, I opine, desire the truth, and nothing but the truth. I am satisfied that the whip-stock, however injurious it may have been in other cases (and it is in most cases an objectionable remedy), was inoperative in this; that is, so far as the vitality of the animal was concerned. Now for the proof. The seat of the disease proved to be, by careful measurement, forty-three inches from the tip of the lips. The whip-stock was three feet six inches in length, and, according to the testimony of the operator and others, six or eight inches of the same never entered the mouth. Computing the medium at seven inches, the reader will perceive that the diseased location was just seven inches beyond the reach of the instrument.

How, then, are we to account for the death of the animal? I shall try to satisfy the reader on this point. The animal, at the time of purchase, had not recovered from the pain, labor, and excitement of parturition. She was an invalid; in the same condition, yet less well provided for than her lordly mistress, who has the advantages of science, skill, and sympathy to alleviate her woes and mitigate her pains. The poor brute was compelled to perform a journey when she ought to have been kept at rest, and kindly cared for. The common sympathies of our race ought to have been extended to her. She ought to have been dosed with groaning cordial, instead of corn-stalks; and, instead of performing a journey through apple orchards, she ought to have been kept at home until health and strength reappeared.

Changes in food, location, and barn management, are, at times, and under certain circumstances, operative in inducing disease, especially when the subject be in a weak or delicate condition. Corn-stalks, therefore, being very indigestible, tend to overtax and irritate the stomach, and the oil, probably, induced nausea. In efforts at vomiting, the rough particles of food found a lodgment at the point indicated, where they accumulated, produced irritation, inflammation, and, finally, mortification. The direct cause of death, therefore, was obstruction within the gullet; the morbid appearances were the consequence of the same.

The best instrument I know of for the accident of choking, or obstruction within the gullet, is a flexible probang; but, as that instrument is not always to be obtained, every farmer should be provided with the next best instrument, which consists of a piece of smooth, flexible rattan, about five feet in length, armed at one end with an oblong ivory ball, which must be securely fastened. If much force be used, laceration of the œsophagus is apt to occur; therefore, if the foreign body will not yield to gentle pressure, I should pour down a little olive oil, wait awhile, and then try the probang again. If, however, the foreign body can be detected, and the probang fails to remove it, we should immediately perform the operation of œsophagotomy, which consists of making an opening into the gullet large enough to remove the former, and then bringing the divided edges together again by means of sutures (stitches).

Cases like the above (when the medical man is not called on until after the lapse of several days from the time of the accident) do not admit of the introduction of a probang.

The following case, which occurred in the practice of W. Sanders, student Royal Veterinary College, goes to show that an animal should never be consigned to death until the skill of a qualified person proves unavailing: "In the month of March, a young Alderney cow became choked with a Swede turnip, which was found to be impacted about the termination of the third of the cervical portion of the œsophagus. The owner immediately sent for a person whom he had been in the habit of employing, but who, not having a proper probang, substituted a common ash stick. After some difficulty, the obstruction in this way was removed. In the course of a fortnight the neck was found much swollen, and the animal not only evinced a great deal of pain, but sometimes, as I was informed, appeared as though threatened with suffocation. It was supposed that the œsophagus must be ruptured, in consequence of, as it appeared, a considerable portion of food having protruded between the muscles of the neck, just anterior to the sternum. A small orifice was made through the skin, and a portion of the food (for food it proved to be) removed. The cow continued to get worse for several days, and putrefaction had apparently commenced. The attendant now advised the owner to have the cow slaughtered; but, as her condition precluded the prospect of selling her advantageously, it was deemed expedient to risk the chances of recovery, especially as she was young and in calf. Under these circumstances, my brother, who resides in that locality, was consulted. On his arrival he gave but little hopes of recovery, seeing she was to so great a degree debilitated. A stimulant was administered, and an incision, about seven inches in length, was made in the most depending part of the swelling, through which more than a quarter of a peck of food was removed from between the muscles. The wound being now held open, and a candle placed in front, the rupture of the œsophagus became quite apparent. It proved full three inches in length. The wound was cleaned. A common side-saddle was placed upon her back, and fastened on with a girth in the usual manner; a small-sized piece of ash-wood was shaved so as to render it pliable at one end. The large end was then tied to the crupper-loop of the saddle, and passed then between the pummels, which kept it in its place, and elevated it half way along the neck. The œsophagus at this part being rather deep-seated within the loose fleshy part of the dewlap, it was not convenient to pass sutures through the edges of the laceration. A pledget of tow, dipped in some digestive, was put into the wound, and pressed against the ruptured part. A pad of flannel was then placed over the outside, and a broad bandage, with some thin but flat pieces of wood sewn to it, to prevent its becoming too narrow. This was carried round and over the stick above the neck, which, being pliable, acted as a spring, that kept a moderate but equal pressure as she moved her head up and down. She was mainly supported upon gruel made of barley and bean and wheat flour; but in addition, occasionally, was allowed a little green food. Tonics and stimulants were administered. Any food that accumulated in the wound was removed, and it was regularly dressed twice a day. Three weeks after she calved a live calf; but, from the weakness before parturition, she became so reduced as to require assistance to get up for a short time. I went home from college on the 6th of May. On the 8th I saw her myself. There was then a small circular opening, leading into the œsophagus, sufficiently large to admit the finger, which was prevented healing by the frequent escape of food. The edges of the wound were thickened, and apparently healed over. They were occasionally scarified, with the view of promoting cicatrization; for it was my opinion that, should the wound heal, it would leave a stricture in that part of the tube, and consequently render the animal susceptible of becoming again choked. The food continued to pass, more or less, through the opening until the beginning of June, when the wound became entirely closed. Since then she has become again in calf, and from that has continued to go on well; nor has she ever, that I am aware, again shown any symptoms of choking, although she has taken her chance as to the nature of her food. She is still in the same person's possession; cousequently I know, from the information I have received, that she continues, up to the present time, apparently as well as ever she was; and it is now eight months since the wound healed over."

APHTHÆ.

This disease is commonly known as "thrush, or sore mouth. It appears as a vesicular eruption on the tongue, gums, and on the buccal and palatine membrane. When the disease is mild, and confined to the above parts, it is easily cured by daily applications of a portion of the following:

Powdered golden seal	2 oz.
Tincture of matico	1 oz.
Honey	4 oz.
Mix.	

Apply by means of a swab or sponge.

When the disease is violent and of long standing, it is apt to extend through the whole course of the alimentary canal, from the mouth to the anus. If this be the case, the animal will purge, as if a powerful cathartic had been administered, and will be otherwise unwell. The method of cure, in this event, is to prescribe tonics and astringents. The remedies are tincture of matico, golden seal, and sulphur, in the following proportions:

Tincture of matico	4 dr.
Powdered golden seal	2 dr.
Sulphur	2 dr.
Water	1 pint.
Mix.	

The patient's diet should consist of oatmeal gruel, slightly alkalized with hyposulphite of soda.

The following article upon epizoötic aphthæ is from the "Veterinarian:"

"Epizoötic aphthæ, commonly known as foot and mouth complaint, is a febrile, very contagious, and panzoötic affection; that is, readily communicable from one species to another—met with in the horse, goat, pig, fowl, hare, etc., but most commonly in the ox and sheep, in which two last-mentioned animals it consists of vesicles breaking out on the mouth, gums, lips, teats, and around the coronary surface of the foot, between the skin and the hoof. It is an epizoötic affection, spreading over large tracts of country, interfering very seriously with the capability of the ox to put on fat 'while preparing for the butcher,' and in the milch cow, rendering the supply of milk small, if not altogether suspending it. In this disease the ox exhibits the following symptoms: Suspension of rumination; constipation; sometimes, though rarely, diarrhea; great flow of saliva from the mouth, and severe lameness.

Milk taken from cows affected with this disease should never be drank, as it will most readily produce aphthæ in man. To prove this fact, Professor Hertwig, together with two medical men, Mann and Vilion, drank the warm milk of an aphthous cow, and the result was that each became the subjects of severe inflammation of the throat, associated with the vesicular eruptions mentioned above as indicative of this malady. Professor Simonds also gave the warm milk of an aphthous cow to pigs, with a similar result."

Description of the Stomach.

The stomach of a ruminating animal presents a very complex arrangement, of which the purpose seems to be to favor the mechanical reduction of the food, and its impregnation by the salivial and gastric fluids, before it is subjected to the action of the biliary and pancreatic juices.

The stomach of an ox is divided into four parts or cavities, viz.: rumen, or paunch; reticulum, manyplus, abomasum.

The rumen, like the œsophagus, is composed of three coats. The internal one is studded with numerous papillæ, which incline in the direction that the food takes. They are erectile, and by inclining in different directions, they can, to a certain extent, favor or oppose the passage of food.

The openings into the rumen are two—one at the base of the œsophagus, through which the food and fluids pass; the other is below this. It is much larger, and communicates with the second stomach. The paunch is not so highly organized as some other parts of the stomach. This compartment is capable of extraordinary distension, and, in some cases of tympanites, becomes so distended as to produce suffocation by pressure on the diaphragm and lungs.

The reticulum, or second stomach, sometimes called the honeycomb, presents a very irregular surface, consisting of open cells, varying in size and depth, looking very much like a piece of honeycomb on a large scale. There are two openings into this stomach—one through the floor of the gullet, the other into the paunch. The pellet of food to be returned for remastication is thrown into the œsophagean canal by the reticulum.

The manyplus, sometimes called manyplies or manyfolds, is made up internally of laminæ, or leaves, which hang down from every part of it. By this arrangement an immense digestive surface is crowded into a small space. The cuticular covering of these leaves or laminæ is very singular. It is thickly studded with eminences, varying in size and form. In some places they resemble little hooks, others look like papillæ; some are soft, others are hard and durable, like horn. The function of the laminæ and papillæ is to comminute and properly prepare the food ere it enters the fourth compartment.

The abomasum is the true digestive stomach. Its function is to secrete the gastric juice; at least the gastric juice is secreted by small glandular bodies, having ducts which terminate on the villous membrane, which lines the abomasum. The lower orifice of this part of the stomach is termed pylorus. It is guarded by a projecting body, which answers the purpose of a sphincter muscle, to guard against regurgitation from the duodenum.

Rumination, or Remastication and Ingestion of Food.

The ox, a member of the group ruminantia, has four compartments in the stomach, yet two of them are nothing more than dilatations of the œsophagus.

The food having been gathered by the lips, tongue, and teeth within the mouth, it undergoes a grinding process between the molars, and receives the admixture of salivial fluids secreted by the submaxillary, parotid, thyroid, and sublingual glands. It then passes down the œsophagus into the paunch. The character of the food, however, regulates its passage into the various compartments. If the pellet of food be solid, the paunch receives it; if it be semi-fluids, it goes beyond the paunch to the second and perhaps third compartment. This is the case with a sucking calf. The milk, which forms its nutriment, requires no remastication, and, therefore, passes directly into the true digestive cavity—the fourth compartment.

It appears, therefore, that the functions of digestion and remastication are involuntary, and are governed by the same sort of power which causes the heart to pulsate, expands the lungs, secretes the bile, pancreatic juice, etc., without the aid or consent of the animal. We may, however, to a certain extent, increase or decrease these functions, by artificial means; but their primary operations are uncontrollable, simply because they are involuntary. Some persons have doubted the fact of rumination, and if any of my readers be skeptical on this subject, let them satisfy themselves by experiment. The best subjects for demonstrating the acts of rumination are animals with lean necks. For example, let a person stand on the left side of the animal, in the region of the neck (supposing the latter to be in the ruminating mood). He perceives the cud re-ascend through the gullet, and re-descend again into the stomach. At the period of re-ascension, place the ear in the region of the gullet, and a gurgling sound will be heard, different from that accompanying re-descension. The action has been described as undulating, alternate, coming and going, like the motion of a ship; but this is regulated by the respiratory movements and different attitudes of the body. We can, however, at the moment of the reascent, perceive a flank movement, deep inspiration, succeeded by a rapid expiration, showing conclusively that a powerful nervous concurrent force (involuntary) controls the action of rumination.

Finally, the cud can be made to ascend or descend, in the following manner: We perceive the cud descend; now grasp the gullet firmly, and it re-ascends into the mouth. We next perceive the cud ascending; arrest it by compressing the gullet, and it rapidly descends again into the stomach; hence the phenomenon of remastication can readily be demonstrated.

The solid food, when once in the paunch, receives the admixture of fluid secreted from its walls. After maceration for a short time, the more solid parts are returned to the mouth, where they undergo another mastication, and are again saturated with the salivial fluids and swallowed. If properly masticated it reaches the third stomach (manyplus or omasum). Here it undergoes a further reduction, becomes quite pulpy, after which it enters the fourth stomach.

Carpenter thus describes the phenomena of rumination: "The direction of the food into one or the other of the digestive cavities, appears to be affected without any voluntary effort on the part of the animal itself, but to result simply from the very peculiar endowments of the lower part of the œsophagus. This does not entirely terminate at its opening into the first stomach or paunch, but it is continued onward as a deep groove with two lips. By the closure of these lips it is made to form a tube, which serves to convey the food onward into the third stomach; but when they separate, the food is allowed to pass either into the first or second stomach. When the food is first swallowed, it has undergone but very little mastication; it is, consequently, firm in consistence, and is brought down to the termination of the œsophagus in dry bulky masses. These separate the lips of the groove or demi-canal, and pass into the first and second stomachs. After they have been macerated in the fluids of these cavities, they are returned to the mouth by a reverse peristaltic action of the œsophagus. This return takes place in a very regular manner, the food being shaped into globular pellets by compression within a sort of mold formed by the ends of the demi-canal, drawn together, and these being conveyed to the mouth at regular intervals, apparently by a rhythmical movement of the œsophagus. After its second mastication, it is again swallowed in a pulpy semi-fluid state. It now passes along the groove which forms the continuation of the œsophagus, without opening its lips, and is thus conveyed into the third stomach, whence it passes to the fourth."

Bloat, Hoven, or Tympanites.

The term "bloat" has long been discarded by veterinarians as an indefinite term, signifying a state of turgescence, dilation, inflation, or puffiness, which is merely indicative of changes in the form and condition of parts, without regard to the actual seat or nature of the difficulty. For example, a horse is bloated when he becomes the subject of subcellular emphysema (distension of the cellular membrane beneath the skin with gas), or œdema (dropsical tumefaction), etc. However, as every farmer appears to be somewhat conversant with the condition of the animal known as "bloat," or "hoven," we shall not offer any remarks calculated to mystify him, but merely suggest that the term tympanites be substituted for "bloat." *Tympanites intestinalis* signifies a distension of the intestines with wind or gas, accompanied by an elastic distension of the abdomen. The latter, when struck or sounded by a blow, sounds like a drum, and indicates a windy distension of the abdominal viscera (a bowel or organ within the body), commonly known as flatulent colic. *Tympanites rumenites* signifies distension of the rumen in the bovine species—the ox and cow—and, in the phraseology of the grazier, is known as bloat or hoven.

Causes.—The direct cause of flatulency and windy distension is imperfect digestion. In such cases the food, instead of undergoing the normal process of digestion, whereby it is converted into chyme and chyle, ferments and evolves gases, either carbonic acid, or sulphureted hydrogen, and, as "a little leaven leavens the whole loaf," so the fermentation, once commenced in the stomach, goes on until the food is in a state of putrefaction, or up to the period when all its gaseous material has been extracted. Before this takes place, it frequently happens that the animal dies, either by rupture of the rumen or some portion of the abdominal viscera. In some cases, unrelieved, the distension is so great that the animal dies in a state of suffocation, occasioned by the pressure on the diaphragm, and other important parts and organs.

Imperfect indigestion may be occasioned by a deranged condition of the digestive organs, induced by various causes, such as give rise to the same phenomena in man, namely, errors in diet, or sudden changes of the same. Thus, if stall-fed animals be turned into a field of clover, or into a luxuriant pasture, they not only eat greedily, and create an undue distension of the stomach, but they partake of food containing a large amount of aqueous matter, which, every one knows, is more indigestible than dry food; and such a sudden change of diet is not always to be tolerated. There can be no dispute about the causes of bloat, hoven, or tympanites. It evidently is occasioned by imperfect digestion. As a general proposition, therefore, we may contend that all indigestible matter may, directly or indirectly, produce a tympany of the abdominal viscera; and we may also contend that an animal may occasionally become tympanitic, under the most intelligent management, owing to some inherent idiosyncrasy in the local organs, honestly inherited from sire or dam, or their ancestors. Hence, the reader will infer that this dyspepsia, or indigestion, is, like various other diseases which seem to appear without any direct cause, transmissible, not always directly, but by predisposition to this and other maladies, which is said "to lurk in breed and conformation," over which we have but little control other than palliative.

Treatment.—Supposing the abdomen to be distended to its utmost capacity by the extricated gas, and the animal is oppressed and distressed in the act of breathing, there is no time to be lost. It is useless to resort to drug medication. The case is imminent. The gas must be evacuated immediately, and we therefore puncture the flank on the left side, in its most salient region, by means of the trocar and canula (an instrument somewhat similar to that used for tapping the chest). Immediate escape of the gas is the result, and the patient is soon relieved. Now we may resort to medication, and that medicine is the best which is calculated to arouse the action of the stomach and arrest fermentation. With these objects in view, I recommend the following:

Hyposulphite of soda..................	4 dr.
Tincture of ginger......................	2 oz.
Water...............................	1 pint.

Dissolve the hyposulphite in the water, and then add the tincture of ginger. Drench the animal with the same. If the tincture of ginger can not be obtained, then substitute four drachms of the pulverized root. If the case be curable, the above treatment is almost sure to afford relief. The medicine, however, may be repeated at the end of four hours, if necessary.

Remarks on the introduction of the Trocar.—Having ascertained that the animal is in a dangerous condition, owing to the great quantity of gas present within the rumen, the most prominent point of the left flank should then be selected. Here make an incision through the integument, sufficiently large to admit the instrument. Then draw the skin upward, and puncture the abdomen; in this way we make an indirect opening, so that, when the trocar is withdrawn, the integument covers the orifice made last. The trocar must be kept very sharp or keen, so that it may, without using much force, penetrate the peritoneum, and, lastly, the rumen. Once within the latter, all resistance ceases. The trocar is now withdrawn, and the canula remains, for the passage of the gas. In bad cases, the moment the cutting instrument is withdrawn from its sheath, the gas will escape, with a noise resembling a steam-whistle, which conveys to us the idea that we are in the presence of a living locomotive, issuing a blast of warning to keep out of smelling distance, for ofttimes the odor is intolerable.

It is best to let the tube remain in the stomach or paunch until the abdomen is reduced to about its natural size. The instrument must occasionally be drawn forth a little, or pushed forward, as the case requires; and when it becomes obstructed with any portion of the contents of the stomach, a quill or straw may be used to clear the obstruction, and, as the gas escapes and the paunch or bowels recede, the canula, which is about six inches in length, must be pushed forward as far as it will go.

Relief may sometimes be obtained by passing the probang into the stomach, and I should advise its use in such cases as those attended by eructation of wind by the mouth from the stomach.

Distension of the Rumen with Food.

It occasionally happens that the function of the stomach, as a whole or a part of the same, become impaired. The food is then very apt to accumulate in the rumen. Or it may happen that an animal has partaken voraciously of meal or corn, which, becoming saturated with the fluid found in the paunch, swells to such an extent that there is danger of its bursting.

Symptoms.—At first the animal is noticed to be uneasy, and frequently shifts its position; occasionally moans; the left flank is swollen and hard. This swelling may be determined by a person taking a position directly behind the animal; he will immediately perceive the enlargement. On striking the part with the hand, it has no drum-like (tympanitic) sound, as in hoven or bloat, but has a solid sound, showing that the distention is owing to the presence of a quantity of solid food. Should the medicinal preparations fail to relieve the animal, rumination then ceases, the symptoms become aggravated, the brain sympathizes, unconsciousness and convulsions occur, which soon end in death.

Treatment.—In cases of extreme distension, it is all folly to waste time in administering medicine. An incision, about five inches in length, should be made through the left flank into the stomach. Then, by means of the hand, the indigestible mass is to be removed. This should be done carefully, so as to prevent the food falling into the abdominal cavity. The incision made into the rumen is then to be stitched, or sutured; and, lastly, the integuments are brought together in the same way. It may be proper to apply a little tincture of matico or tincture of aloes to the wound. Having finished the operation, the next object is to arouse the action of the stomach, for which purpose I recommend the following:

Powdered golden seal	3 dr.
Hyposulphite of soda	4 dr.
Powdered ginger	2 dr.
Warm water	1 pint.
Mix.	

Drench from a bottle. The patient had better be kept hungry the first twenty-four hours after the operation; then an occasional bran-mash, well seasoned with table salt, may be allowed.

Many cases of very considerable severity have been relieved by the above treatment. There is very little danger attending an operation of this kind, for the rumen is not very highly organized with either blood-vessels or nerves. I have known several instances in which this operation has been performed in the rudest possible manner, with a common jackknife, and yet the animals operated on recovered. The intelligent husbandman, however, will, if possible, secure the services of a surgeon for the performance of all operations requiring skill and good judgment.

Removal of the Sutures, or Stitches.—The incision into the rumen having been secured by very fine yet strong thread, and the ends cut off, needs none of our attention. The external sutures, however, will have to be removed in the course of a week or ten days. We merely cut the knot and withdraw the suture.

Gastro-intestinal Inflammation.

Gastro-intestinal inflammation of the stomach and bowels is frequently occasioned by the presence of concretions and hair-balls, or some other foreign bodies. There are many plants, such as hemlock, crowfoot, henbane, wild poppy, etc., which act as poisons, and induce an inflammatory condition of the stomach and intestines. An animal may feed on substances which are too dry and fibrous. They accumulate and distend the stomach beyond its normal capacity. Or the manyplus may contract spasmodically and imprison the food. In either case an inflammatory condition is the result. The treatment of a disease of this character is very unsatisfactory, and it is very difficult to write out any directions that shall meet the emergencies in cases of the above character.

The following case, communicated for the "Veterinarian" by Surgeon Redwood, will give the reader a better idea of this malady than the author can furnish, his experience being rather limited in treatment of this affection:

"I have forwarded to you a jar containing portions of the abomasum of a cow that I have had slaughtered, seeing that further treatment was altogether useless. You will perceive a large gangrenous spot on the inner coat of the above viscus, which I consider was the cause of the symptoms presented. I have also sent you portions of the ilium and jejunum, which will afford you some idea of the intensity of the spasmodic action with which these intestines were affected. The whole of the small intestines presented the most marked spasmodic condition; in fact they were like so many muscular cylindrical cords, and impervious to any body larger than that of an ordinary-sized goose-quill.

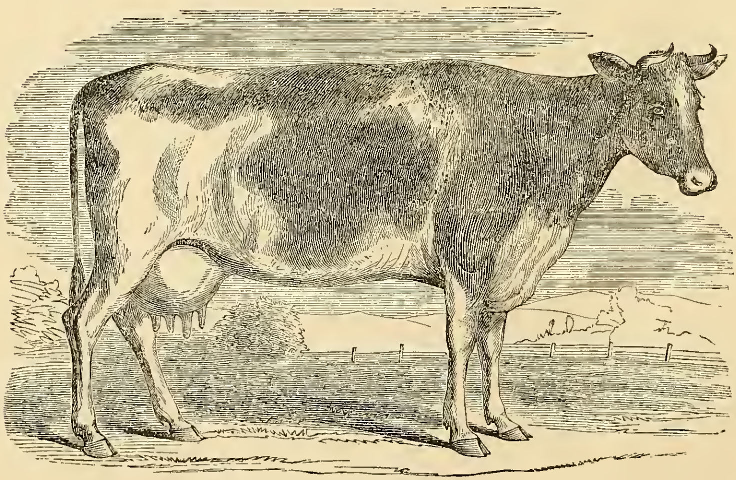
Now, all the diseased conditions are enumerated in the above brief description. Every other organ—except the liver, which had a little deposit of earthy matter in a few of its larger biliary tubes, a very common condition of the gland—both in the thorax and the abdomen, presented the most healthy aspect. The animal was ill but thirty-six hours.

The following were the symptoms observed and the treatment adopted: The patient was a dairy cow, five years old, in excellent condition, living on straw alone for the last fourteen days, five months advanced in pregnancy, and never had been ill before, being bred on the farm. When I first visited her she evinced all the symptoms of hoven, and that, to a great extent, so much so, that at one time I was about to introduce the trocar, for the purpose of affording relief; yet, knowing the animal could not have had access to succulent diet, I came to the conclusion that this was the effect of the chemical laws acting on vegetable matter, over which the stomachs had, in some degree, lost their vital influence. The poor animal was in great agony, shown by loud groaning, though rarely lying down; eyes, sunk in their orbits; pulse, quick and irritable, but not such as to indicate or warrant depletion. Occasionally a quantity of the fluid contents of the rumen were regurgitated through the nose and mouth, almost, it would appear, involuntarily. She also, at intervals, voided a small quantity of commingled aqueous and mucous fluid per anum, although, as before remarked, from the moment she was observed to be ill, not the smallest portion of ingesta passed the abomasum, which, together with all the other stomachs, was partially filled with food in a pultaceous state. It appeared to me evident that the obstruction to the passage was caused by spasmodic action of the pyloric orifice, the action extending throughout the greater portion or all of the small intestines.

Will you favor me with your opinion as to the cause of the circumscribed and intense inflammation of the villous coat of the true stomach, and say if you think it arose from any chemical irritant?

The treatment consisted in the exhibition of spirits of ammonia aromatic with the carbonate; aperients, and at last the chlorides; but all proved inert, no benefit whatever accruing therefrom. Had I suspected spasm to such a marked extent, I should certainly have given large doses of extract belladonna and hyosciami, both in the form of enema and by the mouth. As it was, my treatment was directed solely to the symptoms evinced; and when I found that all the usual remedies were of no avail, as the animal was in high condition, I thought it best to have her destroyed.

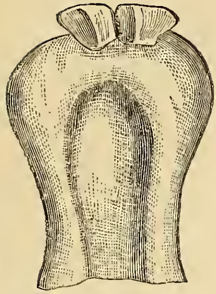
[The lining membrane of that portion of the alimentary canal forwarded by Mr. Redwood was, throughout, in a state of congestion, presenting here and there depressed or cup-like patches, which apparently resulted from ulceration, commencing in the submucous tissue. The ulceration had also penetrated, in spots, the substance of the mucous membrane. This condition of parts is somewhat singular, and might have had its origin in the existence of some local irritant.]"



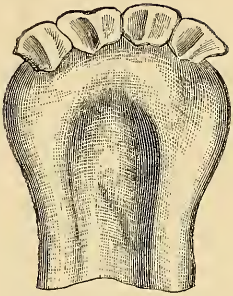
IMPORTED DUTCH COW PURMER.

[Imported by W. W. Chenery, of Belmont, Mass.]

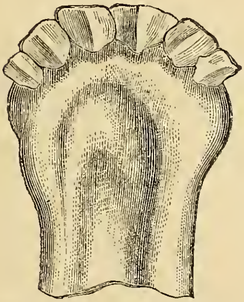
Dentition of Cattle.



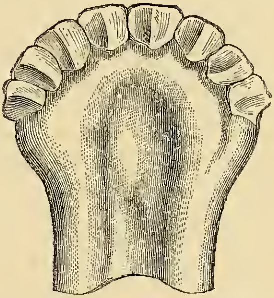
APPEARANCE OF THE TEMPORARY INCISORS AT BIRTH.



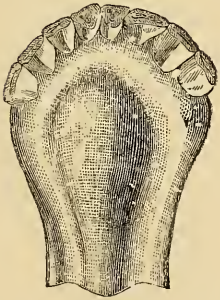
APPEARANCE OF THE TEMPORARY INCISORS ABOUT ONE WEEK AFTER BIRTH.



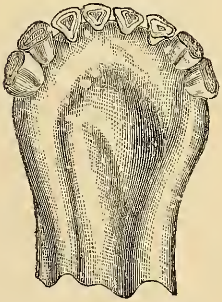
APPEARANCE OF THE TEMPORARY INCISORS ABOUT TWO WEEKS AFTER BIRTH.



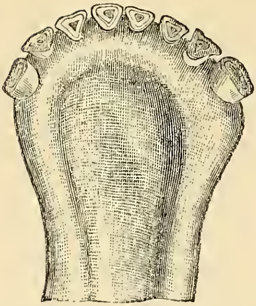
APPEARANCE OF THE TEMPORARY INCISORS ABOUT THREE WEEKS OR A MONTH AFTER BIRTH.



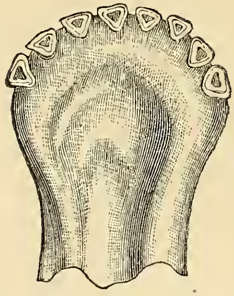
APPEARANCE OF THE TEMPORARY INCISORS AT THE AGE OF EIGHT OR NINE MONTHS.



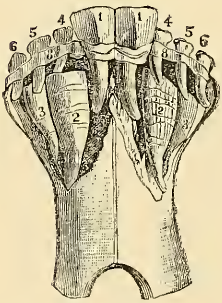
APPEARANCE OF THE TEMPORARY INCISORS AT THE AGE OF TEN OR ELEVEN MONTHS.



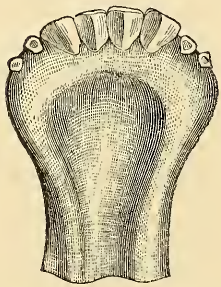
APPEARANCE OF THE TEMPORARY INCISORS AT THE AGE OF FIFTEEN OR SIXTEEN MONTHS.



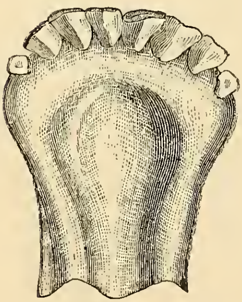
APPEARANCE OF THE TEMPORARY INCISORS AT THE AGE OF EIGHTEEN OR NINETEEN MONTHS.



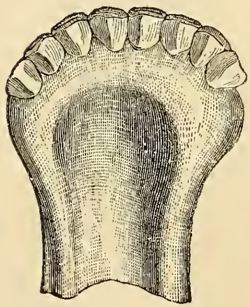
APPEARANCE OF THE TEMPORARY AND PERMANENT INCISORS AT THE AGE OF ABOUT TWO YEARS.



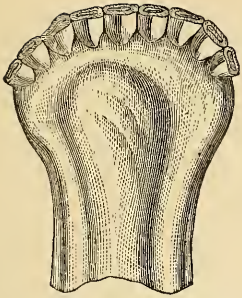
APPEARANCE OF THE PERMANENT AND TEMPORARY TEETH AT THE AGE OF THREE YEARS.



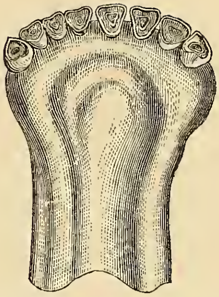
APPEARANCE OF SIX PERMANENT INCISORS AND TWO TEMPORARY AT THE AGE OF FOUR.



APPEARANCE OF ALL THE PERMANENT TEETH AT THE AGE OF FIVE.



APPEARANCE OF THE PERMANENT TEETH AT THE AGE OF ABOUT SIX YEARS.



APPEARANCE OF THE PERMANENT TEETH AT THE AGE OF ABOUT TEN YEARS.

Synopsis of Dentition.

INCISORS.

Temporary incisors all prominent at the end of one month.

The two central permanent incisors appear in from twenty to twenty-four months.

The two inner middle permanent incisors appear at about the age of three years.

The two outer middle permanent incisors appear at about the age of four years.

The corner permanent incisors appear between the ages of five and six years.

MOLARS, OR GRINDERS.

Temporary molars, three in each jaw, above and below, on both sides, are prominent at birth, or within four weeks of that period.

Fourth temporary molars are cut at the age of six months.

Fifth temporary molars are cut at the age of fifteen months.

Sixth temporary molars are cut at the age of from two years to thirty months.

The first and second permanent molars are cut at the age of about two years.

The third molar is cut at about the age of three; the fourth appears at the age of four; the fifth at the age of five; and the sixth at the age of six.

Suspended Rumination, or Loss of Cud.

Some people, who are in the habit of prescribing for loss of cud, more properly termed "cessation of rumination," suppose that if they can only restore the lost function the trouble will end. This is certainly very desirable, for an improvement in the appetite of sick animals is a sure sign of rapid recovery; yet a restoration of the cud alone will not always insure a cure, neither are the remedies prescribed by some calculated to accomplish this object. One man reccommends a red herring to be thrust down the throat; another a portion of the quid, or cud, of a healthy cow. Others recommend raw beef, pork, pepper, etc. This results from mistaking symptoms for disease; for loss of cud is nothing more than a symptom of deranged digestive function, or that of other organs sympathetically associated with it. Those who have the care of cattle, and prescribe for them when sick, are not supposed to be able to trace loss of cud to derangement of one or a class of organs, unless they shall have had the advantages of a medical education, which is not often the case. They are not acquainted with the various sympathetic relations that exist in the animal economy, neither can they understand why an abnormal condition of one organ produces a corresponding effect in one or a class of organs remotely situated; nevertheless, such are the facts. Many a poor cow has been thus forced to swallow down a red herring (bones and all) or "another cow's quid" (not of tobacco, for none other than two-legged animals chew quids of this description), and we can readily conceive that such articles may, for the time being, arouse the digestive organs, and create an unnatural appetite in animals of such refined taste and nice discrimination as the cow. A red herring, either whole or comminuted by the grinders, and then swallowed, only creates irritation on the mucous surfaces of the various compartments of the stomach; an unusual abundance of blood flows into the walls of that organ, the circulation of that fluid is quickened, the gastric juice flows more readily, and the digestive function is exalted. A repetition of the practice enfeebles the power of the stomach; its action is quickened at expenditure of power, for all unnatural excitement of a natural function is followed by a corresponding depression. A stimulant—and red herring may be classed as such—creates a desire for food; but then the animal may be laboring under an acute disease of some organ, when food would be inadmissible; or the stomach may be overburdened and unable to digest what is already there, and, therefore, requires rest, as any other organ would after long-continued action.

The stomach is one of the most important organs, and performs some of the most delicate operations in the animal economy. Its functions may be suspended from various causes, and it is the province of the practitioner to learn and understand the why and wherefore of its derangement. In many cases the stomach craves no food, because it can not digest it; and merely creating an appetite by stimulants is worse than useless, for whatever is then eaten can not be converted into chyme, nor can the lacteals take it up and apply it to the purposes of nutrition. Whenever an animal is suffering from disease, pain, or excitement, there will often be absence of appetite (loss of cud), and this function is suspended because the animal is drawn from it by his sufferings.

The real seat of sensation of hunger is in the brain, not in the stomach alone, as some suppose. The latter may first communicate some such sensation to the brain, yet if that organ be in a deranged condition, unable to recognize the want, then we must impart healthy action to it, and establish an equilibrium between the nervous and general system, in order to produce a natural appetite. Do you wish to know how to do this? If so, study the veterinary art. That the appetite is affected by the state of health, both of the body and mind, is certain. Human practitioners realize that. "In fever, pain, and in certain dyspeptic states, the stomach craves little or no food. So in mental distress, in times of great fear, or sorrow, or extreme anxiety, the appetite fails. Even in a single moment the appetite may be suspended by any sudden mental affection or emotion." Animals are known to manifest mental emotion when separated from their offspring, or from those with whom they have been accustomed to work or associate; and many cases are on record showing that animals, when deprived of the society of their fellows, refuse their food, and die of grief, so that, in this particular, the brute does not differ from his master. Is it not a matter of importance, then, to ascertain the cause of loss of cud (appetite) before we prescribe red herrings, etc.?

"Loss of cud," says Mr. Youatt, "is more a symptom of disease than a disease of itself. It accompanies most inflammatory complaints, and is often connected with those of debility. It will be the duty of the practitioner to ascertain the cause of this suspension of second mastication, and to adapt his mode of treatment to the nature of that cause. A dose of physic, with a small portion of aromatic medicine, will be indicated if any fever can be detected. More than the usual quantity of aromatic should be added in the absence of fever, and still more, with tonic and alterative medicine, if general debility is indicated. The caraway and ginger powder are the best aromatics, and will supersede every other. The gentian and ginger, with Epsom salts, will prove a very useful tonic and alterative in cases of loss of cud that can not be traced to any particular diseased state of the animal."

A word to the farmer, and I have done. If you have permitted your animals to subsist on innutritious diet, so that their digestive powers have been overtaxed, and that function is paralyzed, then the blame rests with you. On the other hand, have you been preparing them for market—piling on the fat, at the same time depriving them of pure air and exercise? If so, you are equally blamable. Is your barn and dairy management consistent with the received opinion of those who are the best judges in these matters? If not, make them so, and, depend upon it, your cattle will thrive and be blessed with a natural appetite; for disease, in nine cases out of ten, results from violating the laws of Nature.

Inflammation of the Bowels (Enteritis).

Inflammation of the bowels, occurring in any of the divisions of the intestines, is one of frequent occurrence; yet among cattle it is not liable to become so suddenly fatal as among horses.

Symptoms.—This disease bears some analogy to colic, in the suddenness of its attack. A healthy animal is all at once attacked with abdominal pain; gets down, and moans from incessant or persistent pain; The pulse generally ranges from 60 to 70; rumination has ceased, and the feces is hard, covered with slime or streaked with blood; the flanks heave (as the saying is); the limbs are tremulous, and the animal has a staggering gait; the visible surfaces of the eye, mouth, and nostrils are reddened; pressure upon the abdominal region (which is generally tucked up), elicits symptoms of pain. As the disease proceeds, these symptoms are aggravated, and intestinal hemorrhage or mortification terminates the sufferings of the animal. The *post mortem* examination generally reveals engorgement of the blood-vessels of the intestines, with highly-carbonized and coagulated blood; the lining membrane is of a dark velvet color, and the large intestines are, more or less, inflamed or gangrenous.

Treatment.—The principal objects in the treatment of this disease are, to lubricate the interior of the stomach and intestines with mucilage of slippery elm, and to equalize the circulation and nervous action over the general system. The remedies are as follows:

Mucilage of slippery elm	1 quart.
Powdered gum assafetida	2 dr.
Powdered lobelia	1 dr.

The above dose may be repeated at the expiration of eight hours. In the mean time, apply a mustard poultice to a part of the abdomen, and excite the circulation on the surface of the body and extremities by friction with wisps of straw. An occasional antispasmodic injection should be thrown into the rectum. Two quarts of hot water to one ounce of powdered lobelia are about the proper proportions. Should the patient appear to suffer from distension of the intestines with gas, then give one ounce of hyposulphite of soda, two drachms of powdered golden seal, and one pint of water.

Animals in the above condition can not bear cathartics, yet cases now and then occur which require a gentle aperient, merely to aid in the removal of fecal accumulations. When such remedy is indicated, I recommend the following, to be used as a drench:

Glauber salts	8 oz.
Warm water	1 pint.
Molasses	$\frac{1}{2}$ gill.
Powdered ginger	1 table-spoonful.

Mix.

Invagination of Intestines.

Invagination of intestine signifies a portion of intestine drawn within another, there becoming strangulated. This difficulty does occasionally occur, and the symptoms do not differ materially from those attending strangulation occasioned by the cord, or vas deferens.

Symptoms.—The animal passes nothing from the rectum but a small quantity of blood; suffers incessant pain; is very uneasy, and rumination is suspended; he will occasionally anxiously regard the flanks and moan. This trouble is generally preceded by flatulency.

Treatment.—The best plan of relieving the animal is to etherize him, for it often happens that, during etherization, a relaxation of the muscular tissues takes place, and such condition is favorable to the return of the bowel. It may be proper, while the animal is down, and under the influence of ether, to introduce a hand into the rectum and try what can be done by manipulation and traction. The small intestines, in which the difficulty occurs, can be seized through the wall of the rectum, and, perhaps, by some slight traction or movement, the difficulty may be remedied. It is impossible to tell what is the result of our efforts until the animal is relieved, and has had time to recover from the effects of the ether. This having taken place, without improvement, I should immediately perform the right-flank operation, search for the seat of the difficulty, and reduce the invagination.

This operation may appear to some as a very formidable affair—very dangerous and painful; but a skillful surgeon, armed with the great Godsend, ether, can perform the same without the least danger. I have opened the abdominal cavity several times, in cases of sterility, merely to explore the uterus and ovaries, and never met with any accident; and to encourage those who have never had any experience in the performance of this operation, I relate the following incident: I was requested, a short time ago, to visit a very valuable Durham cow, the property of Mr. G. Clarke, of Hyde Hall, Otsego County, N. Y., which had been purchased of Lord Ducie, accompanied by a warranty of pregnancy by one of the best bulls in England. Time revealed the fact that she was not pregnant. She had afterward several connections with the opposite sex, yet could not be impregnated. The object in securing my services was to solve the problem of her sterility. Now comes the pith of the matter. I cast her and explored the vagina. It appeared that there was a sort of hour-glass contraction in the vagina, so that the hand could not be introduced more than six inches. At this point there appeared to exist a mechanical obstruction to further penetration. This was sufficient evidence of incapacity of the sexual congress, yet, having traveled a long distance, at great expense to the owner, and there being some prospect of litigation in the matter, I was determined to remove all doubts. I therefore performed the flank operation, and explored the uterus and ovaries. The whole were in a state of atrophy, except the right ovary, which was as large as the kidney of an ox. Being desirous of ascertaining what the character of the enlargement was, I put my thumb and finger into it. By so doing I ruptured a vessel, which bled very profusely. My immediate impressions were that the animal must die of internal hemorrhage. It was a matter of impossibility to secure the bleeding vessel, so I sutured the incision, expecting that the animal would die in the course of a few hours; but, contrary to my expectations she got well.

Diarrhea.

Diarrhea consists of an increased number of lower-bowel discharges, augmented peristaltic motion of the bowels, irritability of the same, and a too rapid propulsion of the secretions. Diarrhea is sometimes salutary—an effort of Nature to rid the system of morbific matter. It frequently occurs at the commencement of various forms of disease, and is scarcely, if ever, an isolated affection. Gallup, in his "Institutes of Medicine," contends that the muco-intestinal discharges are portions of the centrifugal circulations, which probably have their functions accelerated by the force of the heart and arteries, above that of the centripetal series. A fluid, quite similar to the cold sweat of the skin, and by a similar process, is forced out in abundance, and produces the diarrhea.

A moderate diarrhea, occurring in a plethoric animal, is often salutary; for it relieves the relative plethora of the vascular system, which occurs at the onset of acute disease. When the discharges are of a yellow or greenish color, there is, generally, functional derangement of the liver. When an abundance of mucous material is observed, it goes to show that the mucous membrane is congested. Sometimes an excess of serous fluid is observed. This occurs more particularly in dropsical affections. There is also an alvinous variety of diarrhea, caused by an abnormal secretion or exudation of coagulable lymph. It frequently comes away in shreds, or detached pieces, from various portions of the intestinal canal.

Treatment.—Almost any form of this affection, except the chronic kind, can be checked, and perhaps cured, by administering a few doses of charcoal and lime-water. I use these agents in the following proportions:

Finely powdered charcoal.............	8 oz.
Lime-water..........................	4 oz.
Tincture of matico..................	2 oz.
Water...............................	1 pint.
Mix.	

One-fourth of the above is a dose for an ox or cow, which may be repeated every four hours. The same remedy answers for calves, only they require a smaller quantity. The astringent properties of the above mixture can be augmented by increasing the quantity of matico, or by adding a small quantity of powdered bayberry bark.

In all cases of diarrhea, I usually order a change of diet; for, in some cases, the food is operative in producing the difficulty. If it occur while at grass, the animal should be taken to the barn for a short time, and allowed a few moderate meals of ground oatmeal. When sucking calves are under treatment for diarrhea, the mother should also have a few doses of the above remedy; for it often happens that she is ailing at the time, and her milk has a morbid tendency on the calf. In the advanced stages, when the fecal discharges emit a bad odor, and rumination is suspended, the patient should have a few quarts of milk porridge per day. Scalded milk alone will sustain and benefit the calf.

Chronic Diarrhea.

Chronic diarrhea is usually accompanied by loss of condition; the coat stares, and, although the animal is allowed the very best kind of food, still it thrives not; the skin and ribs seem to have entered into permanent relationship. In a case of this character, I recommend the following:

Phosphate of lime...................	6 oz.
Powdered ginger.....................	3 oz.
Powdered charcoal...................	4 oz.
Powdered golden seal................	2 oz.
Powdered bayberry bark..............	1 oz.
Mix.	

Divide the mass into eight equal parts, and mix one of them in the food night and morning. This will generally have the desired effect. Should it fail, I would increase the quantity of bayberry bark to three ounces.

Gut-tie.

It would seem that an apology is due the reader from the author for introducing such an apparently vulgar term as the above; but the fact is, this term has a *meaning*—perhaps better understood than any other that can be introduced at the present time. It would appear that "gut-tie" is often occasioned by a faulty method of castration, or "altering." This is the testimony of experts; but it is my opinion that gut-tie often occurs more accidentally than otherwise, for animals have been known to die of gut-tie after being castrated in the best possible manner. I once operated on an animal for this mechanical trouble, and am satisfied that the castrator was as well qualified to perform the operation as the best of the craft; yet the cord had retracted into the abdomen, formed a false tissue, and had also a large bulbous extremity, which no skill or foresight could have possibly guarded against.

Symptoms.—The animal operated on presented the following symptoms: Pulse, small and quick; respirations, hurried; animal very uneasy (all the time), down and up again very often; rectum, empty, yet coated with slime; the patient refused both food and water, and had not ruminated nor passed any feces for several hours.

Treatment.—I proposed an operation, with the intention of exploring the abdominal cavity, to which the owner consented. The patient was cast on the near or left side, and etherized. An incision, five inches in length, was then made through the integuments of the right flank, midway between the last rib and anterior part of the ilium, about three inches below the transverse spines of the lumbar vertebra. The muscles and peritoneum were also divided in the same manner as when spaying a cow. After introducing my hand, I found a portion of intestine incarcerated by the remains of the spermatic cord, which seemed, together with some false membrane, to have entangled the intestine. After liberating the latter, the divided muscles were closed by suture, one end of which was left long enough to hang out of the wound. The integuments were then sutured, and dressed with tincture of aloes.

The patient staggered a little when he got up, but soon commenced eating. I did not see him afterward, but, a fortnight from the time of the operation, was informed that the animal experienced immediate relief from the difficulty, and was then well.

Up to the present time there appears to be no information afloat in this country regarding the cause and remedy of this singular difficulty; hence, I presume that some reliable account from other sources may be acceptable to the reader of this work. The following account of "gut-tie" is from the pen of Surgeon Crowhurst, published in the "London Veterinarian:"

"I was requested on the 15th of last month, to attend a two-year old steer, the property of W. W. Daws, Esq., of Ewhurst, which was taken ill the day previously; but, it being late when the illness was observed, and my residence nine miles distant, some aperient medicine was administered, and orders given to send for me the next morning. When I arrived, the steer was lying down in a shed, but soon got up and walked across the yard. His back was arched, and the abdomen tucked up. He was somewhat excited at first, but soon began to tremble, and to step in a backward direction, by putting one hind leg directly behind the other. Occasionally he turned his head toward his side, and would kick at his belly, and, now and then, stretch himself out, and curve his loins to a considerable extent. After being in the yard for a short time, he returned into the shed and lay down again, doing this in a very careful manner. He soon got up a second time, and stepped backward as before, seemingly for the purpose of getting his hind-quarters against some resisting body. The man in charge of the animal explained that the symptoms had undergone but very little change since he was taken ill, and that he had not eaten any thing nor voided any feces. There were, however, several evacuations of mucus lying about the yard, which had been expelled from the bowels.

Having procured a wagon-rope, and obtained the assistance of two or three men, I had the animal cast, and examined him per rectum. There were no feces present, but, on passing my hand onward, I readily detected a band, which was drawn tightly round the bowel. It appeared to pass from behind forward, and under the rectum. By pulling at this the animal struggled from pain. Finding this state of things, I at once decided upon operating, as I could not see the patient any more that day, having many pressing professional engagements. I first cut off the hair from the right side, which I prefer to do while the animal is standing, that I may know better where to commence my incision when he is cast. I will here describe my plan of casting the animal, that, should any person have a preferable one, I may put it in requisition in my after-proceedings. I first fastened one end of a rope to the off fore-leg, then passed it in front and around the near fore-leg, and afterward under the part of the rope between the legs, so as to pull them close together. Next, it was carried between the hind legs and round the near one, and then under that part which passed from the fore to the hind legs. By then bringing the end of the rope over the bullock's back, I was enabled to throw him on his near side, and prevent his rising by drawing the near hind leg forward, and fixing it between the fore-legs. As the off hind leg was still at liberty, it was secured by drawing it backward, and fastening it by another rope to a crowbar fixed in the ground. A man was then placed on the animal's neck, to keep his head down, and prevent his rising. Every thing being ready, I commenced the operation by cutting through the common integument and abdominal muscles, midway between the antero-inferior spinous process of the ilium and the last rib, a short distance below the transverse processes of the lumbar vertebra, so as to avoid the arteries of the part. The peritoneum was then broken through with the fingers, and afterward the left hand was introduced into the abdomen, in a direction toward the pelvis. I experienced no difficulty in finding the band, which consisted of the vas deferens, and which formed a semicircular projection in the abdomen from the intestines passing behind it, or from below upward, as the steer lay on his side. It was drawn quite tight, and had produced strangulation of the intestines. I was soon enabled to liberate the intestines, after which I drew the vas deferens toward the opening in the muscles and divided it, excising a portion to the extent of about three or four inches. The part cut through retracted, and was left floating free in the abdomen. The operation was completed by passing some interrupted sutures of wide tape through the common integument only. After the animal was released, I gave him some aperient medicine, and ordered gruel to be administered at regular intervals.

Before I was a student at the college, I attended a *post mortem* examination of an old Welch runt, which my father ordered to be killed, as the proprietor neglected sending soon enough for him to be of any service. In this case there were about six inches of the small intestines strangulated, and quite black in color. The question arises, Is this affection produced from any particular mode of castration? My father has castrated animals in the same way as taught him by his father for forty-five years, and has never had one case among those he has operated upon, although he has been called to several which had been operated upon by other persons.

The calf which I have alluded to was not castrated by him, nor was the two-year old steer, (the subject of this communication,) by either of us, which tends to prove thât castration has to do with its production, these cases having occurred in our district. I had, until recently, supposed that the spermatic artery, on being drawn at until it ruptures, in the operation of castration, might recede into the abdomen, and, hanging loose, afterward strangulate the intestines by getting around them, but I feel convinced this is not the case."

The following, which lately appeared in the Edinburgh "Veterinary Review," is offered for the reader's instruction. It is a translation from Gierer, by Mr. Gamgee:

"On the Internal Ruptures in Oxen.

"Gierer alludes to the fact that all authors agree as to the nature of the internal or peritoneal ruptures termed 'ueber-wurf,' by the Germans—'gut-tie' by the English. There is a separation of the atrophied spermatic cord from the sides of the pelvis, and, under peculiar circumstances, the peritoneum is lacerated; a portion of intestine slips downward and backward, and the cord is entwined round it, so as to constrict it, obstruct the passage of excrement, and inflammation, with other consequences, result. Gierer especially describes his method of discovering the seat of the constriction, and his plan of operating. He says that it is not always so easy to find the spermatic cord, and to discover precisely which intestine is incarcerated. Most cases occur in oxen from a year and a half to four years old. When symptoms of colic, and no discharge of feces induce him to suspect 'gut-tie,' he examines per rectum, and, by careful manipulation, can always detect the spermatic cord and imprisoned intestine. Gierer has never seen this strangulation relieved spontaneously; and there are two methods of cure to adopt—the one palliative, and the other radical. The first consists in the return of the intestine through the fissure in the spermatic cord, by quickly driving an ox or raising his hind-quarters in a stall. This should be tried soon after the first appearance of the disease. When this does not answer, the normal condition of the parts must be restored by the taxis effected through the rectum.

Very often there may be a relapse, from the loose spermatic cord and fissure of the peritoneum remaining *in statu quo*. There are two methods of radical cure—one by the introduction of the hand through an incision through the abdominal walls, and the other by the rectum. Gierer always operates by the rectum, and his method consists in the simple return of the spermatic cord in contact with its natural point of attachment against the abdominal wall. To effect this a limited, successive, and slightly outdrawing traction forward, or from behind forward, of the intestine is effected; and, having accomplished this, the soft part of the thumb of the right hand, which is used from the beginning of the operation, is applied through the coats of the rectum in the lower and posterior part of the cord, and, with a jerk, or forward movement, the operation is completed.

Gierer says that the introduction of the hand in the abdomen is only needed when, from the amount of intestine imprisoned, it is difficult to feel the rudimentary spermatic cord; but, under these circumstances, inflammation and gangrene would have ensued already, and the operation would, therefore, be useless, and it is many years since he had occasion to perform it."

Flatulent Colic.

This disease is generally occasioned by some derangement of the digestive organs, whereby the food, instead of being properly digested, undergoes fermentation, and thus carbonic acid gas, or sulphureted hydrogen is evolved.

Symptoms.—It is attended by considerable pain; the animal will be very restless, continually lying down and getting up again; discharges gas from the anus; strikes the belly occasionally with the hind feet, and the abdomen is enlarged.

Treatment.—This species of colic can generally be relieved as follows: Take one ounce of hyposulphite of soda, dissolve the same in a quart of water; then add tincture of ginger and tincture of golden seal, of each, one ounce. Drench the animal with the same. Clysters of soap-suds, to which a little salt may be added, should be thrown into the rectum occasionally. The belly should be well rubbed with coarse straw, and, in severe cases, I should rub some mustard, moistened with vinegar, on the lower part of the abdomen. After a lapse of two hours, should the patient appear unrelieved, a second dose of the colic drench may be given. Generally, however, one dose is sufficient.

Spasm of the Bowels.

Spasm of the bowels, generally termed spasmodic colic, is occasioned by contraction of the longitudinal and circular fibers of the muscular tunic of the intestines. In this disease nearly the same symptoms are observed as those alluded to in flatulent colic, with the exception of flatulency. The patient, however, is more irritable and dangerous to handle than in flatulent colic, and he has periods of relaxation from pain which return at intervals with increased violence. It is supposed that this affection is caused by the presence of irritating matters in the intestinal canal, either in the form of bad food, poisonous plants, or water impregnated with lead. As the muscles of the intestines belong to that class known as involuntary, it follows that the state of spasm is the result of some excitability or deranged condition of the nerves of involuntary motion; hence antispasmodics are indicated. In view of relieving the spasm, I recommend the following:

Powdered assafetida..................	1 dr.
Sulphuric ether......................	2 dr.
Thin gruel...........................	1 pint.
Mix.	

Use as a drench; then administer, occasionally, an antispasmodic clyster, composed of warm water and a small quantity of powdered lobelia.

Failing to relieve the animal by the above means, I should get him under the influence of sulphuric ether, to be applied to the nostrils by means of a sponge. There is no necessity for fully etherizing the animal, for, if kept in a partial state of stupefaction for about twenty minutes, the spasm will relax; after which, let the patient be kept on bran-mashes for a day or more.

Constipation of the Bowels.

Constipation is generally the result of impaired digestion, yet, now and then, it is the precursor of some definite malady. The old method of resorting to powerful cathartics generally aggravates the symptoms, and the animal dies unrelieved of the constipation.

The best method of treating this affection is to administer, with an aperient, stimulants and bitters; in this way we arouse the action of the digestive organs, and create a lax state of the bowels Let the following drench be given:

Glauber salts	12 oz.
Powdered golden seal	3 dr.
Powdered ginger	2 dr.

Dissolve the Glauber salts in one quart of tepid water; then add the other ingredients. After a lapse of eight hours, the animal should be walked about, have its belly rubbed, and an occasional clyster of warm soap-suds may be thrown into the rectum. Should the medicine not operate at the expected time, administer two drachms of powdered mandrake, the same quantity of golden seal, and half an ounce of hyposulphite of soda, in about a quart of water.

To prevent a recurrence of the constipation, let the animal have half an ounce of equal parts of golden seal and carbonate of soda daily, which may be mixed in the food. It is important, also, in view of guarding against constipation, to make some change in the diet. Thus, if the animal has been long fed on meal, some coarser material (shorts) should be substituted, for a brief period at least.

SECTION IV.

PARTURITION.

Signs of Labor, or Parturition—Natural Labor—Unnatural Labor—Fore-legs Presenting—One Fore-leg Presenting—Head Presenting without the Legs—Extraction of a Calf on its Back—Hind Legs Presenting—Breech Presentation—Cleansing, or Removal of the After-birth—Back of the Calf Presenting at the Brim of the Pelvis—Uterine Hemorrhage—Birth of Twins—Triplets.

Signs of Labor, or Parturition.

At the end of two hundred and seventy days from the period of a cow's impregnation, some enlargement of the udder will be perceived, and the labii pudendi (external parts of the genital organs) are relaxed, and appear tumefied, and a sort of glistening discharge issues from the same. The animal is also restless, and appears desirous of avoiding the society of other cows. Her respirations are somewhat quickened; she becomes nervous and irritable, and labor pains set in, occurring at stated periods, until, at last, the neck of the uterus dilates, the fœtal membranes present themselves in the form of a watery tumor, and the parts admit of the delivery of the fœtus.

Natural Labor.

Natural labor consists of the presentation of the placental membranes, inclosed fluid, with the head and two fore-feet of the fœtus. In the act of natural expulsion the membranes become ruptured, and the liquor amnii (water) escapes. This lubricates the parts, and greatly facilitates the birth of the fœtus. After delivery a few after-pains occur, by which means the placenta, or after-birth, is expelled. This completes the painful routine of natural labor.

Unnatural Labor.

A cow failing to give birth after the fashion described in the preceding article, and being in a state of parturition, having regular uterine pains, increasing in severity as they successively occur, yet no appearance of the fœtus, is probably the subject of false presentation. The character of this presentation must be ascertained, and our efforts then directed to the replacement of the part to its natural position. The person who intends to render assistance to the parturient cow should be clad in suitable garments. His arms must be bared to the shoulders, and, in view of guarding against the absorption of morbid virus, the person's arms should be lubricated with glycerine or olive oil. The instruments required are, embryotomy knife, embryotomy hooks, and slip-nooses. (See cut of instruments.)

Fore-Legs Presenting.

The most common false presentation is that when the two fore-legs are advanced into the vagina, sometimes beyond it, and the head turned upon the fœtal body. This is occasioned by the muzzle having caught at the brim of the pelvis. The delivery can not be effected until the position is changed, without danger to the mother and certain destruction to the calf. The best plan is to attach a cord, or the slip-nooses, to each fore-leg, which are then to be forced back into the uterus. The head must then be sought for, and constant pressure exerted on the same until it is sent forward far enough to enable the operator to release it from the brim of the pelvis, and guide it into the vaginal outlet. A noose may then be slipped over the lower jaw; then traction on it and those of the fore-legs will accomplish the delivery.

If the calf is dead I should use the embryotomy hook in preference to the noose; but, in view of saving the calf, the latter is the safest. Some care, however, is necessary in drawing out the fore-feet, lest the points of the hoofs lacerate the vagina. While the assistants are drawing steadily on the cords, the operator should give them a lateral action, from side to side, and upward and downward. This is far better than pulling persistently in one direction, for it tends to loosen and alter the position of impacted parts.

One Fore-leg Presenting.

This is also a common occurrence, and, if seen early, the delivery may be safely effected by attaching the noose to the protruded leg. This is to be pushed back, the other sought for and secured in the same manner, and again to be returned. The head must then be properly placed, the legs drawn outward, and the delivery may be accomplished with every prospect of bringing forth a live calf.

Head Presenting without the Legs.

In a case of this character, it is evident that the legs are doubled up within the vagina and uterus, and, unless attended to early, the calf will be dead; therefore, in order to save time and trouble, I should decapitate the calf, which is done as follows: Make a circular incision around the neck through the integuments; then cut down in a region between the first and second cervical vertebræ, and sever the capsular ligaments and spinal marrow. A person not expert in these matters will probably succeed better in detaching the head at this point than at the base of the cranium. Before the neck is returned, the embryotomy hooks should be inserted into it, and the blades secured by tying the cord which passes through them. Having pushed back the neck, I run my hand along one limb at a time, and find the hoofs. These are brought forward and noosed. Traction now being made on the three cords, the delivery is secured.

Supposing the calf to be alive, I proceed as follows: A noose is affixed to the lower jaw; the head is then pushed back as far as it can be got; the fore-legs are then to be brought into position as above described, after which the calf is readily brought away. Some difficulty may be experienced in extracting the hind parts. If they require much force in extraction, the probabilities are that the pelvis of the fœtus is impacted in that of the cow. The long diameter of the pelvis is crosswise of the body, so that, if the calf be in a position that opposes its long pelvic diameter to the short one of the mother, it must be pushed back a few inches, and turned, so that its feet shall be downward, in a line with the cow's limbs.

It is very important that the calf should be in the right position as regards the diameter of the pelvis, for many valuable cows are ruined by the violent means used in the extraction of the hind parts when in a faulty position. A little tact in securing a right position for the exit of the calf would save a vast amount of unnecessary and cruel traction, which in our rural districts, where veterinary surgeons are not to be found, is too often employed.

Extraction of a Calf on its Back, Hind Legs Presenting.

Some persons have an idea that when a wrong presentation of this kind takes place the calf may be turned. This is an impossibility, and it is only a waste of time and a feat of ignorance to even attempt it. The calf must be extracted in the manner of presentation. The traction, however, should be made in a direction toward the bones of the coccygis, or tail. In the early stages of this kind of parturition, the back rests on the belly of the mother, and the feet come in contact with her spine. If my services were sought at this early period, I should endeavor to bring the feet down, one at a time, and noose them, and proceed to deliver without making any futile attempts to change the position of the calf. In a case of this character, which occurred in my practice a short time ago, I found it impossible (the cow being down) to dislodge the feet from the spinal region. I therefore procured a double and single block tackle, and fastened it to a beam which ran across the barn; the hind extremities were then attached to the single block by means of straps, and in this way the posterior parts were elevated. The consequence was, that the whole fœtal apparatus receded into the abdominal cavity, the feet were dislodged from the spine, and I had the satisfaction of delivering the animal of a live calf.

The following case is related by Surgeon Cartwright, in the "Veterinarian:"

"On the 30th of April, 1850, Mr. —— came for me to see a cow, four years old, that could not calve, as, in a former instance, another celebrated man at such work had been in attendance on her, but, from the state of the os uteri, was fairly frightened from making an attempt to remove it, as, he said, 'an operation' must be performed on it. I found her well off at the hips, and about the vulva well relaxed. On introducing my hand into the vagina, I ascertained that the os uteri was dilated to about five inches in diameter, in an apparent rigid state. On passing my hand through the os uteri, I found that the calf lay on its back. The hind feet could be felt, but they were doubled up at the fetlocks, and pressed against the rectum and inside of the upper portion of the os uteri. In consequence of the calf lying on its back, and its feet being doubled up, the latter was not forced into the os uteri, from which cause the os uteri could not be dilated for the cow to calve. I immediately got one of the legs straight, brought it forward into the vagina, and passed a cord around it, and then served the other the same. Afterward we used gradual traction to the feet, until the os uteri was fully dilated, and, in the course of an hour, we removed a live calf, which, together with the cow, did well. I fear such cases as these may induce persons to divide the os uteri, thinking it in a scirrhous state. In a fortnight after, this person had an exactly similar case; but, from using gross force, they burst open the pelvis somewhere, and the consequence was, the cow was obliged to be destroyed."

Breech Presentation.

A presentation of this kind is generally attended with difficulty and danger. The difficulties depend, however, somewhat on the length of time which has elapsed since the commencement of the labor. If it be recent, there is some hope for both mother and calf, but in a protracted case there is little hope for the mother; and one reason is, the vagina or uterus is often injured or ruptured by the struggles of the fœtus in trying to free itself from its uncomfortable position. Then, again, the uterus has contracted upon the fœtus so as almost to imprison it, at least forcing and impacting it within the cavity of the pelvis, so that the little animal is almost immovable. Let a person unacquainted with bovine midwifery introduce his hand and arm in a case of this character, and he will be astonished at the amount of force it will require to thread his hand between the fœtus and pelvis; and after accomplishing his object, the hand and arm become so benumbed by the pressure that he can not accomplish much, if any thing, until he can succeed in forcing the fœtus forward, which, in some cases, when uterine action is strong, can not be effected without elevating the posterior parts of the cow by means of a hoisting tackle. It requires a person with a long arm to be of much service in a case of this kind, for the limbs are extended a long distance into the abdomen. A breach presentation is very readily detected by the presence of the calf's tail, which occasionally hangs out of the vagina.

The mode of extracting the fœtus when the breech presents is as follows: Pressure must be made upon the buttocks of the calf in the interim of labor pains. Having succeeded in pushing the calf forward, the hocks may possibly be reached; afterward the feet. These are to be brought into the vaginal passage; then, by traction, and altering the position of the calf, if necessary, the delivery is completed. Should it be found impossible to push the fœtus forward, I should lose no time in raising the hind-quarters of the cow by means of hoisting apparatus, which most farmers have on hand. In order to avoid hurting or injuring the cow's limbs when hoisting the hind parts from the ground, I encircle the legs, just above the fetlock, with some old gunnybag, or something of the sort; then affix a strap to each leg, into which the tackle must be hooked. The cow is, of course, raised from the floor, belly upward.

Cleansing, or Removal of the After-birth.

After the delivery, the after-birth should be detached, if possible; for, if it be allowed to occupy the uterus, the latter contracts upon it, and there it may remain for a week or more, and, at last, come away a mass of putridity—not, however, before the cow has suffered some derangement of health. So soon as the calf is born, I introduce my hand, and pull, in various directions, on the umbilical cord. Failing to bring the placenta away, I introduce my whole arm, and carefully detach the now foreign body from the cotyledons of the uterus. The uterus shortly afterward contracts, and thus effectually prevents uterine hemorrhage.

It has been my universal custom, of late, to remove the placenta immediately after the birth of the calf, and I do so because I consider it unwise to allow it to remain; for the labor is not then completed. No practitioner of midwifery in human medicine would ever deem it proper to leave his patient until the "after-birth" was removed, for it would, most undoubtedly, endanger the mother's life if it were left to rot away, as is too often the case with the poor uncomplaining cow. In the removal of the placenta, I am careful not to pull too hard on the umbilical cord, lest inversion of the uterus ensue. A little tact and patience will often accomplish wonders. The placenta may be detached from the cotyledons, and yet can not be drawn away. The probability is that some irregular contraction of the uterus retains it. Now we must exercise a little patience, and then introduce the arm and feel for the seat of contraction. This can probably be dilated by the fingers, and then the placenta may easily be removed.

In cases of protracted labor, when the cow is much exhausted, the placenta may remain in the uncontracted uterus for want of muscular power in the same to expel it. In such a case I should give the cow about a quart of ginger tea, and if any tympany of the intestines exist, I should add a small quantity of carbonate of soda.

The absurd practice of attaching a weight to the membranes, or rolling them on a stick, as heretofore recommended, is not in accordance with my views of an enlightened system of practice. To say the least, it is unscientific, and presents an unsightly appearance. The odor which arises from the putrid mass, in the course of a few days, is enough to sicken a dog, and no doubt it does sicken pregnant cows, and may induce abortion. The membranes must be removed.

The abominable practice of allowing the cow to devour the after-birth is much to be deplored. I know the custom has the sanction of long usage, but that, in my opinion, is no argument in its favor. The cow is not a cannibal nor a carniverous animal, yet, for the sake of getting rid of an unsightly and filthy mass of carrion, which ought to have been removed from her sight, she is tempted, and finally does devour it. She may, however, sometimes be led to devour the placenta and fœtal membranes through the promptings of a morbid appetite. The best and safest way to dispose of the after-birth is to burn it, for the odor arising from it under the process of decomposition has a bad effect on pregnant cows of a highly imaginative and nervous temperament, and the odoriferous morbid germ is more active in warm than cold weather.

Back of the Calf presenting at the Brim of the Pelvis.

This unfortunate presentation is one of rare occurrence. I never saw but one case, and that I now propose to introduce for the instruction of my readers. I was called, a short time ago, to visit a cow, the property of Mr. R——, of Winchester. The animal had been in labor, with strong parturient pains, for twelve hours. In the mean time several persons had tried their skill on the poor brute, without doing the least good. At the time of my visit, she was in a deplorable condition. Her ears, horns, and extremities were icy cold; she was delirious, throwing her head about in a reckless manner, as if in convulsions; the vaginal lips were very much tumefied, their lining membrane being highly inflamed. I immediately gave her a good drench of stimulating medicine, which appeared to have a good effect in restoring warmth on the external surface and in the extremities. On making an examination, I discovered that the back or spinal column of the fœtus was firmly impacted within the brim of the pelvis; consequently every uterine effort to expel the same was only making matters worse. I employed all the usual means to change the position of the calf to no purpose. Finally, I proposed an operation, to which the owner consented. I now etherized the cow, turned her on her left side, and made an incision through the right flank, beginning at a point two inches beneath the transverse processes of the lumbar vertebra, mid-distance of the last rib and anterior spine of the pelvis. The length of the incision was about ten inches. I then divided the muscles in this region known as the transversalis, external and internal oblique. Having thus exposed the peritoneum, I punctured it, and, by means of a probe-pointed bistoury, dilated it to the extent of the external incision. I then made an incision through the uterus, disemboweled the calf, so as to reduce its bulk, and, finally, removed the heart and lungs; yet I could not extract the carcass (which was of extraordinary size). I therefore made a section of the spinal column, and removed the fœtus in halves; then took away the placenta, and removed all fluids by means of a sponge. The incision was properly sutured, and, after a short period, the cow got up and partook of a bran-mash. Twenty-four hours after the operation the cow died. This probably occurred from the exhausted condition of the animal at the period of operating. When nothing except an operation of this kind can save the mother, I recommend that it be performed early, so that there shall be vitality enough in the system to bear up against it.

Uterine Hemorrhage.

Uterine hemorrhage is known, in common parlance, as flooding from the womb. Occasionally it does occur as a sequel of forcible extraction of the calf, followed by an unwarrantable harshness in extracting the placenta and its membranes from the uterine cotyledans. The best plan of arresting this kind of hemorrhage is to drench the cow with two ounces of tincture of matico, and then encircle the body, in the region of the small of the back, with a cold-water bandage. The object, in a case of this kind, is to induce contraction of the uterus, for, when once contracted, the flooding will soon cease.

Birth of Twins.

There are many cases on record of cows giving birth to twins, and even triplets, without manual assistance; yet occasionally, in consequence of two presenting in the passage at once, some assistance is needed. When called to a case of this character, the object should be to ascertain if the parts presenting belong to one or two calves. If the latter be the case, one must be pushed back and the other advanced; for they can not both be born at once without periling the life of the mother.

Triplets.

Three years ago I visited Keene, N. H., on the occasion of the State Fair, and saw a cow of native breed, the property of Mr. Aldrich. I learned that at two previous births she had brought forth twins, and now was the mother of three at one birth. These were milk-white, and a perfect counterpart of each other. I understood Mr. Aldrich to say that the cow had never been bred to the same bull, so that the plural and triple births were the result of a peculiarity of constitution on the part of the cow. This remarkable peculiarity seems to favor the hypotheses of Pythagoras and Aristotle, who maintained that the female parent affords all the materials necessary for the formation of the offspring, the office of the male being merely to awaken the dormant formative powers residing in the female ovaducts. The "ovists" further assume that the fœtal germs already exist, with all their organs, in some part of the female organs of generation, and that the action of the male is merely that of exciting and endowing the fœtus with vitality. These theories, however, appear irreconcilable with the phenomena of the offspring inheriting the faults and defects of the male. The cow alluded to never required any assistance in labor. This may be accounted for from the fact that the mother had a large pelvis, and her offspring at the time of birth were all small.

But here are two other remarkable cases, as related by Mr. Gamgee, in his translations:

"The subject of this notice had been delivered of her first calf in January, 1857, when two years old—a fine heifer of the Brittany breed, and of medium size. Soon after she was served (only once) by a bull of the district, and became impregnated. During gestation the animal was healthy, walked easily, and her belly presented no uncommon appearance as regards size. On December 26, her term of gestation having closed with little pain or expulsive efforts, she gave birth, in a very few minutes, to two calves (male and female), the first being in the normal position, the last having the posterior limbs presented first. At the same time the fœtal envelopes of the calves came away.

During delivery the cow showed no suffering, and would eat and drink as usual. Shortly after, the attendants perceived, between the lips of the vulva, two white, soft tumors, which they took for inverted uterus, and at once hastened for the cow-doctor. Meanwhile, a neighbor, thinking he recognized in them the water-bags, pricked them, and, on the escape of the water, another calf was seen, with a natural presentation, which was soon delivered by the efforts of the mother. This was immediately followed by a fourth, which was also easily expelled. These two last—the first a female, the last a male—died in a few seconds, though, doubtless, had the liquor amnii been at once evacuated, both might have survived, as they were even stronger than the two first. They were very fat, and weighed, when given to the butcher, 25 kilogrammes each.

"The cow which has shown such remarkable fecundity (five calves in one year) has all along preserved the most perfect health."

Remarkable Fecundation in a Cow.—Mr. M. B. Forbes sent the London "Veterinarian" the following particulars relating to the birth of five calves at one time: "A cow of the short-horned breed, six years old, the property of Mr. Richard Knight, farmer, Santon, about a mile from Ryegate, was safely delivered on Monday morning, the 21st of February, three weeks before her time, of five calves—four bulls and one cow. Three of the calves died a few hours after birth, but the fourth survived until Tuesday, and the fifth until the following day, Wednesday." Mr. Forbes saw the cow on the 23d, and found her going on well. It was her third calving.

SECTION V.

DISEASES OF THE GENERATIVE ORGANS.

Constriction of the Neck of the Uterus—Embryotomy—Treatment of Cows during Pregnancy—Symptoms of Pregnancy—Dropsy of the Womb—Puerperal Fever—Falling of the Womb.

Constriction at the Neck of the Uterus.

OWING to some abnormal condition of the neck of the uterus, it is occasionally the seat of constriction. The difficulty can only be determined by introducing the hand into the vagina; then, by bringing the fingers in contact with the mouth of the womb, it is found in an undilated and indurated or hardened state. Should the labor pains be quite strong, and no signs of relaxation appearing, I should then introduce a probe-pointed bistoury or the embryotomy knife into the neck of the uterus, and dilate the stricture, by making incisions into the inner border of the strictured or hardened mass. This will allow of some slight dilatation, large enough for a bladder of fœtal membrane to gain entrance. After this takes place, the labor will gradually progress, and, if every thing goes right, as the saying is, a live calf may soon be expected to make its appearance, and the cow may also be expected to survive the operation.

Embryotomy.

The operation known among medical men as embryotomy, signifies dismemberment of the calf within the vagina and uterus. I presume no man, except he be acquainted with the anatomy of the parts, would dare to attempt the dismemberment and disembowelment of the fœtus. It is an operation, however, which has to be performed very often, and it has saved the lives of very many valuable cows; therefore I shall try to "post" the reader on the subject. The instrument used for this purpose is called an embryotomy knife (see cut of instruments), and is introduced into the uterine cavity, concealed in the hand, so that its cutting edge shall not injure the genital organs of the cow.

Mode of Operation.—Having introduced the knife within the uterine cavity, I run my hand along the fœtal limb to the top of the shoulder, if possible, and there turn the knife and send its beak point through the integument, and slit the same to the region of the knee. Here I make a circular incision of the integument around the knee. A slip-noose is affixed to the fetlock, and, while an assistant is making steady traction on the same, I loosen the integument from the limb; then, by a little dexterity in the use of the knife, at the top of the shoulder and elsewhere, the whole leg is drawn away. After amputating the shoulder, I make an incision through the cartilages of the ribs. This exposes the whole of the thoracic viscera, which I remove. If the bulk of the calf appears to be sufficiently reduced to insure its extraction, I affix a noose to the remaining fore-leg, and, by traction, remove the carcass. The only difficulty in the way of a prompt extraction occurs, oftentimes, in consequence of the fœtal head being bent round on the opposite side of the chest; but, under ordinary circumstances, the calf can be extracted without proceeding to disembowel or decapitate it. If, however, either of the latter operations will facilitate the birth of the calf, I should certainly perform one or the other, or both. Having extracted the whole of the fœtus, I next remove the placenta and membranes, and then drench the cow with the following:

Fluid extract of ginger................	$\frac{1}{2}$ oz.
Tincture of matico....................	1 oz.
Warm water..........................	1 quart.

This will improve the condition of the prostrate animal, and insure contraction of the uterus. The uterine expulsive power, so favorable to the liberation of the calf, if dormant, can readily be aroused by administering a stimulating drench.

Treatment of Cows During Pregnancy.

The cow is the only animal with which I am acquainted that yields milk regularly during the trying and prostrating probation of pregnancy. She has not only to yield milk for the profit of her owner, but she must also furnish an identical preparation for the nourishment of the fœtus in utero. Then, again, the integrity of her own system requires that her digestive organs shall furnish enough of chyme and chyle for the manufacture of good, rich blood, to repair incidental and extraordinary wear and tear of her system; therefore she should be well fed and cared for. Any stinting or miserly economy in the feeding of pregnant cows is very poor policy, and is a sort of starvation procedure, which can never be expected to pay. It is impossible for the cow to discharge these treble duties unless she be generously fed on nutrimental agents, containing the necessary equivalents. I am aware that most cows are too well fed, hence milk fever and other inflammatory affections; yet the food given to some cows in this region, such as swill, brewer's grains, corn-stalks, coarse, damaged hay, etc., is not suitable for pregnant cows. They should have a mess of roots occasionally, and about a quart of meal night and morning, which may be stirred in a bucket of water, to which add a tea-spoonful of salt. A reasonable quantity of good, sweet hay should be allowed daily. This will not only keep the stomach distended to a healthy capacity, but will also furnish matter for remastication, by which process a large amount of saliva is secreted, and passes into the stomach, where it operates on the food therein contained as a powerful digester.

A pregnant cow should never be confined to the cow-house, for want of proper exercise induces plethora, and a plethoric condition of the system retards the development of the fœtus; hence the cow is very apt to go over her time. The pregnant animal needs, and must have, exercise. It aids in the circulation of blood through her system: it brings the blood oftener in contact with aerating surfaces, and thus invigorates it; in short, the whole animal economy is benefited by exercise in the open air. If the season of the year admits, the cow should be sent to pasture. Here, under the advantages arising from pure air, natural food, etc., she will get in fine condition, so that when the period of calving arrives she will be strong and vigorous, and can bring forth a healthy calf. It must be borne in mind, however, that the petted, stall-fed cow is not a safe subject to leave in the pasture at night. The cold, damp ground and air are apt to derange her health; therefore she should be housed at night and on stormy days.

As regards milking the animal during pregnancy, it must depend on circumstances. A cow in good condition may be milked longer than a poor one, and the poor, overmilked animal must "go dry," as the saying is, for a couple of months prior to calving. Should a pregnant animal yield milk up to within a fortnight of calving, she should have a few bran-mashes, and the daily quantity of food and drink must be diminished. She should also have free access to salt, and occasionally a table-spoonful or so of phosphate of lime may be sprinkled over her fodder.

Symptoms of Pregnancy.

A cow in healthy condition will be in heat (a state of menstruation) about once a month. This lasts for a period of four days, more or less. About three or four months after conception has taken place, the belly is enlarged, and, on making pressure on the right flank, the motions of a live fœtus can be distinctly felt. Pregnancy may be determined earlier than this by auscultation (the art of diagnosis by listening to the sounds of the heart). The beating of the fœtal heart can be distinctly heard. The ear should be applied to the right flank.

Dropsy of the Womb.

This affection generally prevails among aged cows, in the latter period of pregnancy. The causes of it are, perhaps obscure; yet it may be attributable, like other dropsies, to a debilitated condition of the system, and an impoverished state of the blood.

Symptoms.—The symptoms noticed in this affection are as follows: An unhealthy and debilitated state of the animal; visible membranes, pale and watery; a pendulous and much enlarged condition of the abdomen; spinal column, curved in a downward direction; and the animal, when down, is observed to rise with difficulty.

Treatment.—It often happens that in dropsy of the uterus, the walls of the abdomen are ruptured, and the fluid escapes into the cellular tissue beneath the common integuments. This is readily detected by an unnatural tumefaction, or swelling, in some part of the abdominal region. My usual practice in a case of this character is to puncture the integument, and allow the fluid to escape. I then direct that the animal have a few doses of the following:

Fluid extract of buchu	...	1 oz.
Powdered chlorate of potass	...	4 dr.
Water	...	1 pint.
Mix.		

Give a dose of the above once or twice daily.

Dropsy confined to the uterus is a formidable affection, because it requires the services of an experienced surgeon, who will, probably, tap the dropsical membranes through the vagina; yet the operation is not always advisable, for it frequently results in premature parturition.

Puerperal Fever.

During the past few years, very many valuable cows have died of "milk fever" (puerperal fever), puerperal convulsions, etc. It is a remarkable fact that this disease almost always attacks cows in high condition; hence, in view of prevention, we should endeavor to guard against the accumulation of fat; and this can be done by withholding meal and substituting shorts, and also by allowing considerable quantities of roots and grass, when they can be had.

Puerperal fever is a disease of an inflammatory type. The state of plethora, which is observed among fine cows owned by wealthy individuals, who dispense provender liberally, because they hate to see a "poor" cow, is more likely to occur in a cow when pregnant and stall-fed (from the fat of the crib) than otherwise, because, under such management, she does not get exercise enough to make away with the carbonaceous material, and, therefore, it increases from day to day, and is harvested into the cell reservoirs, proving in its bulk detrimental to full and free circulation, respiration, and intestinal peristaltic action.

The warm and impure atmosphere which the stall-fed animal is compelled to respire is decidedly operative in bringing about that condition known as plethora; therefore our object should be to secure a current of cool and pure air throughout the cow-stable. Pure and cool air is a very potent physiological, sedative, contrastimulant, and, as the fat animal is in a morbid state of excitation from the stimulus of the food, as well as artificial atmosphere, the suffering creature will surely be benefited by inhaling the requisite amount of an uncontaminated atmosphere.

The principal causes of puerperal fever in women are said to be misplaced benevolence, which benevolently(!) furnishes her with choice viands, rich caudles, and stimulants, in view of obviating debility and insuring hilarity of mind. Now, the condition of the pregnant female being one of increased susceptibility, it fully demonstrates the incompatibility of using even what may be considered as the ordinary stimulations of health. Therefore, in the case of the cow, stimulating food, and an unnecessary amount of the same, given daily after the cow has "come to her growth," as the saying is, may be termed misplaced benevolence; whereas, if the cow has not attained her full growth, the practice of feeding liberally is not objectionable, for she requires a large amount of nutriment to develop the various parts of her organism, and promote the integrity of the same, and also to nourish the fœtus in utero, and, lastly, for the purpose of furnishing the necessary material for the lacteal secretion. It has been noticed that great milkers, as well as fat animals, are often the subjects of puerperal fever; and probably the suppression of the milk secretion, in the advanced stage of pregnancy, may be an exciting cause of the difficulty, yet not in all cases, for we are pretty certain that some cows, owing to a peculiarity of constitution, are predisposed to puerperal hysteritis. In view, therefore, of guarding against the consequences which may occur when the animal is suddenly "dried up," we should be careful to diminish the daily allowance of food, and also feed lightly from this period up to that of parturition.

Milking the cow before calving, in view of preventing puerperal fever, is very mischievous, for it is apt to excite premature parturition. Many of the cows I have attended for the above complaint had been so treated. Occasionally the udder becomes distended to a painful degree, so that it is necessary to practice moderate milking, otherwise the practice is injurious.

It is generally supposed that this disease first manifests itself in some parts of the tissues entering into the composition of the reproductive organs; or, in other language, primary congestion and irritation of the womb, ending in cerebral congestion and convulsions. The cerebral congestion, however, is not always the cause of convulsions, for we have many cases on record in which phlebotomy was practiced on the heroic plan (an incredible amount of blood having been abstracted) without arresting the convulsions; hence, in such cases, congestion is the result, not the cause, of convulsions. A very eminent physician (Dr. LOGAN) has stated, as the result of observation, that puerperal convulsions were generally found in females of highly organized nervous systems, and who were peculiarly susceptible to irritation of that system; yet our experience in this country, in cattle practice, confirms what we have written in the preceding part of this article; namely, that puerperal convulsions are more frequent among fat animals than in those of lean condition. The theory of Dr. LOGAN may, in the main, be correct; for a lean animal (nervous temperament) can, by artificial means, be brought into the condition known as plethora.

YOUATT contends that "cows in high condition are most subject to an attack of puerperal fever. Their excess of condition, or state of plethora, disposes them to affections of an inflammatory character, at all times and under all circumstances." If it shall prove to be the case that puerperal fever is the result of uterine inflammation, we should diagnose the case as puerperal hysteritis, and treat accordingly. Puerperal hysteritis may, however, occur at any period of pregnancy.

Symptoms.—The early symptoms attending a disease of this character are such as are found to prevail in a disease of a febrile character; namely, loss of appetite, accelerated pulse and respiration (the latter attended with strong but quick abdominal flank movements); tongue, slightly coated; mouth, hot and clammy; muzzle, dry. There is also a sort of wildness about the eyes; the animal is nervous, and some unusual spasmodic twitchings of the muscles will generally be observed. Soon the animal grates her teeth, foams at the mouth, dashes her head recklessly on the floor (for she is now on the floor). Examine the eye at this stage, and the pupil will be found in an amaurotic state. The udder becomes swollen, hot, and tender, and the lacteal secretion is partly suspended.

The disease generally appears within a fortnight after calving, and it may occur within a very few hours. Its duration is very brief, both the curable and incurable cases terminating either one way or the other in a short time; and if violent convulsions set in, we generally find that the patient has but little time to live. Especially is this the case when paraplegia be present, or paralysis in any form. The principal symptoms in which the diagnosis must be founded are as follows: We first ascertain whether or not the animal has, within the period of a fortnight, given birth to a calf. If so, and she manifests the usual symptoms of convulsions, (refuses to notice her calf, has lost the use, more or less, of her limbs, and the eyes present a wild stare, the pupils being dilated, and the udder swollen,) we may then safely conclude that we have a case of milk fever to deal with.

Treatment.—The professional man treats the disease according to its indications, and the non-professional, if he attempt to treat a case of this character, must endeavor to do likewise. I can not possibly commit to paper all the necessary information, but shall merely lay down a few simple rules for the management of such cases. At the same time, I would advise the owner of the sick cow to secure, if possible, the services of some competent veterinarian. Some practitioners recommend the abstraction of blood from the jugular vein, but my practice is to bleed from the bowels, by administering purgative medicine. In this way the animal can be depleted with greater safety than by blood-letting. The cathartic is as follows:

Glauber salts........................	12 oz.
Powdered ginger.....................	½ oz.
Warm water..........................	1 qt.

First dissolve the salts in the above amount of water, then add the ginger. Drench the animal by means of a quart bottle. Take time to pour it down the œsophagus, and the more speedily will it act. If I have no faith in blood-letting, I may be said to have great faith in purgation; for, as PERCIVALL very truly observes, in regard to the treatment of staggers in horses, "Purge a horse and you cure him," so I say in regard to the treatment of puerperal fever, Purge a cow and she shall be cured. The bowels must be made to liberate their contents. After having administered the medicine, the patient must be watched, and, when, she lies down, let her have a comfortable bed of hay; and the attendant should occasionally sponge her head with cold water. When down, a good stimulating alkaline enema may be thrown into the rectum, composed of

Warm water..........................	2 qts.
Ginger................................	½ oz.
Fine salt.............................	2 oz.

Supposing that, after a lapse of six or eight hours, the bowels fail to respond to the purgative, half the quantity just recommended may be given; and perhaps it may be proper, in view of creating a vacuum in the rectum, to repeat the enema; for purgation once established our patient is safe; yet, in view of producing this very desirable result, it is not a rational procedure to convert the stomach into an apothecary's shop, and gorge it with useless drugs, as is, unfortunately, too often the case; for, by this means, a medicinal disease is created, which is generally more uncontrollable than the original one.

In curable cases it is very rare for the above medicine to fail in exciting catharsis; however, such remedy is not always at hand (I mean the salts). The next best remedy is common table salt, to be substituted for the Glauber or Epsom salts.

Other indications to be fulfilled in the Treatment of this Disease.—The palsied limbs require attention. Let them be diligently rubbed with tincture of capsicum (hot drops), in view of producing reaction. By this means we equalize the circulation, and thus relieve internal congestion. Should the bowels be tympanitic, or distended with gas, a quart of ginger tea may be given; and it may do more good if a small quantity of carbonate of soda be added to the same. Should the animal be thirsty, a small quantity of powdered niter may be dissolved in water or thin gruel, and offered to her. After the bowels have operated, the danger passed, a few doses of alterative medicine may be given. This is composed of

Fluid extract of sassafras..............	1 oz.
Fluid extract of hops..................	3 dr.
Water..............................	1 gill.
Mix.	

The following case, from the author's note-book, is here introduced to illustrate a new mode of treatment. The case occurred in a five-year old cow, the property of Mr. G——, of Malden, Mass. The animal gave birth, without assistance, to a healthy male calf. The birth took place during the night-time, at pasture, the weather being rather tempestuous. Three days after parturition, the cow showed symptoms of failing health, and the owner, like a sensible man, instead of boring the animal's horns, at the suggestion of the neighbors, preferred to seek advice; hence my services were secured.

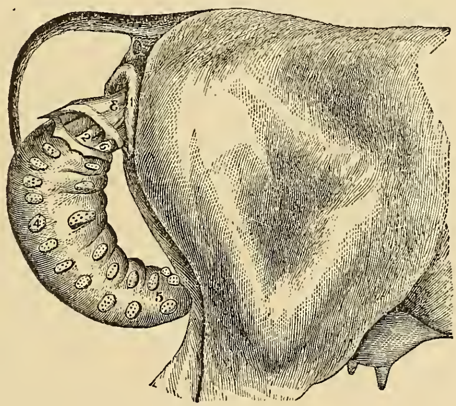
The patient was down on the left side; pupils, amaurotic;

pulse, scarcely perceptible; respiration, of a stertorous character, and accelerated; surface of the body, comfortably warm; visible surfaces, of a leaden hue; abdomen, slightly tympanitic. The animal occasionally turned its head toward the costal region, and returned it recklessly to the floor; mamma, tumefied and hot; internal surface of the labia pudendi, inflamed. The patient takes no notice of its offspring. Applied counter-irritants to the spinal and pectoral regions, and then applied sulphuric ether to the nostrils. The object in administering sulphuric ether was to diminish the reflex excitability of the nervous system, and so cut short the convulsive paroxysms. The ether appeared to prove invaluable; for, soon after its administration, the animal appeared calm, tranquil, and rational, and soon began to take notice of its offspring. I then administered table salt, eight ounces; water, one pint. Flannels, saturated with infusion of hops, were now applied to the mamma, and renewed occasionally. In the course of thirty-six hours after the administration of the ether, the patient was standing up, nursing her offspring, and, at the same time, partook of a bran-mash. The following three days, the patient got two drachms of fluid extract of chamomile flowers per diem, and was then turned out to grass, and did very well.

Remarks on the Preceding Case.—The treatment of puerperal fever, in bygone days, is a disgrace to what has been considered as a "learned profession." It is a very unfortunate circumstance that such learned men as RAMSBOTHAM, CHURCHILL, MEIGS, and other equally distinguished midwifarians, should contend that "the lancet is our sheet-anchor in puerperal convulsions." They inform the world of medical non-thinkers that the daring use of "the lancet is demanded;" that "the lancet is our sheet-anchor;" that "blood must be taken largely;" yet a great proportion of their patients thus treated prematurely pay the debt of Nature *secundum artem.* What a libel on a "learned profession" is this state of affairs! And, unfortunately, the distinguished French surgeon CAZEAUX has indorsed the reckless tactics of England's universally wretched practice; namely, "sanguine emissions." Now, I contend that the routine practice of the acknowledged authorities will not stand the test of modern medical logic; that it is contrary to all demonstrative experience, and, therefore, should receive the seal of oblivious antiquity, never to be reacted or countenanced by sensible men. The old school heretics are great sticklers for the support of their tottering fabric—namely, "that fever and inflammation must be subdued"—and they commit outrages on the physiological laws of animality by instituting a series of manipulations, redolent of the aroma, acceptable to the god of pathology, whom they worship with the spontaneous faith of a new convert.

Falling (or Inversion) of the Womb.

This sad accident is generally occasioned by extra uterine expulsive action, at the moment of the birth of the calf, aided by adhesions of the placenta to the cotyledons, by which means, in the process of delivery, the uterus is actually turned inside out. The relaxation of the ligaments, which ordinarily confine the



FALLING OF THE WOMB.

Explanation.—Fig. 1, Pudendum ; 2 6, Region of the neck of the womb ; 3, Vagina ; 4, The cotyledons of glands of the uterus ; 5, Body of the womb turned inside out.

uterus to the pelvic cavity, may be one among the various causes which tend to induce inversion. The accident, so far as my experience goes, is apt to occur in animals of an inferior class, coarse and flabbily organized, and among others in a debilitated condition. The only way to prevent a recurrence of inversion is to spay the cow.

Treatment.—The old method of introducing the arm, in order to force back the protruded parts, is now superseded by a bulbous rod of iron, which must be applied to the fundus or base of the womb. A due amount of pressure being steadily made, an assistant manipulates the sides, and the womb is re-inverted. Sometimes it is very difficult to get the womb back, in consequence of latent uterine action, which convulsively resists our efforts, and violently sends it out again at the moment of return. Should the convulsive action of the uterus continue any great length of time, I should etherize the animal, and, when fully under its influence, the reduction may again be attempted, and probably consummated. The instrument should be kept in the womb for some time after reduction, so as to give the muscular fibers of its walls time enough to contract; and it may be necessary to have a man in attendance for a whole day or more, in view of accomplishing this result.

So soon as the reduction is complete, I should sponge the loins often with cold water; or a better plan, perhaps, would be to pack the loins, after the fashion of hydropathy. The loins and abdomen will, by this method, receive considerable support, which will be favorable to induce contractile power in the uterus.

Sometimes the presence of the bulbous instrument in the uterus, after reduction, tends to keep up the after-pains, or expulsive action, and if so, it must be removed, previous to which, however, some stout tape should be sent through the thick skin in the region of the prominences found on each side of the vaginal outlet, known as the tuberosity of the ischium. This is a much better plan than that of stitching the vaginal lips. After removing the instrument, a pad may be placed on the lips of the vagina; then tie the tape sutures moderately tight. Two sutures will answer, and they can be allowed to remain until all danger of re-inversion has passed. The animal should be placed in a situation where the hind parts can be elevated a few inches.

The following cases appear interesting enough to obtain a space in this work, and I recommend them to the reader's perusal. They occurred in the practice of Surgeon Younghusband:

"On the morning of the 3d of January, 1850, I was sent for, in great haste, to attend a cow that three days before had calved, and, apparently, up to this time, had done well; but on that morning, on the cow-keeper attending as usual, he found the cow down, and the whole of the uterus protruding through the vagina. On my arrival, I found her as described, with the uterus in a most loathsome state, from being suffered to remain unprotected among the dung and urine of the cow-house, and also the placental membranes adherent. Plenty of assistance being at hand, we had her up, well-raised her hind parts, and in that position secured her, so that she could not well slip down again. Having carefully detached the placenta, I next proceeded to cleanse the parts by washing them with a mixture of weak spirit and water. Having accomplished this, I proceeded to return the part; but, on minutely examining that viscus, before attempting its replacement, I discovered in it a large rent, through which I easily introduced my hand; and, for the better satisfaction of the owner, I caused one of the bystanders to do the same, to show them that it was not through any mismanagement of mine that this untoward accident had taken place; for, in my belief, another cow had trod upon it while she was down, and thus done the mischief. After this, I effected its return without much difficulty. Judging that I had got all the part into a right position, etc., I made an attempt to withdraw my arm; but, in doing this, the cow immediately began to strain with such violence that it was not without the greatest difficulty that I could retain the part in *statu quo*. But, by a fortunate slip, her anterior parts were brought so near the ground that I now easily accomplished that which, for a length of time, I had found the greatest difficulty in attempting to do; namely, getting the part into a right position, retaining it there, and withdrawing my arm without difficulty. The cow now straining very little or none, I applied the usual means of prevention, gave an anodyne, had her set up from the awkward position into which she had got, and waited to see the result. I retreated for a short time, leaving a watch, in case any thing untoward should again take place. On my return, I found her still up, attended with no bad symptoms, very little straining, and appearing to be more comfortable than her situation would warrant. She was now offered a little food, of which she seemed to partake freely. Still, I warned the owner of the danger, and told him I had not the slightest hope of her recovery. To be brief, from that time she had a little fever medicine occasionally, and I paid her a few visits, still finding her apparently improving, and on my last visit, on the 10th, found her in so favorable a situation that I told the owner that, being at a great distance, unless I heard more from him, I would discontinue my attendance; nor had I more occasion to repeat them. The cow did well, and has since had two more calves, without needing any of my assistance.

The second case was that of a cow belonging to Mr. T. Monkhouse, of Moredale, in my neighborhood, which calved apparently with the greatest ease, showing no signs of particular uneasiness; but, on paying her a visit, he found her with the uterus protruded and the placenta attached. They immediately secured the part, so as it might receive little or no injury from the contact of foreign bodies. In the mean time, a messenger was dispatched for me. Being at home, I was not long in being at my post. After having her put in a position which I considered favorable, I proceeded to detach the placenta, which was easily done, and the part being free from dirt, was soon ready for returning, which, from the dilated state of the parts of generation, was, of all cases I ever had, the most easily accomplished. But mark the sequel. When I imagined I had made all right, the cow, appearing to suffer very little from the effects of the operation, was let up from her situation, and I had withdrawn my arm, when, behold, a portion of the small intestine made its appearance through the vulva! Judge of my consternation now, having no cause to fear such an untoward act. I told the owner how the case stood, and frankly confessed my ignorance of its cause. I now proceeded to find out the rent in the uterus, which I soon did, it being in its posterior part, and, without much difficulty, got the intestine returned. My next aim was to cause as much contraction of the uterus as I could, so as to bring the divided edges of the organ together. This I did by the application of camphorated tincture of opium, and which, I am proud to say, soon gave me the required satisfaction—so much so, indeed, that before I withdrew my arm the laceration was scarcely distinguishable to the touch. The cow, in this case, appearing in so easy a state, no truss was applied the first night, but a person stayed with her, if possible to prevent future ills. Now, I must say, of all cows, this one has gone on most favorably. To give a description of her treatment would be a waste of time and paper, since as to the medical treatment it amounted almost to nothing. Careful nursing, with a few solitary doses of medicine, constituted the whole."

SECTION VI.

DISEASES OF THE UDDER, TEATS, ETC.

Mammitis—Stricture in Cows' Teats—Obstruction at the end of the Teats—Obstruction in the Teats—Tumors in the Teats—Injuries to the Teats—Sore Teats—Chapped Teats and Chafed Udder—Inversion of the Vagina—Laceration of the Vagina—Abortion—Inflammatory Affections of the Hind Limbs after Calving.

Mammitis.

MAMMITIS signifies inflammation of the udder. It usually consists of tumefaction, attended with heat and pain, and generally sets in shortly after calving. The treatment of this affection should be antiphlogistic. Let the animal have a full dose of Glauber salts, and apply a refrigerating lotion to the udder (cold water will answer), in view of reducing the temperature of the same. In this state of the udder scarcely any milk flows, and what comes is often bloody. Soon an entire obstruction takes place, or nothing but a watery secretion can be got away. Next, the udder hardens in places, abscesses form, and then the secretory function of one or more quarters is destroyed. The animal now has the "garget," and ten chances to one if the part or parts are ever restored. The only way to prevent garget is to let the calf suck immediately after it is born, or else introduce a tube into one or more of the teats, and thus evacuate the milk ere it coagulates.

Symptoms.—The disease, at its commencement, invariably consists of an inflamed condition of the mamma, or "bag," characterized by pain, heat, swelling, and more or less febrile symptoms. It is precisely the same disease which many nursing women are prone to and suffer from, and its terminations, when not arrested in the early stage, are exactly the same; namely, suppuration, formation of an abscess, induration, or hardening of the walls of the bag. In the human female the suppurative stage is known to nurses as "broken breast;" and the state of induration or hardening which follows, or may exist independent of an abscess, is commonly called "caked" breast; hence the term caked udder. Such is the character of this disease as it occurs among cows in the United States. In Europe it occasionally assumes a more malignant form, and it often becomes necessary to extirpate the whole gland.

Treatment.—The disease should be attended to in its early stage, and the milk must be evacuated, so that it shall not accumulate nor coagulate. In order to do this, a metallic tube may be inserted into the teat, and allowed to remain there, so that the milk shall flow as fast as it is secreted. The inflamed part must be bathed with cold water several times during the day, to which add a few drops of tincture of arnica, and, if the part be very painful, an infusion of hops may be used. Afterward anoint the parts with a small quantity of glycerine. The animal must be kept on a very light diet (scalded shorts are good); and if she be fat, or the least constipation of bowels exist, I should give one pound of Epsom salts, dissolved in warm water, to which may be added a small quantity of molasses and a tea-spoonful of ginger.

Supposing the case to be in the suppurative stage, and it is evident that pus or "matter" is forming within the "bag," or its walls, it may be poulticed with flaxseed, or rubbed twice daily with some stimulating liniment—say linseed oil, two ounces; spirits of hartshorn, one drachm. So soon as the matter burrows to the surface, and a soft spot can be detected, it should have a free opening made into it, by means of a thumb-lancet. The matter must then be squeezed out, and into the cavity syringe some salt and water, or a little tincture of aloes. In the suppurative stage I generally order a generous diet.

In the indurated stage, the treatment consists in exciting absorption of the parts; and in this view I recommend iodide of potassium, known as "hydriodate of potassa." It is one of the most efficient remedies for the absorption of abnormal growths that I have ever used, and it is highly recommended in our textbooks by men well acquainted with its *modus operandi*. The dose of hydriodate of potassa is twenty grains per day, to be pulverized and dissolved in water. Being inodorous and almost tasteless, there is no trouble about the patient drinking it. The medicin may be continued until the enlargement disappears, when the dose may be gradually lessened. If I were called upon to treat a chronic case of long standing, I should, in addition to the above, besmear the parts daily with a portion of the following:

Iodide of potassium..................	1 dr.
Glycerine..........................	7 dr.
Mix.	

Stricture in Cows' Teats.

I was lately consulted in reference to the case of a very valuable imported cow, that had obstruction in the off posterior teat. She had given birth, about a week previous, to twin calves. The obstruction appeared to be located about half way up the teat. I fomented the parts with an infusion of lobelia, after which the tube was easily introduced.

Obstruction at the Ends of the Teats.

It occasionally happens that a fungous or warty excrescence makes its appearance at the end and center of the teat, which obstructs the flow of milk, and is very annoying and painful to the animal. This should be removed by the scalpel, taking care to dissect away every portion of the morbid growth. The part is then to be sprinkled with powdered bloodroot, in order to prevent union of the edges of the outlet of the teat. The milk-tube, well-oiled, must now and then be introduced.

Obstruction in the Teats.

A simple obstruction in the teats is frequently occasioned by imperfect union in the lining membrane.

Treatment.—This is easily remedied by introducing a tube constructed for the purpose, which should be well lubricated with olive oil, and allowed to remain in the lactiferous channel for several hours daily, or until all danger of readhesion has passed away. The lactiferous outlet is sometimes obstructed by false membranes running across its channel. These must be annihilated by the introduction of the tube.

TUMORS IN THE TEATS.

Tumors are occasionally found in the teats. Their presence is determined by bulbous enlargement, which, on manipulation, appear very evident.

Treatment.—The method of operation in such cases is to introduce a tube, well smeared with iodine ointment, and repeat the operation, two or three times daily, until the milk passes freely.

INJURIES TO THE TEATS.

I have met with several cases of injury to the teats in the form of an incision, which occurred accidentally on the animal rising from the ground, cutting or lacerating the same with its own hoofs.

Treatment.—When the accident is discovered shortly after it happens, the parts may be brought together by uninterrupted suture. The seam is then coated with collodion, and the milk must be evacuated wholly by the tube until the parts have united. Sometimes the union is not complete, but a small fistulous opening is left, through which the milk is constantly dribbling. The only way to remedy this is to convert the fistula into a simple flesh-wound. This is done by means of a sharp-pointed knife, which removes the thin callus forming the interior of the fistula. The raw edges are then to be brought together by suture, and collodion and the tube used, as before.

SORE TEATS.

Treatment.—First, wash with warm water and castile soap; then lubricate the parts with equal portions of lime-water and linseed oil.

CHAPPED TEATS AND CHAFED UDDER.

Treatment.—Foment the parts daily with an infusion of chamomile flowers for at least fifteen minutes at a time; then wipe dry, and use the lime liniment. These temporary, or what might, with more propriety, be termed local maladies, will, if the system be free from morbid matter, generally yield to local remedies. If, however, no change for the better can be observed, the following aperient should be given:

Fluid extract of golden seal	3	dr.
Powdered mandrake	½	oz.
Powdered ginger	1	tea-spoonful.

Dissolve in warm water, one quart, and drench the animal with the same. In the event of the above remedies failing to give relief, anoint the parts twice daily with a compound composed of glycerine, four ounces, and fine elm flour enough to form a thin paste.

Inversion of the Vagina.

Inversion of the vagina generally occurs in the latter months of pregnancy, at a time when the digestive organs are somewhat impaired, either actually or sympathetically. In either condition the food is very apt to be imperfectly remasticated, and ferments. This gives rise to the formation of gas within the alimentary canal, and occasions tumefaction of the compartments of the stomach and large intestines. In this state they take up more room than can be spared for their occupancy; hence the pressure in a posterior direction, which forces the vagina out of its location.

Treatment.—When this difficulty occurs in a cow on the eve of parturition, there will be some danger of inversion of the uterus, unless the reduction is effected before delivery; therefore I should endeavor to make room in the abdominal cavity, by putting a stop to the fermentation which is going on in the stomach. In this view, I recommend that the animal have the following drench:

Hyposulphite of soda	1	oz.
Powdered golden seal	4	dr.
Water	1	qt.

Mix.

Having administered this drench, procure a soft sponge, and foment the part (if it be much inflamed and painful) with a tepid infusion of hops. If the inversion be of recent origin, and not much congested, cold water may be used instead. After awhile pressure and manipulation may accomplish the reduction; yet it is apt to reappear, and continue to do so until the animal has got rid of her burden. The reduction, however, must be effected, if possible, every time the protrusion makes its appearance, or the cow will suffer from retention of urine.

It is very evident to me that very many cases of inversion of the vagina are caused by indigestion; therefore great care should be exercised in the feeding of cows during the last months of pregnancy.

Laceration of the Vagina.

This is an accident of very frequent occurrence among cows, yet seldom proves fatal. It often occurs from the rough manner, sometimes practiced, of bringing the feet forward; therefore great care is necessary in conducting an artificial labor to a successful termination.

The following case of extensive laceration of the vagina of the cow, given by the "London Veterinarian," goes to show the potency of Nature in the cure of disease and injuries:

"Mr. J. W. Maw, veterinary student, has sent us the following particulars relating to a case of willful laceration of the vagina, and contiguous parts of a cow: 'Mr. Crosby, who is in practice at Thornton Pickering, Yorkshire, as a veterinary surgeon, was called, a short time ago, to attend a milch cow which presented symptoms of colic. On his visiting her, he observed a piece of stick, about three inches long, protruding from the vagina, and, on removing it, he found that it was about a yard in length, and had been thrust through the vagina, and likewise the rectum, into the abdomen. Previous to its removal the cow did not evince such symptoms as one would have been led to expect in an animal suffering from such a severe injury. There was but little external hemorrhage, the symptoms, upon the whole, rather indicating that internal hemorrhage was going on. Anodynes were administered, and quietude enjoined. No inflammatory symptoms supervened, and, in the course of ten days or a fortnight, the animal had recovered. The atrocious act is supposed to have been perpetrated by some gypsies, who were located near the place at the time, from their going, in the following morning, to beg the carcass, thinking, probably, that the poor animal was dead.'"

Abortion in Cows.

The cow is the most liable of all domestic animals to abortion, and those that have once been the subjects of this mishap are liable to a recurrence of the same. Mr. Youatt, in his work on cattle, furnishes some very useful information on this subject; still, the direct causes of abortion are, like many other enzoötic and epizoötic affections, involved in obscurity. That it occasionally rages as an enzoötic pest, is clearly shown by the records of the past, and by what occurred, a short time ago, among the dairy cows of a milking establishment at Concord, N. H., without mentioning other cases, which of late have been chronicled in our agricultural periodicals.

It occasionally appears as an insolated evil. An Alderney cow, the property of Mr. Burnet, of Southboro, has, in the course of three years, aborted four times. At the time of writing this article my attention was called to her. I recommended that she should be spayed; the owner consented, and, of course, she thereafter became a more useful animal in supporting other offspring than her own. I call this an isolated case, because Mr. Burnet informed me that his other cows had not aborted. She inherits a tendency to abort.

A theory has been broached by some writer that severe winters, succeeded by warm springs, hilly pasturage, the practice of allowing young stock and one and two-year old bulls to run with the breeding cows is likely to end in abortion. This is sheer nonsense, and is not entitled to the least consideration; and, relying on the intelligence of my readers, I refrain from offering any argument in view of controverting evident absurdities. The fact is, some cows will abort, no matter what may be the nature of the pasturage or condition of the atmosphere; and so will women miscarry occasionally, in spite of their own precautions and the advice of their physicians to prevent it. It is evident, therefore, that there exists in the animal economy of some subjects peculiarities of constitution termed idiocyncrasies, which, under certain circumstances, and on the application of the cause, (indirect,) develop the latent pathological fire, and thus they abort.

When abortion prevails among a whole herd of cows on one man's farm, I should consider it as an enzoötic, arising spontaneously, and afterward propagated by infection or by sympathetic influence. YOUATT gives a quotation which favors these views: "In the Leipsic 'Agricultural Gazette,' it is stated that, 'by an unheard-of fatality, the abortion of cows in that district was almost general, and that, after the most anxious search, no assignable cause for it could be discovered, nor would any medicine or medical treatment arrest the plague.'"

I shall now, in a brief manner, throw out a few hints for the consideration of dairymen and breeders, in view of the adoption of preventive measures; for, since neither "medicine nor medical treatment" can arrest the plague, our only hopes of stopping abortions, which in this country are alarmingly on the increase, lies in the practice of preventive measures.

A very objectionable, and I may add, ruinous, practice prevails at some milking establishments, of keeping the cows impregnated all the time. The mother no sooner gets through the pains and perils of parturition than she is again, ofttimes, compelled to submit to a re-impregnation. This is what I call an excessive use of the reproductive organs, which must eventually impair their integrity. It is well known to all physiologists, and I presume that the reader must have some knowledge of the facts, that the uterine organs, like those of digestion and respiration, can be overtaxed; and disease, in some form or other, is very apt to occur in overworked organs. If actual disease does not set in, debility of function or organ must eventually ensue. The uterus, like various other organs of the animal economy, must have periods of rest, or the day of reckoning will surely arrive. An excessive use of the reproductive organs generally, if not always, impairs the integrity of the nutritive organs, and *vice versâ;* hence, if a cow is kept pregnant all the time for the unwise purpose of making her yield a constant supply of milk, it should not appear strange if she fall off in the quantity of milk, appear unthrifty, be off her feed, and have a glairy discharge from the vagina. These are the symptoms which usually precede abortion.

I lately visited an imported cow, the property of a gentleman in Illinois, who informed me that she had aborted three times at about the seventh month of her pregnancy, and she was generally put to the bull shortly after the mishap. I told him that this bad practice was the sole predisposing cause of the trouble; for the short space of time which occurred between the premature expulsion of the fœtus and re-impregnation was not sufficient for the entire recovery of tone in the sexual organs; hence, so long as this practice continued, his cow would never go her full time. I strongly urge the necessity of spaying such an animal. She ought, at least, to be separated from the breeding cows, and her fœtal calf, membranes, and placenta should be burned in the open air, for there is no safety in burying them a few inches under the earth's surface.

It is very probable that many cases of abortion occur through a deranged condition of the digestive organs; therefore the means most likely to prove effectual in keeping the stomach in a healthy state should be adopted. What an immense amount of labor the digestive organs have to perform! They have to be almost constantly engaged in converting the elements of good and bad food into chyme and chyle; and they must not slacken much, else where are sixteen quarts, more or less, per day of milk to come from? How is the fœtus in utero to be nourished, and the wear and tear of the cow's organism to be provided for, when the stomach is not in working order?

The practice of milking cows to within a short period of parturition is highly injurious, yet some persons with whom I have had conversations on this subject contend that, in some cases, it is impossible to "dry the cow." I advised them to reduce the animal's food to less than one-half, or even one-fourth, if necessary; in fact, there would be no harm in withholding food altogether for a short time, and in substituting for food a dose or two of aperient medicine. This course must necessarily soon lessen the amount of blood in the system, and as the milk is concocted from the blood, it will decrease in the same ratio, or, rather, be essentially lessened; and in view of reducing the quantity of milk, I also urge the necessity of keeping the cow on a small quantity of water. This practice may not, on all occasions succeed in arresting the lacteal secretion, still it is the only rational way of accomplishing the object.

Abortion is sometimes attributed to a debilitated state of the animal. This also arises from a derangement of the stomach. Then an opposite mode of treatment must be pursued, such as a change of food to that of a more nutritious character, and the frequent administration of small doses of ginger and golden seal.

Breeding cows require a great deal of care and some watching. Careful selection of the right kind of food for the necessary wants of the animal and her fœtus in utero is indispensable. Neither the one nor the other can be expected to enjoy good health on a diet of slops, swill, brewer's grains, corn-stalks, rotten potatoes, frozen turnips, damaged meal, musty hay, or sour apples, etc. Care is also requisite in providing for the animal's wants in regard to "watering." This is a subject of great importance, yet very few husbandmen give it that attention which its importance demands. The horrible stagnated stuff found in some pastures and water-troughs, which the thirsty creatures are compelled, from sheer necessity, to imbibe, is surely operative in producing very many unnecessary diseases, derangements, and abortions.

Some watching is necessary. A cow likely to abort is generally "off her feed," does not ruminate according to her accustomed activity; she fails to yield the daily quantum of milk; her condition is noticed to be unthrifty, and, on inspecting the vagina, it is observed to be the seat of a glairy discharge. Such an animal should be immediately isolated from the rest of the herd, and proceeded with as above directed. It is said that a very common cause of abortion is sympathetic influence.

There is another matter of some importance to be considered in view of prevention? I allude to breeding. It is my opinion that thousands of the abortions which occur among our domesticated animals of this country are for the benefit of the several races present and to follow; for if the offspring of cows whose systems have been debilitated by a too early use of the sexual organs, and those of other parents, laboring under organic disease, malformation, and stunted growth, together with the apology of offspring of cows doomed to drag out a miserable existence in some horrible "swill-milk establishment," where death runs riot, or runs into the milk-pail, to kill off unnursed infants, these being permitted to come into the world with their inherited imperfections, and being suffered to grow up and become parents, issuing a worse edition than the original copy in turn—these bad specimens, not of Nature's handiwork, but of man's ignorance and folly, or willful transgression of the law of Nature, being permitted to live, they would be so many libels on creative power; and, in order to remove them from the face of the earth, and put a check on the monstrous evil, a friendly pestilence must eventually ensue. This would be a mournful event; for many valuable animals might, by infection or contagion, be involved in the general ruin; therefore Nature adopts the lesser evil, and applies the law of destruction prior to the birth of monstrosity.

The laws of reproduction and destruction are nicely and wisely balanced. "Thus far shalt thou go, and no further." The offspring of weak, emaciated, ill-formed, scrofulous, consumptive, and otherwise defective animals, should never be used for breeding purposes; in fact, they are not even fit for the butcher.

Finally, I would advise breeders to let the female get her growth ere she is forced into copulation; for prior to maturity all the energies of her system are concentrated upon the perfection and integrity of her organism, and, until that important period arrives, the reproductive system can not be exercised without running great risk of violating one of the fundamental laws of Nature.

I have now directed the reader's attention to most of the causes likely to influence or induce abortion, and I leave the rest, if any there be, to be discovered by their own experience. It is impossible for me to furnish definite instructions as regards the treatment of individual cases, either prior or subsequent to abortion, as each require a certain course, according to the condition and prevailing symptoms; yet, if I have succeeded in pointing out only a few of the errors which prevail in our present faulty system of breeding and management, and have been practical enough to secure the reader's attention in a perusal of this article, I have accomplished more than I expected at the time of its composition.

Inflammatory Affection of the Hind Limbs after Calving.

Some cows, after calving, suffer from an inflammatory affection of the hind limbs, which renders them lame, or they are unable to use the parts with that promptitude which characterizes the physiological condition or state of health. The limbs are generally hot, and, in certain localities, are swollen, and the general health of the animal seems to be impaired, yet there is no great danger attending the condition. The tumefaction appears to consist of a local effusion (dropsy) of serum into the cellular tissue, which readily disappears through the local application of cold water, and the action of the calf on the teats.

The attention of veterinarians has been directed to this affection by Lecouturier, in the following paragraph, translated by Mr. Gamgee:

"A few days after parturition, and always when it has been normal, a difficulty in the movements of the hind-quarters is to be observed. The hocks become sensitive; the anterior surface swells up; the synovial capsule is disturbed; great pain is felt at the slightest touch, accompanied with heat. Then the appetite is lost; the secretion of milk diminished; pulse quick and strong; and a certain amount of fever sets in. The patient can not lie down, and still is not safe on its legs. The writer never saw the affection but on recently-calved cows; never after the ninth day, and almost always from the fourth to the seventh. This disease affects generally the good mother, and is of a most benignant nature. A friction of turpentine and alcohol is sufficient to restore to health in most cases; otherwise, brandy and soap. When the fever is strong, a dose of niter, with digitalis, is useful. This disturbance is always of a benignant nature, and is coincident with parturition, as the parturient fever, and a serous diarrhea, which occurs from the second to the third day after calving, easily checked, and never lasting more than twenty-four hours."

Treatment.—My treatment is as follows: Give the patient a drachm, three times per day, of fluid extract of gelseminum, and bathe the limb with a cold infusion of hops, just so long as inflammation and fever exist. Then prepare the following:

Fluid extract of buchu................ 8 oz.
Chlorate of potass.................... 2 oz.
Water................................. 1 pint.
Mix.

Dose, a wine-glassful night and morning. Rub the limbs with a portion of the following:

Fluid extract of wormwood............ 3 oz.
Proof spirit.......................... 1 pt.

SECTION VII.

DISEASES OF THE URINARY ORGANS.

Description of the Urinary System—The Ureters—The Bladder—The Urethra—Hæmaturia—Inflammation of the Kidneys—Urinary Calculi—Calculi in the Bladder—Black Water—Red Water.

Description of the Urinary System.

THE primary organs of the urinary system are the kidneys, two ovoid conglomerate bodies, of a purple color, located in the lumbar region, or loins, separated from each other by the inferior part of the spinal column. They are generally imbedded in adipose tissue denominated suet. The kidneys are the great emunctories of the body, are constantly engaged in secreting waste and morbid fluids from the blood, and we find them much larger in cattle than in horses. When the function of any other excretory organ is impaired, an extra amount of work is in store for them to perform. In health their function never ceases—a constant secretion of urine is going on all the time. Whether the animal be awake or asleep it matters not, there is no rest for the kidneys. On cutting through the kidneys, it is found to be composed of two substances, termed cortical and medullary.

The kidneys are supplied with blood by the emulgent arteries. They are of large caliber, and furnish a large quantity of blood from which the urine is secreted. Within the center of each kidney is a receptacle known as the pelvis, which terminates in a funnel-shaped outlet, the commencement of the ureter. The emulgent arteries, which supply the kidneys with arterial blood, are derived from the posterior aorta. They subdivide and ramify into the substance of the gland, and end in a very complex network. The emulgent veins are much larger than the arteries. They accompany the latter, and, finally, converge into one trunk, and terminate in the posterior vena cava. The nerves of the kidneys are derived from the renal plexus.

The Ureters.

Each kidney is connected with the bladder by a common duct or tube, known as the ureter. These ducts are much stronger and larger than those found in the horse. They are composed of two tunics. The external one is both fibrous and muscular in a longitudinal direction, which permits it to contract and extend in exact ratio as the bladder contracts when empty, and expands when filled. The internal membrane is of mucous texture, and is constantly lubricated with a mucous secretion, which defends it against the irritating qualities of the urine.

The Bladder.

The bladder of an ox is much larger than that of the horse. It is a musculo-membranous sac, or bag, and is located within the pelvis, bounded above by the rectum, and below by the internal surface of the pubic bones. In the cow we find the bladder located between the rectum and the uterine organs. The bladder has a transverse ligament inserted into the lateral parts of the pelvis. It has three coats. One is derived from the peritoneum, or lining membrane of the abdominal cavity, which gives the bladder an external covering. The middle coat of the bladder is composed of muscular fibers, which run in longitudinal and circular directions. The internal membrane, or coat, is more highly organized than the others. It is furnished with excretory outlets, from which issues a mucous secretion for its own protection.

The bladder is divided into fundus, body, and cervix. The fundus is that prominent part which faces anteriorly, or toward the intestines, and when the bladder is full of urine, it protrudes into the abdominal cavity. The body is the bulky or capacious part, generally more rounded, when full, than in the horse's bladder. The cervix is the neck, or contracted part of the bladder. It is surrounded by muscular fibers that involuntarily contract, so as to close the passage, except in the act of urinating. Some anatomists consider this muscle as a distinct one in the horse, and have given to it the name of sphincter; but in oxen it does not seem to be a distinct muscle, neither does it contract with that force or persistency which is known to occur in the case of a horse.

The Urethra.

The urethra arises from the neck of the bladder, and extends from it to the end of the penis. It is much smaller in caliber than in the horse. It affords a passage for the urine and seminal fluid. Interiorly it is composed of mucous membrane, which is a prolongation of that found within the bladder.

Hæmaturia.

Hæmaturia signifies voiding of blood with the urine. In cattle-raising districts, this disease, or rather the symptoms of one, is generally known by the term "red water," although a very marked difference exists between hæmaturia and mere discoloration or reddened appearance of the urine; for in the former case blood globules are invariably present, and their presence can be determined by procuring a sample of the urine. After letting it stand for a short time, the blood coagulæ may be detected by the naked eye, at the bottom of the vessel in which the urine is caught.

Causes—Its Character and Symptoms.—The voiding of blood with the urine is generally supposed to be occasioned by some violence, such as local injury in the lumbar region, calculi within the ureters or the bladder; from local hemorrhage, occasioned by congestion, or inflammation of some portion of the urinary organs. Congestion is apt to occur in overfed animals, and, perhaps, is an effort of Nature to phlebotomize the subject and reduce the amount of circulating fluid, and thus lessen the liability to accumulate adipose tissue. If such be the case (the patient being in a state of plethora), no immediate danger is to be apprehended. Especially is this the case when the hemorrhage is merely passive, unaccompanied by symptoms of pain either at the time or between the periods of urinating. A case of this character might very properly be termed congestive hæmaturia, and may be treated on the same principles which prevail in the practice of intelligent physicians in the management of other local congestions. Nephritis (inflammation of the kidneys) may occasion hæmaturia, and is almost always accompanied by sure and unmistakable symptoms; namely, those of pain and irritation, either in the act or else before or after urinating. It may be difficult to determine what is the exciting cause of this inflammatory condition. It may be purely idiopathic, or may arise from the irritation consequent on the passage of urinary calculi through the parts involved; and, notwithstanding there are certain diagnostic symptoms attending both varieties, still the medical attendant (who has just seen the case for the first time,) may find it hazardous to venture an opinion on its exact pathology; yet he shall not be at fault in treating the case as a local inflammatory affection. If it can be shown that the animal has been dosed with strong diuretics, and no hemorrhage had existed prior to their administration, but is now quite profuse, we may safely conclude that the hemorrhage is occasioned by the local stimulus. It may, therefore, be laid down, as a general rule, that all cases of hæmaturia, attended with symptoms of pain, are occasioned by the irritation of some foreign body acting on some part of the secretory surface of the urinary apparatus, or else is the result of some external violence; and it is the business of the person who prescribes to carefully consider these matters, in view of forming a correct diagnosis.

Hæmaturia does occasionally occur in nursing women of a plethoric diathesis. At the period of weaning the infant, the woman notices, on urinating, that the fluid is tinged with blood; but, as the act is unaccompanied by pain, and nothing of the kind being felt in the region of the kidneys, she feels no alarm about it, and scarcely if ever consults a medical man on the subject. In the course of a few days, all things being favorable, the urine assumes its natural appearance; therefore, if hæmaturia shall appear in a cow at the period of "drying her up," as the saying is, or if a cow shall be observed to pass blood in the urine at the time of weaning the calf, and neither one nor the other manifest any discernible symptoms of pain, nor any perceivable manifestations of derangement in the vital functions, there will be no necessity to resort to any very active mode of medication, and an intelligent physician would merely recommend a mild laxative, light diet, and a little nursing. A few doses of liquor acetate ammonia might be indicated as a febrifuge. This may be given from a bottle.

Treatment.—Should the owner of the animal be unable to obtain the services of a professional man, let him prepare some flax-seed tea (a quart); then add half an ounce of powdered blood-root; after which let the animal have six drachms of tincture of matico, diluted in a small quantity of water, night and morning. Should the disease be traced to the presence of urinary calculi, a lithontriptic will be indicated, which is prepared as follows:

Muriate acid	1 oz.
Water	1 pt.
Fluid extract of hops	1 oz.

Dose, half the above quantity, night and morning.

Inflammation of the Kidneys.

Symptoms.—Cattle affected with inflammation of the kidneys will be observed to have some slight roaching of the back; that is to say, instead of the back or spinal column being straight or slightly concave, as it ought to be, it now presents a convexity, or, in other words, is arched in an upward or superior direction. The arching of the back is occasioned by tonic spasms of the psoas and iliac muscles, located above the kidneys in the lumbar region. These muscles are known to butchers as "tenderloin." On making pressure over the region of the kidneys, the animal will be observed to flinch, the parts appearing very tender and hot. The animal is generally dull; the muzzle, dry; a chilliness of the horns and external surface is observed, showing very clearly that there is an unequal circulation of the blood. There is, generally, some difficulty in passing the urine; the animal strains in the act of passing it, and it is redder than usual. The symptoms vary as the disease progresses, but the above are the principal ones on which the diagnosis must be founded.

Treatment.—Drench the animal with twelve ounces of Glauber salts, dissolved in a quart of warm water; then apply warm-water bandages to the region of the loins, which may be retained in their place by encircling the body with a bandage. An emollient clyster of slippery elm should occasionally be thrown into the rectum, and the patient should be drenched with four ounces of the liquor acetate of ammonia every six hours, until an improvement takes place. Then give tincture of matico, in half-ounce doses, night and morning, until the patient is better.

URINARY CALCULI.

Cattle are occasionally the subjects of urinary calculi, yet there are not many cases of the kind on record; and, during a practice of twenty-five years, the author has never been called upon to prescribe for nor treat a case of this character. This testimony is diametrically opposed to that of YOUATT and others. YOUATT contends that "concretions are oftener found in the urinary passages of cattle than of the horse." This is not in accordance with the experience of American husbandmen. In England, however, cattle may inherit some peculiarity of constitution which causes a tendency to the formation of concretion; or perhaps the water they drink may be impregnated with alkalies, so as to induce an alkaline diathesis. Urinary calculi are generally composed of carbonate and phosphate of lime, carbonate of magnesia, and some animal matter.

Treatment.—Should calculi be present in either the kindeys or ureters they are sure to occasion some degree of pain. The urine will be reddened, and sometimes blood corpuscles can be detected in the same. After awhile some muco-purulent fluid will be discharged with the urine. In this stage, it might be advisable to give the animal one ounce of acetic acid, in sixteen ounces of water, per day, to be continued a week or so. Should the general health be impaired, let the animal have a few doses of the following:

Fluid extract of hops	2 oz.
Hyposulphite of soda	$\frac{1}{2}$ oz.
Water	1 pint.

Mix.

CALCULI IN THE BLADDER.

A stone once having formed in the bladder will defy all our attempts to dissolve or decompose it; yet if any one wishes to try the experiment, they can resort to the use of muriatic acid, sufficiently diluted with water to render it harmless to the animal tissues with which it may come in contact. The stone can, however, be removed by the operation of lithotomy, which will require the services of a skillful surgeon. In such a case the owner may possibly decide upon slaughtering the animal. Perhaps this is the best thing he can do.

Symptoms.—There are various symptoms of deranged health which often attend stone in the bladder; yet, as they frequently accompany other diseases, and throw no special light on this, I shall take no notice of them, but offer something brief, yet more reliable. The presence of a stone in the bladder will generally occasion some interruption to that free and uniform flow of urine which takes place in a healthy animal without any symptoms of stone in the bladder; consequently if, in the act of urination, the flow of fluid is suddenly stopped, to commence again a few moments afterward, at the same moment a slight trembling of the hind limbs is observed, and the animal strains ineffectually to urinate, only passing a few drops, and this state of things has existed for some time, it may be inferred that a stone is present in the bladder, and if so, the animal had better be slaughtered.

Black Water.

A discharge from the urethral outlet of fluid quite black in color very frequently indicates a grave form of disease existing in the liver. Should black-colored matter be detected in the urine, the probabilities are that the animal will die; for the disease which gives rise to the abnormal discharge is probably organic.

Symptoms.—In some cases black water is occasioned by engorgement of the liver, spleen, or kidneys, and when an animal dies of these engorgements, we find the capillary veins much distended; and these engorgements frequently occur, also, in many of the diseases of an epizoötic or malignant character. Such condition or congestion is owing to a loss of equilibrium in the circulation. The arteries are very impressible to excitation, and hold out their physiological actions the longest. The veins being more distensible than arteries, the blood is forced into the venous radicles faster than they can absorb it; hence the free egress of blood is retarded. The result is an accumulation of blood, distending the organs or veins, producing engorgements and a darkened color of the blood and tissues. The blood assumes a darkened color partly from delay and partly from deficient pulmonary absorption and aeration.

The causes of these local congestions are not always to be determined, yet they almost always receive their chief force from a morbid habit pervading the general system; at least this is the case when no local disease exists to account for them.

Treatment.—The principal object in the treatment of black water is to equalize the circulation and decarbonize the blood. Diffusible stimulants and nauseants fulfill the first indication, and ammonia the latter; therefore I use the following:

Fluid extract of ginger..............	1 oz.
Chlorate of potass....................	1 oz.
Spirits of ammonia..................	2 dr.
Water............................	1 pint.

Give the above quantity once daily.

Red Water.

The changes which occur in the color of the urine are the results of various causes. In a preceding article the reader is informed that hæmaturia (voiding of blood with urine) is traceable to certain direct causes, hence the difficulty is of an acute character. Now, suppose we take a well animal as a subject for experiment. We administer repeated doses of sweet spirits of niter or tincture of juniper. The first thing we notice is, the urine is augmented, or rather more profuse than usual, and of a pale color. Continue the medicaments over a given period, and the urine assumes a darker color—first, yellow; next, brown, or coffee color, purple, or even black. This shows conclusively that the color of the urine can be altered by the use of medicinal agents; therefore, if a reddened appearance of the urine follow the exhibition of strong diuretics, the cause is plain enough, and the cure is effected by discontinuing the diuretic medicine, and in restoring the equilibrium of action which should exist among the various excretory organs. Various kinds of food are also operative in producing changes in the color and quantity of the urinary secretion. Beets and carrots, when fed in quantity for a sufficient length of time, alter essentially the color of the fluids of the body, urine included. As regards quantity, musty oats and an excess of stimulating food are notorious causes in explanation of augmented and discolored urinary secretion.

Discoloration of the urine, which some of our Western farmers term "red water," is usually occasioned by derangement of the liver and other parts of the digestive apparatus. The urine, however, is more likely to have a tinge of brown or yellow than red, and, therefore, several writers, Mr. Youatt included, have termed such cases "chronic red water;" and they all agree that such an affection is not primarily one of the kidneys, but of the liver, and I presume that the "red-water" which prevails among cattle in the West owes its origin to the same causes as above. For example: A friend informs me that he lost a valuable cow, "which died of red water," and that the urine was of a "yellow-brown color," indicating, very clearly, that the animal labored under an affection of the liver; and, in view of dispelling all doubt on the subject, I here introduce a short paragraph from my correspondent's letter:

"On skinning the animal, I found that the parts beneath (subcellular tissues) had a yellow appearance. On cutting open the abdomen, I noticed that the liver was of a very dark color, and appeared to be filled with black blood. The gall-bladder was very large, and appeared darker than usual; the manyplies (manyplus) was full of caked food, and there were no appearances of disease in any other parts."

Of course, it will be perceived that my correspondent was far from being an adept in the art of autopsy; however, the appearances which he has described lead us to the necessary conclusion that the so-called red water (which he contends caused the death of his cow) was the result of functional, perhaps organic, disease of the liver.

Mr. Youatt, when discussing the theory of the pathology of chronic red water, offers the following:

"Chronic red water is more prevalent than that which is acute, and in its first stage is far more a disease of the digestive organs, and especially of the liver than of the kidney. The urine is observed to be of a brown color, or brown tinged with yellow. The beast feeds nearly as well as before, but ruminates rather more lazily. In a few days a natural diarrhea comes on, and the animal is well at once; or a purgative drench is administered, and a cure is presently affected. This occurs frequently in cows and calves of weak constitution. At other times there is manifest indisposition. The animal is dull, heavy, languid; the ears droop, the back is bowed; she separates from the herd; she refuses her food, and ceases to ruminate. Presently she gets better; she rejoins her companions, but this is only for a little while. The urine, which at first was brown, with a tinge of yellow, has now red mingled with brown, or it is of the color of porter. It is increased in quantity; is discharged sometimes with ease, at other times with considerable straining—

in little jets, and with additional bowing of the back. The milk diminishes; it acquires a slight tinge of yellow or brown; the taste becomes unpleasant, and it spoils all that it is mingled with. The pulse is accelerated; it reaches to 60 or 70. If the blood is drawn, the serum which separates from it is brown. The skin is yellow, but of a darker yellow than in jaundice; it has a tinge of brown. The conjunctiva is also yellow, inclining to brown. The urine becomes of a darker hue, and is almost black. The animal usually shrinks when the loins are pressed upon. Occasionally there is much tenderness, but oftener the beast scarcely shrinks more than he is accustomed to do when laboring under almost every disease. The belly is not so much tucked up as drawn together at the sides. There is considerable loss of condition; the legs and ears get cold; the animal is less inclined to move; there is evident general debility. In every stage there is costiveness, and that exceedingly difficult to overcome, but, on close inquiry, it is ascertained that there was diarrhea at the beginning, and which was violent and fetid, and which suddenly stopped."

Testimony of this description, emanating from reliable authority, is entitled to our consideration; and it should teach us to seek for the cause of discolored urine beyond the region of the kidneys, except in those cases which are evidently the results of the action of diuretics or stimulants in the form of improper food. It will generally be found that discolorations in the urine are the symptoms of a disease located elsewhere; hence the disease should be treated instead of the symptoms.

Treatment.—If the disease appears to be located in the liver, indicated by a yellow tinge of the visible surfaces, dark-colored feces, and yellow tinge of the urine, the animal being dull and sleepy, showing symptoms of febrile action, it may be proper to administer a dose of purgative medicine, combined with some agent calculated to restore the physiological action of the liver, and I therefore recommend the following:

Epsom salts........................	12 oz.
Podophyllum peltatum (mandrake)...	2 dr.

Dissolve the salts in tepid water, one pint; then add the podophyllum, and administer the same by means of a "drenching-horn," or bottle.

In administering medicine to cattle, our object is to get it beyond the rumen or paunch into the digestive compartment of their complex stomach, and, in aiming to do this, we pour the medicine down the œsophagus slowly. After the bowels have responded to the action of the medicine, it may be proper to administer alteratives which are known to change morbid action. Powdered sulphur and mandrake may be given, in small doses—not sufficient of either to keep up the cathartic action of the salts, but merely to keep the bowels in a soluble condition for a day or two; and if there be any danger of superpurgation, neither mandrake nor sulphur are indicated. In such case I should give an occasional dose of powdered golden seal, two drachms, and the same quantity of carbonate of soda. The patient should be fed sparingly; and if the season permit, a run in the pasture will prove beneficial.

SECTION VIII.

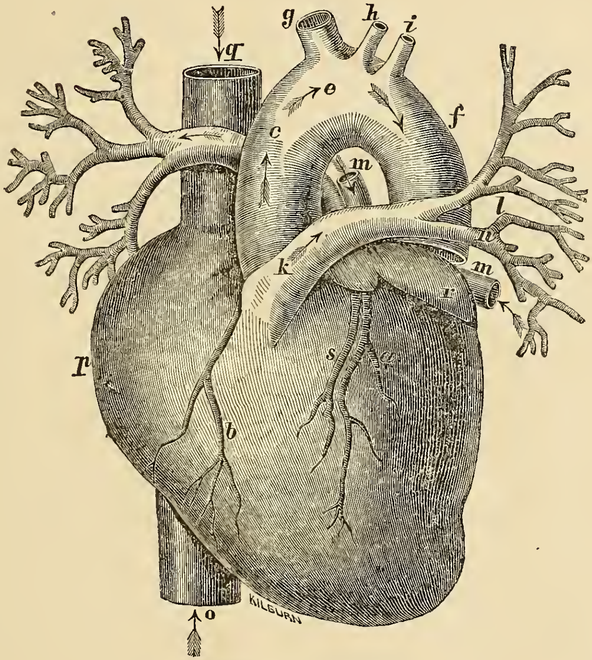
THE HEART—ITS FUNCTION AND DISEASES.

Description of the Heart—The Heart's Function—Diseases of the Heart—Dilatation of the Heart—Pericarditis—Hypertrophy—Endocarditis.

Description of the Heart.

THE heart is a wonderful and powerful piece of muscular mechanism. Its function is of the involuntary order, so that regular contractions and expansions, or beatings, occur in the normal state, without the knowledge and consent of the animal. These contractions and expansions, however, can be modified by means of various medicinal agents which act upon the nervous system, thus producing a sort of mixed action (voluntary and involuntary). For example, all medicines known as sedatives operate so as to depress the heart's action, and lessen, for a given period, the number of its pulsations; while, on the other hand, stimulants augment the action of the heart, and increase the number of its pulsations. The average weight of the heart of an ox is eight pounds, yet it is frequently the seat of fatty degeneration, when its weight and bulk is then materially increased.

The heart is anatomically divided into four cavities, two of which being in a superior and anterior direction, and, in consequence of bearing some resemblance to the ears of a dog, are termed auricles. These cavities, known as right and left (or rather anterior and posterior), are divided by a wall, or septum, known as the septum auriculorum. The right auricle is the receptacle for venous blood, and three venous trunks terminate in it; namely, the anterior vena cava, which returns the venous blood from the anterior extremities, head and neck; next, the vena cava posterior, which returns the venous blood from the posterior parts; and, lastly, the coronary vein. The latter returns blood which has circulated through the heart itself for its own nourishment. A considerable quantity of dark, venous blood is generally found in this auricle after death, and it opens into the right or anterior ventricle by an aperture denominated the auriculo-ventricular opening; yet, in consequence of a valvular contrivance within the ventricle, the blood can not recede into the auricle.



THE HEART; ITS CIRCULATION.

EXPLANATION.—*a*, The left ventricle; *b*, The right ventricle; *c e f*, The aorta; *g h i*, The carotid and other arteries springing from the aorta; *k*, The pulmonary artery; *l*, Branches of the pulmonary artery in the lungs; *m m*, The pulmonary veins emptying into the left auricle; *n*, The right auricle; *o*, The ascending vena cava; *q*, The descending vena cava; *r*, The left auricle; *s*, The coronary vein and artery.

Internally, the right auricle is lined by a glistening vascular membrane, having, on various parts of its surface, small muscular eminences, termed *musculi pectinati*. The small cavities which occur, in consequence of this arrangement, are termed *cul-de-sacs*. The right or venous ventricle is also lined by a nicely-organized membrane, and has beneath it several muscular prominences, named *carnœ columnœ*, which give origin to as many tendinous slips. These are known as *cordæ tendinæ.* They are inserted into a fibrous membrane in the region of the auriculo-ventricular opening, and then get the name (membrane included) *valvula tricuspis.* The lateral contractions of this ventricle are aided by small tendinous cords, having muscular origins from the wall and septum. The venous blood passes from this cavity into the pulmonary tissues of oxygenation, through the pulmonary artery, which emerges from the superior part of the ventricle. At the commencement of the pulmonary artery are found three valves termed *semilunar.* Their function is to guard against a retrograde movement of the blood, so that it has no other channel than that which leads to the lungs.

The left ventricle has scarcely any anatomical or structural differences from those observed in the right, although its cavity is smaller, and its walls are somewhat thicker, than those found on the right. It receives the blood from the lungs after purification, by means of the pulmonary veins, which have four openings into this cavity—two proceeding from the right and two from the left lobes. The left or arterial ventricle is the reservoir for arterial blood, which is destined to reanimate, replenish, and perpetuate the vital economy. Having a vastly more important function to perform (which requires augmented muscular mechanism) than its duplicate found on the right side, the thickness of its walls must, therefore, necessarily exceed those of the right. This is found to be the case, so that the outer wall of this is about three times as thick as that found on the other side; and this guide is useful to us in determining at sight, after the heart is detached from the body, which is the left ventricle, and *vice versâ.*

The channel of communication between the left auricle and ventricle is named, as is the case on the opposite side, *auriculo-ventricular* opening. It is furnished, however, with only two instead of three valvular openings, termed *valvula bicuspis,* or *mitralis.* This ventricle is one of importance for our consideration, from the fact of the great aorta (the plastic hose, which seldom if ever requires cobbling or repair) here originates. Its margin, or outlet, is guarded by a complete set of valves, three in number, termed *semilunar,* similar to those found at the origin of the pulmonary artery. This ventricle is divided from the one on the opposite side by a muscular and tendinous partition termed *septum ventriculorum.*

Form, Situation, and Attachment of the Heart.—Its form describes that simulating a cone having a body, base, and apex. Its base being in a superior direction, it follows, as a matter of course, that its apex has an inferior insertion downward and backward. The heart lies in the region occupied by the fourth, fifth, and sixth dorsal vertebra, right in the central region known as the cavity of the chest. Its apex is inclined to the left side. It appears that in the ox the heart differs in construction from that of the horse in the following peculiarities: There is a bone found in the heart termed *os cordis*, the function of which has never been explained; yet it is evidently intended for some useful purpose—perhaps to give strength and durability to the sanguinous force-pump. Next, we notice some difference in the internal mechanism of the right ventricle. There are several fleshy bands, running across from side to side, which prevents abnormal dilatation; for, taken as a whole, the venous system of the bovine species is more developed than in the horse—the veins are larger and more numerous, and more blood is constantly accumulating in the right auricle and ventricle; hence the need of additional muscular mechanism.

The Heart's Function.

The blood having gone the rounds of the circulation, enters the anterior or right cavity (auricle). It then passes into the venous or right ventricle. By the contraction of this ventricle the blood is forced through the pulmonary arteries into the lungs; there having undergone certain changes (which have been alluded to in another part of this work), it returns by the pulmonary veins to the left auricle; from thence it descends into the left ventricle. The contractions of the left ventricle force the blood into the great aorta (anterior and posterior), which gives rise to a numerous set of arteries, through which channels the blood reaches the extreme parts of the system.

Diseases of the Heart.

Diseases of the heart in cattle are very common, yet they frequently elude detection, simply because the symptoms are very obscure. Mr. Gamgee contends that the most common cause of diseases of the heart in cattle is the passage of needles, and other foreign bodies, from the reticulum through the diaphragm. At the same time, he alludes to many drawings in his possession of polypi in the heart, growing from the auriculo-ventricular valves; also to drawings of deposits beneath the endocardium (lining of the heart's cavity); of tumors, also, outside the heart, consisting in masses of cysts, and due to the development of hydatids of the echinacoccus veterinorum.

Dilatation of the Heart.

The heart is often the seat of dilatation, or amplifications of one or more cavities, with attenuation of the walls of the same. This dilatation is supposed to arise from the mechanical effect of over-distension.

Cause.—The cause of dilatation is deficient power in the heart in proportion to that of the system. This may be acquired or it may be congenital. All obstructions, also, to the circulation, whether situated in the orifices of the heart or in the aortic or pulmonary systems, may induce this dilatation.

Symptoms.—The pulsations are feeble and oppressed, and, on moving the animal about, he becomes distressed; the pulse is soft and feeble; languor in the arterial circulation, as shown by the congested state of the mucous surfaces. The respiration is somewhat affected, not primarily, but through the intervention of irregular nervous action. The jugulars are engorged, and various parts and organs of the body are congested, and the surface and extremities are below the natural temperature.

Treatment.—The principal object should be to improve the general health, by alteratives and tonics. The surface of the body should be kept warm, and often rubbed, so as to excite capillary action. This will also have the effect of relieving the venous congestions. Any hygienic measures, regarding both diet and management, will certainly do good. Pure air, for example, is absolutely needed, to vitalize the blood as it tardily courses the veins. Without such there is very little chance of restoring the animal. The alterative and tonic may be thus prepared:

Iodide of potass	½ oz.
Fluid extract of sassafras	3 oz.
Fluid extract of hops	1 oz.
Water	1 pint

Mix, and dissolve the potass in the water; then add the other ingredients. Dose, one-fourth of this quantity night and morning.

The Pericardium and its Diseases.

The pericardium is a membranous bag that surrounds the heart. It is known to the butchers as the "heart-bag," and is attached to the sternum, diaphragm, and to the roots of the large blood-vessels at the base of the heart. It is composed of two layers, united by cellular tissues. The external one is composed of fibrous tissue; the internal one is a smooth, serous membrane, similar to that which lines the cavity of the chest. This serous membrane is studded by numerous vessels called exhalents. From these issue a vapor of fluid, the purpose of which is to guard against friction. The insertions of the pericardium are such that it confines the heart in its proper situation, and aids in sustaining a reciprocal action between the heart and lungs. It is often the seat of a disease known as pericarditis.

Pericarditis.

This disease consists of inflammation of the pericardium, the causes of which are supposed to be nearly the same as those of pleurisy, or inflammation of other serous membranes; namely, sudden impressions of cold on the external surface, violence, etc. A special cause has also been assigned for this disease; namely, the penetration of the pericardium by foreign bodies, such as nails, needles, wire, etc., coming from the interior of the stomach, and working their way through it into the former.

Symptoms.—There is considerable increase in the force of the heart's pulsation; the jugular veins are engorged (larger than usual), and an undulating movement is observed in them. There will be acute inflammatory fever, generally preceded by rigors, shivering, and coldness; the visible surfaces of the nostrils and eyes are highly reddened in the early stages, and rumination has ceased, with loss of appetite. The animal occasionally directs its head near the region of the heart, and if pressure be made on the sternum (breast-bone), it elicits distressing symptoms. As the disease progresses, the jugulars increase in volume, the pulse becomes feeble, and an œdematous or dropsical state of the lower parts of the thorax sets in. This latter feature indicates that a considerable quantity of fluid is present, both in the pericardium and thorax. In this stage the case is incurable.

Treatment.—In the early stage of pericarditis, the treatment should be about the same as that recommended for acute pulmonic and pleuritic affections. Iodide of potassium, in doses of twenty-five grains per day, may prove serviceable; and some form of diuretic medicine may also be exhibited, to increase the action of the kidneys. So soon as the patient shows signs of amendment, tincture of matico, in ounce doses, may be given, twice daily, until the patient has fairly recovered.

The London "Veterinarian" publishes the following case, furnished by Surgeon Lepper:

"I herewith send you what I think is a rare specimen of a diseased heart, with its investment, which was taken from a cow of the short-horn breed, about seven years old, the property of Mr. Bliss, of Windmill Hill, Waddesdon. On the fourth day after calving she was noticed to fail in her appetite, and her milk also became greatly diminished in quantity. In walking across the yard she staggered and fell. She laid for some considerable time, when, with difficulty, she got up and walked to a shed, where she soon laid down again. It was in this condition that I first saw her. The expression of her countenance did not materially differ from that of a healthy animal. The bowels were regular in their action; the pulse did not exceed fifty beats in the minute, and was soft and full. On the left side of the chest there was an emphysematous swelling, extending over four or five of the middle ribs, and about eight or ten inches wide. On auscultating the chest, I could not discover any unusual sound in the respiratory action; the breathing, also, was regular. The jugular veins were filled to repletion, so as to be observable when standing by the side of the animal—a state of things which I have invariably found to exist in effusion into the pericardium, and, especially, if much fluid is present. I felt satisfied that this was a case of this description, and, consequently, formed an unfavorable opinion as to the issue. To relieve the distended vessels, I took away eight or ten pounds of blood, and gave a slight purgative, which appeared to afford temporary relief. For two or three days the appetite improved, and the cow appeared to move with greater freedom and less pain. On the sixth day after my first visit she suddenly relapsed, and died on the seventh. This animal had, for some time past, wasted in flesh, but, as her general appearance was healthy, little notice was taken of it. It is surprising that she should have gone on so well as she did with so extensive disease of the heart. As to the nature of the affection I shall offer no remarks, but leave this to be explained by you."

The following remarks are added by the editor of the above-named journal:

"This was but another of several specimens which we have received, from time to time, in which the external surface of the heart was covered with layers of effused and partially-organized fibrine. The pericardium was thickened to three times its natural substance, and within it was contained several ounces of colorless serous fluid. The effused fibrine hung in grapelike appendages from the base of the heart, each of which had a flocculent condition. These bodies were devoid of color, and had altogether such an appearance as would lead us to doubt whether the effusions resulted from active inflammation. The muscular substance of the organ, and its internal lining membrane, were alike free from organic change."

The following case, which occurred in the practice of Mr. Williams, may also prove interesting and instructive to the reader:

"On the 16th of June, I was requested by Mr. Thomas Tatum, Gwernafield, to attend a cow of his. Her history he gave as follows: 'She has been unwell since she calved, three weeks ago. The fœtal membranes were not expelled for a fortnight after the event, and they came away piecemeal, in a state of putrescence. Her appetite has been very capricious all along, and her bowels rather costive. A discharge of white matter has taken place from the vagina for the last week or so. She gives but little milk. The breathing is tranquil, and she does not cough. She has a peculiar stare in the countenance, and takes a great deal of notice of every thing.'

On inspection, I found her as the owner had stated, the symptoms, to a casual observer, being any thing but indicative of extensive organic changes, but more of general debility after parturition. She was rather emaciated. On closer examination, I found the mucous membranes to be rather pallid; the mouth, cool and moist; the temperature of the body but slightly below the natural standard, and equal over all parts of the body; the pulse, very weak, beating 96 in the minute, and regular; the breathing only very slightly hurried.

After advancing thus far in my examination, I must confess that the case fairly puzzled me, and I was inclined to look on it as one of general debility and leucorrhea; but as the discharge from the vagina was very slight, I thought it could not be the sole cause of the loss of appetite and other symptoms present. I now auscultated the chest, and, on applying my ear, the respiratory murmur was heard distinct and natural, but I thought a little increased at the anterior portion of both sides. On auscultating the region of the heart, I failed to detect the sounds of that organ, and on still further examination, both the sounds and the impulse were indetectible. This struck me as being curious, but, on account of the regularity of the pulse, I did not consider either the heart or its membranes to be the seat of disease, and treated the case as one of general debility, loss of appetite, and leucorrhea. The animal lingered for about four weeks more, the symptoms remaining nearly the same as at the time when I first examined her, with the exception of increased emaciation.

The *post mortem* examination revealed anæmia, the tissues being exceedingly pale and sodden, the blood in the vessels scanty and pale, and scarcely staining the fingers. The abdominal viscera were healthy, with the exception of the liver, which was congested. The gall-bladder was distended with dirty, lemon-colored bile, of thin consistence, and seemingly containing a large amount of mucus. On opening the cavity of the thorax, the pericardium was seen distended to an enormous extent, filling the floor of the cavity, and adherent to the sternum and pleura costalis by a thick layer of exuded lymph, this having no appearance of organization, but seemingly consisting of a shapeless basis-substance, easily separated from the parts it was in contact with. The cavity of the pericardium contained in its inferior part about two pints of a fetid, whey-like fluid. With the exception of that part which contained this fluid, the cavity was obliterated by exudation, matter about two inches in thickness surrounding and gluing together the visceral and parietal surfaces of the pericardium. The heart itself was flabby, pale, and its cavities contained a small amount of blood, of the same thin consistence as that in other parts of the body. The endocardium was healthy. The lungs presented no appearance of disease; they were pale, excepting in the parts lying undermost after death. The pluræ, excepting where they were involved in the pericardiac disease, presented no abnormal appearance. The thoracic and abdominal cavities contained a little fluid.

Reflecting on the appearance presented by the pericardium, by its being adherent through the accompanying pleuritis to the walls of the thorax and sternum, and by the heart itself being thus in a manner bound down and fastened by a thick layer of plaster, and elastic material existing between it and the ribs, I was satisfied that the absence of the sounds of impulse was due to these pathological changes, and not, as I had foolishly supposed, to general debility. But, before giving publicity to this opinion, I thought it better to wait for more proof.

September 4, 1857, I was called to attend a cow, the property of W. Gregg, Esq., Syntroll, Mold. I had attended her in May previous for 'retention of the fœtal membrane.' She seemed to be very languid and depressed for some days before and after the removal of these; but, as she fed pretty well, I was not requested to prescribe for her. She had given milk freely all the summer, but had not appeared so lively as she ought to be. She seemed as well as usual on the evening of the 3d of September. On the morning of the 4th her quantity of milk was diminished. On examination, I found her wet and cold from the rain of the previous night, standing 'all of a heap;' head depressed, and ears pendulous; mouth and nose, cold; breathing, tranquil; bowels, costive; pulse, 100, very feeble, but regular; the mucous membranes slightly tinged yellow. Auscultation failed to detect the sounds of the heart, and the palpitation was absent. I pronounced the case to be one of pericarditis, and that exudation had taken place to some extent; also that congestion of the liver existed, this being secondary, and owing to the feebleness of the circulation.

The treatment consisted in the administration of purgatives and stimulants. Counter-irritants were also applied to the sides, and as the case advanced, tonics were given. But nothing seemed to affect the pulse; it remained feeble throughout, and it was only a few days before death that irregularity was detected.

On Friday, September 18, diarrhea set in, and on the 21st œdematous swellings appeared in different parts of the body, but more especially on the dewlap and fore-parts. On the 23d she dropped down and died without a struggle.

All throughout, this animal exhibited the same watchful state as observed in the first case, and the appetite was very capricious indeed. One day she would feed pretty well; then, again, she would not touch any thing for days. The bowels were very irregular, and, on account of rumination being suspended, the food passed through her in a half-masticated state.

The *post mortem*, four hours after death, revealed general anæmia of the subcutaneous and muscular tissues, these being seemingly in a broken-down condition. The blood in the veins was pale and thin. The abomasum, small intestines, and liver were congested; but even here the blood was of the same watery character as in other parts. The gall-bladder was distended with thin, lemon-colored bile. The thoracic cavity contained rather a large amount of clear serum. The pericardium was distended by a layer of lymph, about two inches in thickness, gluing together its two surfaces, and containing, near the apex of the heart, nearly a pint of dirty, whey-colored fluid, of a fetid odor. The lymph was easily removed from the heart, and between it and the muscular tissue of the organ was a layer of cartilaginous substance, about a quarter of an inch in thickness, covered by a serous glistening membrane. Toward the apex of the heart this had formed bands of connection between the two surfaces of the pericardium, but in all other parts it was confined to the visceral pericardium only. The lungs were slightly congested. The pluræ were as described in the former case."

Hypertrophy of the Heart.

Hypertrophy signifies augmentation—thickening of the muscular substance of an organ, resulting from increased nutrition. It generally occurs in animals of the sanguine temperament, of vigorous health, their muscles being much harder and firmer than usual. In such animals the blood is rich, and nutrition is very active. I have often visited market for the purpose of inspecting the hearts of slaughtered oxen, and I have observed that hypertrophy generally occurs in the left ventricle. Sometimes its walls are thickened, the cavity retaining its natural dimensions. Occasionally the cavity is dilated and the wall thickened, but, in the majority of cases, the walls are thickened and the cavity diminished. This constitutes the disease known as true or concentric hypertrophy (enlargement).

This disease, when moderate and uncomplicated, is not productive of much inconvenience to the bovine species, whose motions are slow; yet occurring in a horse, it would produce much inconvenience, and render the animal almost useless for speed.

Symptoms.—A person unacquainted with the heart's sounds will find it impossible to diagnose a disease of this character; in fact, such a disease will sometimes defy the scrutiny of experts. A deadened sound is always heard when the ear of a person is applied to the region of the heart, yet this depends somewhat on the form of the disease, its complications, the nature and intensity of the exciting causes, and the condition of the patient. On applying the finger to the pulse at the angle of the jaw, or on the temporal artery, it will appear that the circulation is embarrassed.

Treatment.—No rules can be laid down for the treatment of this affection, and the only agent of any value is iodine, or iodide of potassium. It is possible, however, that in a case of this character the butcher may prove to be the best doctor.

Endocarditis.

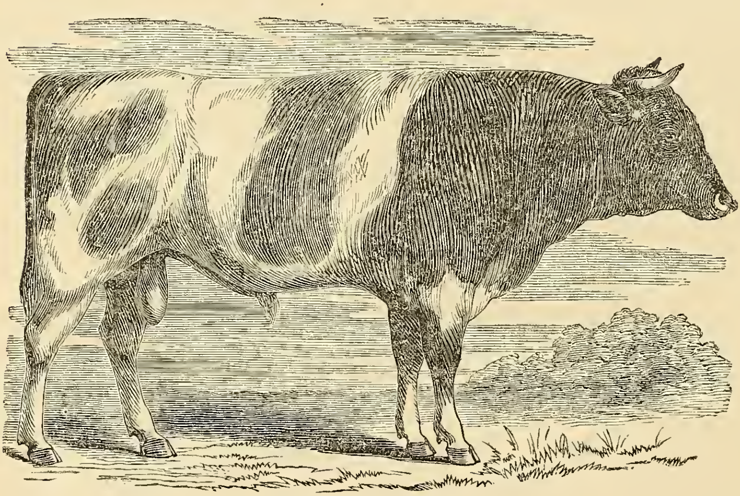
Endocarditis is an inflammatory affection, located in the membrane within the heart. It is a rare disease among cattle, yet very frequently occurs among horses.

Symptoms.—Like all inflammatory conditions, this is attended with heat about the base of the horns; hot and feverish mouth; vitiation of the secretions; cessation of rumination; some degree of suffering, of a peculiar character, not noticed in any other affection. The pulse is violent, abrupt, strong, full, and may range up to eighty; every motion the animal makes accelerates the respiration; yet the lungs show no signs of disease. On examining the heart after death, its internal membrane is thickened, and appears of a dark purple color; clots of extravasated blood are also present on its internal surface.

Treatment.—Administer a cathartic drench, say about sixteen ounces of Glauber salts in a couple of quarts of tepid water; then give half an ounce of powdered nitrate of potassa in a little water, every four hours, until the force of the pulse is essentially lowered.

In the mean time, administer an occasional clyster of soap and warm water.

This disease has occasionally a rheumatic origin; so that if the animal be taken suddenly with inflammatory muscular lameness assuming the features of rheumatism, shifting from one limb to another, and then leaving the region of the first attack and going to the heart, I should prescribe two fluid drachms of wine of colchicum, in a gill of water, every morning, and at night, twenty-five grains of iodide of potass, in half a gill of water.



CELEBRATED BULL "DUTCHMAN."

SECTION IX.

DISEASES OF THE EYE AND ITS MEMBRANES.

DESCRIPTION OF THE EYE—HUMORS OF THE EYE—COATS OF THE EYE—MUSCLES OF THE EYE AND EYELIDS—OPHTHALMIA—FOREIGN BODIES IN THE EYES—SPECIFIC OR PERIODICAL OPHTHALMIA—CANCER IN CATTLE.

DESCRIPTION OF THE EYE.

THE eyes of oxen are frequently the seat of various forms of disease, hence it is necessary that the farmer should know something of their wonderful mechanism; I therefore propose to give a description of the same. The eye is protected by a bony casing known as the orbit, which appears to be much stronger than that found in the horse. In the interior part we find a large quantity of fatty matter which acts as a soft cushion for the eye to repose on, and, at the same time, as the fatty matter accumulates, it gives prominence to the eye and increases the range of vision.

HUMORS OF THE EYE.

The humors of the eye are named aqueous, crystalline, and vitreous—three in number. The aqueous humor fills the interval between the cornea and crystalline lens, and is surrounded by a capsule of its own, on the inner surface of which is secreted the aqueous humor. The uses of this limpid fluid appear to be to transmit the rays of light and permit free motions of the iris. The fluid is frequently evacuated and reproduced.

Crystalline Lens.—This is situated in a concavity behind the aqueous humor, and anterior to the vitreous, opposite to the pupil. In appearance it resembles a crystal or lens of magnifying glass, and is composed of concentric lamellæ, and these of radii. Its form is spherical, yet the posterior surface is more convex than the anterior. Like the other humors of the eye, it is enveloped in a capsule, and the disease known as cataract consists of altered structure in the lens or its capsule; sometimes both are involved. Acids, alcohol, and boiling water convert it into an opaque, solid body, resembling the white of an egg when boiled. The function of the crystalline lens is to concentrate the rays of light so as to form a distinct image on the interior of the eye.

Vitreous Humor.—This jellylike substance derives its name from its glassy appearance. It occupies the posterior concavity of the globe of the eye, known as the "dark chamber." It fills the membranes, aids to maintain the form of the eye, and keeps the crystalline lens at a proper and physiological distance from the retina. Anatomists have hitherto failed in detecting any signs of vascularity in the vitreous humor.

Coats of the Eye.

1. *Tunica Conjunctiva.*—This membrane is very highly organized, lines the eyelids, and is reflected over the anterior part of the eyeball. It covers the region known as the pupil, yet is pervious to the rays of light. Previous, however, to being reflected over the globe, it gives a covering to the membran beneath, carunculæ lacrymale, and puncta lachrymalia.

2. *Tunica Sclerotica.*—This tunic is made up of fibers, which are very dense, yet elastic. It constitutes what is commonly known as the "white of the eye," extends from the junction of the optic nerve with the globe to the cornea, and, more than any other tunic of the eye, tends to preserve its form. It also affords attachment for most of the muscles of the eye—the retractor and four recti.

3. *Cornea.*—This is a dense and compact membrane, yet composed of laminated structure, which accounts for the opacity or "filmy" obscurity so often encountered in veterinary practice; for, in a physiological condition of the eye, the laminæ are compact, like a house newly shingled; but, in consequence of untoward circumstances, a leak occurs; a watery exudation then sets in. The cornea may be considered as the shield that protects the eye, yet, in consequence of its transparency, it is also operative in the production of vision.

4. *Iris.*—This is the movable curtain of the eye, adapts the eye

to vision, possesses the property of contraction and expansion. In its center is a perforation commonly known as the pupil. The dimension of the pupil depends entirely on its contraction and dilatation. In a very dark barn (provided the eye be in a healthy condition), the pupil will be very much dilated; in a barn well lighted, the pupil will be quite small. The iris is a fibro-muscular membrane, abundantly supplied with blood-vessels and nerves, and coated with a substance known as uvea, which is derived from the pigment. The arteries of the iris come from the ciliary; its nerves are derived from the ciliary.

5. *Choroid Coat.*—This coat, or membrane, lies beneath the sclerotica. It extends from the optic foramen to the ciliary edge of the cornea. Both of its surfaces are coated with pigment, which absorb the rays of light. The outer coating is entirely black; the inner one is a mixture of black and green, which lines the posterior half of the dark chamber.

6. *The Retina.*—This is the third or inner coat of the eye. It is a delicate, transparent membrane, highly vascular. The principal part of it, probably, consists of an expansion of the optic nerve; it is the part on which the object of vision is depicted. It is supplied with blood by branches from the central artery of the retina.

Muscles of the Eye and Eyelids.

The first muscle which attracts our attention, on removing the palpebral integument, is the orbicularis palpebrarum, so named from the spherical or circular arrangement of its muscular fibers. It is inserted into the orbital portion of the ungis and os frontis to the palpebral ligament, and to the skin of the lids. Its use is to shut the eyelids.

Levator Palpebræ Superioris.—The action of this muscle is to corrugate and draw the lid upward. It is located above the orbit, and is attached to the forehead by means of an aponeurotic expansion, and is inserted into the upper eyelid, its muscular fibers being blended with those of the preceding muscle. Its action is to raise the upper eyelid, in which action it is aided by the levator palpebræ internus.

Next, we find four muscles known as recti; namely, levator oculi, depressor oculi, abductor oculi, adductor oculi. They are inserted into the cavity of the orbit and external part of the sclerotica, at points equidistant from each other. The action of these four muscles are as follows: The levator raises the eyeball in a superior direction; the depressor, as its name indicates, depresses the eyeball; the abductor turns the eyeball from the axis of the body outward; and the adductor rotates the eyeball inward, or toward the axis of the body.

The three remaining muscles, making seven proper to the eye, are named obliquus superiora, et inferiora, and retractor oculi. The obliquus superiora is found in the upper part of the inner cavity of the orbit, and is attached to the margin of the optic faramen. At the inner canthus of the eye it passes through a fibro-cartilaginous pulley-like arrangement, by which means the eyeball is rotated in an oblique direction upward and outward.

Obliquus Superiora.—This muscle is found beneath the eyeball, in the front and lower part of the orbit. It is attached to the os unguis, and to the lower and outer part of the sclerotica, at its junction with the transparent part of the globe. Its action is antagonistic to that of the preceding muscle.

The seventh and last muscle to be described is the retractor. It is one of the most admirably-arranged muscles in the whole animal economy. In figure it resembles a hollow cone—its apex turned backward, its base pointing forward, the inner edge surrounding the optic foramen, and, at the same time, offering protection to the optic nerve. Around its sides, equidistant, are found the four recti muscles, making a very complex and wonderful piece of mechanism. The action of this muscle is to draw the eye backward within the orbit.

I shall now make some brief yet instructive allusions in relation to the appendages of the eye. The appendages comprise the eyelids, eyelashes, tarsal cartilages, meibomian glands, lachrymal glands, caruncula lachrymalis, punctu lachrymalia, lachrymal sac, and ductus ad nasum.

Eyelids.—The upper and lower eyelids may be considered as the movable blinds of the eye. The upper is the most capable of corrugation, and borders the greatest surface of the eyeball. It is readily resolved into wrinkles. At the junctures of the aperture which separates the eyelids are the canthi, or angles of the eye. The loose portion of integument entering into the composition of the upper lid is derived from the skin covering the frontal region, and that of the lower lid is derived from the face. The lids internally form two cavities, thus adapting themselves to the convexity of the globe. Their internal surfaces are lined with the tunica conjunctiva. The borders of the eyelids have two margins. On the outer one we find eyelashes; between the latter and the internal margin we find the orifices of the ciliary glands, through which issue a secretion for the lubrication of the surrounding parts. The edge, or surface between the two margins just alluded to, conduct the tears into the puncta lachrymalis.

Eyelashes.—The eyelashes (cilia) are so familiar to the reader, and their function is so apparent, that I need not trouble him with any remarks about them, only to observe that, by their advantageous arrangement, the rays of light, come from whatever direction they may, are somewhat intercepted; and they also operate as feeders to the seeing as well as the sightless animal, and warn him of his proximity with bodies that he can not immediately perceive.

Tarsal Cartilages.—These fibro-cartilaginous substances are found at the ciliary margins of the upper and lower lids. They possess firm and thick ciliary margins, yet grow thin as they recede from the cilia. In consequence of their close connection with the rim of the orbit, they are called, by some anatomists, "tarsal ligaments." Their function is to give some degree of firmness to the eyelids, or the soft parts of the same, and they also preserve the physiological curvature of the eyelash.

Ciliary or Meibomian Glands.—On inverting the eyelids of a horse, and carefully running the eye over the borders of the lids, within the grooves, occurring in the concave part of the tarsal cartilages, we perceive, through a very fine tunic or membrane, a number of opaque sacs, having a miniature canal, capable of penetration by a small body equal in caliber to the point of a common needle. They are evidently glandular bodies, and, therefore, have excretory ducts, which pour out the necessary lubricating material to prevent the agglutination of the lids.

Lachrymal Gland.—This gland lies underneath the process of bone known as the orbital arch. It is covered by the lining membrane of the orbit. It is a gland of the conglomerate class, being composed of many lobules. These lobules are composed of granules, from which spring the excretory ducts, and they, by interunion, form a set of tubes which terminate on the conjunctiva of the upper lid. The office of this gland is to secrete the tears, which run into the ducts, and are then poured on the conjunctiva.

Caruncula Lachrymalis.—At the inferior canthus of the eye, between the eyeball and eyelids, is seen a small, black tubercle, called the caruncula lachrymalis. It is not a secretory organ, but appears to be placed there for the mechanical purpose of directing the tears into the puncta lachrymalis.

Lachrymal Puncta and Conduits.—The puncta are two small orifices, seen in the inner margins of the lids, at the root of the caruncle. They are the openings of two canals found within the substance of the lids, termed lachrymal conduits; they terminate in the lachrymal sac.

Lachrymal Sac.—The lachrymal sac is a funnel-shaped membranous bag, lodged in close proximity with the lachrymal foramen. This sac serves as a reservoir, into which the tears flow from the lachrymal conduits. The lachrymal sac terminates in the ductus ad nasum.

Ductus ad Nasum.—The office of this duct is to convey away the tears as fast as they are collected within the lachrymal sac. The duct terminates at the inner and inferior part of the nostril. It is formed by a prolongation of the membrane which enters into the composition of the lachrymal sac.

Ophthalmia.

Symptoms.—Ophthalmia, or inflammation of the eye, is quite a common affection among neat stock. It frequently occurs without any assignable cause, except the concentration of morbid action or morbid material in the tissual membranes. It is always attended with more or less pain, tenderness, and tumefaction, and the tears being secreted faster than they can be carried through the ductus ad nasum, flow over the lower lid. This simple diseased condition differs from what is known as specific or periodical ophthalmia. There is no constitutional disturbance to be noticed, nor symptomatic fever, and the affection appears to be confined to the conjunctivial membrane only.

Treatment.—The treatment should commence by giving the animal a dose of Glauber salts, which consists of twelve ounces of salts dissolved in one quart of tepid water. The action of this medicine will be to remove morbid matter from the system. The eye should be carefully fomented with a warm infusion of hops, after which lay a piece of wetted rag over the eye and fasten it to the horns. I could name many favorite local applications (lotions) for the disease in this stage, but, in my opinion, cold water surpasses them all. The food should consist of scalded shorts, the animal to be kept quiet in comfortable quarters.

Foreign Bodies in the Eye.

If an animal should suffer in consequence of irritation and tumefaction of the lids of one eye, and a little pus or matter can be detected, the probability is that some foreign body, such as a piece of hay, straw, or dirt, has insinuated itself between the ball and eyelid, and has become lodged there. In a case of this character, the lids must be carefully inverted, one after the other, and examined. The removal of the foreign body is equivalent to a cure; for very little, if any, after-treatment is needed, with the exception of cleansing the eye with cold water.

Specific or Periodical Ophthalmia.

This dangerous form of disease is termed periodical, because, having once made its appearance, there is a liability of a recurrence. It is not, however, so prevalent among cattle as among horses. It is a disease which, finally, is sure and certain to end in cataract, or disorganization of the eye. In this stage perhaps the butcher would be the best doctor.

It may be proper, however, to give the reader some idea of the nature and symptoms of this malady, so that common ophthalmia may not be confounded with nor mistaken for it. It has been observed, in the preceding article, that common ophthalmia was confined to the membranes of the eye. The disease now under consideration makes its ravages on the inner structures of the eye, the external covering being only sympathetically involved. On parting the swollen lids, and if the cornea be not too opaque, we shall find that the aqueous humor is thick and muddy; the iris, lens, and other internal parts are altered in texture and structure; in fact, the eye has all the appearance of being ruined, which is probably the case. The remote causes of this disease are constitutional predisposition.

There are several other affections of the eyes of oxen and cows, but, as they are incurable, the subjects must be referred to the butcher.

Cancer in Cattle.

Cancer is a peculiar malignant growth, affecting one or more parts of the body. It probably owes its origin to some peculiarity of constitution. It is usually divided into two stages. The first is that of scirrhous, or hardening of the soft parts; the second is that of open cancer, or ulceration. In this stage, a foul fungus sore is observed, having an irregular surface of varied hue, with elevated, everted, and rough margins.

Treatment.—The popular method of treating this dreadful malady is to dissect out the diseased parts; but this rarely succeeds, for the disease generally has an origin beyond the reach of our scalpel. The only remedies of any value, in curable cases, are bloodroot and iodide of potassium. The parts should be sprinkled often with powdered bloodroot, and the patient should have twenty grains per day of iodide of potassium.

A writer in the "Eclectic Journal" offers the following as the pathology of cancer:

"According to the researches of the most eminent physiologists, malignant growths are composed of two parts, granules or cells, with cell germs, and granules within them, nourished with fat cells and globules, and of fibrous tissue or stroma, in which the former parts are embedded. Malignant growths are composed chiefly of albumen, supplied with blood-vessels, but differ in their essential elements—namely, in their chemical and microscopic—from healthy tissue. The development of this disease is evidently a perversion of the ordinary process of nutrition. The lymph, or blastema, which exudes through the capillaries, either in the ordinary course of nutrition or through some accidental inflammation, appears to have its vitality perverted; so that, instead of forming itself into one of the proper tissues of the body, it forms the irregular abnormal cells, which constitute this species of growth. These abnormal cells are deposited in distinct masses, or else spread through the tissue of the organ or part, which it ultimately supersedes. When once formed, they increase in size by the constant formation of new cells, which are supplied with fresh material from the blood. In the course of time, the older portions of cancerous growth lose their vitality, soften down, their outer surface ulcerates, and a sanious discharge follows."

The following case appeared in the "Veterinarian," and is selected for the instruction of the reader:

"About two years since, we were called in to attend a cow, the property of a gentleman residing in our neighborhood. On examination, we perceived a cauliflower excrescence growing from the membrana nictitans, about the size of a strawberry, from which issued an ichorous discharge that excoriated the adjacent parts, and which bled on the slightest touch. We at once decided upon taking it out, and this was accordingly done, the parts being subsequently touched with lunar caustic. After this the cow appeared to go on well for about twelve months, without any reappearance of the cancerous growth. At the conclusion of that time, we were again sent for, and found the cornea had become of a bottle-green color, and that the sight of the eye was completely gone. About three months after this a fungoid growth sprouted from the cornea, which increased in size very rapidly, but was repressed by the application of a little burnt alum. Shortly after this the eye receded considerably into the socket, and eventually it sloughed entirely away. Some weeks afterward she became partially paralyzed, and was unable to masticate. The lower lip was pendulous; the ear hung down by the side of the neck on the affected side; difficulty of deglutition was experienced, and the saliva flowed from the mouth, mingled with the partially-masticated food. Attenuation of the paralyzed muscles quickly followed, and much general emaciation of the frame. The owner being desirous of obtaining another calf from her, she was kept alive with gruel; but, as it was soon seen she could not live so as to give birth to a calf, she was destroyed. This being a fortnight before her time, the calf was immediately taken out, and it seemed likely to live and do well. It however lived only three days, the immediate cause of death being injudicious feeding."

SECTION X.

HERNIA, OR RUPTURES.

Forms of Rupture—Inguinal Hernia—Strangulated Hernia—Ventral Hernia.

Hernia.

HERNIA signifies rupture, or unnatural protrusion of a portion of the intestines or the omentum. In consequence of the rough encounters which horned creatures frequently engage in, they are liable to suffer from the consequences of external violence, and a pregnant cow, with a distended abdomen, is more apt to be injured in this way than the male. Still, an accident of this kind will occasionally occur without the intervention of external injuries; for the cow is often the subject of dropsy of the womb, and in such condition the abdomen is distended to an enormous capacity. The only thing that can be done in a case of this character, is to rupture the fœtal membranes by means of a blunt instrument, introduced through the neck of the uterus. This will not only evacuate the fluid, but also bring on premature labor, and thus the lives of both mother and calf may be saved; provided, however, the calf be full grown.

Forms of Rupture.

There are various forms of rupture. A calf is occasionally born with a tumor or enlargement in the region of the navel. This is known as congenital umbilical hernia. It is termed congenital in consequence of being present at birth, and umbilical because it is found in the umbilical region.

Treatment.—This form of hernia is not a very serious matter, and very rarely requires an operation. My usual course is to apply some cotton-batting, wet with an astringent (infusion of bayberry bark), and over the same a bandage, which must be passed twice round the body; yet, if the part is bathed occasionally with infusion of bayberry, the bandage and batting can be dispensed with. The reason why a case of this kind is not a serious affair, is because there is no rupture of the walls of the abdomen, but a mere purse, or dilated state of the common integuments, exists, which, if necessary, can be sloughed off by the application of a common pair of clams.

Inguinal Hernia.

When rupture in the groin appears at birth, it is congenital, and consists of a portion of intestine, which has found its way through the inguinal canal (the channel through which the testicle descends into the scrotum).

Treatment.—This can readily be reduced by raising the animal by its hind legs, and giving it a few jerks upward. If the intestine slips down again, and the case requires it, I should castrate the animal, and put a stitch or two in the external ring, or else castrate by the clam method, which will produce considerable swelling, and block up the passage so that the bowel can not descend. The clams may be removed at the end of twelve hours.

Strangulated Hernia.

The intestine will occasionally descend into the scrotum, and become strangulated, so that it can not be returned.

Treatment.—In a case of this character, the operator must dilate the ring (through which the intestine descended), by means of a probe-pointed bistoury. Having returned the bowel, let the animal be castrated, and then apply the clams. Strangulated hernia occurring in any other part of the body must be treated as follows: If the protruded bowel is tumefied in consequence of gas within, it may be punctured, in one or two places, by means of a suture-needle. This will allow the gas to escape. Then efforts should be made to return the protrusion. Failing to accomplish this object, in consequence of stricture or thickening of the walls of the abdomen, I should introduce the bistoury, and dilate the wound. The reader will infer, and rightly so, that I am alluding to a case in which there is an accidental external wound; otherwise it would constitute what is called ventral hernia.

Ventral Hernia.

This form of hernia consists of an escape of a portion of the intestines through a rent in the abdominal muscles, creating a tumor beneath the common integument. This tumor may exist for some time without affecting the animal's health, but when it increases in size, so as to be bulky, or becomes strangulated, an operation must immediately be performed. In performing the operation, however, it must be borne in mind that the protruded bowel has pushed before it a portion of the peritoneum (the lining membrane of the cavity of the abdomen); therefore the intestine is contained in a sac, which should also be returned, along with the intestine, into the abdominal cavity.

Treatment.—The mode of operation in cases of ventral hernia is to cast and etherize the animal. A semilunar incision is then made over the tumor, the convex border of the flap being downward. The panniculus carnosus (subcutaneous muscle), or superficial fascia, is also divided. A probe-pointed bistoury is then introduced between the bowel and edge of the wound. This must be dilated or made sufficiently large to allow the return of the intestine. The rent in the muscles is then to be strongly sutured, and one end of the suture should be left long enough to hang out of the wound; the integuments are then to be brought together in the same manner, after which dress the wound with tincture of aloes. In the course of eight or ten days a pull may be made on the ends of the deep-seated sutures, to see if they are ready to come away, yet it is best not to remove them until they are quite loose.

It is impossible in a work of this character to furnish the reader with all the information necessary to meet the emergencies which may occur in the various forms of hernia; for their management and treatment require more than ordinary skill, and many persons, who consider themselves competent to prescribe for the ordinary diseases of cattle, are willing to acknowledge themselves at fault when consulted on the subject of rupture; and, lest my own remarks on this subject may prove of little avail in furnishing the husbandman, in the hour of need, the necessary instruction, I introduce the two following cases, selected from the "London Veterinarian." Mr. JAMES STOWAR furnishes the following case of strangulated hernia:

"On the 17th of September, 1850, I was called to the farm of Ashogle, to see a cow which had been injured by the horns of another; but, as I had left home that afternoon for a distance, and did not return until late next day, I did not see the cow until the 19th. I found her with a hernial tumor protruding from the right iliac, which remained covered within the skin, so large that a bushel measure would not have contained it. She was evidently in much pain while standing, and would stand only a very short time. I was told that she had eaten a good deal since the accident, and, as a stoppage of the dung was observed, they had given her a pound of Epsom salts. Her abdomen was enormously distended, notwithstanding the largeness of the hernial tumor. The non-escape of the feces was proof positive, under the circumstances, of the hernia being strangulated.

I had her laid on the left side, as carefully as possible, and, after every attempt to return the hernia by external manipulation had failed, I cut into the sac, and attempted to knead in, inch by inch, the gorged intestines; but in this, also, I failed. The hernial opening was large enough to admit three of my fingers, so that it was not want of room in that, but in the abdominal cavity, which was so fully distended by the intestines forming the hernia, that caused the difficulty. I had her laid upon her back, with her hind legs drawn up, so as to throw the contents of the abdomen as much as possible upon the diaphragm. Even then, however, I could not succeed. I therefore, with a sharp-pointed scalpel, cut into the intestine, and emptied it entirely of its semifluid contents, stitched up the wound, and washed it carefully, and so, ultimately, accomplished the reduction. With a strong cord I closed the hernial opening, as well as the one I had made through the skin, nine inches further up; I then turned her on her left side, and in a few minutes the feces began to escape by their proper channel. I gave linseed oil, twenty ounces, and tincture of opium, one ounce. Next morning I found her up, stepping through the shed, inclined to eat, her bowels acting freely. I had her tightly bandaged, to support the abdomen, and made an opening to allow the escape of discharge at the bottom of the sac. I saw her daily for a week, and prescribed according to the state in which I found her. On the whole, her health proved good, and her wounds healed pleasantly. She was fourteen years old, and, like most cows, had a large belly. She fattened well, and was sold for the shambles in April. The butcher told the farmer that he found a large abscess in her side when he cut her up."

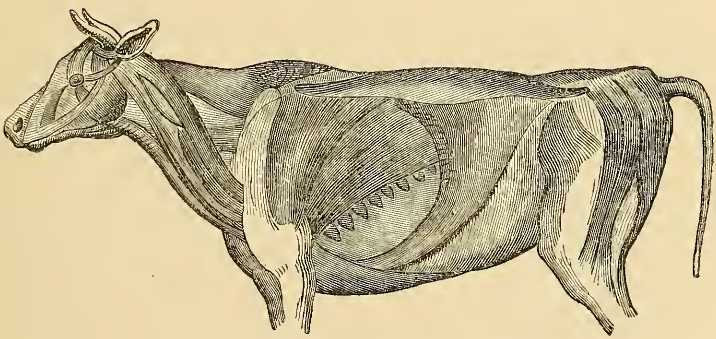
The next case is that of ventral hernia, furnished by Mr. G. Lewis:

"In September last, I was requested to examine a heifer, which was said to have a 'swelling on her right side.' I found her with a pendulous bag, hanging very low on the right flank, and of an immense size. Upon a close examination of the parts, I ascertained that the enlargement was produced by an escape of the intestines through a rent in the abdominal muscles. I informed the owner that nothing short of an operation could be productive of benefit to the animal, and I also pointed out to him the nature of the case, and its probable results.

According to the arrangement, the heifer was sent to me on September 6, when, after due preparation by medicine, etc., I had her cast and secured, and then carefully made an opening through the skin and panniculus muscle, immediately over the laceration in the other muscles, but a little longer than it. I thus exposed the rent which existed in the external and also the internal oblique. The edges of the aperture were very uneven and much thickened; and I may state in this place that the enlargement had been observed a month prior to this date. A large portion of the intestines were found to have escaped into the sac formed by the panniculus and common integument; besides which, a considerable quantity of serous fluid existed beneath the skin, and externally to the panniculus, which had doubtless been thrown out by the injured vessels.

The intestines being returned into the abdominal cavity, the edges of the laceration were brought together with strong metallic sutures, and properly secured. The external wound was then closed; and, before allowing the animal to rise, I passed a seton through the most depending portion of the integumental sac, with a view to give a gradual and continuous exit to the serous effusion. A compress was also placed upon the part to remove as much of the pressure of the viscera as possible, after which the animal was allowed to rise.

For several days the bowels remained obstinately constipated, and some symptomatic fever was also present; but, by proper measures, these unfavorable symptoms were soon removed. The animal was allowed only linseed tea and thin gruel for a few days. Subsequently a large amount of serous fluid was discharged through the openings made for the introduction of the seton; it however, soon ceased. The sutures also came away in due course, leaving but little appearance of the original injury."



VIEW OF SOME OF THE SUPERFICIAL MUSCLES.

SECTION XI.

DISEASES OF THE BONES.

Cachexia Ossafraga—Bone Disorders—Mechanism and Structure of Bones—Composition of Bones—Ultimate Constituents of Bones—Dilatation of the Jaw Bones—Abscess beneath the Periosteum, at the Angle of the Jaw—Exostosis, or Deposit of the Calcareous Matter on the Surface of Bones—Caries, or Ulceration of Bones—Preliminary to Horn-Ail—On Sympathy and the Sympathetic Relations which exist in the Animal Economy—Horn-Ail—Tail-Ail.

Cachexia Ossafraga (the "Cripple").*

"ALTHOUGH using this term as the title of my subject, I do not consider it to give an idea of the exact character of the disease I am about to describe, but merely to convey an impression of a very prominent symptom of the disease. As many other maladies existing in different localities, this one is very differently treated of in our veterinary works. The inefficiency of our works on cattle medicine is sufficiently apparent to the practitioner, who, after a nominal term spent at college, enters into the world of medicine a sufficiently-educated person, as his diploma gives him to understand; but how frequently is he wofully disappointed when called to any of the several enzoötics in cattle which he finds have not been treated of, perhaps not mentioned either at college or in the books!

The present subject is one, among others, which is not discussed in British works on cattle medicine. It is a disease very prevalent in many districts I am personally acquainted with, and in all of which it passes under the very expressive term of 'cripple,' the appearance of the animal fully confirming the term. It seldom happens that a solitary case occurs on a farm which is subject to it;

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* P. Sarginson, V. S.

for all the milch cows, and perhaps some of the younger stock, are more or less affected by it. Such farms are considered to be of much less value than other places on which it does not occur, not only from the unthrifty condition of the stock, but also as regards fertility, as they are never found to be very productive, and among farmers they pass under the cognomen of 'crippled places.' The disease will never be found to exist on farms that are fertile and rich; in fact, a certain guide to the *locale* of this affection is to look out for farms that are situated on high lands, possessing stunted hedges and trees, a barren, or, at least, a poor soil, producing a dry, short, and innutritious herb. On passing over the farm, the limestone rock will, most generally, be seen to project out of the soil, proving that it is situated on the limestone; or by examining the rivulets, if any, that flow through the farm, the water will appear to be beautifully transparent, so that the smallest pebble may be discerned on its bed. There is, also, in the generality of instances, the limestone rock forming its bed. When this is present, any old farmer will tell you that the water which seems to be so limpid and pure is 'hard,' and that the cattle confined to it are certain to be crippled. I have, however, noted farms where the water which supplied them was charged with a carbonate of lime, and still no cripple exists on them. This is, undoubtedly, owing to the character of the soil, which, on examination, is found loamy and free, and lying on the red sandstone rock. I have also noticed 'cripple' prevailing on farms supplied with water running over mosses, etc., which, from the experience of intelligent farmers, has been said to be antagonistic to this affection. This, in my opinion, is caused from the character of the soil proving to be of an undoubted calcareous character, intermixed with clay. Although it can not be doubted but that the water supplying farms impregnated with any principle of an injurious character will have an influence in the production of disease, yet, in the instances quoted, it appears that the character of the herbage produced on such farms either counteracted the injurious influence of the water, or, on the other hand, destroyed or overbalanced the influence of the mossy water.

From what has been stated, it will be seen that the 'cripple' will and does exist on those farms where the soil is calcareous and clayey, and that it is evident that such soils are incapable of producing a succulent and healthy plant; in fact, will the herb not be surcharged with calcareous and silicious elements? and is there not a deficiency of azote-producing principles? As it is well known that where nitrogen abounds a luxuriant herbage is the result, we need go no further in support of this than a farm on which an abundant supply of its manure is spread. How much more abundant and luxuriant is the character of the vegetation from the use of decomposed vegetable matter and animal excretæ than from any thing else. If, therefore, the herb grown on these 'crippled farms' be unhealthy, as there is little doubt, the animals partaking of such will, without doubt, in the course of time, have their systems seriously deranged, and the character of derangement will depend either upon an insufficient supply of nitrogenous material, inducing, consequently, emaciation and pure debility; or it may be that, where this deficiency of azotized material exists, the earthy salts may not exist in an abnormal degree, but still, from a want of other nutritious material to counteract their ill effect, the system may become charged with them. When the herbage and other produce of the soil is charged with earthy salts, whether carbonates or silicates, they would, in all probability, become assimilated, or, at least, there would be a tendency to the deposition of these salts into the various textures, such as the cartilages, ligaments, and cardiac valves, etc., all of which lesions are apparent, to a greater or less degree, in all the animals which have died of this disease that I have examined. Some are of opinion that it is owing altogether to an excess of carbonate of lime in the soil and waters; but if this were the case, the character of the farm could not be altered, nor the disease be removed, as has been done, and which will be noticed hereafter. It is most probable, at least, as far as my humble opinion goes, that it is induced from the combined influence of poverty in the soil, and an excess of astringent salts, silicates, etc. When I refer to the poverty of the soil, it must not be understood that I mean an exhausted state of the soil, because many of those places have not been broken up with the plow to any extent. Many farmers are of opinion that the labor and expense required in the cultivation of such lands would not be compensated by their produce. If it were turned up by the plow, the advantages it would derive from exposure to the atmosphere and rain-water would be considerable.

There are many farms which are termed crippled farms, and many cattle called crippled, which are not really so. The mystery of this is easily explained. On strict inquiry, you will find that the reason the stock display so many of their bones, and walk off so stiff, is owing altogether to imperfect feeding. It answers as a good excuse for the farmer who overstocks his farm, and is thus compelled to serve out short rations, to say that it is the cripple (or any other name it may possess) that is the cause. The climate will, without doubt, have a great influence in modifying this disease, as is shown by the greater severity in form on those lands that lie the highest, where the protection is scanty from the inclemencies of the seasons. A fact connected with this affection is that when cattle are taken from those farms which are subject to it, even when suffering severely from it, to farms existing on the eastern banks of the river Eden (which flows through the vale of Westmoreland), they recover completely from its effects, and are perfectly free from a recurrence of the attack if they remain in that district. It is a common saying among farmers that 'there is no cripple on that side of Eden.' The character of these farms that are free from the affection is essentially different from those afflicted with it. They have a free, sandy, and rich soil, producing excellent oats and rich meadow-grass, but their climate is colder, owing to their being situated near a range of mountains; but if the cattle are brought on to those farms situated on the western bank of Eden, where the cripple prevails, they soon begin to show the symptoms of an attack. I do not include all the farms on the western bank, as some are perfectly free from it.

From this instance, we may again be led to infer that the herb and water to which they had been previously subject were not sufficiently nutritious, or else impregnated with some injurious matter, because, on removal to farms producing a superior herbage, they have recovered, sometimes in an incredible short time, for the sad state they were in. On all these crippled places cows that yield a great quantity of milk are the soonest attacked, and the farmer knowing this will not take such to his farm, because he would soon have to 'dry' them, or they would rapidly fail; but animals that have been reared on these places are less liable to its attack, and are seldom so severely afflicted by it.

Many have confounded this affection with rheumatism, but it is, without doubt, a distinct disease in character, as in no case of cripple will be seen the acute symptoms and fever which exist in both the acute and chronic form of rheumatism. In those cases where suppuration exists in the joints, and the limbs even rot off, it is, in my opinion, produced from the friction of the joint from ossified cartilage, and an evident deficiency of synovia, these inducing a local inflammation altogether differing from the peculiar characteristics of rheumatism, and, unlike it, the osseous system seems to be the principal seat of disease.

Some cattle evince a greater predisposition than others to an attack, as the elderly cow and the cow that yields a great quantity of milk. I have never noticed young calves become affected by it. Some have stated them to have been so, but, on inquiry, it has been found to be pure arthritis, or joint-felon, from cold and damp houses. While one of the stock of calves has been so afflicted, the others were perhaps perfectly healthy. The symptoms vary in degree of virulence on different farms. Some farms have a very slight attack, while others are very severely afflicted with it; but the symptoms will vary frequently on one farm, as, on entering a cow-house with a collection of 'crippled' cattle, it will be seen that some are slightly affected, while others are evidently suffering greatly. The disease being of a subacute character, the period from its first appearance in an animal to its last stage occupies frequently some years, according to the vigor of their constitutions, and the mild or severe form of the disease. There is one farm I am acquainted with where the owner is compelled to change his stock every two years, to prevent heavy losses occurring.

Symptoms.—In the primary stage of the disease the animal presents a lean, emaciated condition. The bones in every part of the body are prominent; the skin is tight, hard, and void of all suppleness; the hair presents a coarse appearance, standing almost straight up, having none of its naturally smooth character about it; but if we see our patient walk, it will strike us that there are no joints in her limbs, as she is peculiarly stiff, knocking her hock-joints up against each other without any regard to the unstateliness of the gait. She will, also, while walking, make an extaordinary cracking noise, showing an insufficiency of synovia to lubricate the joints; the pulse, on pressure, feels flaccid, but the caliber is rather increased than diminished; rumination is performed rather slow and sluggishly; appetite is not indifferent, eating her hay, straw, or turnips with a degree of zest. If we allow her to come in the neighborhood of the hedge where the farmer's wife has displayed her linen, she will indicate the phenomenon of bulimia or depraved appetite. She will seize with avidity the first article she reaches, and chew it with wonderful pleasure; she will also hunt with avidity any sour or filthy liquids, even human urine, and drink them greedily; and when in the pasture will pick up a bone, if such can be found, and chew it for an hour at a time, seeming to enjoy the occupation. Stones, iron, sticks, clothes, etc., are all alike objects of attraction to her. This peculiar habit is attributable, I should think, to acidity of the stomach. The farmer imagines that a sod, cut from a field and placed before her, will palliate her affection, and the cow, to appreciate his kindness, commences to lick it, and even to devour the soil that is on it. I have noticed them chewing these different articles, and never saw one display any anxiety to swallow the object, but merely a desire of chewing. When such articles are swallowed, it will, I think, be more accidental than intentional on the part of the animal, but I can not be positive on this point. They show a particular desire to chew articles of clothing, as is testified by a person going to a stall-head between two of them. They will immediately seize his dress and chew it. The bowels are always more or less constipated, and the secretion of milk is partly checked, although but slightly. They may continue in this manner for a longer or shorter period, according to constitution and external circumstances, before they display any of the worst symptoms concomitant on the termination of the disease. It is a gradual declining from the primary symptoms to those of a more fatal character. These may be marked by the appearance of tumors over the hips or stifle-joints, or, perhaps, a tumefaction extending from the stifle to the hock-joint, which, in the course of time, suppurates. In the mean time, the system, it is evident, is sinking. The pulse is flaccid, but still retains its caliber, although accelerated; appetite is impaired, and rumination is performed very lazily; constipation, if a milch cow; the milk is now wholly suspended, or nearly so. If, perchance, the animal has swallowed any irritating or indigestible substance, which is almost always the case, the symptoms of indigestion will be more severe, with perhaps an intermittent pulse, great lameness, increasing to such an extent that the animal is either unwilling or incapable of rising; or, perhaps, on closer examination, some bone will be found to have become fractured, either the scapula, femur, or the pelvis, or it may have occurred in any other bone, as there is the same tendency in all the bones to fracture, although the animal is fastened up in his stall, and, therefore, not subject to any of the ordinary causes of fracture.

I recollect a case in which the animal could not stand. On examination, it was found that the radius and ulna were completely fractured; next day the scapula and femur were broken; in fact, one after another, all the bones of the limbs became fractured, until the animal died from the extent of irritative fever set up, consequent on the fractures. Another instance of this brittleness of bone: A milch cow was purchased as perfectly sound. She was poor, and the excuse was that she was rather crippled. A fair price was paid for her. She walked to her new home extremely stiff and lame. Next morning I saw her, and found the os ilium fractured; afterward the femur broke, and she died.

In the greater part of cases the brittleness of bone is present, and in such I never noticed any suppurative tumors, excepting some cases where the joints were affected, and opened from local inflammation. On examining some cases after death, I found attenuation of muscles, the bones polished at their extremities, and brittle. In some rare cases exostosis may be noticed on the body of the bone, but such are scarce. On the epiphyses of the bones, however, they will frequently be found, more especially at the lower extremity of the tibia. Sometimes they have existed to such an extent as to anchylose the hock-joint. In all the articulations there is evident deficiency of synovia. The different articulatory cartilages displayed an undoubted tendency during life to the deposition of osseous matter in them, as all of them possessed a degree of hardness inconsistent with nature.

In regard to prevention, it will be evident enough that the removal of the animal from the innutritious farm to one of a richer and more luxuriant character will be attended with the greatest benefit. Many cases have been recruited even when the animal has been compelled to lie and eat. An important fact I wish to mention here is, that there are some two or three large farms in this neighborhood which were formerly severely afflicted with this disease; but now, since they have become possessed by enterprising agriculturists, the disease is much abated, in fact, proving a very rare visitor, although these farms possess the characteristics previously described as 'crippled places,' and were, in fact, situations where this disease prevailed to a serious extent. The means which have been resorted to by these men were irrigation and extensive use of artificial and other manures on the farms, thus altering the character of the herbage, as it is not only more luxuriant, but evidently of a more succulent and nutritious character. They also cultivate a good quantity of the mangel-wurzel and linseed for consumption by the stock. These articles were never known on the farms while suffering from 'cripple.' These means have evidently produced a wonderful effect, as they are seldom if ever afflicted with it. As the disease is found to be worse during the autumn and winter seasons, when the cattle are brought in to dry food, the necessity of a succulent diet is obvious; but still I have seen many bad cases during summer, on farms where the soils were calcareous or clayey. Where there is a scanty supply of turnips, and where oil-cake or other of these useful articles of diet are scarce, the 'cripple' will be the most severe. In a word, to prevent it, soft nutritious diet, as turnips, mangel-wurzel, oil-cake, etc., must be resorted to; and the hay or straw with which the animals are supplied should not be the stunted and dry material which is produced by those lands on which the 'cripple' is known to exist, but such as is produced by the plentiful use of artificial and other manures, to counteract the tendency of the soil to produce a dry and stunted herb. The use of crushed oats and barley, along with other nutritious food, will, in the course of time, have a very beneficial effect also.

When the practitioner is sought to a case of confirmed 'cripple,' where the preventive means have not been resorted to, it will be necessary to employ more active measures. Many remedies have been tried, with more or less benefit, according to the advancement of the disease, where the cachexia ossifraga is so predominant, and one bone becoming rapidly fractured after another, the case may be looked upon as altogether hopeless; but in those cases where the tendency to fracture is not so great, the animal may be recruited most generally. In recommending remedies for a disease possessing different phases, it is necessary to apply those means which seem most applicable to the one particular case in hand. Many disappointments have originated from the reported success of a particular remedy from parties who, no doubt, did succeed with it, while others, without taking into consideration the modifications of the disease, ruled by circumstances, climate, etc., have unmistakably failed, although the same remedy may have been employed, thus showing that one remedy may succeed admirably in one district, while in another it is sometimes nearly useless.

Treatment.—The means which I have seen applied with success, according to the modification of the disease, were, in the cases where the attack is primary, the use of malt ale, administered in pint doses every night for a length of time; water acidulated with sulphuric acid, diluted, or with nitric acid, allowing the animal no other water to drink excepting this; also administering the diluted sulphuric acid, twice daily; and where constipation is threatened by its use, it must be obviated by a laxative diet. Hydrochloric acid and nitric acid have been used, but the preference is given to the sulphuric. Sulphate of soda, in quarter-pound doses, combined with vegetable tonics, will sometimes be found useful. Camphor, in large doses, combined with tonics, given in cold ale instead of gruel, have been attended with good success; also, the use of a decoction of the willow or poplar barks, given in pint doses, will be found an admirable tonic for advanced cases. As to the use of sedatives, the animal rapidly sinks under their influence. The only class of medicines that have been the most successful were tonics. There are many cases of chronic rheumatism and arthrites that have been confounded with cripple, but any one acquainted with these diseases will readily recognize an essential difference between them. But, in fact, every remedy will be comparatively useless unless the animal be put upon a more nutritious diet—a diet free from astringent qualities."

Bone Disorder.

During the past few years I have noticed a number of articles in our agricultural periodicals referring to a disease named by the writers "Bone Disorder." The name, as the reader will perceive, does not throw the least ray of light on the pathology of the malady; in fact, it savors strongly of the so-called "horn-ail" and "tail-ail"—terms which apply to symptoms rather than to any real disorder. One writer informs us that when an animal becomes the subject of bone disorder, "the bones threaten to cave in—have wasted away." If they do threaten to cave in, the best method I am acquainted with to insure an opposite tendency, is to promote the healthy functions of the body, and thus keep disease and the cattle separate. If the bones waste away, and then assume their original shape by merely feeding bone meal, as the writers contend, then the bones of cattle must possess some peculiarities that I have never, in my professional capacity, been able to discover.

If the animals recover (as we are told they do), then it might be inferred that the bones possess properties analogous to that of the soft tissues—an inference which the reader knows is not correct. I would observe, however, that all parts of the animal organism undergo a very perceptible augmentation, and decrease or waste. Thus, up to the period of adult life, all parts of the animal frame increase in bulk, and give to the animal that rotund and symmetrical appearance which attracts the eye of all those who love to admire the works of Nature; but, at last, old age comes on, which is attended by a gradual waste or shrinkage. This occurs, however, more in the muscles than in the bones; yet the latter undergo some condensation, which may possibly lessen their volume. This, however, is a physiological result, the work of uncompromising Nature, over which human agency (bone meal included) has not the least control.

Whenever the bones do become diseased, it is the result of hereditary predisposition, of local injury, or of impaired digestion. So far as my inquiries have extended in relation to the character of the so-called bone disorder, I infer that it is a disease of a debilitating character, originating, in most cases, in the digestive and nutritive organs affecting not only the bones but various other tissues of the body, and, therefore, the only rational plan of treatment consists in improving the general health of the animal. The ways and means of accomplishing this very desirable result are as various as the causes which occasion the derangements. If it be evident (as the bone disorder theorists contend) that the animal organism, in such cases, is deficient in phosphate of lime, I have no objection to offer against the popular custom of giving the patient a few doses of bone meal; for, whenever there shall be a deficiency of carbon in the system, bone meal may be useful in supporting pulmonary combustion, and thus insure healthy action of the organs and functions of the animal economy; yet I would suggest to the intelligent reader that as bruised oats, ground corn, and linseed meal contain a large amount of phosphates, they should be selected in preference to bone meal, which I think is more valuable as a remedial agent for a carnivorous than for a herbivorous animal.

As I understand the complex theory of digestion, the value of food or remedial agents is in exact ratio to their adaptation for assimilation; so that if their elements are only held in union by an uncomplex chemical affinity, as is the case with all vegetable productions known as food, their solution is easily and promptly effected by the ordinary process of insalivation, mastication, and remastication; but bone meal (a popular remedy) is actually an animal production, (vegetable matter animalized,) and, in order to convert the same into the component parts of the cow's structure, it will perhaps require more chemico-vital force to effect the solution than when oatmeal, etc., are used, the chemical affinity

PELVIS AND RIBS DISEASED AND DISTORTED.

here being weaker than is the case with bones. In the treatment of any and every disease, it is usual to endeavor to ascertain the direct causes, and, if possible, effect their removal, and whatever seems to be indicated we are justified in supplying; so that if phosphates are indicated, they may be prescribed; yet in cases of emaciation, when weakness and debility preside, I should prefer to use nutritious food, tonics, and stimulants, instead of bone meal. Why not add the bone meal to the barnyard manure? In this way the animal would get the benefit of it in the form of fodder.

In reference to a deficiency of phosphate of lime in the milk, which the writers alluded to have noticed, I remark that it may, in part, arise from functional derangement in the digestive organs (in such cases a large quantity of phosphate, etc., is expelled from the system in the excrement); or the fodder itself may be deficient in its usual yield of phosphate of lime. We then have an evidence of vegetable disease, for I believe that the phosphate of lime is as necessary for the growth and integrity of the plant as it seems to be for the same purposes in the animal kingdom. But I believe that the plant can not lack phosphates without there being a corresponding deficiency in several other constituents which go to form the healthy vegetable; so that, in such cases the disease is general, not local. The plant is not fiber-sick nor the cow bone-sick, but, in both cases, (the food of each being innutritious,) debility is the disease.

It is well known that successive cultivation exhausts the soil, and uses up the constituents necessary for the growth and maturity of grains and fodder; yet the pastures and plowed land might be made to yield good crops and rich harvests by depositing in the soil (in the form of animal excrement, straw, wood, ashes, lime, charcoal, etc.,) as much as we take out of it. The soil can not create any thing of itself; therefore an increase in crops can only be obtained by adding more of certain agents to the soil than we take out of it.

"In Flanders the yearly loss of the necessary matters in the soil is completely restored by covering the fields with ashes of wood or bones, which may or may not have been lixiviated. The great importance of manuring with ashes has been long recognized by agriculturists as the result of experience. So great a value, indeed, is attached to this material, in the vicinity of Marburg and in the Wetterau, (two well-known agricultural districts,) that it is transported, as a manure, from the distance of eighteen or twenty-four miles. Its use will be at once perceived, when it is considered that the ashes, after being washed with water, contain silicate of potash exactly in the same proportion as in the straw, and that their only other constituents are salts of phosphoric acid."

It is a fact well-known to husbandmen, that some breeding cows do not come up to the standard of health or fair condition, although they are fed from the cream of the crib, on the best kind of fodder. The inference is that the digestive organs are not in working condition; therefore, in such cases, the food operates as an exciting cause of disease. The effects of cheap and damaged food are too well known. Poor food is dear at any price which may be asked for it. It may not furnish sufficient carbon; if so, the animal is deprived of the power of reproducing itself, and must, eventually, suffer.

Mechanism and Structure of Bones.

Bones have many things in common with the soft tissues and organs; for example, arteries, veins, nerves, lymphatics, and a connecting cellular web. Their structure, in the embryotic state, is highly vascular, yielding, and gelatinous. They have externally a fibrous investment, known as periosteum, which is well supplied with arteries, veins, nerves, and absorbents; and it is through the intervention of this fibrous tunic that the vessels proper to bones reach their ultimate destination. On the interior surface of hollow bones we find a membrane of similar structure, only more delicately organized. The cavity of the shaft-bones is usually occupied by a quantity of adipose matter, known as marrow. This is inclosed in laminated cells, and is supposed to be a sort of aliment in reserve, to provide against accidental emergencies of non-nutrition.

Composition of Bones.

Bones consist of two constituents; namely, animal basis and calcareous matter. In the healthy adult the proportions are as follows:

Animal matter	$33\frac{1}{3}$ per cent.
Calcareous matter	$66\frac{2}{3}$ " "
Total	100

Ultimate Constituents of Bones.

The ultimate constituents of bones are gelatine, animal matter, carbonate, phosphate, and fluate of lime, phosphates of soda, and magnesia. Their growth, like that of shells, is effected by the addition of new tissues to that already formed. Bones which have a central cavity are protected internally by cartilaginous fibers or unions; hence they expand or burst so soon as their cartilaginous braces are decomposed by a diseased condition of the parts.

Dilatation of the Jaw Bones.

This disease seems to be more prevalent among horses than cattle. In equine practice it is termed "big head;" in bovine practice we call it spina ventosa (a bony tumor, in which the interior of the bone is absorbed, leaving a mere shell of bone, divided into cells, containing purulent, cheesy matter); but perhaps "dilatation of bone" will give the reader a better idea of the character of the disease than any other term. On inspecting the jaw bones of cattle, the subjects of dilatation, we find the greatest enlargement at the angle of the lower jaw. On cutting into the same, its cavity is occupied by a preparation resembling soft cheese. On removing this, it is discovered that the cartilaginous braces which hold the sides of the bone together are decomposed; hence the dilatation. This foreign material often degenerates into true pus, and burrows through the bones toward the surface. In this condition a fluctuating tumor can be felt at the angle of the jaw.

Sometimes the bones of the jaw appear to have lost their cohesive firmness and vitality; they then border on a state known as necrosis. Now, if a portion of bone in this condition be macerated, for only a short time, in a weak solution of muriatic acid, it can be rolled up like a piece of paper, showing that it is deficient in calcareous matter; but if it takes a day or more to put the bone in this condition, the experiment would not be of much value, as all bones can be more or less softened by means of weak acids.

Treatment.—Having ascertained that the osseous structure is deficient of earthy matter, and that the animal matter preponderates, we are then in possession of facts which can be used to great advantage in preventing the malady, and perhaps treating it in its early stage. The remedies are phosphate of lime, vegetable tonics, and stimulants. I use them in the following form:

Phosphate of lime	6 oz.
Powdered golden seal	2 oz.
Powdered sassafras	3 oz.
Powdered ginger	2 oz.
Oatmeal	4 lbs.
Mix.	

This is to be divided into sixteen parts, one of which may be incorporated with the food every night. I recommend the medicine in this form because it is calculated to give tone to the function of nutrition.

It is well known that the maintenance of the functions of animal life are almost entirely dependent on the due performance of the nutritive operations, and, therefore, the integrity and properties of all the hard as well as the soft tissues depend on their regular nutrition by a due supply of perfectly elaborated blood. This can not be effected unless the functions of circulation, respiration, and secretion are performed with regularity. Circulation is necessary to convey a supply of nutritious fluid, and respiration and secretion separate the blood from its impurities. Therefore, in cases of this character, I advise stock-owners to endeavor to improve the general health of the patient by means just suggested, and also that they should see that the animal gets that kind of food which is rich in phosphates.

It is very difficult to define the causes of this disease. It may originate in a peculiar morbid habit of body, or it may be the sequence of faulty nutrition or hereditary predisposition. When an animal labors under any morbid habit of body he is in a state far removed from that of health, and various parts of the body become affected by the change; and even should the power of forming good healthy blood remain, the organic force by which the constituents of blood are transformed into osseous structure must necessarily be enfeebled by the morbid habit, so that the power to produce metamorphoses is necessarily diminished. It is my opinion that big head usually commences in the fibrous tissues which are found in the internal surface of bones. A very peculiar feature of these fibrous tunics is, that when they once become diseased they run rapidly to purulency; and this accounts for the large amount of purulent matter often found in the cavities of jaw bones when buried or exposed to a drying process. It is then, however, in a spongy state.

A very distinguished French writer contends that "fibrous tunics or tissues hardly ever contribute to the formation of pus." This is evidently an error; for when the periosteum (covering of bones), which covers the fang of a tooth, and gives a lining to the cavity into which it is inserted, becomes inflamed, it suppurates, and the tooth has to be removed. I contend that it is the most common tissue that excites the flow of those exudations from arterial capillaries, which becomes converted into pus; hence, in this way I account for the collections of pus often found on and under fibrous ligamentary tissues and coverings of muscles; also upon and beneath the peritoseum, and in the vicinity of fibrous tissues in other parts of the system.

The surgical treatment of a case of this kind is to liberate the pent-up pus or matter. With this object in view, I cast the subject, and, after having brought him under the influence of ether, I make an incision through the integuments, etc., and expose the bone; then, by means of a pair of common bone forceps, I make an opening into the same, liberate the imprisoned matter, and inject the cavity with pyroligneous acid. Having removed as much as possible of the morbid matter, I then cram the cavity with equal parts of powdered bloodroot and bayberry bark. The external wound must not be closed by suture, but left open, so as to allow of a free discharge from the parts; for the healing process must begin at the upper part of the cavity, and the integument should be the last to heal. I continue to throw into the cavity, by means of a glass syringe, a small quantity of pyroligneous acid daily, until the discharge ceases. Then the parts are to be dressed with common tincture of aloes. After an operation of this character there will remain some enlargement of the tissual structures about the parts. This can gradually be reduced by a few applications of a portion of the following:

Iodide of potassium.................	1 dr.
Glycerine..........................	1 oz.

Mix, and keep the preparation in a glass vial, well corked.

Abscess beneath the Periosteum, at the angle of the Jaw.

This is a very frequent and formidable disease among cattle, and is ofttimes occasioned by blows inflicted purposely or accidentally on a region known as the angle of the jaw. It is a formidable disease, because it frequently ends in caries or ulceration of the jaw-bone.

Symptoms.—It originates in an inflammatory condition of the periosteum, accompanied by a gradual enlargement at the angle of the jaw. It is very painful, the animal being very unwilling to have the part handled. The pain is occasioned by distension of the periosteum, and this is sometimes found to be indurated or thickened. The animal does not eat as well as usual, in consequence of the pain occasioned by the act of mastication, and he generally labors under some degree, more or less severe, of febrile excitement. Ordinarily it is a very easy matter to detect the presence of pus in any of the superficial regions; but in this, located directly on the bone, and covered by a fibrous membrane which only admits of a limited amount of distension, it is very difficult for an unskillful person to discover it; yet, if the above symptoms are observed, I should decide that there is pus beneath the periosteum.

Treatment.—No treatment is of any advantage except that of making a free opening through the skin, muscle, and periosteum, and thus insuring a complete discharge of the morbid matter; and the sooner this is done the better, for it will relieve the animal of much suffering and prevent ulceration of the jaw-bone. Very little after-treatment is required. It is only necessary to cleanse the part daily, and dress with tincture of matico.

Exostosis, or deposit of Calcareous Matter on the surface of Bones.

Exostosis signifies an unnatural growth of bone, or deposit of calcareous matter on the surface of bones. Among horses this disease occurs in the form of splent, spavin, and ring-bone. It is very seldom that cattle are treated for this affection; for the deformity is so slight, and the lameness so obscure, in consequence of the slow motions of the animal, that very little notice is taken of it.

Treatment.—The proper mode of treatment is to apply, daily, a small quantity of iodide of glycerine, prepared as follows:

Iodine	1 dr.
Glycerine	1 oz.
Mix.	

Apply by means of a small piece of sponge. This is to be applied daily for a period of two weeks, after which use acetic acid, one part; water, six parts. With a portion of this sponge the enlargement until pain and lameness disappear.

Caries, or Ulceration of Bones.

This is a very common disease among cattle, and is preceded by inflammation and suppuration. It sometimes proceeds from a blow received at the angle of the jaw; generally, however, it is a constitutional disease of a malignant character.

Treatment.—In the first stages of this disease, the part being hot, painful, and tender, I should foment with warm vinegar, which will tend to hasten suppuration; then, having ascertained that there is some pus or matter locally imprisoned, the part must be freely punctured, the pus evacuated, and the cavity injected with pure pyroligneous acid. Supposing, or rather suspecting, the disease to be constitutional, I should administer the following:

Iodide of potassium	1 oz.
Glycerine	4 oz.
Tincture of golden seal	2 oz.
Water	2 qts.
Mix.	

The dose is one-sixteenth part of the above quantity, to be administered daily.

Preliminary to Horn-ail.

Many very valuable animals die prematurely, under treatment, in consequence of mistaking symptoms for the disease. Before I discuss horn-ail, I propose to offer a few brief remarks on the subject of sympathy, so that the non-professional reader may be prepared to comprehend the why and wherefore of sympathetic diseases, as they occur in neat stock during the progress of primary affections.

On Sympathy and the Sympathetic Relations which Exist in the Animal Economy.

The animal structures are so sympathetically related to each other, and so dependent are various organs and functions on an equilibrium of vital action, based on the law of sympathy, that the animal economy, as a whole, may be said to compose a vast machine, the integrity of which depends on the free and full play of all parts composing its intricate mechanism. The media by which sympathy is aroused and maintained are the nerves. These originate from the brain and medulla spinalis, or spinal marrow. Ten pairs of nerves radiate directly from the brain, termed cerebral; thirty-nine pairs from the spinal marrow, termed spinal. They are named after that of the region in which they are found; hence we have seven pairs of nerves issuing from the cervical region (neck), eighteen from the dorsal (back), five from the lumbar region, and five sacral, within the pelvis, four coccygeal—making, in all, forty-nine pairs cerebro-spinal nerves. They are distributed from each side of the spine to various parts of the body, and their terminations are called "sentient," this being the seat of sensation.

The most important nerve, however, for our consideration, is the sympathetic. It is supposed by some writers to be in itself a complete nervous system. It originates in a branch issuing from the base of the brain, and communicates with every other nervous filament of the body. The connection takes place in the following manner: The sympathetic nerve has, at various points, a number of gangliform plexuses. From these thread-like filaments arise, which radiate and connect with similar ganglions found on the cerebral and spinal nerves. On these divergent filaments we have other ganglionic structures, which send branches to the liver, spleen, kidneys, etc. The sympathetic nerves of one side amalgamate with those of the opposite, and this is their mode of communication. The nerves of the sympathetic system possess a certain degree of power in exciting muscular contractions, as well as sympathetic actions, in the various parts to which they are distributed. CARPENTER has observed that, by "irritating a branch of the sympathetic nerve, immediately after the death of an animal, contractions may be excited in any part of the alimentary canal from the pharynx to the rectum, according to the trunks which are irritated; in the heart, after its ordinary movements have ceased; in the aorta, vena cava, and thoracic duct; in the ductus choledochus, uterus, fallopian tubes, vas deferens, and vesiculæ seminales, etc. It is probable that the sympathetic system not only thus brings the organic functions into relation with the animal, but that it also tends to harmonize the former with each other, so as to bring the various acts of secretion, nutrition, etc., into mutual conformity."

There are several orders of sympathetic nerves. Some pass into the parenchyma of the organic viscera, and others are distributed on the outer coats of arteries, continuing, throughout their minute capillary structures, into the papillæ. By this arrangement the harmony between the internal, external, and remote parts is perpetuated.

Correct knowledge regarding the sympathetic relations peculiar to animal organization seems absolutely necessary, in order to correct the erroneous impressions that some persons have formed of the nature and seat of disease incidental to horses and cattle, and, in this view, I offer these preliminary remarks as introductory to the subjects of "horn and tail-ails" (imaginary diseases, which oftentimes, perhaps always, are the result of a fertile imagination, or, rather, a sequence of that faulty mode of reasoning which confounds effects with causes). Any person conversant with the sympathetic relations existing in the animal economy, can readily discover the difference between a pathological condition and the local or general symptoms which usually accompany it. An animal, for example, is attacked with acute disease of the liver. He evinces signs of pain from pressure on the right or off side, in the region of the liver, and, possibly, the lameness is of so grave a character as to mislead the non-medical observer, and he necessarily concludes that the subject is lame, "and nothing more." He prescribes an external remedy, accordingly, which is neither calculated to cure nor palliate the liver difficulty. Thus, for want of the necessary knowledge, the symptoms are mistaken for the disease.

In derangement of the digestive organs, more particularly of the stomach, the brain is usually sympathetically affected. The symptoms of disturbance in that organ, or its functions, may escape the attention of the "cow-leach," yet they are always present, and range from what has been observed as "dullness" up to somnolency, accompanied by other morbid phenomena well understood by the physician. A knowledge of these and other sympathetic relations existing throughout the animal economy, enables us to understand what occasions vomiting in a man when a blow of sufficient force is received on the skull. The blow arouses a certain set of involuntary operations which the subject is unable to control, as in the cases of vomiting, etc. It explains, also, why giddiness or vertiginous symptoms usually follow when a blow is received on the region of the stomach; how the impregnated uterus influences the mammæ and stomach, causing increase of function and volume in the former, and morning nausea in the latter; how a diseased condition of the internal mucous membrane reacts on the common integument, and *vice versâ*. Even in the osseous structures the law of sympathy prevails. A disease in the upper extremity of the bone gives rise to sympathetic pain at the opposite extremity. And as regards the muscles and tendons, there exists a very marked sympathy, although in the mind of pathologists this is not strange, for, anatomically considered, the tendons are neither more nor less than tendinous terminations of muscles. Puncture of a tendon is often followed by great derangement of the nervous system, and other pathological conditions, not unfrequently ending in trismus (lock-jaw.) This is owing to the same law of sympathetic association just alluded to. There is, therefore, a tendency in certain organs to become deranged or diseased in consequence of a malady locating in others, although they may not always be identical in function.

Horn-ail.

Persons who are in the habit of prescribing for sick brutes, and have never made themselves acquainted with the sympathetic relations existing in the animal economy, to which I have referred, are liable to commit errors in diagnosing disease, and, when questioned regarding the seat of the same, their opinion generally is that the suffering animal has either the horn-ail or tail-ail. The idea, in almost all cases, is so supremely absurd, that, if any thing other than a living animal were the subject of the barbarities which, according to mistaken notions of cure, are sure to follow, I should feel disposed to burlesque the whole procedure regarding both horn-ail and its treatment. In my opinion, horn-ail, in ninety-nine cases out of one hundred, exists only in the imagination of those persons who allow error to overcome their better judgment, or else they have not given the subject a passing thought; therefore, they are incompetent to even guess at the true nature of the malady with any chances of correctness. No allusion, that I am aware of, has ever been made by the authors of standard works or text-books on veterinary science, to horn-ail; and if educated veterinary surgeons were as numerous here as in England or France, and they had the same means to reach the ears and the understandings of our husbandmen, the latter would soon be convinced of the absurdity which is here described, and, consequently, be induced to protect their animals from that species of cruel quackery or ignorance which would refer all their aches and diseases to horns or tails, and which sanctions the boring of the former, and curtailing or docking the latter.

The pathological conditions on which the absurd theory of horn-ail seems to be founded are heat or coldness of the horns. These are the principal, and, in fact, only symptoms which the unlearned expounders of a popular malady have given us; but every one ought to be aware that variations in the temperature of a part so inferiorly organized as the horns are is no criterion as regards the nature of the disease which occasions, in this vicinity, merely an increase or decrease of temperature. The actual disease which occasions a loss or increase of temperature of the external surface of the body, horns included, may be, and often is, located in either the brain, stomach, or bowels, and at other times is the result of local congestions of the lungs and other parts—mere effects—the results of preëxisting disease; therefore, I contend that the term horn-ail, when used to express the condition of parts sympathetically affected or aroused, throws no light on the true nature of the disease under which the animal labors.

I shall contend that neither the augmentation nor decrease in the temperature of the horns constitutes actual disease of the same, but may indicate a loss of equilibrium in the circulation of blood. If the horns are at fever-heat, and the surface of the body be cool, we know that the brain or its membranes may be actively or passively congested. On the other hand, should the horns and the extremities be cold, it goes to prove that the animal is the subject of internal congestion or disease. But why locate it in the horns, when in the animal economy are found so many hundred parts, sections, and divisions of parts, more important, sensitive, and of vastly more consequence to the preservation of vital integrity, than the horns? The variations in the temperature of the horns and other parts of the body, which the horn-ail theorists neglect to notice, enter into a class of symptoms from and by means of which an educated surgeon makes up an intelligent and correct diagnosis, and, consequently, are only of value, in point of fact, in so far as they go to show the actual state of the whole animal mechanism. The proposition admits of the following appropriate and convincing illustration: A man is attacked with acute disease of the liver, and almost always experiences a pain in the right shoulder, a purely sympathetic affection. Now, it would be very ridiculous for a physician to overlook the diseased condition of the liver, and merely prescribe for the sympathetic shoulder-lameness, and call it "shoulder-ail." Such ignorance is calamitous, but does not often occur when the educated physician is employed; otherwise it does, and many such cases are quite fresh in my memory. Now, instead of prescribing local agents, as some have done, in view of mitigating sympathetic local pain, would it not be more in accordance with reason and science to administer medicinal agents, such as are calculated to restore the liver to a natural physiological condition? A man who thus ignorantly prescribes falls into the same error with him who would refer all diseases of neat stock to their horns or tails, merely because the parts are not in their natural physiological condition, owing, as I have said, to actual disease seated elsewhere. Thus the symptoms are mistaken for the disease, and the treatment, in so far as boring, sawing off horns, and curtailing the caudal appendage is concerned, is highly injurious, barbarous, and, in these enlightened times, deplorable.

It requires no argument to convince many men that horn-ail is a very prevalent disease, for the false doctrine has been promulgated, and has received attention from men whose domains extend from Maine to California. The error has been sown broadcast, and has acquired such hold on the minds of some that it will take many years to root out the evil. One writer on this subject, believing that horn-ail is a sort of national disease, recommends the barn-yard faculty (for no regular physician will heed his advice) to carry gimlets in their pockets, so that they may be armed and equipped to encounter and subdue that which is more imaginary than real.

I have made examinations of the bodies of cattle, subsequent to death, said to have died of horn-ail. Among them were evident traces of softening of the brain; and this is a feature of disease very often present, as I shall attempt to show, in many of the so-called cases of horn-ail. Softening of the brain is a disease of so grave a character, that any morbid symptoms attending the same, as local heat or coldness of horns, might compare in the ratio of a mole-hill placed beside a mountain. Softening of the brain is the ultimatum of a grave disease occurring in that organ; and if the owners of live stock are disposed to believe that horn difficulty is the most preponderant and alarming, and they can sleep soundly in the belief that no danger threatens, then, "If ignorance is bliss, 'tis folly to be wise." I can not indorse this sentiment, however; for, in this day of intellectual maturity, no one has a right to be a dunce in his chosen profession, nor a fool, to thwart the intentions of those who would substitute light for darkness.

Softening of the brain is always preceded by acute, and, subsequently, chronic, inflammation of the same or its investing tunics, and constitutes the last stage of disease; so that the days of such a subject are numbered, and the man of gimlet and ignorance, armed with his munitions of warfare, treats the disease at long odds. He pockets the fees but loses the case. His patient, on which a too confiding owner has foolishly permitted him to practice his cruelty and legerdemain, dies, and he knows not the why nor the wherefore.

But, in order to convince the reader of the follies of the above practice, I offer the following illustration, from a reliable source. The case was diagnosed and treated as horn-ail. I quote from the "Southern Planter:"

"After death, examined the head. Crest between horns perfectly hollow. All the little divisions and offshoots of bone which are usually found in the cavity were removed, in a greater or less degree, and there were only the white of egg matter and pus. The horns, also, entirely hollow; one of them filled with nearly a pint of lymphy and purulent matter. The cavity extending to the orbit of the eye, thence communicating with the nostrils, especially on one side. The brain, which lies in very near contact with this cavity of the crest (which we may as well call the frontal sinuses), was softened and fallen, in one hemisphere, into a thick mush. A small part only of this half was of healthy consistency, preserving its form or vessels entire. The other half (hemisphere) was not softened, but the vessels were very full of blood, and the membranes exhibited signs of intense inflammation. No other region or organs examined."

In regard to this quotation I remark: It is very natural that the frontal sinuses should be hollow; for, if they were solid, the weight of the head would be enormous; and I can readily perceive the wisdom of the Divine Artist in thus adapting the parts for the convenience of the animal, and relieving him of what, had it been otherwise, must have been a burden, and would have required powerful muscles to support the head. The bones about the head are divided into two plates, separated by numerous vacuities or cells; but, unlike those of the horse, they extend through the whole of the bone—nay, penetrate even through the parietal and occipital bones. Hence it happens that the frontal sinuses (so these cavities are called in cattle as well as the horse) extend from the angle of the eye to the very foramen through which the brain escapes from the skull—nay, to the very tip of the horn. Hence the parts may be said to be hollow; and it is well that every farmer should know this, for some suppose them solid, and are very much surprised to find them hollow. On making a section of the horn, from tip to base, it will be found partly hollow, "having sinuses that extend almost to its tip." The lymphy and purulent matter found within the frontal sinuses and those of the horn, together with the softening of one hemisphere of the brain, proved that the parts were all involved in disease; but then the disease never had its origin in the horn. The brain, or perhaps its membranes, were the primary seat of the affection, and, after softening, (decomposing,) involved the surrounding parts in ruin. "The other half of the brain was not softened, but the vessels were full of blood, and the membranes exhibited signs of intense inflammation." Probably this was the state of affairs in the diseased hemisphere in its early stage, and some physical impediments to the return of blood from the brain had induced cerebral appolexy. The animal was in a plethoric state, "very fat." There was too great redundancy of blood—just the subject for such disease. Softening of the brain, I think, would be a better designation of the disease than "horn-ail."

The editor of the "Planter," in a subsequent number of his journal, remarks: "The notion that this disease originates in the horn itself seems to us to be an error, resulting from that backward mode of reasoning which confounds symptoms with disease. The disorder in that organ, 'the horn,' should rather seem to be secondary. No less erroneous do we deem the opinion, held by some, that the horn becomes frost-bitten, and then putrifies. Though its whole inner surface is exceedingly vascular, yet it is perfectly protected by the almost insensible horny covering in which it is cased throughout, except only a very minute ring at its base, whose pulsations are the most accurate index of the pulse; and that ring, hardly wider than a thread, can not be affected by cold. When it is considered that the horn is a substance of lower vitality than the hoof, which never becomes frost-bitten, even though chilled by an iron shoe, reason should teach us that it can not be injured by cold."

A similar case occurred in the experience of the editor of the "Planter," which "ran to a speedy and fatal termination." Upon dissection of the head, the left hemisphere of the brain was found completely "broken down," or disorganized; the base of the left horn was slightly implicated. The introduction of a gimlet, therefore, into the horns of cattle thus affected, and afterward cramming in pepper, turpentine, and other foreign bodies, can not possibly reach the disease nor benefit the animal, but is apt to do much harm; for puncture of the lining membrane of the frontal sinuses, which generally takes place when the instrument is introduced near the base of the horn, is attended with danger, both as regards inflammation and hemorrhage; and it is just as unwise to fill the parts with pepper, turpentine, etc., in view of cure, as it would be if one of our own race were concerned.

I now have an impression that the reader, like myself, has come to the conclusion that, in the generality of cases occurring among neat stock, the disease christened horn and tail-ails, is located elsewhere. Yet some persons contend that the practice, which I denominate as unscientific and barbarous, saves some of the afflicted animals. I have doubts about the treatment saving them. They may survive it; for it is well known that both men and animals often recover after an unfavorable prognosis is made, and they will also survive very severe injuries, fractures, punctures, and formidable wounds, etc.; so that health returns, in such cases, in spite of the violence opposed to it. Hence, if an animal should be restored to health, after having been compelled to submit to the fashionable barbarities of horn-boring, that is no proof of the utility of the means used.

If we could only collect all the facts in the case of an animal said to be the subject of horn-ail, we should probably discover that, in four cases out of five, the animal's stomach was the seat of the original difficulty, for the stomach is more frequently deranged than any other organ of the body; and it often occurs in this way: A man has a cow, an ox, or a lot of cattle, which he intends to bring to market, in view of exchanging them for dollars and cents. He puts them through (as the moderns have it) the fattening process, furnishing them with a superabundance of carbon, in the form of meal and other nitrogenous equivalents. The result is an accumulation of adipose tissue; the animal becomes fat, and, consequently, plethoric. The accumulation of fat offers an impediment to the free and full play of the heart, lungs, and diaphragm; and, should the subject be a pregnant cow, she is liable, a few hours after the period of parturition, to be attacked with milk or puerperal fever, or convulsions; therefore the liability to disease in more important structures than the horns is a matter that I seriously urge our itinerant cattle doctors to consider.

Neat stock are often the subjects of catarrh, (or "hoose," as it is termed,) nasal gleet, etc. In either case, a profuse discharge occurs from the surface of the nasal membrane, extending to the frontal sinuses, up to the very tip of some horns. This is often called horn-ail, and the gimlet is brought into requisition, and, on withdrawing it, some of the "matter" may possibly escape from the orifice; hence the gimlet is said to do good. This I deny; for the more rational way of favoring the discharge of the matter would be to steam the nostrils, and adopt such other means as the nature of the case may seem to require.

Even granting what some contend for—namely, that an abscess occasionally forms in one of the nasal cavities—then it would not be proper to bore the horns, for the pus must necessarily be inclosed within a sac, which the gimlet may rupture. Then the morbid matter escapes into the frontal sinuses, and is apt to set up diseased action on the tissue with which it comes into contact. If it be ever necessary to puncture an abscess of this character, it should be done by way of the nostrils. Even should the animal labor under any disease located within the horns, the introduction of a gimlet would be a very unsafe remedy, as all veterinary surgeons are ready to testify. It is a dangerous business to puncture a membrane so highly organized as that found within the frontal sinuses,* especially when so rude an instrument as a gimlet is

* The gimlet, before it enters the lining membrane of the parts (termed schneiderian), must necessarily puncture a highly vascular membrane (termed

used. The instrument must lacerate the parts, and induce severe inflammation and suppuration; consequently, it is better calculated to produce disease in this region than to cure one existing there.

I have examined many animals after their horns have been bored, and have always found an undue degree of heat in the cranial region; throbbing pulsations about the base of the horn, and a general disturbance of the functions; sometimes an accumulation of pus within the cavity. Then, again, internal hemorrhage, effusion, etc., of blood, are apt to occur after boring the horns; and every intelligent physician would be unwilling to incur the risk attending it. Many a valuable animal has been lost by hemorrhage, following fracture, puncture, and sawing off the horns.

Horn-ail is said to be so prevalent among neat stock, that the farmer (in the imaginative mood) fears it as he would the plague. And the only remedy for this lamentable state of ignorance is for farmers to use their reason, godlike and rational, and avail themselves of the experience of those competent to diagnose disease by its concomitant and persistent symptoms. We are now in possession of facts showing that the introduction of a foreign body (a gimlet) may induce a formidable disease; therefore, it should never be used.

Among the diseases mistaken for horn-ail I name indigestion; and this disease is almost as prevalent among neat stock as it proves to be among the members of the human family in this country. Loss of cud, or a cessation of rumination, is one of the principal symptoms of acute indigestion. I made an autopsy, in a case of this character, only a short time ago, and found the abomasum, or fourth compartment of the stomach, enormously distended with food, and, on removing the same, the mucous membrane readily peeled off. I particularly pointed out to the owner of the animal the pathological appearances as they occurred; but, as he had made up his mind, and the neighbors confirmed his opinion that the animal was the subject of horn-ail, he still believes that the trouble first commenced in the horns, which had been bored in several places.

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periosteum), the external covering of the bony column, and inflammation and suppuration may be the consequence, ending in altered structure.

I am not contending that the vascular membrane within and without the osseous structure of the horns and contiguous parts enjoys immunity from disease. It is subject to it, as are other parts, precisely identical in function and structure. But I am exposing a false theory, which confounds functional and organic diseases with their symptoms or manifestations.

A local disease of the horns is not unusual. For example, a blow in the region of the base of the horn often occasions a local affection; and this is not to be wondered at, when we know that the parts in this region are merely defended by a thin cuticular envelope, and, therefore, offers but little protection to the subtissues. This region is denominated by brutal men the "tender spot;" and, in view of subduing a restive animal, they aim their bludgeons in this direction, with terrible effect. Local injuries of this character, and those occurring in the savage encounters which horned animals frequently engage in, the boring of their horns, and sawing them off, etc., are accidents and processes more or less operative in exciting a local affection.

A local disease of this character admits of the following demonstration; namely, percussion. Percussion is the art of striking various parts of the body, with a view of ascertaining the seat of disease. Every substance, when thrown into sonorous vibration, produces a sound the tone of which is peculiar to itself, and every change which takes place in the composition of that substance, or in the arrangement of its component parts, is accompanied by a corresponding change in its tone. If we strike a solid body, it emits a solid sound; strike an empty one, and it emits a hollow sound. In like manner, if we strike a healthy horn, we get a sound of hollowness. When the horn and frontal sinuses are occupied by matter, we elicit a dull sound, without vibration. The difference between the sound elicited from an empty barrel and that from a full one, or the sound from a solid post and that from a hollow one, when struck with a hammer, is not more remarkable than in the cases of healthy and diseased horns. By the same means we diagnose diseases of the chest. We are, therefore enabled, with absolute certainty, to determine the presence of pus within the horns; and, keeping in view the history of the case, which it is our business to inquire into, we can generally tell whether or not such abscesses result from local injury or disease within the parts, or if it be the sequence of some other disease.

Treatment.—In regard to the treatment of an abscess located in the region of the base of the horns, the proper method is to trephine the skull, which operation can only be performed by a veterinary surgeon.

Tail-ail.

In view of sustaining the respectability of veterinary science and my own professional reputation, I would inform the reader that tail-ail is an imaginary disease, appearing only in localities which the apostles of true veterinary science have never visited. The supposed affection is said to induce partial or complete paralysis of the hind extremities, and, contrary to the principles of science and the testimony of several veterinary writers, this condition is often termed tail-ail. The faulty theory is, a soft spot is found at the end of the tail, (this is a feature of every healthy cow's tail, when it has not been docked,) which takes the strength out of her back, and produces paralysis. The remedy is either to amputate the caudal appendage, or slit open the soft spot and stuff in tar, pepper, salt, or whatever remedy Neighbor So-and-so recommends. It seems a pity that the poor animals I am now writing about can not, like their masters, receive the benefits resulting from the investigations of scientific men in improved methods of treating disease. However, it is gratifying to know that the errors of the past are fast "dying out," and that the days of ignorance are numbered.

The tail is sometimes the seat of a local affection arising from blows, etc., or it may be the seat of a cutaneous disease; but neither one nor the other can be of so grave a character as to produce paralysis of the posterior limbs. The soft extremity of the tail may also occasionally become congested, or else œdematous (dropsical). But these states of the part would not justify a man in cutting off the tail; for the limbs are often found in the same condition, and no one would ever think of lopping them off, for the remedy would be worse than the disease; and, so far as the tail is concerned in being the seat of local congestion, or œdema, there is no disease at all, and, therefore, does not require local treatment. But I am not discussing the probabilities of diseases of the tail. This is not my purpose. I only aim to show the folly of making the cow's tail the indicator of the various diseases of her body, and, also, that of confounding a disease of the nervous system with a slight congestion of the tail; and, further, the folly of arguing that the cow's strength is taken out of her back, etc., because the end of her tail is soft. If the tails of neat stock, or those of any other animals, become diseased, in the name of humanity let them be prescribed for; but I do hope that those who read this article will never be caught prying into the end of the above useful appendage for the purpose of demonstrating that which never existed.

Almost all animals said to have the tail-ail are laboring under various forms of disease remote from the tail, and, however diligent men may be in performing their barbarous operations on the same, the disease under which the animal suffers, perhaps located either in the brain, spinal marrow, liver, or pancreas, entirely unsuspected, may progress to a fatal termination, while an uneducated cow-leech is amusing himself by taking unwarrantable liberties with the uncomplaining animal's tail. I am often told that animals, after being thus operated on, get well. Very likely. Some animals will endure the most cruel torture, and I once saw a cow, in apparent health, who a fortnight previous drank a pint of white paint. Such cases I look upon as nothing more nor less than lucky escapes.

I shall close this article by introducing a selection from "YOUATT on Cattle." Mr. YOUATT, when treating of palsy, thus alludes to "tail-ill," or "tail-slip":

"In many parts of the kingdom palsy is traced to a most ridiculous cause. The original evil is said to be in the tail, and all maladies of this kind, involving the partial or total loss of motion in the hind limbs of the animal, are classed under the name of tail-ill, or tail-slip. Our friend, Mr. Dick, of Edinburgh, has taken up this subject, in a very interesting point of view, in the fourteenth number of the 'Journal of Agriculture,' and the public are much indebted to him for dispelling a false, injurious, and cruel superstition. The farmer and the cow-leech believe that the mischief passes along the cow's tail to the back, and that it is on account of something wrong in the tail that she loses the use of her legs; and then some set to work and cut the cow's tail off, while others, less cruel or more scientific, make an incision into the under surface, and allow the wound to bleed freely, and then fill it up with a mixture of tar and salt, and we know not what. * * * Mr. Dick, with a kind consideration for which he deserves much credit, condescends to reason the case with these foolish people; and what he says is so much to the purpose, that we can not refrain from introducing it here: 'The disease, in ordinary cases, is said to consist in a softening about the extremity of the tail, and is to be distinguished by the point of the tail being easily doubled back upon itself, and having, at this doubling, a soft and rather crepitating kind of feel. But what is the real state of the case? The tail is lengthened out to the extent of about three feet, and is formed like a common whip. Toward the extremity the bones terminate gradually, becoming insensibly smaller as they proceed downward. At this part is said to be found a soft place (the tail-slip). Beyond this, again, a firm cartilaginous portion is found, covered with hair, to brush off the flies within its reach. Now, why have we the long columns of bones—the termination with a soft space of a few inches—this thickened, hard, cartilaginous part at the very extremity, and that extremity covered with hair, but with a view to form a whip, to drive off, with the greatest possible effect, the insects which wound and torment the animal?'"

After such testimony as the above, I firmly believe that the readers of this work will never be caught in the foolish act of locating paralysis at the extremity of the caudal appendage.

SECTION XII.

DISEASES OF THE BRAIN.

INFLAMMATION OF THE BRAIN AND ITS MEMBRANES—STURDY IN CATTLE—SHAKING PALSY—HYDROPHOBIA.

INFLAMMATION OF THE BRAIN AND ITS MEMBRANES.

IT makes but little difference, so far as our method of treatment is concerned, whether the brain or its membranes be the seat of inflammation; for the treatment, in both cases, must be the same, and the difference, in a pathological point of view, can not be very great between a disease of the brain and its investing membranes, although each may have peculiarities of appearance. The affection is generally sudden in its attack, and it is often accompanied by symptoms of frenzy, and the animal sometimes becomes frantic, and decidedly mischievous. Soon, however, alterations in the structure of the parts take place, as softening, effusion, etc., and then the animal dies.

In regard to the treatment, I must confess that it is much easier to write about it than accomplish it. In cases when delirious fits occur, accompanied by convulsions, which make it dangerous to approach the animal, I have no remedies to offer; the case is beyond the reach of art. I may, however, add that the terminations of this disease are different. They depend on the intensity of the malady and the structural susceptibility. The disease is generally treated on the antiphlogistic plan: cold water to the head, active cathartics, and counter-irritation on the region of the spine.

Causes.—The causes of a disease of this character are often obscure, yet I have known it to occur as a symptomatic affection. I examined the carcass of an ox, a short time ago, that died of what the owner termed "mad staggers." I found the brain highly congested, and several adhesions between it and its membranes. There were also large patches, intensely red, on the lining membrane of the third and fourth apartments of the stomach. I was informed by the owner that the animal died twenty-four hours from the time of its first attack. The disease probably originated on the digestive surfaces, in consequence of the irritating nature of the food—moldy hay and tough corn-stalks, with a sprinkling of damaged meal and brewer's grains.

Symptoms.—The symptoms of symptomatic disease of the brain are as follows: Dullness, loss of appetite, staring of the coat; and, if the animal be a milch cow, diminution in the quantity of milk is observed; the extremities are cold, and the animal grates its teeth; the respiration is at first tranquil, and the pulse slow but full; the patient will frequently be seized with a kind of epileptic fit, which lasts but a few minutes, during which time some of them will exhibit the most violent symptoms, such as bellowing hideously, pawing the earth, and running at any thing within their reach; they will also break out into profuse perspiration, and press their heads forcibly against the wall, even to such an extent as to break off their horns. Many are seized with violent tremblings and twitchings, and, toward the latter period of the disease, the respiration becomes extremely laborious, the jaws are firmly closed, convulsions succeed each other rapidly, and death shortly closes the scene.

Treatment.—Give the animal two drachms of fluid extract of gelseminum in a gill of water, twice daily, until the pulse and respirations become more natural. Give occasional enemas of soap-suds, and keep the head and spine sponged often with cold water. So soon as the inflammatory symptoms subside, discontinue the gelseminum, and administer, daily, doses of

Fluid extract of golden seal..........	1 oz.
Hyposulphite of soda................	½ oz.
Water..............................	1 pt.

Mix.

Sturdy, or Cerebral Parasites.

The brain, and its investing membranes, are often infested with a species of entozoa, termed cœnurus. They consist of a parent sac, or membranous tunic, from which, externally, germination takes place. This mode of multiplication of this group of parasites differs from that which is observed in the hydatid (fluke), in which it occurs internally.

Symptoms.—The symptoms will depend altogether upon the number and size of the parasites. In their early state they take up but little room, and do not occasion any very marked symptoms; yet, if the animal could only speak, we might be informed that he was the subject of headache. As the parasite or parasites increase in size, they produce pressure on the brain, which makes the animal appear giddy, confused, nervous, and desirous of separating itself from the herd; and it is in consequence of these peculiar symptoms making their appearance, when no other form of disease is present, that the term "sturdy" is applied, which is simply used to denote the presence of cerebral parasites.

Treatment.—When once these parasites have fairly taken up their abode in the cranial cavity of an ox, I fear there is very little help. An operation, such as that alluded to by the writer of the appended article, may, once in awhile, prove successful, yet, in my opinion, the remedy is about as bad as the disease; therefore I recommend prevention rather than attempts at cure. The preventive remedies are salt, sulphur, and charcoal, equal parts. This is a specific for all parasites. About a table-spoonful of the mixture, given occasionally in the food, will prevent the germination of many forms of parasites.

The following interesting translations are by Mr. GAMGEE:

"*Sturdy in Cattle.*—No less than seven bladders of the cœnurus were found in the left hemisphere of the cerebrum, in an old cow affected with the sturdy. Between the dura mater and the cranial parieties there were several transparent vesicles, about the size of a pea, embedded in the substance of the bones. The left hemisphere of the cerebrum only weighed three drachms and a scruple less than the right, although the former contained all the bladders. Hering could not find any heads of the cœnurus on the interior of the sacs, and he held them to be yet undeveloped hydatids.—*Repertorium für Thœrheil*, p. 21. 1855: Stuttgart.

"In the second volume of the Milan 'Veterinary Journal,' at page 52, is a case of sturdy, recorded by Patellani. It occurred in a two-year old animal, that had shown, for several days, attacks of madness, and in one of these it had broken a horn off.

Patellani found her lying senseless on the ground; the head, bent on one side; the forehead, hot, and painful on percussion; the sound produced, hollow. On examination after death, the membrane of the brain was found injected, and in the right ventricle of the cerebrum were hydatids with several heads.

"The trephine has, of late years, been much recommended in cases of cerebral hydatids in cattle; and in Bavaria and Wurtemberg it has frequently been employed, and often with good results. At the Clinique of the Munich Veterinary School, in the month of November, 1854, a year-old heifer was presented, with expansion of the right frontal bone. There were symptoms of giddiness, with turning toward the right side, dullness, etc. Ramoser found, on percussing the seat of the disease, that the sound was most hollow to the left. The case was observed for forty-three days, during which time the symptoms became more severe; the animal was trephined, and about two ounces of serum passed out, followed by the bag of the parasite. The wound would have been closed with a clay plaster, but the animal had to be slaughtered the following day. The membranes of the brain were inflamed, especially to the right, and blood was extravasated on its surface. The expansion, thinning, and even perforation of the upper part of the right lateral ventricle, showed that the bladder was lodged in the ventricle itself, as had been seen the previous year, in another case that had been operated upon. Death was then attributable to the far-advanced stage of the malady, and to the abrupt collapse of the parietes of the ventricle, after contraction of the bladder."—*München Jahresber*, fer 1854–5, p. 13.

The following is from the pen of Mr. John Gamgee, (Edinburgh,) on sturdy in sheep, in which much useful information relative to parasites is given:

"The more inquiries made, the more accurate will the conclusion arrived at by scientific men appear, that dogs and sheep must live together for certain parasites to extend their ravages with effect. On all the sheep-farms I visited last summer, sturdy was complained of, and on all such farms there were dogs. Such was the case at Cairnton, Mill of Kincarnardine, on Glendye, and in other localities. Mr. Falconer, of Balnakettle, a gentleman of great experience, and other farmers, assured me that there has been more giddiness in sheep within the last two or three years than they had ever witnessed before, and the losses, in consequence, are sometimes greater than by that fatal malady "braxy." This clearly does not depend on a large number of dogs being kept; but there are many conditions affecting the propagation of parasites, and if destructive agencies were not as universal as the productive, much more effectually would vermin and parasites multiply and spread their baneful influence, to the detriment of mankind. It is accidental circumstances that affect the development of diseases of animals. If every germ produced by a single tape-worm, in a limited period of time, were to take effect, it would be quite sufficient to exterminate the flocks of Great Britain; but, I repeat, the laws established to procure the multiplication of any animal are counteracted by an infinity of uncontrolled, but, perhaps, not uncontrollable, agencies. The latent vitality of the eggs of such parasites is extremely difficult to destroy, and, to use the words of one of Kuchenmelster's reviewers, after months of exposure to warmth and moisture, the pulpy and putrid debris of segments of the tænia solium yield ova which show no sign of any approach of degeneration or decay. And the writer of this review has been struck by the remarkable way in which the size and structure of these ova allow them to elude all precautions that may be taken against their mechanical dispersion. In spite of every attempt to insure their destruction, by steeping the specimen glasses he may have used in strong acids, and by afterward bathing them in the flame of a spirit-lamp, he has once or twice found the characteristic ova appear most unaccountably in healthy and diseased tissues of secretions of the human body, which he has subsequently examined with these glasses. The dissolution of the parent tissues ultimately sets free the eggs contained in their interior, to be carried by the winds and waves wherever accident may determine. How vast a number of them miscarry is evident when we attempt to take the census of a single tape-worm! Or imagine the million of eggs such a parent foists upon society during the years it may inhabit a given animal. What becomes of these abortive germs, how long they retain any vitality, and what are the circumstances that may rob them of it are questions we can not answer, save by the conjecture that their albuminous and fatty materials are either applied to the soil in a decomposed form, or are consumed as food by various of the minute intervertebra that throng the surface of the earth and the waters. But the more fortunate minority of these eggs, the destiny of which is to eat instead of being eaten, after many and long wanderings of this passive nature, are, at length, engulfed by some unconscious animal in company with its food, and, through its alimentary canal, attain the locality of their second form of existence. During this passive emigration, the worm has retained its previous size (1-700th of an inch) and shape. But its thick wall bursts and sets free the inclosed embryo, which is an ovoid body, of nearly equal size, armed with six hooklets at one extremity. Impelled by instinct to begin its active migration, the embryo pierces the first portion of its path by bringing together the anterior pair of hooks, so as to form with them a kind of wedge-shaped stiletto, and now drags itself forward in the same direction by means of the succeeding pairs of hooks, which it uses like a person who, in attempting to get out of a bow-window, thrusts himself forward by his elbows. In this way the minute embryo penetrates the body it inhabits, and only increases its efforts on reaching the place its instinct recognizes as suitable for its abode, prior to the next series of changes it has to undergo. Streaks of reactive inflammation and exudation generally indicate the minute channel by which the embryo thus traverses the wall of the digestive canal, in its course to the liver or other organs. The migration of a tænia is probably a passive process. Various facts suggest it to be so—"a true locomotion, effected under the impulse of an instinct, and by means of certain special organs. The germs of parasites are evidently carried through the system in the stream of circulating blood, and they do not always travel themselves through the interstices of tissues.

Sturdy was long considered as dependent on a simple accumulation of water on the brain, generally affecting one side. Lœcke had observed, in 1780, that the water-bladders on the brain of giddy sheep were animals; and Fabricus (Harvey's master) was the first to assert the same respecting the cysticercus of the pig. Albildguard, the founder of the Copenhagen Veterinary School, observed that a tape-worm (the bothriocephalus latus) which existed in the abdominal cavity of the stickle-back, and in the intestinal canal of certain water birds, never had eggs in the former but only in the latter situation; and that from the first-mentioned creature it passed into the second, he ascertained by direct experiments with ducks, which he fed on banstickles. Gœtze, in 1782, had perceived the great resemblance between the head of the hydatid of the liver of mice and rats, the cysticercus fasciolaris, and of the tape-worm of the cat (tænia crassicollis.) The cercariæ was first studied by Müller, and lastly by Bejanus, in 1818, who recognized them as parasitic in certain snails, inclosed in bags. M. Wagner and Von Siebold and Steenstrup fancied they had discovered the change cercariæ underwent to become true fluke-worms. Ehrenberg, in 1852, disputed Steenstrup's accepted metamorphoses, and only gives the resemblance of the tailless cercariœ, with a trematode worm. Dr. Kuchenmeister, of Sittau, instituted ingenious experiments to settle these hypotheses. He made dogs and cats swallow hydatids, which developed into tape-worms in the intestines. From the hydatids of the liver of cats and mice the tænia crassicollis in the intestines of the cat arose, and from the cysticercus of the hare and rabbit the tænia serrata in the intestine of the dog; so that if the water-bladder is lost, the head of the worm attaches itself to the head of the mucous membrane, the rings constituting the body of the tape-worms, including the organs of reproduction, and they are thus formed. By repeated experiments, made by several eminent zoölogists, the deductions were confirmed."

Shaking Palsy.

Shaking palsy is a condition of the animal economy known to medical men as irregular or abnormal nervous action. It generally occurs in cows of the nervous temperament, whose digestive organs are deranged; and, so far as my experience goes, the disease is confined to imported stock, of the Alderney breed. I lately attended an Alderney cow, the property of Mr. Chenery, at the "Highland Stock Farm," Belmont, Mass.

Symptoms.—The patient was suddenly attacked with symptoms of irregular nervous action of the muscles of the chest and fore-legs, simulating shaking palsy. The membranes of the eyes were highly injected; pulse, jerking in unison with the irregular muscular action; external surface, extremities, and horns, quite chilly· respirations, normal; pulse small and languid.

Treatment.—I gave the patient three drachms of fluid extract of golden-seal, and the same quantity of fluid extract of camomile flowers. The spine and fore extremities were then irritated by the application of tincture of capsicum. On visiting the animal, the next day, I found her in better condition. The tremulous motion had somewhat subsided, and I pronounced her out of danger. She finally recovered without much subsequent treatment.

It is my opinion that this case had its origin in derangement of the digestive organs and constipation; for, after the exhibition of the tonics ("bitters,") which aroused the action of the stomach, the animal passed an immense quantity of black, fetid excrement. The quantity was so great that it occasioned remarks on the subject from all who visited her.

Hydrophobia.

There are generally some circumstances connected with a case of hydrophobia which afford a clue to its real nature. It often happens that evidence conclusive is furnished that the animal has been bitten by a rabid dog. If this be the case, all doubts are at an end.

Symptoms.—In the early stages of the disease, there may be nothing in the symptoms to excite suspicion as regards the true character of the affection; they may merely denote approaching illness; but if the animal has been bitten by a rabid dog, or any other animal, and has become inoculated with the virus, which is usually communicated through the medium of the saliva, then any slight deviation from health, as shown by suspension of rumination, or by any other abnormal condition which may attract the attention of the farmer, is the precursor of the dreadful malady which is to follow. The most marked symptoms of hydrophobia are, protrusion of the eyeballs; the conjunctivial membrane is very much reddened, and, in fact, all the visible surfaces of the eyes, nostrils, and mouth are much inflamed. The animal is ripe for mischief, bellows occasionally, will paw and tear up the ground with its horns, and, on the least excitement, will become more dangerous than a rabid dog, trying, however, to do injury, to friend or foe, with its horns rather than with its teeth. The rabid cow or ox will drink water, if it can swallow; in fact, it generally suffers from intense thirst; but the fact is, the poor creature can not swallow a drop. The least attempt at deglutition induces spasms of the larynx, and puts the animal into the most distressing agony. It is not the sight of water that puts a rabid animal into convulsions, as some persons suppose; for in the early stage of the disease, when the membrane of the larynx is not much affected, they will drink freely.

Treatment.—It is well known that the poison of all rabid animals resides in the saliva, consequently they can not be handled and drenched without fear of danger; for if a small quantity of the saliva comes in contact with an abraded surface or sore, the unfortunate individual is just as much in danger as if he had been bitten. The only remedies that seem likely to be of any service are the plantain leaf (plantago major) and lobelia. Take four ounces of each of these herbs, and infuse them in two quarts of boiling water; when cool, strain through a fine sieve, and administer at once. If at the end of a few hours the patient has not improved, it will be advisable to destroy him.

The following interesting case occurred in the practice of Mr. G. Lewis, of Monmouth, England:

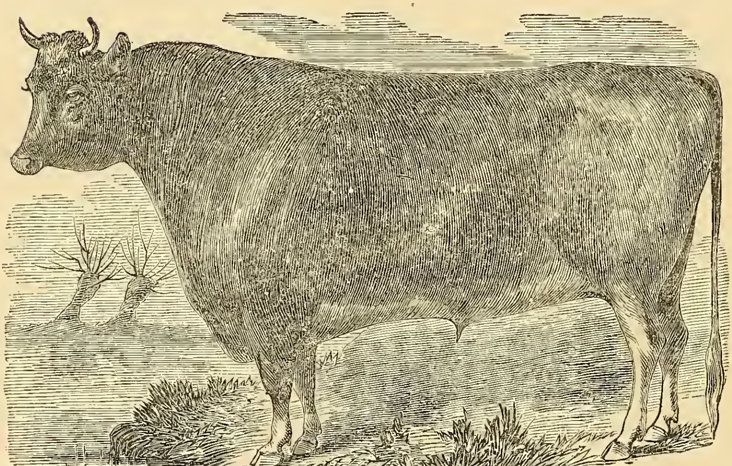
"I was requested to see a cow, the property of an extensive farmer near this town. Upon my arrival he gave me the following history of the case: 'On the 15th ult., the calf from this cow, tied in an out-house, was severely bitten in the nose and mouth by a dog, it was believed, although none was seen. But the cattle which were in the same meadow were in a very excited state, lowing and bellowing, as also the calf; and, upon the arrival of the shepherd, who hastened to the spot, he found the calf much torn, and the cow with blood upon her nose. The calf, from this period until the 27th, could not take its milk in the natural manner, and was obliged to be drenched. But from the above date, the wounds having healed, and the animal apparently recovered from the injuries it had received, it was turned to the cow, and took its milk in the usual way, which it continued to do up to the 31st, at which period the teats of the cow were bitten by the calf. From this date the calf became very ill, appeared to have sore throat, made a very peculiar noise, a kind of half bellow and roar, continued to get worse, and died on the 3d inst.' I did not see him, but such is the description given to me by Mr. J——, and I know that it is a faithful one. My attention was now directed to the cow. She was observed yesterday to separate herself from the others, and to bellow occasionally; but this morning she was seen to foam greatly at the mouth, and appeared much excited. The other cattle, also, would not associate with her, but kept at a respectful distance, with their heads and tails erect. She was now brought to the house, at which time I first saw her. She was standing; the eyes were half-closed; she appeared to be in a kind of stupor, or half comatose state; extremities, natural temperature; respiration, natural. She was looking rather thin; she was always a remarkably quiet creature, but now the least noise appears greatly to agitate her. The human voice, or the slightest movement, is sufficient to cause her eyes to glare, and set her bellowing, which ends in something between a growl and a roar. A person whistling, or the bark of a dog, produces fearful excitement. These paroxysms also appear to come on spontaneously. At their termination, the eyes again become half-closed, the abdominal muscles tremble, the respiration is slightly quickened, and the pulse is quick and tremulous. I remarked that some water might be brought. Upon presenting the same she plunged her nose into the bucket, but could not swallow, and the effect was fearful to behold.

I informed Mr. J—— as to the nature of the case, stating that I had no hesitation in pronouncing it to be a case of hydrophobia; but, as he did not wish to have her destroyed, and was very anxious that I should give her something, and watch the case, I merely ordered a purgative, combined with a little febrifuge medicine, at the same time pointing out the propriety of being cautious while administering the medicine, and the probable impracticability of it, which was verified.

September 14.—All the symptoms of yesterday are aggravated intensively. The eyes have still a heavy appearance, when suddenly they appear like two brilliants. I observe that the spasm is more severe, and that she bites the wood-work of her stall.

September 15.—Much worse; the cornea of the left eye, in its center, is become opaque, and appears as though nitrate of silver had been applied to it. She sometimes lies down, but gets up again and roars. Upon a person present putting his foot near her mouth, she made an effort to seize it, uttering a growl. She died this evening.

"*Post mortem examination, seventeen hours after death.*—The brain—its substance appeared healthy. The pia mater showed intense inflammation in small patches; its vessels generally were very fully congested. The larynx showed traces of intense inflammation, as also did the membrane lining of the trachea, throughout its entire length, and was most beautifully spotted, as was also the lungs, pleura pulmonalis, pericardium, and heart. The coats of the first and third stomachs parted upon the slightest touch, in patches. The abdominal viscera, also, was similarly spotted, as was the diaphragm, etc., although not so thickly as the respiratory organs."



SPECIMEN OF AN ALDERNEY BULL.

SECTION XIII.

THE LIVER AND ITS DISEASES.

Description of the Liver—Secretion of Bile; its Uses, etc.—Gall-bladder—Inflammation of the Liver—Hydatids—Jaundice, or Yellows.

Description of the Liver.

THE liver is the largest gland in the body. Unlike the liver of a horse, it has a large reservoir for the reception of the bile, called the gall-bladder. In form it is irregular, being convex anteriorly, or toward the diaphragm, with which it is in contact, and concave on its posterior surface, or toward and in the vicinity of a part of the stomach. It is composed of two lobes. That on the right side is the larger. The central portion of the gland is the thickest, and it gradually becomes thin toward its borders. The mass consists of a vast number of minute lobules, varying in size and form, containing a net-work of biliary ducts connected with their main trunks, and a large number of biliary cells; and each is connected, in like manner, with three blood-vessels; namely, the hepatic or nutrient artery of the liver; the vena porta, which returns the venous blood after it has circulated through the intestines; the hepatic vein, which carries back the blood received from both the other sources. It will be seen, therefore, that the venous blood, which is brought to the liver by the vena portæ, is intended for the elimination of bile; therefore this vessel seems to act in the double capacity of vein and artery; for, as a vein, it receives blood from the abdominal viscera; as an artery it ramifies through the liver, forms a capillary net-work, and then secretes the bile. From this capillary net-work, which can be traced to the center of the minute lobules, the hepatic vein takes its origin, collecting the blood from the capillary net-work. It then unites with other radicles to form the main trunk, by which it is delivered into the vena cava.

The branches of the hepatic artery are principally distributed upon the walls of the hepatic ducts, and upon the trunks and branches of the portal and hepatic veins, supplying these and the contiguous parts with the necessary amount of arterial blood for their nourishment, as well as that of the whole gland.

The investing membrane of the liver, from which prolongations extend into its substance, is termed Glisson's capsule.

The liver derives its nerves and nervo-vital power from the great sympathetic and eighth pair.

The liver is confined to its situation by ligaments, which get the name of broad, lateral, coronary, and round. The round ligament is the remains of the umbilical vein of the fetus. The others are continuations or duplicatures of the peritoneum.

Secretion of Bile; its Uses, etc.

The bile is secreted from the capillaries of the hepatic artery, by minute glands found on the surface of the biliary ducts. It then passes through the biliary pores and branches of the hepatic duct. By this duct it is conveyed to the ductus communis choledochus (union of the cystic and hepatic ducts), from whence, in part, it passes by the cystic duct to the gall-bladder. When needed in the duodenum, it returns by the cystic duct, and mixes in the ductus communis choledochus with fresh bile from the hepatic duct, and then passes into the duodenum. The bile having entered the intestine, mixes with the aliment and pancreatic juice. The pancreatic juice changes the digested aliment into a brown mass, termed chyme, and then emulsifies it. After being emulsified, a portion of the chyle is taken up by the lacteals and enters the receptaculum chyli. In a healthy state of the system, should any bile escape with the chyle, it is absorbed by the mesenteric glands, and returns to the liver by the vena portæ.

Gall-bladder.

The gall-bladder is a pear-shaped bag connected with the concave and posterior surface of the liver, by the above vessels and cellular membrane. It has four coats, termed peritoneal, cellular, muscular, and villous. The villous coat is the internal one, and is thrown into numerous minute folds, arranged in a reticular form, filled with small ducts, or follicles, and glands. The latter secrete a fluid for the protection of the internal surface.

Inflammation of the Liver.

Cattle and young stock, when fed too high, or when allowed to luxuriate in a rich meadow, are often attacked with an acute disease of the liver.

Symptoms.—The principal symptoms of this malady are yellowness of the membrane which lines the eyelids, and covers that part known as the "white of the eye." The visible surfaces of the mouth are also of a yellow tinge. In addition to the above symptoms, the animal is feverish, thirsty; mouth and base of the horns, hot; pulse, accelerated; breathing, rather laborious; rumination is suspended, and the animal is said to have "lost its cud." Some fullness will also generally be observed on the right side, in the region of the liver, and the animal will occasionally turn its head in that direction, as if it were the seat of pain, which is probably the case; yet the most reliable symptoms, in a disease of this character, are a yellow tinge of the visible surfaces, accompanied by febrile symptoms.

Treatment.—The most rational method of treating this disease is to endeavor to mitigate the inflammatory diathesis, and restore the normal function of the liver. In view of accomplishing these desirable results, I recommend the following prescription:

Glauber salts	16 oz.
Powdered mandrake	2 dr.

The salts should be dissolved in one quart of tepid water; then add the mandrake, and drench the animal by means of a common porter-bottle. This drench should be poured down the œsophagus in a gradual manner, so as to prevent its being received into the rumen, or paunch.

The patient should, if possible, be dieted on green fodder. If such can not be procured, some sliced cabbage, turnips, or carrots may be substituted. A tea-spoonful of mandrake should be given daily in the food, until the visible surfaces assume their natural color. A curable case will generally yield under the above treatment.

This disease sometimes runs into a chronic type, and is known by the yellow color of visible surfaces, dull, sleepy appearance of the subject, and absence of those acute symptoms which are invariably present in the inflammatory stage. A chronic disease of this character may exist for months and even years without interfering very essentially with the general health. Finally, however, the liver undergoes alterations in structure, becomes hardened or indurated, or else it becomes tuberculous, or is the seat of hydatids, and the fluke-worm is often found in the ducts. The treatment for chronic disease of the liver is as follows:

Powdered iodide of potassium........ 2 dr.
Powdered golden seal............... 4 oz.
Mix.

Divide the mass into six equal parts, and give one in a little water, every morning, on an empty stomach. The medicine may be continued for some length of time without the least danger. If this treatment does not benefit the animal, the case is probably incurable.

Hydatids.

Hydatids, commonly known as "flukes," consist of a sac or vesicle filled with fluid. To the naked eye it appears as a simple enveloping cyst; but on examining it more closely, by means of the microscope, it shows many tunics or coats, and these are the rudimentary cells in various stages of growth. According to Carpenter, these rudimentary developments project more and more into the parent cell, and, at last, become detached from its wall, and lie loosely within it. Shortly before this separation, however, the young hydatid is seen to contain smaller cells, which increase in size along with it. This increase continues until the new brood thus formed entirely fills the cavity of the parent, and a further increase causes the rupture of the sac and the escape of the progeny; and these, in their turn, undergo the same evolution, becoming parent hydatids in distinct cysts, and setting free their contained cells as a subsequent generation. These cystic entozoa are never found in the alimentary canal, but are always embedded in the liver, brain, or glands of organs. They obtain their food by absorption from the inner surface of the investing membrane. Hydatids infest the various organs of the bodies of all mammalia, and, although they are said to possess an independent existence while residents of the organ or organs which they inhabit, they die immediately when removed from their chosen habitation.

"The principal genera of cystic entozoa are, cysticercus, cœnurus, echinococcus, to which may be added acephalocystis. Several species of cysticercus are enumerated, but the most common are cysticercus tenicollis and cysticercus cellulosus. The former (tænia hydatagenia, hydatis globosa) is met with frequently in the peritoneum and pleura of ruminating animals and pigs. It is often generated in the disease called rot, where another entozoön, the distoma, or fluke-worm, is met with in the biliary ducts (liver). The cysticercus cellulosis is found generally lodged in the tissues of the muscles. It occurs sometimes in man, but more frequently in animals, particularly in the hog, where it causes the disease denominated measles. Of the genus cœnurus (hydatis polycephalus), the species cerebralis is found in the brain of sheep, oxen, and other ruminating animals. These hydatids on the brain of sheep cause the disease called sturdy, or giddiness. The hydatids belonging to the genus echinococcus are considered, by some, as varieties of the acephalocyst. They are commonly called granular hydatids, from the presence of numerous granules which float in the fluid of the cyst, or adhere to its walls. There are two species of echinococcus. One, echinococcus hominis, has been met with in the brain and abdomen of man, in a few instances; the other, echinococcus veterinorum, occurs in the hog and other animals.

Hydatids occur much less frequently in the brains of cattle in Great Britain than in other countries, as Youatt has correctly said, in his treatise on the 'Diseases of the Ox.' It occurs only in the young animals. Indeed, it obeys the same laws that guide the development of the cœnurus in the sheep; and it is a well-established fact that it is only when animals are growing that the germs for the propagation of the bladder-worms will be taken up, and carried to parts probably through the blood.

The success attending the trephine, in cases of hydatids in the brain of the ox, is very great and encouraging; and not only have I read interesting and convincing records on this subject, but, in conversation with skillful and experienced veterinarians, I have learned that trephining is an operation often to be relied upon." *

The liver is sometimes enormously enlarged, in consequence of

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* Pan, in the "London Field."

the presence of a numerous progeny of the fluke-worm. The following case, contributed to the "Veterinarian" by Surgeon J. B. Gregory, will serve to illustrate this matter. The morbid parts referred to were sent by Mr. Gregory to the editor of the "Veterinarian," who makes the remarks inclosed in brackets:

"The morbid parts I send were taken from a well-bred, shorthorned cow, six years old, estimated to weigh, when fat, one hundred and twenty-five stones of eight pounds. She was purchased in August last, with a warranty to calve in November following. On September 2d her owner called on me, and wished me to give her some medicine, as he thought she was not quite recovered from the effects of being driven sixteen miles. The medicine I sent had a beneficial effect, as the cow's appetite returned, and she appeared to be quite well again. After this I heard no more of her until the 6th of January last, when I was requested to go and give my opinion as to her being in calf, it being two months beyond the time she was expected to calve. I found that her appetite and rumination were natural, the pulse regular, and the kidneys and bowels acting well. There was, however, a peculiar expression of her countenance, that told of continuous pain. Her eyes, also, were sunk in their orbits, and she had a frequent and troublesome cough. Her skin, likewise, had lost its pliancy, and she was sadly out of condition, but no yellowness of the mouth or eyes was present. I first examined her abdomen externally, by percussing the right side, with a view of determining her pregnancy; but the body my hand came in contact with was too large for, and had not the feel of, a fœtus. As the cow had occasionally been observed to strain, I was now induced to examine her per vaginum, when I found the os uteri to be indurated and unyielding. I could also distinctly feel a round and hard substance, about the size of a large cricket-ball, and which I supposed to be the right ovary; the other one, however, I could not find. I told the owner that the cow was not in calf, unless it were extra uterine, and that, in all probability, the mass we could feel from the outside was a tumor within the abdomen. I also added that medicine could do no good in such a case. He at once decided on having her killed, which afforded me the opportunity of making a *post mortem* examination. All the viscera were healthy, with the exception of those I send. The liver, as you will see, is the organ principally affected. It weighed, when first removed, one hundred and forty-six pounds. Its great size led to its encroaching on the space occupied by the other viscera, all of which were more or less compressed. It did not adhere to the side of the abdomen, but was firmly attached to the diaphragm, and also, in places, to the intestines. In my examination I had the assistance of Mr. Hearn, M. R. C. V. S., who was recently your pupil, and who has, I believe, also written to you on the subject. The cause of the enlargement of the liver is evident enough, being produced by hydatids, but I leave to you to describe the variety to which they belong. I have attended *post mortem* examinations of many cattle since 1828, but never met with any thing like this before.

[The description given by Mr. Gregory leaves us but little to say respecting this extraordinary enlargement of the liver, as stated by him. The sole cause of its increase in size was due to the presence of an immense number of hydatids in the substance of the organ. These entozoa belonged to the variety designated the acephalocystis endogena, and each cyst contained within it a considerable quantity of the so-called echinococci. In the 'Transactions of the Veterinary Medical Association,' for 1842–3, a similar case is recorded as occurring in a pig, which is illustrated by a colored plate, and which may be said to depict equally as well the condition of the liver of the animal in question.]"

Jaundice, or Yellows.

This disease is of very common occurrence among horned creatures. The stall-fed animal is, probably, more subject to it than those otherwise fed. From this the reader will infer that it is more likely to occur in the winter or spring than at any other season, which is the case. In order to prove this, let any one visit our markets, and note the color of the fat of beef, and he will notice the yellow appearance of almost all the beef offered for sale. There may be some exceptions, yet this feature of fat is a sure sign that the animals, while living, were not entirely free from functional derangement of the liver. This peculiar color, however, is very rarely, if ever, found to pervade the brain, humors of the eye, or the milk during lactation.

Occasionally a yellow tinge of the visible surfaces (membranes of the mouth, nose, and eyes) appears very suddenly, and is supposed to originate from sympathetic action of the brain upon the liver; yet it may arise in the same sudden manner, in consequence of gastro-intestinal irritation, produced by the introduction of poisonous plants and rough food, such as corn-stalks and sugar-cane, into the stomach. Jaundice, in a very protracted form, often owes its origin to the presence of biliary calculi. So say the authorities; but I have examined many gall-bladders after death, yet have never succeeded in finding any; and I have inquired of many slaughterers, and am informed that they never observed any stones in the gall-bladder; yet, in various alkaline districts of this country, I presume biliary calculi may be as common as in the chalky regions of the old world. According to concurrent testimony, the presence of biliary calculi in the gall-bladder of an ox does not interfere much with the general health; but they occasion a jaundiced appearance, a general eye-sore, which renders yellow beef unacceptable to the palate of an epicure, and the shrewd butcher declines to deal in any thing yellow, except pure "dust." I know of no symptoms by which the presence of biliary calculi can be detected prior to death.

The following paragraph occurs in "YOUATT on Cattle," and may throw some light on the subject:

"Sometimes, they (calculi) enter the duct (the cyst) which conveys the bile to the intestines. They are likely to do this on account of their swimming on the surface of the fluid which the bladder contains. The cystic duct is large at its union with the bladder. It is a continuation of the neck of the bladder, and the gall-stone may be easily pressed into the commencement of the tube; but it has scarcely entered it before its passage is obstructed by the folds of the inner coat of the duct. These assume a semilunar form, with the edges projecting toward the bladder, and they act as partial valves, retarding the progress of the bile, so that it may not all be pressed out at once, but gradually escape as the process of digestion may require. The gall-stone being thus impacted, violent spasmodic action takes place in the muscles of the duct, occasioned by the irritation of its continued pressure. It is fortunate, however, that, although the muscles of these ducts act with some power, the obstruction is usually, with no great difficulty, overcome. The duct distends; as it distends these valvular folds lie closer to the sides, and no longer oppose the passage of the calculus, which is pressed on until it reaches the common duct. The caliber of this tube is larger, and, unless the calculus is of considerable bulk, no further difficulty occurs until it reaches the opening into the duodenum, which, being situated in the center of a muscular prominence, acting as a valve, and preventing the passage of all matters, whether fluid or solid, from the intestine into the ducts, a new difficulty is opposed to the progress of the gall-stones, and there is some return of pain, and, in a few cases, the pain is evidently more intense than in the early stage. At length, this sphincter muscle of the duodenum dilates, the calculus enters the intestinal canal, the pain ceases, and the natural color of the skin returns. In this species of jaundice, we have, in addition to the yellow skin, the heaving of the flanks, the hard, concentrated pulse, the diminished appetite, the insatiable thirst, and the other symptoms of fever. Then, too, we have the alternate cold and heat of the ears, the roughness of the coat, the urine becoming first of a transparent yellow, and then opaque red, saffron-colored, or brown, and the sediment brown. The bowels are constipated, the feces seldom evacuated, and, when appearing, are hard and black."

Treatment.—When occasioned by the presence of gall-stones, the animal should have a daily drench, composed of

Hydrochloric acid....................	2 dr.
Water..............................	1 quart.

Every other day, give three drachms of fluid extract of mandrake. This will arouse the liver to healthy and vigorous action and will remove from the intestinal canal all irritating substances.

When jaundice is occasioned by either functional or organic disease of the liver, I generally give the following:

Fluid extract of mandrake...........	1 oz.
Powdered hyposulphite of soda.......	½ oz.
Water..............................	1 pint.
Mix.	

Let this dose be given every morning, before feeding, for five or six days, or until the visible surface of the mouth becomes of a more natural color. In the day time the animal should be turned out to grass, if the season permits.

SECTION XIV.

DISEASES OF THE SKIN

EXANTHEMATA, OR ERUPTIVE FEVER—MANGE—FOUL IN THE FOOT—WARTS—GADFLIES—YOKE GALLS—THE HAIR OF CATTLE AN EPIDERMIC APPENDAGE—PEMPHYGIS OR VESICULAR ERUPTION—CRACKS IN THE HEELS OF CATTLE.

EXANTHEMATA, OR ERUPTIVE FEVER.

EXANTHEMATA is the name given to a contagious (sometimes epizoötic) or eruptive fever which occurs among cattle. The following cases will probably give the reader a good idea of the cause and nature of the malady now under consideration:

An unusual and alarming disease having made its appearance on the premises of Mr. Waterman, at Warsaw, I was requested to visit the place, in view of ascertaining, if possible, the nature of the disease, its cause, and treatment. On arriving at the place designated, I learned that disease and death had run riot, making terrible ravages among a herd of cattle which, only a few weeks ago, numbered eight hundred, but are now reduced to six hundred. The loss of two hundred fine animals in the course of a few weeks was a calamity calculated to alarm the husbandmen in the whole neighborhood.

From information obtained on the premises, I learned that no disease of the kind had ever prevailed there, nor in the regions where the cattle had been purchased, but the most positive evidence seemed to show that the malady had a spontaneous origin on the premises of the proprietor. Some of the animals were purchased in Missouri, and, when they arrived at Warsaw, were as poor as Pharaoh's "lean kine," splendid specimens of skin and bone. The dietary arrangements of the establishment were not calculated to benefit their condition, their principal food being "slop" from the distillery. It was not the intention of the owner to feed this large herd of cattle exclusively on "swill," but his stock of hay having become exhausted, and the roads being in very bad condition, it was impossible to obtain a supply of the same. In consequence the function of rumination, or remastication, was suspended. The hot "swill" from the distillery failed to distend the complex stomach of the animal to a healthy capacity; it operated so as to produce a lax state of the bowels, amounting, in a large number of cases, to actual diarrhea, or liquid stools having an offensive odor. The constant discharge from the bowels of liquid feces augmented the debility of the "lean kine." They became afflicted with a mortal malady, or enzoötic affection, which ran like wild fire through the whole herd. It manifested itself, first, in a condition of anemia; then depilation of the hair took place; the external surface of the body, in many cases, presented a raw surface, and the animals seemed to be crazy to rub themselves against any fulcrum that would mitigate their intolerable itchiness. Many of them got down on the floor, and, by contact, abraded the external surface of the body in many places, so that the raw flesh was exposed, and, in some cases, the hip bones protruded. It was noticed that whenever an animal thus affected got down on the floor, death invariably closed the scene. Some of the creatures thus having the finger of Death upon them were charitably put out of their misery, by killing them outright.

It appeared to be of an exanthematous character, and contagious. The proof of its contagiousness seemed to be evident, from the fact that the whole herd were affected with precisely the same pathological symptoms; namely, depilation of hair, debility, eruptions on the surface of the body, anemia, diarrhea, etc. I might be mistaken about the contagious element of the disease, but give my readers the facts, and leave them to form their own opinions. It may be that the evils to which the animals were subjected, and which was operative in implanting the malady in the system of the first victim, was operative, and produced the same in all the rest of the herd; but I have no proof of a positive character to offer in favor of either theory.

I had supposed that the skin disease was, like itch, dependent on the presence of parasites located under the scarfskin; but in the use of a good magnifying power, the supposed parasites were not discernible, but beneath the scarfskin, in the integuments and subtissues, were observed a multitude of minute local beds of lymph, from which sprang the superficial local malady on the skin. Incrustations, or scales, solitary and in clusters, formed wherever the deeper-seated integuments were affected; and in some cases, when the scabs were rubbed off, the parts looked red and inflamed, and some persons contended that the animals had the red or mad itch. Almost every person who saw the animals declared that itch was the disease; but, knowing that itch is due to the presence of parasites, and failing to detect any, I could not so name the malady.

I examined very carefully the external surface of the body, yet could not detect either lice or parasites to account for the intolerable itchiness which was present, more or less, in the whole herd. From all the evidence I was enabled to obtain during a brief visit, I was forced to the conclusion that the cutaneous affection was of an exanthematous character, and resembled eczema. Nearly all the animals were in a state of debility; all had daily been losing flesh, and those which I had examined after death were anemiac (bloodless). Their muscles were pale, like those of a calf when bled to death. Their stomachs and intestines were void of food; the hot swill seemed to have found no resting-place in the digestive cavities, but ran through them like a dose of cathartic medicine. The internal organs of those animals I examined presented no signs of disease, except that they were pale and bloodless.

Causes.—The causes of the disease may be summed up as follows: Debility, from insufficient nutritive food; the filthy condition of the cattle-pens and surroundings; herding of too many animals together in a small space; want of pure air, exercise, and muscle-making nitrogenous fodder.

Treatment.—I informed the proprietor of the establishment that no medicinal remedies would be of any avail unless the exciting causes were removed, and suggested that the afflicted animals be allowed the use of their limbs and lungs on dry ground, in the open air, within an extensive inclosure, and that they should be allowed a bounteous supply of hay, corn, and corn-stalks; then medicinal remedies of a tonic, stimulant, and alterative character, which I prescribed, might prove beneficial. For the local affection, I prescribed linseed oil, petroleum, lime-water, and sulphur. Several applications of this compound were made, and the subjects were much benefited thereby. Many of the affected animals, however, were in such a deplorable condition that I urged the owner to have them destroyed, as a deed of charity.

Mange.

This disease is too well known to need any particular description from me. It is due to the presence of parasites; hence it can be communicated by contact or touch, and is, therefore, contagious. This latter fact suggests the propriety of removing the diseased animals from the healthy ones.

Treatment.—Let the animal have a table-spoonful of sulphur in the food, for three or four days in succession; in the mean time, anoint the affected parts daily with a portion of the following:

Cod-liver oil	6 oz.
Sublimated sulphur	2 oz.
Mix.	

Apply by means of a sponge.

In the course of four or five days, wash the surface of the body with warm water and soap, and then give the body a thorough sponging with the following:

Lime-water	1 qt.
Sublimated sulphur	2 oz.

The above treatment generally cures the most inveterate cases.

Foul in the Foot.

In cases of this character the animal is dead lame, and often an intolerable stench arises from the parts between the claws. This is followed by the discharge of sanious and, finally, purulent matter. In this stage astringents and antiseptics are indicated; therefore I recommend the following:

Tincture of matico	2 oz.
Pyroligneous acid	1 pt.
Glycerine	4 oz.
Mix.	

Saturate a small piece of sponge with a portion of the above, and introduce it between the "cleft" of the foot; the hoof and contiguous parts are then to be bathed with the preparation; and, finally, in view of keeping the sponge in place, and to produce a good effect on the external parts, a narrow bandage must be applied, so as to encircle the hoof. If any heat or tenderness exist, the bandage should be kept moist with cold water.

WARTS.

Warts, as they occur on cattle, are of three kinds. One makes its appearance upon the skin, and consists, in part, of an increased development of the epidermis or scarfskin; the next kind originates under the epidermis, and, as it grows, elevates the same; the latter, however, is nothing more than a common encysted fibrous tumor, without organization. This can readily be removed by cutting down upon it, and dissecting out the cyst or sac which enshrouds it. The epidermic wart sometimes has a very broad base, and, in order to remove it, a double-armed ligature must be sent through it, so that it can be tied in two equal halves. Occasionally this kind of wart is pendulous—has a contracted neck at its base. This may be encircled by a single ligature, and, in the course of thirty-six hours, will fall off. The third kind of wart is a sort of fungous excrescence—not horny or hard, like the two former, but possessing great vascularity, and, when rubbed or bruised, they often bleed profusely. I lately removed one from the inferior jaw of an ox, which bled very profusely after the removal, and did not cease until a hemostatic had been repeatedly applied. The hemostatic was powdered matico leaves, which coagulated the albumen of the blood. There is great danger in removing warts of this kind. The following case, occurring in the practice of Surgeon CARTWRIGHT, will illustrate the proposition:

"On the 1st of June, 1846, I removed several warts from the linea alba of a year-old heifer, belonging to Samuel Worthington, Esq. I cast her, and cut them off with the knife, and did not apply any thing to the wounds, as they did not bleed an ounce. I could see one or two large blood-vessels on the surface of the wounds. We loosed her from the hobbles, and then tied her up, and the wounds soon left off bleeding. Gave her an aperient, and left her for the night.

The next morning she was found down, and could scarcely get up from loss of blood, which continued to issue through a large band that was passed round her. I was immediately sent for, but was gone to Liverpool. They, in consequence, applied to a druggist, who sent some alum-water, which stopped the blood. In a day or two I saw her, but, as a scab was then forming on the wounds, I did not meddle with it; soon afterward the parts were cicatrized.

There is no doubt but that, after she was left, she commenced licking the wounds, and so brought on the secondary hemorrhage. The person who looked after her believes that, had not something been done at the time, she would have bled to death. From this and other cases that I have seen, I think it absolutely necessary that we should guard against the animals licking themselves, and perhaps it would be quite as well to apply the cautery to the parts, after removing the warts, or subsequently."

When a large surface is occupied by warts which do not possess any definite necks, they must be cut off close to the skin, and the surfaces thus exposed should be touched with strong pyroligneous acid, and then sprinkled with powdered bloodroot.

Warts on the teats are to be removed by ligaturing them at their base, by means of saddler's silk, or horsehair. If securely tied, so as to obstruct circulation, they drop off in the course of thirty-six hours. Any sores which may occur in consequence of the removal of warts, can be healed by covering them once or twice daily with a small quantity of glycerine.

Gadflies.

The gadfly is known to naturalists as the œstris bovis. It punctures the integument of cattle, and then deposits its ova, or eggs. In this situation the ova mature, until they are capable of enjoying an independent existence. They then make their exit through the external outlet, fall to and burrow into the ground, and remain there until the period of their metamorphosis takes place, when they assume the form of winged insects. In this form they multiply the species by the deposit of their ova. They probably occasion much irritation; and, in view of getting rid of them, I usually puncture the tumor, by means of a thumb-lancet, and squeeze out the parasite.

The following paragraph is from the pen of Gunther; and I urge the reader, if he be the owner of live stock, to give them an occasional dose of sulphur; for I contend that no living creature can ever be infested with parasites when its system is saturated with sulphur:

"The gadfly not only persecutes healthy oxen, by its bites, during summer, but also deposits its eggs in their skin, which give rise to tumors on the back and other parts, in which the larvæ become developed. They live there on the succulent fluid which the soft parts secrete, and make their escape thence in the following spring, in order to become metamorphosed. The greater the number of tumors, the more is the strength of the animal diminished by the pain and suppuration. For this reason we should endeavor to free the animal, as soon as possible, from these larvæ pests, by frequently washing these tumors with camphorated brandy or forcibly compressing them, which either crushes the insect or forces it to make its exit. When they have attained the size of a filbert, an incision must be made into the part, which is then to be covered with a pitch plaster. A few doses of sulphur are to be given internally. We are told that those oxen which have taken sulphur for a long period of time are not infested by gadflies."

Yoke Galls.

The exciting cause is local irritation occasioned by the yoke.

Treatment.—So soon as an abrasion is discovered on the neck, the animal should be excused from duty for a few days. The abraded part should be lubricated two or three times daily, with a small quantity of glycerine. In most cases, however, a few applications of tincture of aloes and myrrh will produce a healthy action, and thus restore the parts to soundness. Should there be no abrasion, yet some tumefaction, heat, and tenderness, a cold-water bandage, renewed as occasion seems to require, will, in most cases, have the desired effect. Occasionally the integuments are so bruised as to induce induration (hardening). Local induration in the neck is a morbid condition of parts, known to the farriers of old as "sit-fast." The treatment consists in smearing the part with a portion of the following:

Iodine	½ dr.
Simple ointment	7 dr.
Powdered bloodroot	½ dr.

Mix.

A few applications of a portion of the above will have the effect of removing the sit-fast, or eschar, when a healthy granulating surface will appear.

Some animals, owing to a peculiarity of constitution, will "chafe," as the saying is, in those parts which come in contact with the yoke, and no human foresight or mechanical contrivance can prevent it; therefore, in view of protecting the parts against the local irritation and its consequences, I recommend the following liquid cuticle:

Collodion....................	Equal parts.
Castor oil....................	

After washing the abrasion with soap and water, wipe dry, and smear it all over with a portion of the above invaluable liquid cuticle.

The Hair of Cattle is an Epidermic Appendage.

According to Carpenter, hair is an epidermic appendage, although not developed upon the external surface, but in the interior of a follicle (sac or fold) formed by a depression of the true skin. This follicle is lined by a continuation of the epidermis (scarfskin), the cells of which are developed in peculiar abundance from a spot at its deepest portion, the dense exterior of the cluster thus formed being known as the "bulb of the hair," while the softer interior is termed its pulp. Although the hairs of different animals vary in the appearances they present, we may generally distinguish two elementary principles corresponding with those which we meet with in the stem of a feather; namely, a cortical resembling bark, and a medullary resembling marrow. The fullest development of both substances is seen in the spine hairs of the hedgehog, and in the quills of the porcupine, which are but hairs on a magnified scale. The cortical envelope of hairs is a continuation of the outer scales or layers of the epidermis that lines the follicles, while the medullary is derived from the deeper stratum, whose cells are produced in usual abundance at its cœcal (blind) extremity; and it is by the constant development of new cells at this point that the continual growth of the hair is kept up.

Pemphigus, or Vesicular Eruption.

In the United States, (at least in the East,) pemphigus is of rare occurrence, yet it has made its appearance in Texas and in the Western States. The following symptoms, which usually accompany this eruptive affection, may enable the reader to recognize it.

Symptoms.—The breathing is generally hurried and sonorous, accompanied by a slight cough; the animal shivers, which is occasioned by deranged and irregular nervous action; the integument in the regions of the neck, shoulders, anus, loins, and haunches is elevated by effusion into the cellular tissue; the cuticle, or external tunic of the body, is the seat of watery bladders, varying in size from a Beverly bean to a walnut; in other parts of the skin a serous or watery fluid may be observed to dribble from the hair. The ears are drooping and moist, and their temperature is much elevated; the base of the horns are hot, and the whole external surface of the body is in the same condition; the visible surfaces—namely, those of the eyes, mouth, and nose—are highly injected with a reddened yellow tinge; the tongue is swollen or tumefied, and an abundance of saliva flows from the mouth; the pulse will often run up to 80, yet may be imperceptible at the jaw; the spinal column presents a convexity, or is arched upward; the urine is scanty and dark-colored, and the feces are of a lighter color than usual, showing very conclusively that the function of the liver is impaired. As the disease advances, the serous tumors burst, exposing broad excoriated patches.

Treatment.—Let a portion of the following mixture be applied to the surface of the body, morning and evening:

Glycerine	2 oz.
Hyposulphite of soda	2 oz.
Rain-water	1 pint.

Mix well together. After this lotion has been applied a few times, a decided improvement in the skin will be apparent.

A few daily doses of the following medicine must also be given:

Fluid extract of poke-root	3 dr
Chlorate of potass	4 dr.
Water	½ pint.

A few years ago a vesicular epizoötic broke out among cattle and milch cows at Stratford-on-Avon, England, the symptoms of which are thus described by J. Tombs, V. S.:

"The symptoms were, increased pulsation; copious discharge of saliva from the mouth; respiration, disturbed. These symptoms continued for two or three days, when a tremendous inflammation of the integuments and cellular tissues set in, around the coronets at the heels and between the hoofs, causing exceeding lameness and excruciating pain. The swelling quickly extended to the fetlocks. The poor beasts lay down the greater portion of their time—panted and perspired profusely, with occasional deep groaning. At this stage of the disease the mouth improved. When made to get up, they could hardly walk, and soon lay down again. The beating of the heart could be distinctly heard several yards off. In some, all four feet were affected; in others, the fore-feet; others, the hind feet, and in some one fore-foot. Suppuration took place in the integumentary and cellular membranes, five or six days subsequently to the original attack, which process afforded great relief. In the interim they became emaciated, and lost their milk. In a day or two after, extensive sloughing supervened of the integuments of the coronets and heels, and between the hoofs, leaving the pedal and coronary bones bare, with deep sinuses. The putrid parts, while sloughing, emitted an unbearable stench. Granulations of new flesh soon formed, which became prominent and luxuriant, forcing the hoofs wide apart. At this period of the complaint the urgent and painful symptoms considerably lessened; the animals could then hobble out of the yard into a grass-field close by, where they were prior to the attack. The milk, flesh, and strength began to return, and the lameness slowly diminished, as the thickening of the integuments and cellular membrane became absorbed. New hoofs formed, which in some grew irregularly, and caused great tenderness for some length of time."

Cracks in the Heels of Cattle.

Cracked heels are generally more prevalent in the horse than cow; yet as I have had an opportunity of seeing and prescribing for a few cases of this character, I shall give the reader the benefit of my experience, so that, when cases of this character do occur, the farmer may know what to do. Some persons suppose that uncleanliness is the sole cause of cracks. This is not the case; the subjects are predisposed to a humory condition and congestion of the feet.

Treatment.—The part must first be sponged, or, rather, washed, with tepid water, slightly alkalized with a small quantity of carbonate of soda. I prefer soda instead of soap. The latter is apt to irritate the parts; and there exists no dirt nor morbid matter which can not be removed by an alkaline wash. After cleansing the parts, apply a portion of the following:

Pyroligneous acid.................... 2 oz.
Kerosene.......................... 1 oz.
Olive oil.......................... 3 oz.
Mix.

Apply by means of a piece of sponge. The parts should be dressed once per day, and oftener if necessary. The edges of the crack sometimes become inverted. In this case procure a small piece of linen, form it into a pad, and, after smearing its surface with a portion of the above preparation, apply it so as to press the lips of the gap together, and then bind it on.

If the disease be constitutional, which may be inferred from the fact that the animal is said to be "subject to it" in the winter, then a few doses of alterative medicine may be given. The following forms a very excellent stimulating alterative:

Iodide of potassium................. $\frac{1}{2}$ oz.
Water............................. 1 quart.
Tincture of sassafras............... 4 oz.
Mix.

Give a wine-glassful every morning, before feeding-time.

SECTION XV.

VARIOUS OPERATIONS AND DISEASES.

Castration—Enzoötic Milk Sickness, or Trembles—Improved Method of Milking—Diseased Thymus Gland—Cords in Young Calves—Steamed and Cooked Food for Stock—Cheap Fodder for Cows—Black Tongue—Fractured Bones—Fractured Radius of a Calf—Light in Barns—Diarrhea in Calves—Sprains or Strains—Spaying Cows.

Castration.

I LABOR under an impression that the husbandmen of this country commit some awful mistakes in the theory and practice of castration. The usual practice is to castrate the calf from one to three months after birth. This is evidently done to the manifest injury of form, size, and muscular development. The operation may tend toward fattening the animal, and improving the epicurean quality of its meat; and it may render the animal docile, and thus increase his usefulness; but his strength, stamina, and endurance are compromised by early castration. If animals are needed as working oxen, they should not be castrated until they have attained the age of three or four years. At these periods the muscles of the neck and chest have undergone remarkable developments, and the animals have strength and endurance to make really valuable oxen for work; whereas, if castrated at too early a period, the muscles of the forward parts are always defective, lank, and lean. I am aware that there are difficulties in the way of keeping bulls up to the age here indicated; yet the experiment has been tried, in this country and elsewhere, to the entire satisfaction of the parties that made the experiments; therefore, I recommend farmers not to castrate calves intended for work-oxen until their muscular system is well developed; and even in view of obtaining good beef, and developing the propensity to fatten, I should let the calves remain uncastrated for six months or more. It has been urged, by some writers, that the danger of castration is less in young than adult animals. This may be correct, yet I apprehend but little danger in castrating either a horse or bull at any age, provided the creature is in the enjoyment of health, and the operation be properly performed.

In many parts of France the bull-calf is castrated by means of a curious species of torsion, termed bistournage. The animal is thrown and secured. The operator places himself behind the animal, and opposite to the tail; he seizes the testicles with both his hands, and pushes them violently upward and downward several times, in order to destroy their adhesion to their coverings. He continues this manipulation until he thinks that he has produced sufficient lengthening of the cords, and dilatation of the bag itself. He then pushes up the left testicle as nearly as possible to the ring, leaving the right one low in the bag; he seizes the cord of the right testicle between the finger and thumb of the left hand, about an inch above the testicle, and, grasping the bottom of the scrotum with his right hand, he turns the testicle, and pushes it forcibly upward, until he has reversed it, and its inferior extremity is uppermost. Some little practice is required in order readily to effect this. Then, the right hand holding the testicle while the left hand raises the cord, the testicle is turned round from right to left four or five or six times, until there is a degree of tension and difficulty in the turning, which indicates that the spermatic vessels are so far compressed or obliterated as to be deprived of the power of secreting or conveying the seminal fluid. The testicle is by this means brought up nearly to the abdominal ring, where it is retained by turning the scrotum over it, while the left testicle is brought down, reversed, and turned in the same manner. Last of all, in order to prevent the untwisting of the cords and the descent of the testicles, the operator grasps the bottom of the scrotum in his left hand, and, holding one end of a piece of cord, eighteen inches in length, and about as large as a quill, between his teeth, and having the other end in his right hand, he makes with it several turns round the scrotum with considerable firmness below and close to the testicles, yet not so tightly as quite to stop the circulation of blood through the bag. This is taken away at the end of the second day, after which the testicles will remain fixed against the abdomen, and will gradually wither away. The animal is usually bled after the operation, and half of its allowance of food taken away.

I lately castrated two horses, at the respective ages of twelve and seventeen years, and they have both done well; yet, if they had been "prepared," as the books recommend, I might have lost both animals; and I verily believe that the once popular method of physicking (prostrating) animals before castration has been the cause of many unnecessary deaths.

In castrating bullocks, I apply a ligature around the whole cord, for it is not always safe to merely ligature the spermatic artery, as the reader will perceive by reading the following paragraph:

HERRING has observed that, after tying the spermatic artery, without difficulty, in two places, and cutting between them, the spermatic cord being then cut across two inches below, arterial hemorrhage sometimes ensued. It is easy to account for blood flowing through the spermatic veins, after this operation, by a retrograde circulation in the wide vessels; but, as regards the arterial hemorrhage, HERRING was in doubt, until, after several injections of the spermatic cord, he found that the spermatic artery often divides into two nearly equal branches; if but one be tied, on removing the testicles, the other division bleeds. HERRING afterward injected several testicles and spermatic cords of bulls, and found an extraordinarily rich net-work of veins, which differs in many points from the pampiniform plexus of the spermatic cord in man, horse, dog, etc. In the spermatic cord of the horse, we observe the artery making a large number of curves on itself until it reaches the testicle; and from the latter organ arise numerous veins, which coil upward, but now join in several branches which pass up with the artery, anastomosing at intervals, and forming a net-work, the meshes of which are in the shape of parallelograms. In the bull, on the contrary, the veins are exceedingly numerous, and spin round the artery like the tendrils of a climbing plant round a wire; and this is seen high up in the abdomen, so that, in successful injections, the spermatic artery is completely hidden.

Some persons may object to the plan of applying a ligature around the whole cord, and YOUATT speaks of it as a cruel operation. I can not conceive how there can be any more cruelty in it than when the "clams" are used. The pressure on the cord is the same; and all the difference is, I use saddler's silk instead of wooden clams. I have castrated a great number of animals, at all ages, by means of a ligature around the cord, and have never met with loss or accident.

Method of Castration.—There is very little danger in castrating a young calf, and it is very rare that a surgeon is ever called upon to perform the operation; yet I would advise persons who are in the habit of castrating these young animals to make free openings into the scrotum and inner covering of the testicles. This inner covering is called tunica vaginalis. If too small an opening be made, the swollen cord will be imprisoned by the divided edges of the tunica vaginalis, which will untimately end in hardening or scirrhosity of the end of the cord, or else there will be scrotal abscess. A large opening into the scrotum and tunic is necessary, in order to postpone union of the external parts, until the tissues above and within have healed.

When castrating bullocks, I either secure them in the trevis and partly etherize them, or else cast them with the hobbles (see cut of instruments), and render them completely insensible by ether. I then grasp the scrotum, between the belly and testicle, and make an incision on one side and at the lower part of the scrotum sufficiently large to allow the testicle to escape. The testicle then hangs by the cord. A ligature is then passed around the latter, which must be tied tight enough to compress the blood-vessels and prevent after-bleeding. The cord is then divided, and one end of the string may be cut very close to the knot, so that a slight pull will untie it. The other testicle is to be proceeded with in the same manner, and the operation is complete. It is proper, however, to return the cord within the inner tunic, or covering of the testicle, and one end of the ligature is left long enough to hang out of the wound. In the course of a week, if the ligatures do not come away, a slight pull will detach them.

I never make use of any dressing, except when a bad odor arises from the parts. The best remedy, under such circumstances, is diluted pyroligneous acid, in the following proportions:

Pyroligneous acid....................	3 oz.
Water..........................	15 oz.
Mix.	

Let the parts be well cleansed, night and morning, with a portion of the above. Should any undue amount of swelling ensue, the parts are to be rubbed occasionally with an ounce or two of sweet spirits of niter.

I find that exercise operates favorably in preventing scrotal swelling, which is a condition of the parts known to surgeons as local effusion (dropsy); and, as exercise at pasture always tends to reduce these kinds of swellings, I generally, if the weather permits, place the castrated animal under the care of "Doctor Green," (a good pasture,) where the patient can vitalize its blood with pure air, promote the integrity of the whole system by voluntary exercise of the muscles, and partake of herbage calculated to benefit the whole animal economy.

Enzootic Milk Sickness, or Trembles.

The cause or origin of enzoötic milk sickness (commonly denominated "trembles") is a subject of much speculation. Various are the opinions and conclusions of medical and non-medical men. It has been asserted that a creeping vine, known to luxuriate in forest regions, occasions the disease. The theory is that this vine, or vegetable parasite, is matured in the latter months of summer, or the first autumnal, at which season of the year the grass becomes dry and tough, when the cattle resort to the timbered land for sustenance, feeding upon the (supposed) vine; and as the animal is (without satisfactory evidence) susceptible to its (imaginary) influence, it often sickens and dies; yet, strange to relate, many animals located in the same regions escape the pest. And, in order to sustain this faulty theory, we are informed that the lucky creatures who live and die at a respectable bovine age know enough to give the poisonous plant the go-by. This is nothing more than mere speculation, for the disease very frequently occurs when the ground is covered with snow.

Dr. Graff informs us that the general appearance of the infected districts is somewhat peculiar. "The quality of the soil is, in general, of an inferior description. The growth of timber is not observed to be so luxuriant as in situations otherwise similar, but is scrubby, and stunted in its perfect development, in many instances, simulating what, in the West, is denominated 'barrens.'"

Now, it is possible that these barrens do not furnish a sufficient amount of carbon, in the form of food, for the metamorphoses of the tissues; and if we take into consideration that the animal receives, during the day, while in search of this food, a large supply of oxygen, and at the same time the waste of the body is increased by the extra labor required to select sufficient nutriment—it being scanty in such situations—then it follows that this disproportion between the quantity of carbon in the food and that of oxygen absorbed by the skin and lungs must induce a diseased or abnormal condition. The animal is sometimes fat, at others lean. Some of the cows attacked with this disease were fat, and in apparent health, and nothing peculiar was observed until immediately preceding the outbreak of the fatal symptoms. The presence of fat is generally proof positive of an abnormal state; and, in such cases, the liver or spleen is often diseased. The blood then becomes loaded with fat and oil, and is finally deposited in the cellular tissues. The reader will now understand how an animal accumulates fat, notwithstanding it be furnished with insufficient diet. All that I wish to contend for is, that in such cases vital resistance is compromised. We are told that, in the situation alluded to, vegetation was stunted, etc.; and knowing that vegetables are composed of nearly the same materials which constitute animal organization—the carbon or fat of the former being deposited in the seeds and fruits, and that of the latter in the cellular structure—then we can arrive at but one conclusion; namely, that any location unfavorable to vegetation is likewise ill-adapted to preserve the integrity of animal life.

In connection with this, it must be remembered that, during the night, the soil emits excrementitious vapors, which are taken into the animal system by the process of respiration. In the act of rumination, vapor is also inclosed in the globules of saliva, and thus reaches the stomach. Many plants which, during the day, may be eaten with impunity by cattle, actually become poisonous during the night! This, I am aware, will meet with some opposition, to combat which I quote from LIEBIG:

"How powerful, indeed, must the resistance appear which the vital force supplies to leaves charged with oil of turpentine or tannic acid, when we consider the affinity of oxygen for these compounds! This intensity of action, or of resistance, the plant obtains by means of the sun's light, the effect of which, in chemical actions, may be, and is, compared to that of a very high temperature (moderate red heat). During the night an opposite process goes on in the plant. We see, then, that the constituents of the leaves and green parts combine with the oxygen of the air—a property which in daylight they did not possess. From these facts we can draw no other conclusion but this: that the intensity of the vital force diminishes with the abstraction of light; that with the approach of night a state of equilibrium is established, and that in complete darkness all those constituents of plants which, during the day, possessed the power of separating oxygen from chemical combinations, and of resisting its action, lose their power completely.

A precisely similar phenomenon is observed in animals. The living animal body exhibits its peculiar manifestations of vitality only at certain temperatures. When exposed to a certain degree of cold, these vital phenomena entirely cease. The abstraction of heat must, therefore, be viewed as quite equivalent to a diminution of the vital energy. The resistance opposed by the vital force to external causes of disturbance must diminish, in certain temperatures, in the same ratio in which the tendency of the elements of the body to combine with the oxygen of the air increases.

It is obvious that the cause of the generation of force—namely, the change of matter—is diminished, because, with the abstraction of heat, as in the plant by abstraction of light, the intensity of the vital force diminishes. It is also obvious that the momentum of force in a living part depends on its proper temperature, exactly as the effect of a falling body stands in a fixed relation to certain other conditions; for example, to the velocity attained in falling. When the temperature sinks, the vital energy diminishes; when it again rises, the momentum of force in the living parts appears once more in all its original intensity. The production of force for mechanical purposes, and the temperature of the body, must, consequently, bear a fixed relation to the amount of oxygen which can be absorbed in a given time by the animal body.

The quantities of oxygen which a whale and a carrier's horse can inspire in a given time are very unequal. The temperature as well as the quantity of oxygen is much greater in the horse. The force exerted by a whale, when struck with the harpoon, his body being supported by the surrounding medium, and the force exerted by a carrier's horse, which carries its own weight and a heavy burden for eight or ten hours, must both bear the same ratio to the oxygen consumed. If we take into consideration the time during which the force is manifested, it is obvious that the amount of force developed by the horse is far greater than in the case of the whale.

In climbing high mountains, where, in consequence of the respiration of a highly rarefied atmosphere, much less oxygen is conveyed to the blood, in equal times, than in valleys or at the level of the sea, the change of matter diminishes in the same ratio, and with it the amount of force available for mechanical purposes. For the most part, drowsiness and want of force for mechanical exertions come on; after twenty or thirty steps, fatigue compels us to a fresh accumulation of force by means of rest (absorption of oxygen without waste of force in voluntary motions.)"

In the situations alluded to we generally find poisonous and noxious plants, with an abundance of decayed vegetable matter. An English writer has said: "The farmers of England might advantageously employ a million, at least, of additional laborers in clearing their wild domains of noxious plants,* which would amply repay them in the superior quality of their produce. They would then feel the truth of that axiom in philosophy, 'that he who can contrive to make two blades of grass, or wholesome grain, grow where one poisonous plant grew before, is a greater benefactor to the human race than all the conquerors or heroes who have ever lived.'"

The noxious plants found in such abundance in the Western States are among the principal causes, either directly or indirectly, of the great mortality among men, horses, cattle, and sheep. The hay would be just as destructive as when in its green state, were it not that, in the process of drying, the volatile and poisonous properties of the buttercup, dandelion, poppy, and hundreds of similar destructive plants found in the hay, evaporate. It is evident that

* The American farmers are just beginning to wake up on this subject, and before long I hope to see our pasture lands free from all poisonous plants. Dr. Whitlaw says: "A friend of mine had two fields cleared of buttercups, dandelion, ox-eye, daisy, sorrel, hawk-weed, thistles, mullein, and a variety of other poisonous or noxious plants. They were dried, burnt, and their ashes strewed over the fields. He had them sown as usual, and found that the crops of hay and pasturage were more than double what they had been before. I was furnished with butter for two summers, during the months of July and August. The butter kept for thirty days, and proved, at the end of that time, better than that fresh churned and brought to the Brighton or Margate markets. It would bear salting at that season of the year."

if animals have partaken of such plants, although death in all cases do not immediately follow, there must be a deficiency of vital resistance, or loss of equilibrium, and the animal is in a negative state. It is, consequently, obvious that when in such a state it is more liable to receive impressions from external agents; in short, is more subject to disease, and this disease may assume a definite form, regulated by location. It has been observed, also, that in the infected districts the water is not of the best kind, neither is it very abundant; hence, in consequence of its insufficiency or unwholesome character, the equilibrium of health may become disturbed.

A loss of vital resistance may also be the result of exposure. It has been observed that cattle which have been housed regularly have escaped the attacks of this malady, and that, when suffered to run at large, they were frequently seized with it. Therefore we may conclude that the indirect causes of milk sickness, or trembles, are any thing that disturbs the general health.

Now, let us suppose that one or a combination of the preceding causes has operated so as to produce an abnormal state in the system of a cow. She is then suffered to remain in the unhealthy district during the night. While there, exposed to the emanations from the soil, she requires the whole force of her vital energies to ward off chemical decompositions, and prevent encroachment on the various functions. A contest commences between the vital force and chemical action, and, after a hard conflict, in their incessant endeavors to overcome each other, the chemical agency obtains the ascendency, and disease of a putrid type (milk fever) is the result. The disease may not immediately be recognized, for the process of decomposition may be insidious; yet the milk and flesh of such an animal may communicate the disease to man and other animals. It is well known that almost any part of animal bodies in a state of putrefaction, such as milk, cheese, muscle, pus, etc., communicate their own state of decomposition to other bodies. Many eminent medical men have lost their lives while dissecting, simply by putrefactive matter coming in contact with a slight wound or puncture. Dr. Graff made numerous experiments on dogs, with the flesh, etc., of animals which died of milk sickness. He says: "My trials with the poisoned flesh were, for the most part, made on dogs, which I confined; and I often watched the effect of the poison when administered at regular intervals. In the space of forty-eight hours from the commencement of the administration of either the butter, cheese, or flesh, I have observed unequivocal appearances of their peculiar action, while the appetite remains unimpaired until the expiration of the fourth or fifth day." From the foregoing remarks, the reader will agree with me that the disease is of a putrid type, and has a definite character. What is the reason of this definite character? All diseases are under the control of the immutable laws of Nature. They preserve their identity in the same manner that races of men preserve theirs. Milk sickness of the malignant type luxuriates in the locations referred to, for the same reasons that yellow fever is peculiar to warm climates and consumptions to cold ones, and that different localities have distinct diseases; for example, ship fever, jail fever, etc.

Before disease can attack and develop itself in the bodies of men or animals, the existing equilibrium of the vital powers must be disturbed; and the most common causes of this disturbance I have already alluded to. In reference to the milk, butter, cheese, etc., of infected animals, and their adaptation to develop disease in man, and in other locations than those referred to, I observe that when a quantity, however small, of contagious matter is introduced into the stomach, if its antiseptic properties are the least deranged, the original disease (milk sickness) is produced, just as a small quantity of yeast will ferment a whole loaf. The transformation takes place through the medium of the blood, and produces a body identical with, or similar to, the exciting or contagious matter. The quantity of the latter must constantly augment; for the state of change or decomposition which affects one particle of the blood is imparted to others. The time necessary to accomplish it, however, depends on the amount of vital resistance, and, of course, varies in different animals. In process of time the whole body becomes affected, and, in like manner, it is communicated to other individuals; and this may take place by simply respiring the carbonic acid gas or morbific materials from the lungs of diseased animals in the infected districts.

My principal object is to show what are the causes of this malady, so that the farmer can prevent its occurrence, for the treatment is very unsatisfactory. A writer in the "Atlanta Medical Journal" informs us:

"Where stock cattle, for instance, are kept pent up until after the morning's dew, they are never affected, though they are pastured where it is known to abound. Again: if food, in the form of bundles of hay, or fodder, or sheaves of oats, has been cast on the surface of the earth where it was suspected to exist, fed to calves or a calf, during the morning, while wet with dew, the result is the death of the animal. Facts like these are, to my mind, evidence conclusive of its origin in the form of vapor. But let it originate from whence it may, it is only known in timbered land, and there disappears, after being once cleared, cultivated, and seeded with tame grass, which shows, again, if of a telluric source, that the toxical agent lies near the surface, and is destroyed by being shifted from its lurking-place."

Symptoms.—The principal symptoms are irregular, nervous action; trembling, tremors, spasms, and, lastly, convulsions. The other symptoms are such as are noticed in affections of a low typhoid type. The pulse is quickened, yet small; the tongue slightly swollen, and coated with a brown fur; the urine is high-colored, and the bowels are constipated; the membranes of the eyes are reddened, and the breath has a bad odor.

Treatment.—If the bowels are constipated, I should give an aperient, composed ot

Glauber salts........................	10 oz.
Powdered ginger....................	1 dr.
Golden seal.........................	1 dr.
Tepid water.........................	1 quart.

Then let the whole length of the spine be well rubbed with two two or three ounces of oil of cedar. Should the breath or excrements have a very bad odor, the following must be given:

Pyroligneous acid....................	2 oz.
Glycerine............................	4 oz.
Water	1 quart.
Mix.	

Dose, a wine-glassful three or four times daily, until an improvement takes place.

To relieve the nervous irritation and trembling, I give two drachms of tincture of Indian hemp, in a little water, twice daily. The patient is to be kept on oatmeal gruel, the quantity to be regulated according to actual necessity. A curable case will be very likely to improve under the above treatment; if it fail, the owner will have the satisfaction of knowing that the patient was not destroyed by meddlesome medication.

Improved Method of Milking.

The first process in the operation of milking is to make the cow's acquaintance, and give her to understand that the milker approaches her with none other than friendly intentions; for if he swears, scolds, or kicks her, she is likely to prove refractory, and may, possibly, give the uncouth and unfeeling milker the benefit of her heels, which, in my opinion, he is justly entitled to.

Before commencing to milk the animal she should be fed, or have some kind of fodder. In the enjoyment of the mastication of the same, her attention is withdrawn from the milker's operations, and the milk is not "held up," as the saying is, but is yielded freely. The milker should not sit off at a distance, like a coward, but his left arm should be in close contact with the leg of the cow, so that she can not kick. If she make the attempt when the milker is in close proximity with the cow's body, the former merely gets a push instead of a blow. Before commencing to milk, the teats are to be washed with cold water in warm weather, and warm water in winter. The object is to remove accumulated dirt, which otherwise would fall into the milk-pail, to the disgust of persons who love pure milk and hate uncleanliness. Here is a chance for improvement.

The best milker is a merciful man. The udder and teats are highly organized and very sensitive, and these facts should be taken into consideration, especially when milking a young animal, for the parts are sometimes excessively tender, and the hard tugging and squeezing which many poor sensitive creatures have to endure at the hands of some thoughtless, hard-fisted man, are really distressing to witness. A better milker than even a merciful man is a woman. The principal part of the milking in private establishments in foreign countries, is done by women; and in these United States there are thousands of capable women out of employment that might be advantageously employed, in private and dairy establishments, as milkmaids. Therefore, in view of improvement in the art of milking, I advise farmers to learn their wives, daughters, and female domestics how to strip the cows. An indolent person (slow coach) should never be suffered to touch a cow's teats. The process, to say the least of it, is painful; therefore, the best milker is the one that can abstract the milk in the quickest time. Finally, milk the cow dry. The last of the milk is the most valuable, yet Mr. Hurry-up can not spare time to attend to this matter; consequently he loses the best of the strippings, and actually ruins the cow as a milker.

Diseased Thymus Gland.

The thymus gland, commonly known as the sweetbread, is usually found, after adult life, in the region of the thoracic duct, just within the anterior or front part of the chest; yet the greatest activity and development of this gland is during fœtal life. This is one of the glands which, according to Goodsir, is an involuted portion of the germinal membrane, acting as the first assimilating organ possessed by the fœtus; hence, as soon as the animal is born, and the legitimate organs of digestion are called into operation, the thymus dwindles away, and, in some cases, almost disappears. Occasionally, however, it becomes enlarged, and has to be removed by a surgical operation. The following instructive case occurred in the practice of W. Lyon, V. S., and appeared in the "London Veterinarian:"

"I beg to forward for your inspection a tumor, being the largest of two which were removed on the 15th instant from under the cervial vertebræ of a yearling quey, and which, although now considerably shrunk and dry, weighs forty-nine ounces, and measures twenty-three inches in its greatest circumference. It rested upon the œsophagus, trachea, blood-vessels, and sternal muscles, excepting when the animal's head was depressed; so much so, that had the same degree of pressure been made on the gullet, by a tumor existing elsewhere, as within the chest, permanent hove, etc., would have been produced.

The operation consisted in an incision through the integuments of the off-side of the neck, over and parallel to the course of the vessels, which exposed part of the levator humeri; the next incision being made right through that muscle, in the direction of its fibers, which brought to view part of the great tumor, exposing also the sub-scapulo-hyoid muscle, which was considerably but favorably displaced by the pressure of the lesser tumor, which inclined to the off-side. The remaining incisions were made, with care, through numerous ligamentous-like bands and cellular membrane, by which the tumor was attached to the inter-vertebral and other muscles. The lesser tumor, which was more superficial, was then removed in the same manner, after having been very useful in keeping the said sub-scalpulo-hyoid muscle out of the way. Both tumors seemed to be indifferently supplied with blood. Excepting the cutaneous veins, which yielded less than an ounce of blood, there were no blood-vessels divided; hence no artery nor vein required to be taken up. A few interrupted stitches were put in, and as the quey had necessarily to stand during the operation, there being only one man and a boy present at its commencement, orders were given to let go the under-jaw, when the animal immediately sprang over a four-foot wall. I have not seen her since, but have learned that she is doing well.

I need make no remark on the origin, progress, structure, locality, and treatment of such tumors, such being already well-known to veterinary practitioners. Farmers, however, would do well (now that the disease is very common) to feed off cattle so affected or predisposed, when it is possible to do so, and not to breed from such stock, as it is generally difficult and sometimes impossible to remove the tumors when once formed. It would also be for their interest to pay less attention to the direct treatment, by intrusting that in the hands of a practitioner, and to attend more to the negative treatment, such as blood-letting, avoiding refrigerants, such as nitrate of potash, and all other medicines that tend to diminish the fibrine of the blood, particularly all mercurial preparations, and, in general, to avoid every thing formerly used in the treatment of scrofula in the human subject. But this they will not always attend to when any thing is wrong with any of their cattle. They must not merely get direct treatment, but, without due discrimination, they must share and share alike."

Cords in Young Calves.

A disease to which the above name is given occasionally appears among young calves. It is an inflammatory affection, and particularly manifests itself in contractions of the sinews (tendinous structures); hence the name, "cords." White contends that calves are most liable to be affected by this disorder during the first days or weeks after they are dropped. If they outlive five or six weeks, they are seldom in any danger. Calves that suck their mothers are not so liable to the disease as those which are reared by hand. The greatest number of calves that fall a sacrifice to this disease, if not the whole of them, are those which are closely confined to the house from their birth, without ever being exposed to the free, open air. It is a well-known fact that calves which are dropped and remain in the fields are in little or no danger. Mr. LAWRENCE, in his "Treatise on Cattle," observes, that "a complaint called the cords has recently destroyed a number of young calves in Scotland, both such as have been calved abroad and under shelter. Those which are brought up by hand are most liable, and the most dangerous period is the first week or two after birth."

Treatment.—As a preventive I should give the new-born calf (provided we have no discharge from the bowels) a wine-glassful of castor-oil; yet if the mother yield milk, and the calf immediately after birth imbibes the same, there is no need of giving any medicine. The object in giving castor-oil is to purge off the meconium—first excrement. The first flow of milk, however, will meet the emergency, and it is only in cases of suspended lacteal secretion, or in cases of acute garget, when the cow can not yield milk, that I recommend the castor-oil. Should the oil purge the calf too actively, twenty drops of the oil of anise-seed or peppermint, may be given in half a pint of flour gruel. Should the animal be dangerously attacked, and the contractions of the tendinous structures violent, let the little creature be placed in a warm bath for a few minutes; then give him a good rubbing with coarse towels, after which he will probably do well.

Steamed and Cooked Food for Stock.

In view of fattening neat stock, and augmenting the quantity of milk in dairy cows, I recommend the use of steamed and cooked food. It has been satisfactorily proved that fat cattle of the best quality, may be produced by feeding them on boiled food.

Dr. WHITLAW says: "On one occasion, a number of cows were selected from a large stock, for the express purpose of making the trial; they were such as appeared to be of the best kind, and those that gave the richest milk. In order to ascertain what particular food would produce the best milk, different species of grass and clover were tried separately, and the quality and flavor of the butter were found to vary very much. But what was of the most importance, many of the grasses were found to be coated with silicia, or decomposed sand, too hard and insoluble for the stomachs of cattle. In consequence of this the grass was cut and well steamed, and was found to be readily digested; and the butter that was made from the milk much firmer, better flavored, and would keep longer without salt than any other kind. Another circumstance that attended the experiment was that, in all the various grasses and grains that were intended by our Creator as food for man or beast, the various oils that enter into their composition were so powerfully assimilated or combined with the other properties of the farinaceous plants, that the oil partook of the character of essential oil, and was not so easily evaporated as that of poisonous vegetables; and experience has proved that the same quantity of grass, steamed and given to the cattle, will produce more butter than when given in its dry state. This fact being established from numerous experiments, then, there must be a great saving and superiority in this mode of feeding. The meat of such cattle is more wholesome, tender, and better flavored than when fed on the ordinary food.

"A mixed diet (boiled) is supposed to be the most economical for fattening cattle. 'A Scotchman, who fattens one hundred and fifty head of Galloway cattle annually, finds it most profitable to feed with bruised flaxseed, boiled with meal or barley, oats or Indian corn, at the rate of one part flaxseed to three parts meal, by weight—the cooked compound to be afterward mixed with cut straw or hay. From four to twelve pounds of the compound are given to each beast per day.' The editor of the 'Albany Cultivator' adds: 'Would it not be well for some of our farmers who stall-feed cattle to try this or a similar mode? We are by no means certain that the ordinary food (meaning, probably, bad hay and corn-stalks) would pay the expense of cooking; but flaxseed is known to be highly nutritious, and the cooking would not only facilitate its digestion, but it would serve, by mixing, to render the other food palatable, and, by promoting the appetite and health of the animal, would be likely to hasten its thrift.'"

An article on steamed food for stock lately appeared in the columns of the "Mark Lane Express." It does not sustain my theory exactly, yet the closing paragraph proves all I contend for at the commencement of this article. It is my opinion that, in order to test the real value of steamed over raw food, the experiments must be conducted with great care, and be continued for some time, during which it must not be expected that the animal will thrive in health and flesh, unless it have an occasional meal of its more natural food in its raw state. What I mean by the "real value" of steamed food, is its usefulness in the animal economy, as a co-agent with the unsteamed articles of fodder; and, considerable discretion will be needed in making selections among articles of food, some of which might be improved, or, rather, rendered more acceptable to the palate and convenient for mastication, while others might be deteriorated by the same process. I select the following from the above source:

"As to steaming food for cattle, there is considerable difference of opinion among theoretical writers. Among practical men there is little difference of opinion, especially where experiments have been individually undertaken. The late Mr. Howden, of Lawhead, East Lothian, undertook a series of experiments on feeding cattle with steamed food. Lots of cattle of similar age and breeding were selected and divided. Those cattle fed on turnips and potatoes, given raw, made rather greater progress than those fed on the prepared food, equal quantities being given. The difference was slight; still it was perceptible, the rate of progress being tested by girthing the animals, and the condition generally, by handling. The experiments were carried on for more than one season, with nearly the same result. A lot of young cattle, a year and a half old, fed on boiled beans, made very rapid progress, and left a profit beyond payment for their food consumed. They were cheap when purchased, and the value of beef was at the time relatively high with that of lean cattle. Of course, the straw was not prepared, either by steaming or cutting into chaff. Other experiments with steamed food have been, from time to time, undertaken in that county, and with nearly the same result. In every case that came under our observation, the preparing of food by steaming and boiling was, after a time, given up. In feeding dairy stock when in milk, steaming and boiling food is known to be profitable; but the health of the animal sometimes suffers, compared with that of cows kept partly on raw and partly on prepared food."

Cheap Fodder for Cows.

Straw contains much farinaceous aliment. The attention of agriculturists in France has recently been directed to the discovery of a method of converting straw into a kind of bran. The discovery has been claimed by two individuals. The first is a miller, near Dijon, who, it is said, on trying the mill-stone of a new mill, discovered the possibility of converting straw into a nourishing food; the second, M. Joseph Maitre, of Villotte, near Chatillon. This distinguished agriculturist, known for the purity and perfection of his breeds of sheep, conceived the idea of converting into farina not only the straw of wheat and other grains, but of hay, trefoil, lucern, sanfoin, etc. His efforts have been perfectly successful, and his discovery arrived at, not by chance, but by long experiment and research. The aliment which he has produced is said to be a complete substitute for bran. It is given to sheep and lambs, who consume it with avidity, and may be given to all other graminivorous animals as a grateful and substantial food. We know, in this country, that the mere chopping of straw adds greatly to its powers, by facilitating mastication and digestion. We may believe that a more perfect comminution of its parts will produce a corresponding effect, and extend very widely the uses of straw and other fodder as a means of feeding our domestic animals. This sort of aliment is very excellent, when combined with a sufficient amount of nutrimental matter, for animals whose systems lack the requisite amount of phosphates and phosphoric acids. A milch cow, for example, whose lacteal vessels yield, in the form of milk, the above equivalents, may be benefited by an occasional feed of straw meal.

Black Leg, or Anthrax.

Various are the names given to an affection of the above kind. Some persons call it inflammatory fever, gangrene, etc. Then again it gets its name from the region in which it first appeared. So, if it first appears in the region of the thigh, it is called quarter ill, quarter evil, black quarter, joint murrain, etc.; hence it appears to have as many names as there are locations for it.

The Nature of Black Leg.—Youatt, and other orthodox veterinary writers contend that this affection is a pure inflammatory fever, yet, at the same time, they admit that cattle of all descriptions, ages, and conditions are subject to it. Now, I think it will be very difficult to prove that inflammatory fever can attain a very high grade in the system of an animal in poor condition. The very reverse is the case; for disease of a low typhoid type, and those which are known to run a rapid course, are apt to pounce upon animals having but little vital resistance—being out of condition, as the saying is.

In my opinion, this is an epizoötic affection, and, like most epizoötics, its pathology must necessarily be obscure. In applying the terms black leg, black quarter, etc., to this affection (epizoötic or enzoötic) leads us into error in supposing that it is merely a local affection, limited to a certain part, when, in fact, it is a general affection, showing itself in various parts of the economy at the same time. For example, in the early stage, when a limb or part is swollen and distended with gas, the various organs and functions of the body are more or less disturbed. Even in the early stage the respirations are short and quick; pulse, accelerated (a mere fluttering action, scarcely perceptible); the coat stares; rumination is suspended; the bowels are constipated, and the nervous system is affected; for the beast staggers, and soon becomes comatose; death frequently takes place in the course of from twelve to twenty-four hours. It will be perceived, therefore, that the local affection is not proportionate, in degree or extent, to the severity and magnitude of the general symptoms; therefore it is a general disease.

The autopsy clearly indicates the ravages which this epizoötic or enzoötic makes on the general economy. Youatt informs us that "the chief appearances after death will be venous congestion every-where. It affects both of the pleura, the whole substance of the lungs, brain, and peritoneum; the intestines and stomach are also affected. Therefore what we perceive externally, in the form of tumors, emphysema, ulcers, sloughing, and mortification are only the symptoms of a general malady. Mr. Ernes informs us, through the pages of the "Veterinarian," that "black quarter" (which is the same as 'black leg') is neither more nor less than that dreadful malady of horses and cattle called by the French charbon. Anthrax would, perhaps, be the better appellation, seeing its characters are a hard, circumscribed tumor, exceedingly painful, with tension and burning heat in the subcutaneous cellular tissue. This is often depressed in its center, and sometimes preceded by a small opening.

According to authorities, "the tumor of black leg, though small at first, suddenly increases in size, sometimes to that of a child's head. Gangrene soon supervenes, beginning in the center and extending to the circumference, which rapidly converts the whole into an eschar of a black color, similar to a piece of charcoal; hence its name—charbon. The eschar is sometimes several inches in diameter, and is almost always either preceded or accompanied by bladders, which form a sort of areola around it. There is also always an œdematous swelling, more or less considerable, owing to an emphysematous state, and an infiltration of serum or sero-gelatine into the cellular tissue, which crackles on pressure, caused by the presence of gases. The danger and rapidity of the disease are such that, when an animal is attacked, after a violent access of fever, it falls a sacrifice to it in a few hours, rarely exceeding twenty-four or thirty-six. All animals are subject to it, but the herbivorous more so than others. It is either epizoötic or enzoötic; the first is the most destructive."

I now consider the point settled regarding the nature of the disease; namely, it is an epizoötic or enzoötic affection, and, of course, is subject to the same laws which govern diseases of this type. This will explain the otherwise unaccountable variations which are observed in the symptoms of the affection when prevailing in different localities, and it also enables us to account for the great losses which Messrs. Shortfeed and Overfeed are continually encountering. The fact is, all overfed animals may be ranked as gluttons, and all half-starved animals furnish a savory morsel for the great epizoötic pathological glutton, which, like the epidemic one that, hovering around the city of New Orleans, a few years ago, destroyed several thousands of its inhabitants ere it touched a single sober citizen. When this disease ranges in a single locality, it is supposed to have a spontaneous origin. Then the term enzoötic is applied to it; and if it prevail among the cattle of an extensive region, then it is called epizoötic.

Causes.—The causes of this affection are as obscure as those of cholera, influenza, potato rot, etc. They seem to appear independent of local causes, occur at uncertain intervals, prevail for indefinite periods, and run their course in a short space of time. It is supposed by some persons that a disease of this character and nature is propagated by contagion or infection. How far it is engendered in these ways I am not prepared to decide. There must, however, have been a time when the disease did not exist, but must have arisen from a concurrence of natural causes; and if these were adequate to its production at an anterior period, they must be so at the present time. I shall, therefore, abandon all further speculation in this direction as unprofitable, for there is evidently no direct cause, but various are the predisposing, exciting, indirect, and morbid causes. The only way that I know of to prevent this malady is to keep the cattle in a physiological condition, by paying proper attention to breeding, feeding, rearing, and housing; for animals in a perfectly healthy state are certain to enjoy immunity from this and other diseases.

I have noticed, at various times, articles in agricultural papers on the prevention of black leg, which, in the name of common humanity I am compelled to notice. The one I have thought proper to select reads as follows:

"*Preventive.*—Take spring calves in the month of October; cut a small incision in the hollow above the foot. On the top of the flesh a small blue vein appears; take a crooked instrument, in the shape of an awl, and put the point under the vein, raise it up so that it can be cut, and take about an eighth of an inch out of the vein. Don't sew up the incision. It must be done on all the four feet. I have cut many hundreds, and have known of thousands being cut, and never knew of one dying with the above disease after being cut."

Now, I am not disposed to scold or find fault, nor question the intentions of men who recommend or practice such outrageous barbarities under the guise of doctoring sick animals, but I wish to remind the intelligent reader that cattle have nerves to feel, and are as keenly sensible to pain as we are; therefore all unnecessary operations, even should they have received the seal of antiquity, ought to be avoided. This is the age of progression. The lamp of veterinary science is illuminating the mystified halo which has hitherto surrounded our barn-yard practice; and before the barbarities of bygone days are practiced on our domestic animals, let us be satisfied that we are using rational means for the recovery of the sick, such as science and common sense confirms. Just as rational would it be, if it were at all rational, to take an infant and divide one of the posterior veins of both feet, in view of preventing disease common to adult life, which, after all, might never occur, the little creature not being predisposed thereto.

Let any one just study the anatomical structure of the foot of an ox, and he will learn that the vein which we are recommended to sever and amputate from is called the coronary, and is engaged in returning blood from the vast venous plexuses of the foot, which requires to come in contact with the lungs for purification and oxygenation. Any impediments, such as severing a vein, which interrupts the free circulation or return of blood to the heart and lungs, can not be beneficial, but otherwise. It will be seen that the vein is nothing more than an elastic hollow tube, a mere vehicle, through which the blood courses; therefore it can not be supposed to have any specific power over other parts of the organization in warding off disease.

I shall not trouble the reader with any further remarks on the subject of irrational and barbarous prevention; for I presume that the introduction of the foregoing paragraph will answer all the purposes intended. Among physicians the disease is known as hœmatosepsis; and our experience is that it usually occurs among young stock, and generally in well-bred animals in high condition, or in native stock in low condition; yet it may occur in the system of any bovine, as the result of sudden change in the quality of the food.

Treatment.—It is an unfortunate occurrence that this disease should ever have been classed as an inflammatory affection, for the error has led to a system of practice disastrous as the cattle plague. The following paragraph from YOUATT will serve to show the orthodox method of treating inflammatory fever, and will also explain the reason why a great proportion of the animals treated die:

"The very name of the disease (inflammatory fever) indicates the mode of treatment. In a case of excessive vascular action, the first and most important step is copious depletion. As much blood must be taken as the animal will bear to lose; and the stream must flow on until the animal staggers or threatens to fall. Here, more than in any other disease, there must be no foolish directions about quantities. As much blood must be taken away as can be got; for it is only by the bold and persevering use of depletory measures that a malady can be subdued that runs its course so rapidly. Purging must immediately follow. The Epsom salts are here, as in most inflammatory diseases, the best purgative. A pound and a half, dissolved in water or gruel, and poured down the throat as gently as possible, should be our first dose; and no aromatic should accompany it. If this does not operate in the course of six hours, another pound should be given; and after that, half-pound doses, every six hours, until the effect is produced."

It is a wonder to me how any creature can survive such barbarous treatment as this; yet, even at the present day, just such doctrines are taught in the schools and practiced on cattle, to the disgrace of science and shame on those men who perpetrate the wickedness. Blood-letting and purging can have no good effect on a disease like this, so prostrating, and which runs its course to mortification so rapidly. Such a wretched system of practice has always failed, and ever will fail.

That form of treatment which reason and experience suggests is the best. For example, it would naturally occur, to the mind free from the prejudice of veterinary orthodoxy, that a disease which runs into sloughing and mortification in a few short hours must require life-sustaining agents; hence I recommend a very different mode of treatment from that heretofore practiced. I commence the treatment thus:

Spirits of hartshorn................	4 dr.
Tar-water.........................	1 qt.
Tincture of bloodroot..............	1 oz.

Mix the hartshorn and tar-water first; then add the bloodroot. Drench (dose No. 1). The object in giving the hartshorn is to decarbonize the blood, and impart healthy stimulus to the nutrient system of blood-vessels and nerves; and this agent will do it.

Should the animal show any lameness in the back or hind quarters, apply the following:

Oil of cedar.........................	2 oz.
Sulphuric ether....................	2 oz.
Tincture of capsicum................	1 oz.
Cod-liver oil	6 oz.

First, mix the two oils; then add the ether, and shake them thoroughly; lastly, add the tincture. The object in applying this preparation is to arouse capillary action, and thus prevent the engorgements, which, according to the best authorities, are everywhere found.

Four hours after administering "dose No. 1," drench the patient with the following:

Liquid tar	1 oz.
Glycerine	4 oz.
Thin gruel	1 qt.

If the urgency of the case demands it, this dose may be repeated, at intervals of four hours, until symptoms of improvement are observed. The tar is a powerful antiseptic, and prevents decomposition, emphysema, and mortification.

All sores and ulcers must be dressed with pyroligneous acid, and kept constantly sprinkled with powdered bloodroot. All abscesses must be punctured with a thumb-lancet, their contents evacuated by pressure, and syringing them with soap-suds; and their cavities must be crammed with fine flour. Should any sores or ulcers be observed about the muzzle, mouth, or throat, tincture of matico is the remedy, or liquid tar. One ounce of the same may be introduced into the mouth of the patient; it will surely do good. If the patient be weak and debilitated, tonics are indicated; golden-seal, in two-drachm doses, may be incorporated in the food, in direct ratio to the urgency of the case.

Black Tongue.

This epizoötic has raged very extensively, at different times, in North and South Carolina, Georgia, and Florida. Several persons have died from drinking milk from cows thus diseased. It appears that domestic cattle are not alone the sufferers, but that in Florida, particularly, the deer perish from the same disease in large numbers; and, according to a letter in the Savannah "Republican," dogs, and the buzzards in Burke County, Georgia, that have eaten the flesh of cattle that have died of the black tongue, have perished from the effects of such poisonous diet. The cause of this malignant disease does not seem to have been yet ascertained, though by many it is attributed to the rust, which, in varirious parts of the Southern States, as elsewhere, has affected the grain crops, and, it is said, in some places, the grass also. The cattle are attacked by stiffness, and walk as though foundered, while froth is discharged in large quantities from the mouth; they can eat nothing, fall away rapidly, and the tongue and gums become dreadfully swollen, and turn black, and death speedily releases them from their agony.

Treatment.—The rapid progress which usually attends this dreadful epizoötic calls for prompt and energetic treatment. It is evidently a congestive disease, and very apt to run into the typhoid stage and end in sudden death. The moment an animal is suspected to be the subject of this malady, he should be drenched with

Table salt	12 oz.
Warm water	1 qt.
Tincture of capsicum	2 oz.

This medicine will act as a powerful antiseptic and stimulating tonic, thus preserving the animal tissues against putrescence; and at the same time it relieves the venous congestion. If, on applying the hand to any part of the body, a crackling sound is elicited, the animal is then said to be emphysematous, which signifies an accumulation of gas beneath the skin. The patient should then be immediately drenched with

Pyroligneous acid	2 oz.
Pure oil of sassafras	28 drops.
Linseed tea	1 qt.

Mix the oil with the latter, then add the acid. After having drenched the animal, apply a portion of the following to the tumefactions, or emphysematous region:

Soft soap	4 oz.
Oil of sassafras	$\frac{1}{2}$ oz.

Dissolve the sassafras in two ounces of alcohol.

Tincture of capsicum	2 oz.
Tincture of Peruvian bark	1 pt.

Mix, and rub the external surface with a portion of the same. The swollen tongue should be frequently covered with fine salt; and the moment there appears any improvement, tonic medicines should be given. One ounce of the fluid extract of camomile flowers may be given, twice daily. This remedy will give tone to the system and restore the appetite.

Fractured Bones.

Fracture of bones, occurring among neat stock, is generally considered as a justifiable cause for their destruction; but I object to this summary mode of disposing of unfortunate yet valuable animals; for the truth is many are killed that might be saved. The trouble of managing, and the expense of treating cases of fracture, often deter husbandmen from performing a duty incumbent on them in view of protecting their property; but the trouble and expense are mere trifles when the usefulness of a valuable animal is involved.

The remedy in case of a simple fracture of bones, under the improved system of practice, is neither tedious nor expensive. The bones unite very readily, if kept in contact, and the unity is secured by means of starched bandages. Where there is any laceration of the soft parts, and the bone is broken into several pieces, the better way is to put an end to the sufferings of the creature, for recovery is impossible. The following case will give some idea of the method of treating simple fractures. An animal under treatment for fracture, may be placed in the trevis, if necessary; but I prefer to let the patient have its liberty in a box stall. The limb opposite to the fractured one will have to sustain more weight than usual; therefore I try to prevent swelling and stiffness by occasional hand-rubbing, or by bathing it once or twice daily, with a portion of the following:

Oil of wormwood....................	1 oz.
Alcohol............................	2 oz.
New rum	2 qt.
Mix.	

The following case of fracture of the radius I extract from my note-book:

This was a case of simple fracture of the radius (bone above the knee) of a calf about six months old, the property of a gentleman residing in Brookline. The accident was occasioned in consequence of the animal getting his leg entangled in a fold of chain, the latter being used for the purpose of confining him, in the day time, to a grazing spot. The fracture was crosswise of the long diameter of the bone in the central region; namely, midway between its superior and inferior extremities. No laceration of the soft tissues, nor comminution of bone. The diagnostic symptom was crepitis (crackling noise).

Treatment.—The bones were brought in apposition, and secured by means of slips of pasteboard and starched bandages; and, in order to keep them from slipping downward, they were sewed to a broad belt, which passed over the inferior cervial region, in the form of a figure 8. The animal did not appear to like this contrivance, or else he liked to lick the starch, for he soon commenced to nibble the wick-yarn with which it was marled on, and so loosened the bandage that, in the course of a few hours, it slipped below the carpus. So soon as this occurred I was again summoned to visit the patient. I now procured some thick tar, and with it smeared the limb to the extent which was to be covered by bandage. The bandage was composed of common sheeting, three inches wide, three yards long, and this was also well tarred, and, after being neatly applied, was secured by means of the many-tailed, tarred bandage. This had the desired effect; for, however well the animal might have liked the taste of starch, he apparently had no relish for tar. The bandage remained undisturbed.

The accident happened on the 18th day of August, 1857; on the 4th day of October the osseous union was complete. The bandage had been removed some time prior to the latter date, yet the condensed tar was allowed to remain on the skin for some time. In a few months his limb was just as symmetrical as the other, and no one but a skillful surgeon would ever discover that the bone had been fractured.

Light in Barns.

Barns should be so constructed, by the insertion of windows in various parts of the building, that they shall be as "light as day." A "dark" barn is only a suitable black-hole for some vicious animal; it is the very worst location for any thing that breathes. Sir A. Nylie (who was long at the head of the medical staff in the Russian army) states that the cases of disease on the dark side of an extensive barrack, at St. Petersburg, have been uniformly, for many years, in the proportion of three to one to those on the side exposed to a strong and uniform light. Humboldt has also remarked that among bipeds the residents of South America, who wear very little clothing, thus allowing the cutaneous, as well as the orbital surfaces to receive a free ray of light, enjoyed immunity from various diseases which prevailed extensively among the inhabitants of dark rooms and underground locations; and so excellent an authority as Linnæus contends that the constant exposure to solar light is one of the causes which render a summer journey through high northern latitudes so peculiarly healthful and invigorating. Dr. EDWARDS has also remarked that persons who live in caves or cellars, or in very dark or narrow streets, are apt to produce deformed children; and that men who work in mines are liable to disease and deformity. Light, therefore, is a condition of vital activity; and, in view only of preserving the sight of animals, it is absolutely necessary that, while they are in the barn, their optics shall have free access to the sun's rays.

If a cow were in the same condition as a polype, with no organs of vision, who shuns light, a dark barn might prove to be its earthly paradise; but as the cow has special organs of vision, evidently susceptible to the influence of light, and the integrity of its organism, or a part of the same, depending entirely on the admission of light, it is absolutely necessary that barns should be constructed accordingly.

DIARRHEA IN CALVES.

Diarrhea is a very prevalent disease among calves. The sucking calf is liable to be the subject of this affection whenever the general health of the parent is impaired. In such cases the mother is to be treated instead of the calf. She, probably, is the subject of a deranged condition of the digestive organs, which can easily be remedied by the administration of a few doses of the following:

Pulverized charcoal..........	equal parts.
Carbonate of soda...........	
Pulverized ginger............	

Dose, two ounces daily, to be incorporated with the food; or it can be given as a drench, by adding a pint of scalded milk.

The disease occasionally occurs in consequence of weaning the calf (in view of husbanding the cow's milk), and feeding the juvenile on improper food. This kind of diarrhea must be treated as follows:

Phosphate of lime..................	1 oz.
Carbonate of soda....................	2 dr.
Scalded milk........................	1 pt.

Mix the same, and administer by means of a drenching-horn or bottle. It may be divided into "broken" doses, or may be given at once, as a single dose.

If the above remedies fail in arresting the diarrhea, I should give three drachms of tincture of matico, every four hours, until the patient showed some signs of improvement.

Sprains or Strains.

Sprains or strains are generally occasioned by unnatural distension of parts, or rupture of cellular structure, which connects muscles or tendons. They are generally accompanied by heat, tenderness, and lameness. Working oxen are more liable to sprain than cows, because, when used in the yoke for draught, they are as liable to strain or rupture parts as horses, by sudden exertions, or violent efforts of the muscles to guard against a sudden slip and fall. The slightest strain will sometimes occasion lameness, because the parts concerned are composed of minute fibers and cells, delicately organized; and a portion or the whole of such minute tissues are easily injured. In bad cases of strain, considerable tumefaction or swelling is observed. This is occasioned by the presence of serum, or water, in the cellular tissues beneath the skin. If proper means are adopted, this fluid can be taken up by the absorbent vessels, so as to leave no enlargement; but if the case be badly treated, the enlargement becomes organized into a permanent, hard mass, which is known to medical men as induration.

Treatment.—The very best and cheapest remedies in the early stages of strain are rest and cold water. This very soon lessens the vascular excitement; and, if there is no laceration, the animal will soon get well. It will be necessary to shower the sprained spot two or three times per day, until the acute symptoms have subsided. Then a common bandage may be applied. This should be wet with vinegar occasionally. Should the strained part be very painful, I would foment with infusion of hops—a handful of hops to a quart of boiling water, to be applied when cool. If this does not relieve the pain, let the part be occasionally sponged with a small quantity of sulphuric ether or chloroform.

Bronchocele.

Bronchocele is a disease known in common parlance as swelling in the throats of cattle. When it occurs among members of the human family it is denominated goitre; yet it is my opinion that bronchocele occurring among cattle, and goitre in man, are very different affections. For example: Bronchocele occurring in cattle is curable, and, so far as I have been able to ascertain, is confined to the thyroid glands, although in a protracted state of the malady, the surrounding tissues may become so involved as to render the case incurable. Goitre, as I understand it, is a diffuse tumor occupying the anterior part of the neck, occurring principally among the inhabitants of the Alps, and is considered incurable. Medicine and external applications seem to have little if any effect on it, and its removal by operation is generally fatal. The following cases are offered in support of my argument as to curability:

A couple of cows, the property of Mr. Humphrey, of Brookline, Mass., were observed to be the subjects of an enlargement in the thyroid region, which gradually increased up to the size of a man's fist. At this period I was requested to see them. The animals were natives; their ages, seven and eight; in fair condition, and yielding the usual quantity of milk. The only fault the owner had to complain of was that their appetites were not so good as usual, and he merely consulted me for the purpose of ascertaining what could be done for the thyroid tumors. On making careful examination of both animals, there was very little of abnormal action to be perceived, either internally or externally. The pulse was regular; respirations, normal; the surface of the body, comfortably warm; coat, glossy; nothing unusual about the feces nor urine; and all I could say about the cases was, that they were mild forms of hypertrophy of the thyroid glands (enlargement without change of structure). The tumor in one animal occupied the right side of the thyroid region; in the other it was found in the left; both immovable, yet having no morbid adhesions to skin nor subtissue.

Treatment.—The owner being unwilling to incur the expense of professional attention, and desiring to treat them himself, under advice, I accordingly prescribed as follows: Each animal to have daily ten grains of iodide of potassium in half a gill of water. The tumor to be anointed daily with a portion of the following:

Simple ointment....................	2 oz.
Iodide of potassium.................	2 dr.
Mix.	

During a period of seven days each animal got seventy grains of iodide of potassium, and by inunction received one drachm each.

According to the testimony of Mr. Humphrey, the remedy was effective; for at the end of two weeks the tumors had disappeared, and the animals were on the high road to health.

Spaying Cows.

Before I commence to point out the method of spaying, it may be proper to allude briefly to the female organs of generation.

Uterus, or Womb.—This is a hollow, musculo-membranous organ, united to the front part of the vagina, and terminating beneath the anus, in what is known as the lips of the pudendum. The womb is destined for the reception of the fœtus. It is situated within the cavity of the pelvis, between the region of the bladder and that of the rectum, and is an organ capable of extraordinary distension.

The womb is divided into body, horns, neck, and mouth. The body is the oblong, cylindrical part, growing out of the front part of the vagina, in the center of which it terminates, internally, by the mouth of the womb, termed by physicians the os uteri. The front part of the body of the womb, by branching into two divisions, forms the horns. They diverge laterally (sideways) toward the front part of the pelvis, and, finally, terminate in oval extremities, (fallopian tubes,) and, lastly, the testes, or ovaries. The part termed the neck protrudes backward into the vagina, and is only perceptible when the parts are unimpregnated.

The uterus and ovaries are partly covered, and confined to the sides of the pelvis by a portion of the peritoneum, called broad or lateral ligiments, which also inclose within its folds the fallopian tubes.

The ovaries are two soft bodies, about the size of a walnut, and resembling somewhat in form the testicles of the male. They are filled with little vesicles, or bladders, which can be seen through the surface texture, containing a small quantity of a whitish yellow fluid. These yellow bodies, or spots, termed corpora lutea, are supposed to contain the ova. The cicatrices, or marks left in the region where the vesicles have burst, denote the number of times the animal has been impregnated. The contents of the ovarian vesicles, from one or both testicles, are discharged into the uterus through the fallopian tubes, and the same is vitalized by the male semen in the act of copulation; so it will be perceived that the uterus has two inlets, coming from the ovaries, and one outlet, which is the lips of the vagina.

The arteries which supply the uterine organs with blood are named vaginal, uterine, and spermatic. The vaginal is derived from the internal iliac; the uterine, from the external iliac; and the spermatic comes directly from the great aorta.

This brief description of the form, function, and location of the uterine organs may possibly prove of some value to the husbandmen of this country, who are not expected to be posted on the subject, and can not spare the time to familiarize themselves with the technicalities of the schools, yet have intelligence enough to comprehend plain matters of fact.

On the Selection of Animals for Spaying.—If the animal be intended for milking purposes, a good milker must be selected, for the operation will not transform a poor milker into a good one. She must necessarily be in possession of those constitutional peculiarities which have been observed to prevail in animals renowned as first-class milkers. The operation will, without doubt, improve the quality of the milk, yet may not, under all circumstances, increase the quantity, although the French dairymen contend that "the cow will be found to give as much milk after eighteen months as immediately after the operation; and there was found, in quantity, in favor of the spayed cows, a great difference." About three years ago I spayed a cow, the property of a gentleman residing in Southboro'. She continued during this period to yield her usual quantity of milk, yet gradually accumulated fat, so that she was known in the neighborhood as the "fat cow." When in this condition, the daily yield of milk gradually decreased, and the owner at last sold her to the butcher. I learned from parties who bought the meat that it was of superior quality even to that of an ox or steer, and commanded a higher price. Among other animals that I have spayed several have run to fat, as the saying is, and at the end of from eighteen months to three years, fell into the hands of the butcher as first-rate beef. I am, therefore, inclined to think that if animals are predisposed to fatten easily, they will not remain uniform milkers beyond the above period; yet, from a report made by the Rheims Academy, I learn that this liability to fatten was not observed in the environs of Paris, where, in some milking establishments, one hundred and fifty cows are kept, all spayed except fifteen or twenty. It may happen, however, that in consequence of their not being permitted to go to pasture, and their artificial food not of the best quality, and perhaps scanty, they do not have enough adipose matter to spare and store away in the fat-cells, as is the case with stall-fed animals in private establishments, where only one or two are kept.

In view, therefore, of securing a permanent milker, I should select a cow of compact muscular organization (native breed), having little, if any, predisposition to accumulate fat. She must be a good milker, and the mother of at least three calves. The best period for spaying is in the spring, when the unimpregnated animal is in her full flow of milk. If the object of spaying be to furnish the market with fat, tender, juicy meat, then I should select animals, barren or otherwise, that keep in good condition on a small quantity of food. The operation may be performed at any period, from the age of three months to nine or more years.

Mode of Operation.—The principal authority on the *modus operandi* of spaying is M. Morin, a celebrated French veterinary surgeon. I am not in the habit of performing the operation according to his directions, yet the reader may desire to know how it has been performed in a country where the results have been so remarkably successful; therefore I introduce the following quotations:

"Having covered the head of the cow to be operated on, we place her against a wall provided with five rings, firmly fastened and placed as follows: The first corresponds to the top of the withers; the second to the lower anterior part of the breast; the third is placed a little distance from the angle of the shoulder; the fourth is opposite to the anterior and superior part of the lower region, and the fifth, which is behind, answers to the under part of the buttocks. We place a strong assistant between the wall and the head of the animal, who firmly holds the horn in the left hand, and with his right the muzzle, which he elevates a little. This done, we pass through and fasten the end of a long, strong, platted cord in the ring to the lower part of the breast; we bring the free end of the cord along the left flank, and pass it through the ring which is below and in front of the withers; we bring it down along the breast, behind the shoulders and the angle of the foreleg, to pass it through the third ring; from there we pass it through the ring which is at the top of the back; then it must be passed around against the outer angle of the left hip, and we fasten it, after having drawn it tightly to the posterior ring, by a simple bow-knot. The cow being firmly fixed to the wall, we place a cord, fastened by a slip-noose, around the hocks, to keep them together in such a manner that the animal can not kick the operator. The free end of the cord and the tail are held by an assistant. The cow, thus secured, can not, during the operation, move forward nor lie down; and the veterinary surgeon has all the ease desirable, and is protected from accident.

M. Leorant advises that an assistant should hold a plank or bar of wood obliquely under the teats and before its limbs, to ward off the kicks; but this method is not always without danger, both to the operator and the animal, because, at the commencement—that is, when the surgeon makes the incision through the hide and the muscles—the cow makes such sudden movements, and tries so frequently to strike with its left hind foot, that it may happen that, upon every movement, the plank or the bar may be struck against the operator's legs. On the other hand, although the defense may be firmly held by the assistant, yet it may happen that, in spite of his exertions, he sometimes may be thrown against the operator, by the movements she may attempt, and there may be an uncontrollable displacement of the plank or bar; and then it may happen that she becomes wounded, and, at the same time, prevents the operation; while, by the mode we point out, there is no fear of accident, either to the operator or the beast. In case of the want of well-provided rings, we may use a strong palisade, a solid fence, or two trees, at suitable distances apart. Across we fix two strong boards of wood, separated from each other, according to the size of the cow.

There is another means of confining them that we have employed for some time past, where the cows were very strong and irritable, more simple than the preceding, less fatiguing to the animal, less troublesome to the operator, and which answers perfectly. It consists in leaving the cow almost free, covering her eyes, holding her head by two strong assistants, one of whom seizes the nose with his hand, and strongly pinches the nostrils whenever the animal makes any strong movement during the operation; in causing another assistant to hold the two hind legs, kept together by means of a cord passed above and beneath the hocks. This assistant also holds the tail, and pulls it whenever he animal seeks to change its place.

The cow being conveniently disposed of, and the instruments and appliances, (such as curved scissors, upon a table, a convex-edged bistoury, a straight one, and one buttoned at the point, suture-needle filled with double thread of desired length, pledgets of lint of appropriate size and length, a mass of tow in pledgets, being collected in a shallow basket held by an assistant,) we place ourselves opposite to the left flank, our back turned a little toward the head of the animal; we cut off the hair which covers the hide in the middle of the flanks, at an equal distance between the back and hip, for the space of thirteen or fourteen centimeters in circumference. This done, we take the convex bistoury, and place it open between our teeth, the edge out, the point to the left; then, with both hands, we seize the hide in the middle of the flank, and form of it a wrinkle of the requisite elevation, and running lengthwise of the body.

We then direct an assistant to seize, with his right hand, the right side of this wrinkle. We then take the bistoury, and cut the wrinkle at one stroke through the middle. The wrinkle having been suffered to go down, a separation of the hide is presented, of sufficient length to enable us to introduce the hand. Thereupon we separate the edges of the hide with the thumb and fore-finger of the left hand, and, in like manner, we cut through the abdominal muscles, the iliac (rather obliquely) and the lumbar (cross), for a distance of a centimeter from the lower extremity of the incision made in the hide. This done, armed with the straight bistoury, we make a puncture of the peritoneum, at the upper extremity of the wound; we then introduce the buttoned bistoury, and move it obliquely from above to the lower part, up to the termination of the incision made in the abdominal muscles. The flank being opened, we introduce the right hand into the abdomen, and direct it along the right side of the cavity of the pelvis, behind the paunch and underneath the rectum, where we find the horns of the uterus. After we have ascertained the position of these viscera, we search for the ovaries, which are at the extremity of the cornua, or horns (fallopian tubes); and when we have found them, we seize them between the thumb and fore-finger, detach them completely from the ligaments that keep them in their place, pull lightly, separating the cord and the vessels (uterine or fallopian tubes) at their place of union with the ovarium, by means of the nails of the thumb and fore-finger, which presents itself at the point of touch; in fact, we break the cord, and bring away the ovarium.

We then introduce the hand again in the abdominal cavity, and proceed in the same manner to extract the other ovarium. This operation terminated, by the assistance of a needle we place a suture of three or four double threads, waxed, at an equal distance, and at two centimeters or a little less from the lips of the wound. Passing it through the divided tissues, we move from the left hand with the piece of thread; having reached that point, we fasten with a double knot. We place the seam in the intervals of the thread from the right, and, as we approach the lips of the wound, we fasten by a simple knot, being careful not to close too tightly the lower part of the seam, so that the suppuration, which may be established in the wound, may be able to escape. The operation effected, we cover up the wound with a pledget of lint, kept in its place by three or four threads passed through the stitches, and all is completed. It happens sometimes that, in cutting the muscles of which we have before spoken, we cut one or two of the arteries, which bleed so much that there is no necessity for a ligature before opening the peritoneal sac, because if this precaution be omitted, blood will escape into the abdomen, and may occasion the most serious consequences."

Improved Method of Spaying.—I cast the cow, by means of the hobbles (see cut of instruments), on her right side. I then apply to the nostrils a sponge, saturated with concentrated sulphuric ether. When the animal is completely unconscious, I slacken the casting-rope, so as to free the limbs and prevent any pressure on the walls of the abdomen. By so doing, I secure room enough to introduce a hand and arm, for the purpose of searching for the ovaries.

The first stage of the operation consists in pinching up a fold of the skin on the left side, midway between the prominent bone of the haunch or pelvis, and the last or posterior rib, about four inches below the transverse processes of the lumbar (back) vertebræ. Having divided the integuments to the extent of about five or six inches, I make a similar incision through the abdominal muscles, until the peritoneum (lining membrane of the abdominal cavity) is exposed. This membrane is then punctured by means of a beak-pointed bistoury, into which puncture I insinuate a knife having a probe point, and then divide the peritoneum to the extent of the external incision.

The second stage of the operation commences with the introduction of the operator's right arm, he kneeling down in close contact with the cow's back. The hand is then passed within the brim or cavity of the pelvis. Having found the deep-seated or right ovary, it must be removed by laceration. I find that the best and most expeditious way is to slip the other hand into the abdominal cavity; then, with the right hand, I seize the broad ligament at the base of the ovary; my left then clasps the ovary, and in this way, by using trifling force, the ovary is detached or torn away. The left ovary is then to be sought for, and an assistant depresses the edges of the incision. At the same time the operator, having a firm hold on the ovary, brings it into view, so that it can be removed by means of a pair of blunt-pointed scissors.

The third stage of the operation is the process of uniting the abdominal muscles, by means of stitches or sutures. A curved needle, armed with four or five threads of shoemaker's twine, well beeswaxed, is to be passed through the abdominal muscles, without penetrating the peritoneum, (lining membrane of the abdominal cavity,) at interrupted distances of one inch, more or less. Each suture is to be securely tied; one end of the same is to be cut close to the knot, the other is left long enough to protrude through the integumental incision. The skin, or integument, is then to be closed by means of ligature or metallic wire, leaving a small orifice at the inferior or lower region of the external incision, for the escape of morbid matter. This completes the operation. In the course of a week or ten days the deep-seated ligatures may be pulled away, and when the integument is well united, the external stitches may also be removed. The wound is healed by Nature, and scarcely, if ever, requires any sort of dressing.

SECTION XVI.

REMARKS ON THE CATTLE PLAGUE.*

DISEASES of all kinds are attributable to predisposing and exciting causes. The majority of maladies require a combination of agencies to induce them; but there are some which can only be developed by one unchangeable and specific means, which we designate contagion. A sheep can only become scabby by the scab-insect creeping on its body, and there multiplying. A dog only becomes rabid by the virus of another rabid animal entering its system; and scientific men are agreed that an animal can only be seized with rinderpest as the result of direct or indirect communication of the rinderpest virus from a diseased to a healthy animal. These are accepted truths which somewhat shock the minds of people unacquainted with the mysterious operations of Nature. The question occurs to most persons whether, under extraordinary circumstances, these contagious maladies are not generated *de novo.* All we can say is, that as yet no one has demonstrated that in the steppes (Russian plains) cattle can be placed under such circumstances, apart from being subjected to the influence of contagion, as can induce the disorder. The disease is always there, roving to and fro, winter and summer, among cattle of all kinds, sometimes killing many, and at other times attacking few. My belief is, after searching in vain for evidence of the spontaneous development of the rinderpest in Asiatic or European Russia, that the malady (just like human small-pox) is never developed, *per se,* out of nothing, but is propagated in obedience to immutable laws, such as those which operate in perpetuating small-pox in man. There are periods of recrudescence which are,

* Condensed from Mr. JOHN GAMGEE's late great work on the Cattle Plague.

to a great extent, accounted for by periodic and extraordinary movements of stock, as in times of war, or by an activated cattle trade; but neither cold nor heat, rain nor drought, storms nor severe frosts, affect the propagation of the malady, except in so far as they affect the movements of people and the traffic in cattle.

The predisposition said to exist in the cattle of the steppes (the special idiosyncrasy which has been spoken of) is observed, during outbreaks in Western Europe, to manifest itself in rendering the disorder less severe, far less malignant, in the cattle of Russia than in any other known breeds. JESSEN tells us that foreign stock in Russia, acclimatized and bred there, succumbs from attacks of the disease as rapidly as in its native country. Thus Devon cattle imported into Russia, bred there, for years continue to indicate a terrible susceptibility, and are rapidly exterminated when the disease is communicated to them by accidental contact or artificial inoculation. It is difficult to understand that these animals, manifesting an extraordinary susceptibility, should not, as it is proved they do not, suffer from spontaneous manifestations of the disease, which have been regarded as likely among the less susceptible herds of the steppes. I do not believe that the flesh and blood of the Russian cattle are impregnated with this malady, nor that they inherit it as human beings do scrofula; and I am strongly disposed to regard the specific poison of the cattle plague as obeying the same laws of reproduction as those which we know regulate the development of the virus of variola.

We are asked again, How did the first case occur? We must give an Irishman's answer, and ask, How did the first case of human small-pox or hydrophobia occur? We can prove absolutely nothing as to their primary origin, and all we can say is, the most careful observations show that the transmission and procreation of certain animal poisons, including that of the cattle plague, obey laws similar to those which govern the transmission and procreation of living organisms. Some day we may know more of the vitality of animal poisons. We now know that their destructive operations are not more extraordinary, and the reasons for their existence not more unfathomable, than those of many parasitic plants and animals which seem to live and to multiply by undeviating processes of generation, only to shorten the existence of the higher orders of the animal or vegetable kingdoms.

It is strange, but true, that the poison of the steppe murrain may be compared to any living organism which only requires a favorable habitat for its indefinite increase. Just as the scab-insect lives and breeds almost exclusively on the skin of a sheep, so does the cattle-plague virus grow in quantity only when it meets with conditions favorable to its fructification in the systems of bovine animals. This statement is not affected by the occasional appearance of the disease among goats, sheep, and other animals; for we well know, after the experience of centuries, that whatever animals may be in a country, whenever the horned stock has succumbed the disease vanishes. It does, indeed, inflict some damage on the flocks of sheep; but its slow and imperfect propagation among them indicates that it needs a more favorable nidus for its perfect and complete development.

If all known facts seem to favor the view that the Russian murrain owes its origin to contagion alone (even in Russia), no one having a knowledge of the subject believes that any other cause can induce it beyond the confines of that country. Numberless outbreaks, traced without doubt to contagion, and the certainty with which the early slaughter of diseased animals extinguishes any manifestation of the malady, even in countries where it appears often, have tended to discard from our minds the possibility of any spontaneous development of the plague over the European continent, in the new world, which it has never visited, or in the islands of the globe. It is singular, and it is very instructive, that the disease should alone be kept up in a country such as Russia. The conditions there are all in favor of the perpetuation of contagious maladies; and it is important to mention that even small-pox in sheep is preserved in Europe by its constant presence and frequent recrudescence in Russia.

The view of the purely contagious nature of rinderpest is materially strengthened by the definite knowledge of the origin of all diseases, which, undoubtedly, originate spontaneously in various parts of the world. The Siberian boil plague, which has been confounded with the steppe murrain, is one of those enzoötic disorders due to excessive heat in the broad plains of Siberia, and especially in certain spots where an elevated temperature operating on retentive and ill-drained soils, produces a malady which certainly acquires contagious properties, but which ceases with the advent of cold and the washing of miasmata into the earth. The Siberian boil plague springs suddenly into existence, is propagated a certain distance, but can not spread far, after the manner of purely contagious disorders, which are not influenced by seasons or weather. I could mention many similar instances, were it necessary, and there is none better than that virulent blood disease which has gone on increasing of late in this country, in districts where farmers grow the largest crops by liberally distributing manure on fertile soils. That disease is splenic apoplexy, which has been studied on the Northumberland hills, in the fens of Lincolnshire, and the Somersetshire pastures. Professor VOELCKER traced, in his laboratory, one of the potent causes inducing this malady in the west of England, and proved how wrong it was to give animals water charged with the products of organic waste, such as nitrates and other salts. The Russian cattle plague never did and never can appear here but as an imported pestilence. All who have seen this disease must, at all events, admit its highly infectious and contagious character. The air surrounding a diseased animal is impregnated with volatile poison, and every part of the animal's system is charged with the same principle, but in a tangible form capable of being carried on the point of an inoculating needle, and of being plunged with effect into the tissues of a healthy ox. Admitting, therefore, that contagion is the great and all-potent exciting cause, it may be well to enter into details on two points. We must first discuss whether certain conditions directly affecting an animal render its system more than ordinarily susceptible to the disease; and, secondly, what external conditions favor the propagation of the virus.

Causes.—Individual susceptibility or idiosyncrasy affects the communication of the disorder to some, though to a very limited extent. We no doubt have the striking illustration of the Russian ox, which is often attacked in a mild manner; and so we find in this country that a herd is killed out in five days, and another, of a very similar kind, is not killed out in a month, and several animals do not suffer at all. This fact is partially explained by the poison sometimes growing weaker as it passes from herd to herd. We witness this with all poisons; and hence the great importance of guarding against fresh importations of virus, even during the prevalence of the steppe murrain in a country. The broader the area over which the poison can meet with favorable conditions for its development, the greater the tendency to severe recrudescence during an outbreak.

There are some unaccountable instances of constitutional immunity, and animals in this country have appeared to withstand the disease with effect, or it has attacked them so mildly as scarcely to be observed. This, it is true, is extremely rare, but has been observed sufficiently often to indicate that, whatever may be the cause, one animal is very susceptible, and another less so, to attacks. We can not ascertain the special predisposition until the effects of contagion on an animal have been witnessed.

Age exerts no influence on the disease. KERSTING has, however, said that, as the result of inoculation, young calves and cows suffer most severely. Lean or fat oxen are also badly affected; but animals in moderate condition, and at maturity, seem to bear up best against the disease. As to the influence of sex, it would appear that, as with other contagious maladies, cows yielding milk are very susceptible. Pregnant animals readily catch the disease, but probably not so readily during gestation as at the period of calving.

The conditions under which animals are kept do not seem to have much influence on the character and rapid spread of the disorder. We believe that, as a rule, the disease will be most speedily propagated where animals are congregated in a shed under one roof. Indeed, numerous instances have occurred of animals, by being separated, escaping the disease; and, although it is virulent enough in the open air, the cases do not follow each other quite so rapidly as where the cattle are housed. A proof of the aggravation of the disease among housed stock is its general manifestation where sheep are constantly penned with cattle, and the common escape of these animals when they only mix with oxen or cows in the open air. Dr. MARESCH, who first described the cattle plague in sheep with accuracy, showed that the malady was only rife in flocks housed with bovine animals. The question then arises, Does the housing affect the constitution of animals, or does it simply concentrate the poison? It is not improbable that it acts in both ways. Every one agrees that the depressing effects of bad ventilation, of breathing an impure atmosphere, tend to aggravate and accelerate the malady, though there are not wanting cases to prove the exact contrary. The same is observed in other contagious diseases; and I have known two herds of heifers, belonging to the same owner, one housed and the other in the fields, seized with pleuro-pneumonia about the same time. The housed herd, by no means kept cleanly, suffered little, while few survived in the open fields. I am a great believer in fresh air, wholesome food, and pure water; but there is absolutely nothing to prove that animals die more readily from the cattle plague where the ventilation is imperfect, and the food and water far from being of the best quality.

It is understood that the poison of the cattle plague comes from abroad, and there are those who think that it may be the result of confining cattle for days and nights together in crowded ships, surrounded with dirt, ill-fed, and supplied with an insufficient quantity of water. Vivid descriptions have been written of the heat, fetor, and steaming sweat which rises from the holds of ships engaged in the cattle traffic. We are asked if it be possible that animals should be thus ill-used without suffering from any or all diseases; and the foot and mouth disease, pleuro-pneumonia, and the cattle plague, which differ in intensity, but not in character, have each been ascribed to these general causes. It is certain that maltreatment is not invigorating. It may lead to suffocation or severe constitutional disturbance; but, in spite of all the mismanagement in bringing cattle across the sea, no case of specific disease has, to my knowledge, ever thereby been induced. However much the animals may suffer, they can only die of the cattle plague with varying rapidity when that plague is brought among them by a diseased beast or infected materials. The same remarks apply to markets, farm-yards, and town cow-sheds. The filthier these places are, the greater, undoubtedly, the facilities for infection; but no amount of filth ever produced a specific outbreak of lung disease or rinderpest. We concentrate the poison in foul places, but we do not create it.

We can, with some show of reason, attribute to steam-power the outbreak of contagious diseases in this and other countries during the last quarter of a century. But steam has operated in facilitating locomotion, and in placing distant parts in regular and rapid communication with each other. Before countries were intersected, as they now are, by railways, it took several days to transport animals a distance of one hundred miles. It is, of course, better to move an animal in a pure van or truck than to walk it along roads where its feet may plunge in excrement, or its lungs inhale the breath of any sick animal passing, and which, by some strange fatality, is sure to be approached. Cattle are inquisitive, and sheep flock toward sheep; so that if they meet animals of their kind, and especially sick ones, they are sure to run up to them and smell about, and thus endanger their own lives.

The excrement which drops from animals affected with rinderpest, and which are driven or placed in trucks or vans, is highly charged with poison. It readily communicates the disease, as has been proved by myself and others, by inoculation; and it is well known that if a cow places its foot in a mass of this excrement, the chances are that it will be inoculated. The intestinal gases have been collected and then discharged by the diseased animal, so that, if healthy cattle inhale these gases, the probability is that they will contract the disease. The discharge from sick animals generally, and their manure in particular, are very apt to secure an indirect contagion. The greatest care should, therefore, be exercised not to disseminate the poison by such means. Food which has been mouthed or breathed on by sick cattle is capable of communicating disease, and this should always be kept in mind. It is not easy to determine if water, under the same circumstances, has a contagious effect. Some persons have supposed that if animals with the Russian plague drink from a river whose waters run through other farms or districts, the disease may be carried by the stream to great distances. This I do not believe, inasmuch as water is a great purifying and diluting agent, and even all the poison that a large herd of cattle may drop into a river can have no effect, as it passes on in an enormous mass of water, which effectually weakens and destroys it. The case is different if animals are made to drink out of a common pail or trough; for, in such a case, it is not so much the water that carries the virus as the sides of the vessel containing that water. It may be noted, however, that cattle of different farms often stand for hours together in a stream at only a few yards apart; and here, as in the drinking-trough, the virus contained in the discharges may reach healthy animals unchanged, and thus lead to their contamination.

In countries or districts where contagious diseases prevail among cattle and sheep, we find that slaughter-houses are favorable for their dissemination. This is due to the fact that plague-stricken animals are taken there for slaughter, are sometimes kept alive for hours, or even days, and, when killed, much that is charged with virus escapes in surface-drains, or on an open causeway, so that, within a certain radius, there is a chance of contaminating healthy stock. One way in which the cattle plague may be carried from diseased cattle or from a slaughter-house is unquestionably by flies, which, after resting on the carcass or offal of sick animals, fly about, rest again on the animal, especially on any wounded parts, and thus produce a direct inoculation. Any place in which many animals affected with rinderpest are slaughtered, must charge the surrounding neighborhood with enough poison to kill large numbers of cattle. The hides and meat of diseased animals carry the infection. In Hungary I am told that one common cause of rinderpest outbreak on a farm is the hawking about of the flesh of animals slaughtered during an attack of the disease. If the water in which such meat is washed be thrown into a yard to which cattle have access, an outbreak is almost sure to follow. Jessen speaks of cattle becoming infected by drinking the water used in soaking or washing salt meat. Slaughter-houses and the traffic in hides and meat are probably not so active in favoring the spread of the rinderpest as cattle-dealers' farms, and the changes of stock which necessarily occur there. The grazing of cattle in neighboring fields, feeding them on the road-sides, driving them along paths through fields where there is a right of way, are all potent circumstances in the dissemination of rinderpest.

No one doubts that dogs which feast on the carcasses of diseased animals are very liable to carry infection. I have been consulted more than once as to the probability of a pack of fox-hounds carrying infection over a country by passing through fields containing sick cattle, and afterward crossing healthy farms. It is possible that a pack of hounds may carry much excrement charged with organic poison from one field to another; therefore, in an infected district hunting should, in my opinion, be discontinued. Human beings, as well as quadrupeds, are accused of harboring the poison and distributing it, and no doubt they do carry it, more or less, if great care be not exercised. I have been assured that in Russia one common cause of wide-spread outbreaks was the practice of calling priests and people together to pray in the cattle-sheds, that the plague might be stayed, and the assembled people moving thence from farm to farm. Vicq d'Azyr demonstrated, last century, that if clothes worn by attendants on diseased cattle were placed on sound stock, three animals out of six would be seized with the disease.

Without entering into further details, I may state that the causes here enumerated as affecting the transmission of the cattle plague are not imaginary but real. Enough to mention that farmers and others, who have any thing to do with rinderpest, must regard it as a purely contagious and specific disease, incapable of spontaneous development, but most readily and certainly communicable from diseased to healthy cattle, and sometimes from cattle to sheep, or *vice versâ*.

Symptoms.—The recognition of this disease is greatly facilitated, especially when it first appears in a herd, by a knowledge of its prevalence in any district or country. I mention this, as in many diseases we have premonitory signs similar to those of the cattle plague; and it is especially when we know of its existence in or near a country, district, or farm that the earlier symptoms are of value. Indeed, when an outbreak is studied, great importance should be attached to the period which elapses from the introduction of a diseased animal, or other source of infection, to the first appearance of sickness in a stock. Every specific fever has its period of incubation—that period during which the poison is insidiously attacking the system of a man or animal—and there is no more distinct feature of the cattle plague than its latent stage. From four to seven days is the usual period of incubation. It often extends to a week, but very rarely, indeed, beyond the eighth day. Some say it may be as short as twenty-four hours, and others that it occasionally extends to twenty-eight days. There are no reliable facts in proof of these extremes, but there is a large amount of evidence to show that an animal may be regarded as absolutely free if it does not show signs of disorder within ten days after having been exposed to the contagion. Indeed, recent inquiries and observations would lead one to regard the incubative stage as not often exceeding six days, though the earlier or premonitory signs of an attack are not apparent to non-professional observers. I consider this point of the greatest importance in relation to the subject of veterinary inspection, and one affording scope for many experiments as to the facilities offered for the prevention of the disease, by recognizing sickness in animals before they become dangerous from the discharge of that poison which is the cause of the propagation of the malady. Whenever medical treatment may have to be tried, it is at this early period that good results may be anticipated.

A delicate thermometer indicates an elevation of temperature in the earliest stage of the disease varying from one to four degrees. The elevation precedes the acceleration of the pulse and every other symptom. It is not uncommon to find it in healthy animals varying one or two degrees at different periods of the day, so that reliable observations can only be made on a number of cattle at the same time, obeying in all the same conditions as to the instrument used, the part in which the observation is made, whether it be the rectum or vagina, and the length of time the instrument is inserted, etc. Sometimes, when animals are excited on a hot day, and are hurried into a shed from a field, the thermometer may rise one or two-tenths more than usual; but if a whole stock be examined, any animals suffering, however slightly, from the disease, indicate an elevation amounting even to five or six degrees. Such an exaltation of temperature is generally incompatible with health, and the only exception yet known to this rule is that observed during œstrum or sexual excitement; the temperature then rises three or four degrees, and the same may be seen just after parturition. A number of experiments prove:

First. That the temperature is much exalted when the pulse indicates slight or no variation from the normal standard.

Secondly. That there are variations in the frequency of the pulse and the temperature during the course of the disease.

Thirdly. A sudden lowering of temperature usually, if not always, precedes death. In the cases quoted above, where the temperature last taken is marked as high as 105° and 104°, death did not take place until ten or twelve hours after the last observation.

Fourthly. With the lowering of temperature before death there is a greatly increased frequency of pulse, varying from 120 beats per minute to such a rate as to render observations almost impossible.

When animals recover, the temperature decreases gradually till it reaches its normal standard. There is an absence of very marked and sudden change. The transition from sickness to convalescence occurs steadily and with regularity.

I consider it impossible to over-estimate the importance of thermometric observations such as those referred to, and, although similar results may be obtained in the investigation of other diseases, it is evident that the thermometer affords unerring as well as early evidence of an animal sickening, recovering, or about to die. No other indication is so unmistakable and satisfactory;

and though there are other febrile diseases associated with an early elevation in temperature, it must be admitted that, taken with the history and symptoms of the case, the accuracy afforded by thermometric observations is of the highest moment.

The visible premonitory signs consist in shivering, muscular twitchings, and uneasiness. In some cases there is dullness, and in others excitement amounting even to delirium and associated with remarkable sensitiveness. There is often a short, husky cough; the appetite is irregular, capricious, and then entirely lost; rumination ceases; the animal grinds its teeth, yawns, arches its back, and draws its legs together under its body; the eyes, nose, and mouth are dry, red, and hot; the extremities are cold, though the internal heat is high; constipation, as a rule, exists; and secretion is generally arrested, as indicated in milch cows, by the milk at once ceasing to flow. The respirations are often, but not invariably, increased in frequency; expirations succeed the inspirations tardily, and with each there is a low moan; the temperature continues to rise, though the animal's skin becomes rigid, and indicates functional derangement by a staring coat, dryness, and eruptions.

The redness of the visible mucous membranes, especially of the gums, lips, papillæ on the inside of the cheeks, is partial, pale, and patchy at first. Dr. Weber has spoken of the aphthous eruption of the mouth, the aphthæ being of circular or indefinite form, covered with whitish-yellow granular exudation, which adheres very slightly and is easily removed. He also speaks of the redness of the papillæ of the cheeks as always beginning at the apex. Jessen has published a pamphlet on the appearance of the buccal membranes, which he describes as sometimes consisting in small, round nodules (seldom larger than a millet-seed), still covered with epithelium when discovered, through which a yellowish or yellowish-gray material can be distinguished. Within twenty-four hours the epithelium gives way and the contents become visible. The result is a superficial lesion, which soon heals. In other cases the nodules become confluent, and form a considerable enervated ulcer, with irregular margins. The so-called aphthæ are described by Jessen as small vesicles due to raising of the epithelium, and either contains a clear watery or a turbid fluid, and leave behind round, flattened excoriations, with even edges. My observations, in a considerable number of cases, have shown that on the inner surface of the lips, on the inside of the nostrils, and other parts of the mucous membrane, there are at first scarcely visible whitish opaque specks, about the size of a small pin's head. These are the starting-points for the softening and desquamation of epithelium, which results in the dirtyish-yellow, flaky appearance in some of the worst cases.

When a number of milch cows has to be examined, one of the first symptoms to look for is redness, and a mottled appearance of the lining membrane of the vulva and vagina. Animals in apparently perfect health, eating well, ruminating, yielding a full quantity of milk, are seen to have a reddened condition of the mucous membrane of the external organs of generation. The redness of the vagina also occurs in animals that have recently calved, and it is important to guard against this source of fallacy. In many cases the continuous rigors, and singular muscular twitchings of the face, ears, and neck, may be regarded as characteristic. They are not, however, so typical as the discharge from the eyes and nose, which soon appears, and which, from being glary and watery, changes shortly to a turbid secretion. No symptoms can better illustrate the care required in diagnosis than the discharge both from the eyes and nose. A marked symptom is restlessness, lying down and rising again; sometimes looking round to the flank, and by drawing the hind legs forward, denoting more or less colic or abdominal pain. Animals often lie on the left side, with the head stretched across the right flank. Severe diarrhea sets in, and the animal becomes very thirsty. Emphysematous (windy) swellings are apt to form at this period, and there are exacerbations (violent) of all the symptoms toward night-time. The discharges are all fetid, especially in severe cases. The urine is rather scanty, and generally, if not always, albuminous. This stage lasts about three days. The symptoms increase in severity. The dysentery is aggravated, and the animal becomes extremely weak; it stands and walks with difficulty, and lies much. The pulse becomes feeble and indistinct at the jaw; it beats from 90 to 130 per minute. The discharge from the eyes, nose, and vagina increases; the cough becomes less audible and soft. On the buccal and schneiderian membranes, as well as in the clefts of the feet, there is a deep redness, with flaky discharge of epithelium. The muzzle, angles of the mouth, and membrane round the nasal orifices are sometimes ulcerated, with a greenish-yellow and somewhat dense granular and epithelial deposit. On opening the mouth, a similar change about the base of the tongue and on the inside of the lips is often found. The coldness of the extremities, or of the body generally, the stupor or drowsiness, quick breathing, and fetor of the exhalations, with spasmodic action of the alæ nasi, jerking respiration, and moaning, are among the most unfavorable symptoms. The feces, at first dark, become slimy, charged with masses of detached epithelium, are very fetid, and are more or less tinged with blood. The urine acquires a dark color, due to the coloring principles of bile. Cows abort, and all symptoms of sensibility or consciousness gradually disappear.

I have seen many cases which presented, from the earliest moment, great disturbance of the organs of respiration. A hacking cough, depressed and protruded head, spasmodic action of the nostrils and flanks, indicate serious pulmonary lesions. Emphysema takes place, and usually begins in the anterior lobes. Dr. WEBER remarks that the anterior intercostal spaces become somewhat fixed, whereas the posterior true ribs are raised with an effort, and sink rapidly. On percussion, the thorax is found to be very resonant, and this resonance becomes greater as the emphysema increases. On auscultation, râles of various pitches are heard, either accompanying the vesicular murmur or superseding it. The heart's sounds become inaudible, and impulse imperceptible on the left side. As death approaches, the mucous membranes often acquire a leaden hue; the erosions (ulcerations) are marked, and blood-spots, or ecchymoses, occur. The partially open and dark red or otherwise discolored aspect of the inner surface of the lips or the vulva can not fail to be noticed at this stage. The involuntary evacuation of excrement, extreme fetor of all discharges, tendency to tympanitis, muscular twitching, lowering of temperature, and increasing listlessness betoken the approach of death.

In some cases there are signs of improvement about the third day, and then a relapse occurs. Animals may become quite convalescent; but still the gastric or intestinal lesions advance, and when least expected, a fortnight or three weeks after marked improvement, alarming symptoms supervene, severe diarrhea occurs with the return of other discharges, and the animal soon sinks and dies.

In favorable cases we find a cutaneous eruption on various parts of the skin, especially on the neck, back, and teats, not unlike cow-pox. There are instances of severe illness and death with this eruption, and, indeed, in bad cases, we sometimes find a dirty yellow appearance of the skin of the back, and a desquamation of epidermis, which indicates a morbid process of the skin, similar to that affecting the mucous membranes. The surface of the skin over the neck and withers is often moist or greasy from an abundant sebaceous secretion. There are no vesicles, and an entire absence, as a rule, of pustules. Convalescence is indicated by a certain vivacity, return of appetite, equable temperature of the body and extremities, restored secretion of milk, moist muzzle, and other well-known signs of health.

As with other fevers, we find in the rinderpest a marked periodicity in its manifestations. Improvement in the morning, violence of symptoms at night; a distinct subdivision of an attack into stages, and, from the date of the crisis, either sudden aggravation or gradual abatement of alarming symptoms. There are, at times, chronic cases, as in lung disease, and animals get into a hectic state, out of which they can not be rallied. It is, therefore, evident that the duration of the malady varies. I have seen animals dead in the evening which had only indicated active signs of the complaint for the first time during the early part of the same day. As a rule, death occurs from the third to the sixth day.

Symptoms in the Sheep.—The cattle plague among sheep is characterized by comparatively mild symptoms, and frequently speedy restoration to health. In 1857, Dr. KREUTZER first described the symptoms of the cattle plague as observed on a sheep which had been inoculated on the 1st of October. The period of incubation lasted till the 9th, and was followed by general disturbance, discharge from eyes and nose, prostration, moaning and diarrhea. The animal died on the 13th. Dr. MARESCH observed the disease more carefully from 1860 to 1863, and since then much information has been obtained. The period of incubation extends usually to seven or eight days; languor and dullness appear, with redness and prominence of the conjunctiva at the inner angle of the eye. There is a yellow discharge which trickles down the face, and a viscid phlegm flows from the nostrils; the head droops, and there is grinding of teeth; the appetite is diminished and capricious; rumination, suspended; feces, thinnish, and partly adhering to the hind legs and tail; there is an occasional cough, with frequent pulse and labored breathing; the pulse rises from 120 to 160 beats per minute. Ewes not unfrequently abort, or bring forth weakly lambs, which afterward rally. It is not at all unusual for the disease to cease at this period, and the animals to recover rapidly. In other cases the diarrhea increases; there is painful straining, or tenesmus, panting respiration, very feeble pulse, and the animal sinks. Great weakness, awkward gait, and somewhat severe nervous or convulsive symptoms mark fatal cases, when death occurs about the fourth, fifth, or sixth day from the commencement of the disease. When a case takes the more usual and favorable turn, there is more liveliness, improved appetite, restored rumination, less discharge from the eyes and nose, and diminished frequency of pulse and respirations. The animals are quite convalescent in from ten to fourteen days. In some cases, such as those observed by Dr. LEICHT in 1860, the disease is more rapid. The animals stagger, lie down much, shake their heads, have a dense discharge from the eyes, are subject to diarrhea, and die, sometimes, within twenty-four hours of the first appearance of premonitory signs.

There are as great variations in the symptoms in sheep as there are among cattle. Some cases differ from those described above, as the animals stand, are dull, and keep apart from the flock; there is no appetite, no rumination; constipation at first, followed by diarrhea; arched back; elevated temperature of the skin; eyes sunken and discharging; from the nose a quantity of dense, grayish-yellow, flaky matter drops, and the mucous membranes of the mouth and nose are reddened, showing erosions and desquamations of epithelium; the breathing and pulse are accelerated; there is pain on pressing the loins, and, at last, general prostration.

Special Symptoms in cases of Cattle Plague coupled with Pleuro-pneumonia.—The animals seized with the two diseases at once are observed to suffer from greater prostration and more labored breathing at the outset. The short grunt of lung disease begins early; there is a spasmodic action of the nostrils, and, on auscultation, the impervious condition of the portion of the diseased lung is ascertained. Any one acquainted with the two diseases can readily recognize such cases.

Special Symptoms in cases of Cattle Plague coupled with the Foot and Mouth Disease.—It is more difficult to diagnose rinderpest in its earliest stages when epizoötic aphtha has attacked a herd. Smacking of the lips, eruption, and salivation exist; but the greatest reliance is to be placed in the usual lameness and morbid condition of the feet in foot and mouth disease, as also the usual eruption on the teats, and tendency to congestion and inflammation of the udder. When the cattle plague advances, there is the shivering, discharge from the eyes and nose, the diarrhea and prostration not usually seen in epizoötic aphtha.

The Nature of the Cattle Plague.—From all that has been said in the preceding pages, it is evident that the murrain of the steppes is not typhus, nor is it the typhoid or enteric fever which we observe in man. Not only is it distinct in its origin, progress, and essential nature from any known contagious disease of the human subject, but it is, undoubtedly, a specific bovine fever, manifesting all its characteristic features in horned cattle alone, though experience has proved that there are circumstances under which the plague may be communicated to the buffalo, goat, sheep, deer, gazelle, zebu, yak, auroch, ibex, and other wild ruminants. One experiment, performed by myself, proves the communication of the disease to the deer; but it is remarkable that until the recent outbreak of rinderpest in the gardens of the Paris Acclimatization Society, in the Bois de Boulogne, it was not known that the majority of wild ruminants could catch the disease and suffer from it in a virulent form. It never attacks men, horses, dogs, and, indeed, the great majority of warm-blooded animals; and it is worthy of special remark that the virulent animal poison, which is the active agent in the development and propagation of the malady, originates in the system of the ox, is perpetuated in countries where herds of cattle abound, and is not to be found where bovine animals are wanting. The history of the cattle plague clearly indicates that the disease has been always recognized as attacking horned stock almost exclusively, and that it spreads from country to country through the trade in cattle or the transport of oxen in the rear of armies. The poison does pass through the system of some ruminants besides those of the bovine race, but it appears to be deprived of much of its force until it returns to members of the ox tribe.

The cattle plague is not a local disorder; it is not an affection of any special organ or group of organs. It is a systemic disease—a fever in which the mucous membranes and skin are specially implicated. There are important local and characteristic manifestations, usually most marked in the mouth, fourth stomach, and intestines, in the organs of generation, and frequently in the respiratory passages. It is, however, something different, and something more than an inflammation of the breathing, or digestive, or generative systems. The cell growth, fatty and molecular disintegrations, desquamation, and discharge of the epithelial and epidermic cells, are typical of this disease. In this way it can only be classified among general diseases, with fevers of a specific kind, and which originate from specific causes, run a definite course, manifest a singular periodicity in their progress, and have a marked tendency to destroy life.

The pathological process, observed from first to last, indicates an early development of severe febrile disturbance. All the functions are modified. The temperature of the body fast rises; general functional disturbance soon follows, and the blood loses its watery parts and soluble albumen, indicating, also, a large increase in the proportion of blood-corpuscles and fibrine to serum. The process of assimilation is checked; the large reservoirs in which the food is prepared for true gastric and intestinal digestion become torpid; the rumen, reticulum, and ornasum retain a large quantity of solid food, and their movements are stopped; the fourth stomach ceases to secrete gastric juice, its epithelium is thrown off, a morbid cellular deposit clogs the gastric glands, and the proper preparation of aliment for intestinal digestion can no longer occur. The intestine is the seat of inflammation and extravasation; its contents indicate the drain of the blood of its soluble albumen and other products; the intestinal epithelium is rapidly ejected, and, in some cases, many of the glands become clogged with a deposit similar to that which is found in the follicles of the gastric mucous membrane. A free suppuration is nowhere witnessed, but discharges flow from the mucous membranes, and are highly charged with epithelial cells and the specific virus of the disease. The rapidity and completeness of the general functional disturbance is indicated not only by the checked process of assimilation, the nature of the intestinal contents, and the general implication of the mucous membranes, but it is recognized on an examination of the albuminous and dark-colored urine, the disposition to early putrefaction, fetor of the secretions, etc. All shows that the cattle plague poison speedily induces in the system of a susceptible animal changes which defy the successful use of medicine, and which must inevitably result in death. Like most animal poisons, the rinderpest virus is reproduced with marvelous rapidity in, and discharged abundantly from, the bodies of sick animals. The breath of a sick ox inspired by a healthy animal, and the solid products of the disease, seem to be alike capable of inducing the malady; and antidotes are applied too late when an attempt is made to reach the poison in the animal's system. I know of no antidote to be used internally. Agents are employed which, when directly mixed with the virus, kill it; and caustic alkalies, mineral acids, chlorine, iodine, carbolic acid, creosote, the alkaline permanganates, and other oxidizing or decomposing agents, render it perfectly inert. I have no faith in our ever reaching the virus with effect in the living animal. We must not even expect too much from the system of treating certain symptoms during the progress of the disease, which is frequently confounded by the unskilled with the effectual treatment of the disease itself. A large proportion of animals seized must always die. A certain percentage will always recover, and this depends on the severity of the attack, the constitutional resistance of the animals seized, and the consequent extent and rapidity of the morbid changes which occur.

Treatment.—The steppe murrain is essentially one of those diseases for which prevention is better than attempted cure. Urgently enforcing this doctrine has cost me the good opinion of some, who, without duly considering the importance of slaughtering the diseased and infected animals for the protection of many untainted herds, argue that it is not scientific to exterminate the malady by destroying diseased animals. The cattle plague can be prevented and can be extinguished, at comparatively small cost and with the greatest certainty, in countries such as England. Whatever tentative trials are made as to treatment, this fact must ultimately reveal itself, that it is impossible to deal with outbreaks of rinderpest by administering drugs. I hold it to be eminently scientific to act on our knowledge of the cause of any disease; and, knowing, from lengthened experience, how easily disseminated and malignant cattle plague virus is, it has been my duty to insist on its early and complete destruction, so that it should never reach the systems of herds of animals, in which, when it has once entered, it can not be counteracted by any known antidote.

The cattle plague is not so deadly in its effects as equine glanders, cancer, or well-developed human phthisis; but no known remedy restores an animal once severely attacked, and the administration of medicine is, as a rule, not required to save the small percentage which may recover. As, however, the malady has been suffered to spread, veterinarians are called upon to adopt means of cure. With a view, therefore, to indicate what has been suggested and what may be attempted, I shall draw attention to the following points:

PRECAUTIONS TO BE OBSERVED SO AS TO PREVENT THE SPREAD OF DISEASE FROM A HERD UNDER TREATMENT.

HYGIENIC MANAGEMENT.

MEDICINAL AGENTS USED.

METHODS OF TREATMENT SUGGESTED AT VARIOUS TIMES IN THIS COUNTRY AND ABROAD.

Precautions to be observed so as to Prevent the Spread of Disease from a herd under Treatment.—Diseased cattle should be placed for treatment in warm and detached buildings where proper ventilation, drainage, and facilities for feeding can be obtained. They should not be left in the fields, and are best kept entirely in the house until perfectly recovered. The sheds should be kept clean, frequently disinfected, and every particle of urine and excrement must be disinfected by means of chlorinated lime. People attending the stock must be kept there for that purpose, and not allowed to rove about and go on other farms, or to fairs and markets. All dogs should be tied up, and every attention paid to cleanliness with other stock and in farm-yards generally. Dirt and negligence are great propagators of the cattle plague. It is impossible to be too clean or too careful in avoiding the carriage of tainted objects from an infected to a healthy farm or district.

Hygienic Management.—This is of far greater importance than any medicine or system of medication hitherto recommended; and I have to direct the attention of my professional brethren to several points of incalculable importance. It is not desirable to have many animals in the same shed when under treatment, and several attendants are essential, so that proper care be taken of the cattle. When a large stock has to be treated, the labor and trouble is enormous; it will not do, therefore, to trust to a few attendants, who get tired and faint-hearted over their work, especially when the number of animals recovering is not large. If possible, it is undoubtedly best to have the animals loose; but this can only be secured where isolated cases are under treatment. With forty or fifty beasts sick at one time, loose boxes can not usually be obtained; and it is not desirable to keep many sick animals loose in a yard. As a rule, in winter all the animals should be clothed, lightly, but sufficiently, so as to favor cutaneous exhalation. The shed is best kept at a proper and never-varying temperature, not exceeding 58° Fahrenheit. Proper ventilation is indispensable to recovery, and heat must not be purchased at the expense of atmospheric purity. Clothe the animals rather than close the aperatures made for the purposes of ventilation. In order to secure purity of the atmosphere, every attention should be paid to sweeping away excrement and washing the stalls thoroughly by means of common soda and water. The use of chlorinated lime is not to be advocated where stock is under treatment, as the chlorine gas induces great disturbance, irritation of the respiratory passages, and a troublesome cough. I prefer cleanliness and abundance of fresh air where the cattle are actually diseased, to any system of disinfectants, and the chlorinated lime is best used to disinfect the manure-heap and other objects outside the shed containing the sick. The food allowed to animals varies much according to circumstances. During the various stages of acute disease it should be given sparingly. At first linseed tea or linseed gruel, well boiled, may serve as a laxative, with or without medicine. Linseed is not to be continued when purging begins; well-boiled oatmeal gruel should then be substituted for it. The oatmeal gruel, which is perhaps the best nutritive material to be given from first to last, is made by taking a peck of meal for every three or four animals, and adding some cold water. Boiling water is then mixed and stirred with the whole, until it acquires a proper consistency to be poured through a towel or sieve; and thus all the coarser and more indigestible portions of the meal are removed. The gruel is boiled for at least ten minutes or a quarter of an hour, and is used warm. About half a gallon of it may be given three or four times daily; and if the cattle drink it voluntarily, so much the better. Badly-made oatmeal gruel irritates the stomach and intestines, and aggravates the diarrhea. When animals are severely affected they do not eat; but if they have any appetite, well-boiled mashes should be made for them. Of these we can suggest a great variety, such as steeping barley for a time, throwing off the water, adding fresh, and boiling the barley; the whole is then allowed to rest for awhile, and bran is mixed with it, as well as a certain quantity of well-boiled turnips. The mash must be moderately salted. The barley may be replaced by brewer's grains, and a moderate quantity of bean or peasemeal—say half a pound of the latter morning and night. One of the best managers of cows I ever knew made, for every sick animal that would eat, a mash of four handfuls of bran, four of brewer's draff, one pound of peasemeal, and two pounds of well-boiled mashed turnips. This was given thrice daily to each animal. Cattle have been fed on milk, soups, etc., but not with the same benefit as with vegetable food which was properly cooked, and not allowed to get sour. Great moderation in diet is essential. The sick cattle must have cold water to drink in small quantities, and at least every two hours. Their mouths are parched, and great benefit is derived from frequent allowances of fresh water, which may be acidulated with a little vinegar, or given alone. All animals under treatment must be kept scrupulously clean, and are benefited by brushing, washing, hand-rubbing, bandaging the legs, etc. As a means of insuring cleanliness and action of the skin, I think it is very probable that the hot-air bath, when at hand, may be of great service, as also the vapor bath or the wet packing, used occasionally.

Medicines.—The plan principally adopted in the treatment of cattle suffering from steppe murrian has consisted in giving solutions, mixtures, and powders, either alone or in food. There are various ways, however, which might be resorted to, and perhaps with benefit, and which would effectually set aside some of the uncertain and often injurious administration of draughts. In order to explain myself fully on this subject, I shall consider the various methods by which remedies may be given internally.

Administration by the Mouth.—It is often possible, in the early stage of disease, and in favorable cases when appetite returns in the later stages, to give animals tasteless or palatable drugs in food, and this is by far the best plan. The frequent, troublesome, and somewhat dangerous drenching to which sick cattle are subjected, should, if possible, be dispensed with. I have seen so many animals tormented and injured by the administration of medicines, treacle, gruel, and other liquids, that I venture to make a few remarks on the operation of giving a draught. In the first place, glass bottles are dangerous; and nothing is so useful as a horn of proper shape, or a tin instrument made in the shape of a horn, with its mouth well rounded off. The operator should go up to the right side of the animal, pass his hand over the face into the angle of the mouth on the left side. The head is bent round, not elevated, except to a very slight extent; and if the person giving the draught plants his feet well on the ground, with his back against the animal's shoulder, he can steady himself well, and, holding the horn or other instrument charged with the draught in his right hand, he can pour it by degrees into the animal's mouth. It has often pained me to see sick cattle seized by the nose, and, with their heads drawn up and necks stretched out, required to gulp down a quantity of liquid which can not be conveniently swallowed in such a position. Often have I seen ar animal get worse after such treatment, and the passage of medicine into the windpipe and lungs was not unfrequently the cause of aggravated symptoms. One great objection to the administration of draughts when an animal is suffering from the cattle plague is, that they accumulate in the rumen, do not reach the true stomach until the diarrhea, inseparable from the disease, sets in, and then the accumulated drugs exert a most prejudicial influence. It is incredible how long a vast amount of medicine, and very acrid, irritating medicine, too, may remain unchanged, unabsorbed, and inactive in the paunch of an ox, which is usually full of vegetable food throughout the progress of an attack of the plague.

Administration by the Rectum.—Injections, given carefully with an enema funnel, have the benefit of creating little disturbance, and the power of solution and absorption of remedies is probably as great, if not greater, in the rectum during this disease as in the stomach and small intestine. Simple warm-water injections, cathartic, stimulating, sedative, and even nutritive enemata, deserve a fair trial, and as much good may be anticipated from them as from the administration of draughts.

Subcutaneous Injections.—Various medicinal agents have been effectually introduced into the system by being injected into the open tissue beneath the skin. This plan can be adopted if such remedies as tincture of aconite, solutions of belladonna, of various alkaloids, and other agents which do not irritate and inflame the tissue, are used.

Injection into Veins.—The principal object in view in resorting to this operation would be to try the effect of injecting about a pint or a quart of water, at 100° Fahrenheit, after abstracting a similar quantity of blood from one of the jugular veins. The operation should be tried in the early stage of the disease, and the result usually observed is purgation, action of the kidneys, and free exhalation from the skin. The system might thus be prepared for any further course of treatment. The operation is simple, and unattended with bad results.

External Applications.—The method of applying heat, cold rubefacients, and blisters to the surface of the skin is too well known to deserve any lengthened description. Dashing cold water over the body, and then using towels and wisps of hay to dry and warm the animal, has been often recommended. The vapor bath, by covering the animal, head excepted, with woolen rugs, fixed out by sticks, etc., and then heating the air between the rugs and the skin by a spirit or gas-lamp, has been suggested. If mustard poultices are used, they should be large, warm, and applied with a rug to the body, so as to be kept on for three or four hours. Rugs dipped in boiling water, wrung out thoroughly, and applied to the abdomen, have been resorted to.

Internal Remedies.—A close observation of the treatment adopted by empirics has led me to the conclusion that no remedy, or class of remedies, can be regarded as absolutely efficacious in any real case of rinderpest. Some animals recover despite the mode of treatment, but the majority die. I shall here notice some of the principal remedial agents used by myself and others under various heads.

Most veterinarians consider that the over-distended stomachs and the marked constipation should be relieved. From the fact that the omasum is loaded with dry food, even in the later stages of cases attended by great diarrhea, it is believed by some that smart and early purging is desirable. Full quantities of Epsom salts, linseed oil, and even croton oil, have been given, and a very common result of drastic cathartic doses is to induce an early and very fatal diarrhea. There are more advocates for mild laxatives, such as treacle, small and repeated doses of sulphate of soda, sulphur, and oil. I have treated many cases successfully without attempting to relax the bowels, and have certainly had as much success then as when either mild or active purgatives have been prescribed. A purgative which may be used advantageously is the following:

Sulphate of magnesia	12 oz.
Sulphur	4 oz.
Spirits of nitric ether	1 oz.
Niter	$\frac{1}{2}$ oz.
Water	1 quart.

As this is not apt to induce much purgation, a bottle of linseed oil may be given after it. Oil of turpentine, to the extent of two or four ounces, has been given with a quart bottle of linseed oil, and with good effect when no other purgative has been administered.

I think that injections have been too much overlooked in the treatment of this disease. They may be given at first to move the bowels, and various forms of medicated or nutritive injections might prove of service. When the diarrhea comes on, and there is some tenesmus, an injection may be given of one pint of starch emulsion, containing one ounce of laudanum, to be repeated, if necessary. It is desirable to guard against irritation of the rectum as a result of frequent enemata.

Niter has been extensively used during the present outbreak, and in considerable doses, with a view to aid in the elimination of the virus. It is apt to weaken, and must be prescribed in moderation. It has no specific action of value. Oil of turpentine, which is a stimulant as well as diuretic, has been strongly recommended by some, in ounce and two ounce doses.

Warm clothing, the application of heat to the skin by means of heating the air, confined with woolen covers arranged round the animal, and the internal use of liquor ammoniac acetatis, oil of turpentine, and other agents calculated to excite perspiration, have been most strongly advocated. I undoubtedly prefer to excite the action of the skin by raising the temperature of the air rather than by the employment of internal remedies, which often act feebly and very imperfectly on the lower animals.

Stimulants have had their strong advocates. I have given whisky, brandy, spirits of wine, in two ounce doses, every two or three hours, and some animals have recovered while others have died. Carbonate of ammonia, in half ounce doses, has been largely employed, and seems to agree as well as any thing with the sick animals. Strong ale, porter, port wine, and other more or less active beverages containing alcohol, have been principally used when animals have been convalescent.

I have not resorted to sedatives to any great extent in this malady. Tincture of aconite, in thirty-drop doses, has been administered at frequent intervals. Extract of belladonna and considerable doses of opium have been chosen from among narcotic remedies as affording the best chance of regulating, at different times, the condition of the bowels.

Nitrate of potash, chlorate of potash, and acetate of ammonia, have been freely administered, and, in some cases, with apparently good effect. These agents are almost exclusively relied on in certain febrile disorders from their action on the blood, and the favorable effects they induce in activating the secretion of the skin, kidneys, and mucous membranes generally. They are administered singly or combined, in moderate and repeated doses, with or without carbonate of ammonia, and dissolved in a considerable quantity of water.

Mineral and vegetable tonics are used with benefit in the convalescent state, and, if not given in large doses, so as to induce derangement of the stomach and bowels, they accelerate the return to health in a very decided manner. Vegetable tonics, such as chinchona bark in decoction, or infusion of gentian, are given about an hour before feeding-time, and serve to stimulate the appetite. Of all the mineral tonics, sulphate of iron is the best, and should be given in drachm doses in food. Preparations of iron have been supposed to act powerfully as prophylactics, and for this purpose I recommended them when I first recognized the existence of the disease in the country.

Mineral acids have claimed a great share of attention, and I have been in the habit of using them freely. Hydrochloric acid, largely diluted, has lately been vaunted as a specific. Sulphuric acid has been more frequently used. Nitromuriatic acid is serviceable in the convalescent stage.

Methods of treatment may be classified under two heads—Preventive and Curative Treatment.

Preventive Treatment.—A somewhat rational plan, recommended from the commencement, was the daily administration of tonics, in addition to proper feeding, ventilation, and use of disinfectants. Iron has proved so useful in my own practice during outbreaks of contagious diseases, that, in a circular entitled "Advice to Owners of Cattle," dated the 3d of August, I said: "The administration of tonics in moderation, and especially preparations of iron, may be recommended for all cattle that have been accidentally subjected to the contact of infected animals. All should be done to support the animal's strength, that it may withstand the disorder." Shortly afterward, the British Consul at Warsaw brought to the notice of the British Government, in the month of August, a remedy for the rinderpest, adopted with much success in Poland, in 1857: "The putting of old iron into the troughs from which the cattle drink, so as to produce a highly chalybeate water. The efficacy of this mode of treatment is said to have been discovered by the almost entire immunity from the disease, in 1857, of the cattle on a farm where there was a chalybeate spring." An observer recommends a plentiful supply of bruised oak bark as a great preserver, and fresh-powdered carbonate of ammonia, dissolved in about the proportion of a tea-spoonful to a quart of the water supplied to the cattle, to keep their blood pure and in a state to resist infection. Sulphurous acid and its salts have been strongly advocated, and Dr. DRUITT, Dr. SMART, Dr. WILKINSON, and others, have recommended daily doses of hyposulphite of soda to healthy cattle in infected districts. The use of vinegar has also been suggested. Two calves were placed among a number of diseased cows, and had a wine-glassful of vinegar in a pint of water twice a day; they also had their eyes and nostrils sponged with the same mixture, with complete success. Tar-water, made of the best Barbadoes tar and capsicum, was also suggested. Hot tar was to be painted on the cribs and mangers, and a little tar was to be smeared on each nostril, and upon every foot, and between each hoof.

Curative Treatment.—It is difficult to classify the many extraordinary methods of treatment suggested since the 1st of August last for the treatment of steppe murrain. Advocates of hot-air and vapor baths have been very positive in their statements, some, like Mr. R. MONTEITH, insisting on the value of the first, and others asserting their firm belief in the second, especially in combination with other remedies. The vapor bath is an old method of treatment, said to originate with the celebrated THAER, the father of scientific agriculture in Germany, who is reported to have applied it with signal success during the murrain year of 1828. A large copper kettle is sunk in the earth and filled with water. A strong fire is then kindled underneath the kettle, over which perforated boards have been laid. When the water boils, the sick animal is placed on the boards and covered with a woolen cloth, and a linen one above it. The animal is kept there from half to one hour, then rubbed dry, kept warm, and allowed hay and gruel. Great attention was paid to this method of treatment by a Russian farmer, who explained it, in a letter to our Ambassador at the Court of the Czar, Sir A. BUCHANAN, which was forwarded in a dispatch to Earl RUSSELL, on the 3d of October, 1865. Mr. FEULING, the gentleman in question, spoke confidently of the value of the vapor bath; and the faith in the remedy increased when Mr. GRAHAM, of Capellie, near Glasgow, detailed recoveries under the following system. Mr. GRAHAM administered

Sulphur	3 table-spoonfuls.
Niter	3 table-spoonfuls.
Ginger	½ table-spoonful.
Treacle	1 pound.
In warm water.	

The animal was to be packed in three heavy horse-rugs, well saturated with cold water, and three other rugs were wrapped over them. In a letter to Sir FITZROY KELLY, Dr. DRUITT enters somewhat fully into the kind of remedies which may be found serviceable in the treatment of the plague, and his observations are condensed in the subjoined note:

"In any zymotic disease, the first question is, Can we stop it? Can we put out the fire? Have we any medicines capable of summarily checking the disease before it comes to the point at which it is naturally spent? We wish we had, but have not. Providence will show us the way some day, if we exert ourselves; but at present the only fevers which we can cut short are the malarious ones—ague, remittent, jungle fevers, etc.—against which we have quinine, arsenic, and other tonics. We have not at present any remedies on which we can rely for cutting short any true zymotic disease, such as small-pox, chicken-pox, measles, scarlet fever, typhoid, typhus, whooping-cough, and all that other dreary catalogue; but if we are to make experiments on the rinderpest, there are two or three glimmers of light to guide us. Supposing that we seek for remedies for the early stage. To cut the disease short, deliberate trials should be made—first, into the various alkaloids, amorphous or crystallized, produced from chinchona bark, of which quinine is the chief. But there are many others, such as chinchonine, chinchonidine, and quinidine, which are got from the bark, which may now, or will soon be, obtained abundantly in India, and which are cheaper. We have just as much reason, and no more, to expect these substances to cure the cattle plague as the Spanish pilgrims had, three centuries ago, to expect the bark to cure the Countess of Chinchon's ague. It was a fair experiment, which succeeded. Certainly, large doses of these alkaloids ought to be well tried. If we give six doses, of ten grains each, to a man weighing one hundred and sixty pounds, we ought to give in the same proportion per weight to a cow. Secondly, there are various combinations of bitters, astringents, and aromatics, with stimulants. When they could get no Peruvian bark on the continent, during the war with France, combinations of alum, oak bark, gentian, and aromatics were used, with more or less success, for their malarious fevers. Thirdly, there are certain saline matters, such as nitrate of potass and chlorate of potass, antimony, purgatives, etc., which have more or less virtue in allaying some feverish symptoms, but which are not to be relied on in any zymotic or malarious disease. Lastly, there are stimulants which may be tried in the commencement of the attack with the hope of enabling the animal to shake off the disease, even as a glass of hot brandy-and-water, Turkish bath, and other excitants, may, as I believe, enable man to shake off the earliest stage of influenza. So far, then, as remedies are concerned which tend to cut the disease short, experience bids us look for specifics among the quinine group. And it is experience only that can teach us. But, confessing that we are unable to deal with the disease in its essence, there is a very great deal we can do in the way of mitigating its local effects—of keeping up the strength, of preventing the patient being poisoned by the poisonous secretions generated within her own system; of checking exhausting discharges; and of rendering those secretions innoxious to other animals. It must, however, be borne in mind that while we speak of the different stages of the disease, and can always separate them in idea, they may be all so crowded together that it may be necessary to begin at the very outset with the treatment adapted for preventing local ravages and intestinal infection. Now, the chief local effects produced by the rinderpest are a softened, congested state of the mucous membrane of the alimentary canal, with copious fetid discharge from the bowels; and the most likely class of remedies are those which will restrain this discharge, and so prevent it from draining the patient, and which shall deprive it of its poisonous qualities, and thus hinder it from doing mischief to the patient, or, if voided, from contaminating other animals. If putrid excretions be poured out in the bowels of any animal, they poison the animal's blood, cause all fresh food to be tainted, and, when voided, they are the source of contagion to others. Now, then, we seek a remedy which shall not be poisonous in itself, which shall have tonic or nutritive virtues, which shall restrain excessive discharges, and which shall have the power of deodorizing and disinfecting the contents of the alimentary canal. Such a remedy is the tincture of sesquichloride of iron. The mineral acids, well diluted—as the nitric, muriatic, and sulphuric—do in a lesser degree what the tincture of steel does. Their influence in atonic diarrhea is marvelous; and we ought to know their results in the rinderpest. Small quantities of opium may be added. The trisnitrate of bismuth, in ounce doses, would deodorize the alimentary canal, and soothe it and restrain diarrhea. I have published cases showing how, in threatened ulceration of the bowels, the human alimentary canal may be quieted by adequate doses of this excellent drug. Sulphate of potass, and other compounds of sulphurous acid, have great virtue in checking fermentation, and have been proposed by Polli as remedies in zymotic fevers. We want experiments with large doses of these. But I suspect they are of more value as preventives than as curatives—to disinfect unwholesome water, to rinse the mouths of animals exposed to contagion, and the like. There is the class of creosotes—medicines, such as carbolic acid, which check fermentation, act as antiseptics and deodorizers, and are capital in certain cases of dyspepsia and diarrhea. Here, then, we have half-a-dozen remedies, and the example I have given from practice on man shows the precise method in which good results are to be looked for. I reiterate again the necessity of disinfecting the whole tract of bowels, of restraining discharge, and of rendering the fecal matter innoxious to the patient and her neighbors—all this, too, as a means of helping the patient to live through her disease till its fury be overpast. Whisky, sweet spirits of niter, beef-tea, and other nourishment, should be given freely. There are other remedies, too, as yeast, in large quantities, whose *modus operandi* is probably that of an antiseptic, and others. Enough if I can succeed in inducing any one, who can do so with safety, to make a resolute series of experiments on diseased animals." A veterinary chemist recommends:

Chlorate of potash	1	oz.
Nitrate of potash	1	oz.
Strong muriatic acid	1	dr.
Powdered opium	1	dr.
Decoction of linseed	$1\frac{1}{2}$	pints.

Mix together for one dose.

This, it is said, "can not fail to alleviate the trouble, if not entirely ward off the disease, if given on the first symptoms, and followed up three times a day."

The following prescription has also been recommended:

Chlorate of potash	Each 1 oz.
Common salt	
Niter	

Dissolve them in a pint of hot water, in which an ounce of dilute hydrochloric acid has been mixed, and administer in a sufficient quantity of their gruel for a dose. Mr. MOFFAT'S prescription consists of

Chlorate of potash	3	dr.
Tartar emetic	5	gr.
Carbonate of iron	15	gr.

Mr. CROTCH, M. A., recommended the injection of various antiseptic and parasiticide salts into the circulation of the veins, and the hyposulphite of soda, the permanganate of potash, or the perchlorate of soda are said to be well adapted to this purpose. Dr. CARR speaks of a dozen cows cured "by removing the diseased cattle from the shed and tethering them in a shaded spot in the field, administering warm drinks of gruel or linseed tea, with aromatic seeds (fennel or caraway), an astringent, if diarrhea be urgent, and blistering the throat. The mouth is frequently washed with strong vinegar and water; and vinegar is also administered to the extent of a pint or more daily."

Dr. SMART'S method of treatment has been described by himself as follows:

"*General Principles of Treatment.*—These are based upon a knowledge of the pathology of the disease, and indicate the line of treatment to be adopted in dealing with it.

1. *The Animal Temperature is Lowered and Deficient.*—This has to be restored and maintained. To do so the affected animal is

protected from all direct draughts of air, placed in a house or byre with an equable temperature not under 70° Fahrenheit, and the hide thoroughly cleaned and rubbed down, and a warm covering kept on the animal throughout the progress of the case.

2. *The Stomachs are Loaded and Distended with Food.*—This condition, by preventing access of medicine and suitable nourishment, presents a very great obstacle to treatment. But it also indicates the line of treatment to be adopted at this stage; namely, to remove the hurtful accumulation as quickly as possible. This must be done by mild purgation, suited to the already irritable condition of the lining membrane of the stomach and bowels. The medicines here indicated are gentle relaxants, combined with diuretic action.

3. *Extreme Vital Depression is characteristic of the Disease throughout its entire Progress.*—This is conjoined with a very peculiar and rapidly-destructive change of some of the internal structures. Stimulants to support the depressed vital powers, and resist, as far as possible, this tendency to destructive dissolution, are thus clearly indicated from the very commencement. And as it is of importance to make the healthy organs subserve the purpose of removing from the blood the morbid materials that may exist in it and in the general system, stimulant treatment should conjoin with it remedies fitted to excite the functional activity of the two great eliminators of this class; namely, the skin and kidneys. Hence stimulant, diaphoretic, and diuretic action are here indicated. Regular milking of the diseased cow, in order to prevent the retention in the blood of the elements of the milk, is, also, on the same general principles, clearly indicated throughout the entire course of the disease.

4. It almost appears an axiom to say that a properly-regulated and rational system of nursing is in the treatment of disease in cattle, as in man, of very great importance to the comfort of the sick, and as an aid to their recovery. In the present example, no method of combating the malady can be of any use in which careful nursing does not form the basis of every other effort to restore health. It is not idle to repeat this, because, in any system of treatment hitherto made public, the importance of this fact has either been insufficiently recognized or entirely overlooked. Hence arises the necessity of there being kind, skillful, and experienced attendants, and a well-regulated dietary.

Remedies.—These are few, simple, and selected on the principles above stated. My experience of their suitableness is every day more established by fresh examples of their efficacy. There are yet only three kinds of drugs which I found it requisite to employ. 1. Laxative, with diuretic action. This is principally used in the early, but often required at other periods, in the progress of the disease. It is composed of

Nitrate of potash Powdered ginger	each	1 oz.
Powder of sublimed sulphur		2 oz.
Treacle		1 lb.
Water to make a quart, and well mixed.		

This quantity is given night and morning, or, if requisite, oftener, until scouring is produced. Afterward, an occasional bottle will maintain the free movement of the bowels, without inducing excessive action. As the vital powers sink rapidly, there should be as little delay as possible in administering stimulants. I have found the following mixture possessing stimulant, diuretic, and diaphoretic properties, very efficacious:

Carbonate of ammonia		$\frac{3}{4}$ oz.
Sweet spirit of niter Spirit of mindereris	each	$1\frac{1}{2}$ oz.
Cold water		9 oz.
Mix.		

This dose, from the commencement of treatment, is administered thrice a day during the entire course of the disease. When prostration is great, it is sometimes needful to give it from the commencement, and to combine it with any other medicine that may be given. In such cases, the doses may be reduced one-third. When convalescence is fully established, a simple tonic hastens recovery. I find none so good and safe as chinchona bark. The best quality only should be used, and given in doses of one ounce and a half of the powder. This tonic, in the early period of convalescence, is combined with the stimulant, and at a later period with a quart of good, sweet ale, given once daily. It is best administered at night. Two table-spoonfuls of laudanum may be added at any time to any other medicine which the animal is getting, or given in the food when it becomes requisite to control excessive diarrhea, or obviate straining. With this exception, there are at present no other drugs employed.

Diet.—It should be simple, and, until decided convalescence, well cooked, and given in small and regulated quantity. I use the following full mash. It is composed of,

Bran	4 handfuls.
Brewer's draff	4 handfuls.
Peasemeal	1 pound.
Mashed turnips (well boiled)...	2 pounds.

Not too thick, and given night and morning. At midday a drink of gruel is given, made with two pounds of oatmeal, well boiled in six quarts of water. In addition to these, some raw turnip (two pounds, for example, of greentops), and one pound of hay, may be allowed in small quantities during the twenty-four hours. To allay thirst, three to four quarts of water, previously boiled and allowed to cool, is given in mouthfuls during the day. This constitutes the full diet of a decided convalescent. Half of this diet is, in most instances, during the acute course of the disease, too much. In all cases, the same kind of food and periods of giving it are followed. There are some animals that, for a time, refuse all food, not excepting gruel. In such cases the gruel is administered by the bottle, thrice daily, along with or after the medicine. The animal should get a little mash so soon as it takes it voluntarily. It is often expedient to miss a meal, especially whenever symptoms of an unfavorable indication appear. These are not of unfrequent occurrence during the course of treatment. Grass is given, and the quantity of hay and turnip increased as there is progress toward more perfect recovery.

Symptoms of Convalescence.—The more obvious indications are, 1. Recovery of appetite; 2. Greater animation; 3. Return of breathing and pulse to their normal condition; 4. Increase of milk; 5. Chewing the cud. The seventh, fourteenth, and twenty-first days are critical periods in the progress of the disease.

Summary of Treatment.—1. The animal is at once taken from its ordinary food and separated from the rest. 2. Placed in a well-aired byre, or house, free from draughts, and the temperature of which is maintained at 70° or 75° Fahrenheit. 3. It is to be well rubbed down, and thoroughly cleaned, and covered with a good rug. 4. If there be constipation, begin with laxative, and continue night and morning, or, if required, oftener, until there is free scouring. 5. Let there be no delay in giving the stimulant, and, if needful, combine it with the laxative. 6. Defer giving ale and bark until convalescence appears. 7. To obviate straining or excessive purging, two table-spoonfuls of laudanum, night and morning, may be added to other medicine. 8. Be careful to avoid overfeeding, as an error in diet may prove fatal. 9. See that the cow is well milked, night and morning, (even when there is no yield,) during the course of the disease. 10. All the droppings should be at once disinfected by solution of chloride of lime, and quickly removed. 11. The affected animals should be frequently and closely observed, and threatening indications treated as they occur."

The Edinburgh Committee on the Cattle Plague, having been authorized by the Royal Cattle Plague Commission to make observations and experiments in reference to the prevention and treatment of the disease, considered it desirable, in addition to the experiments on treatment which they proposed to institute themselves, to obtain a record of observations and experiments made by as large a number as possible of qualified veterinary practitioners throughout the country. With this view, they drew up the following suggestions for methods of treatment of various kinds, prophylactic and curative, which they were anxious should be tested on an extensive scale:

"The Committee, before specifying the various methods of treatment in detail, would premise a few general remarks, which they consider to be applicable to all cases.

FIRST, *as to General Sanitary Measures, Disinfection, etc.*—The Committee content themselves with referring for full information on these matters to the 'Supplement of the Report of the Royal Cattle Plague Commission,' which is in the hands of all veterinary inspectors.

SECONDLY, *as to Food.*—The Committee deem it desirable to state it as their opinion that, as a general rule, at all stages of the disease, and whatever treatment is used, food should not be pressed on the affected animal. They believe that too much, even of the softest food, is hurtful, the powers of digestion being so greatly impaired by the disease. During the earlier stages, they believe that the safest articles of diet are oatmeal gruel, barleymeal gruel, with linseed tea, hay tea, or bran tea, and that little, if any, addition to these is needed. During convalescence it is also very necessary that the food should be both sparing and of easy digestion. The same diet as during the earlier stages may be continued, with the addition of mashes of well-boiled turnips or carrots, but in moderate quantity. When rumination commences to be reëstablished, a handful of sound hay, damped with salt and water, may then be given in addition.

THIRDLY, *as to the Maintenance of the Heat of the Animal.*—The tendency to chill of the surface is a marked feature of the disease, and it is very essential that the animal should be guarded against cold. The byre should be kept heated up to a temperature of sixty-five degrees. The animal should be thoroughly rubbed down from time to time, and be kept covered with an ample, clean rug, fastened on with a roller, or band of any kind.

FOURTHLY, *as to the State of the Bowels.*—In the early stages they are apt to be constipated. To remove this condition mild laxatives may be required, but strong purgatives of all kinds are both unnecessary and unsafe. The best laxatives are either raw linseed oil, in the dose of a chopin-bottleful (an English quart), or from two to three ounces of flowers of sulphur, mixed up with two pounds by weight of treacle and two chopin-bottlefuls of water. These doses may be repeated cautiously, according to circumstances. Sometimes even in the early stages, but more frequently when the disease has continued for some days, diarrhea or scouring is apt to come on, and to prove irritating and exhausting to the animal. The simplest and best treatment for this symptom is one ounce of laudanum, mixed with a chopin-bottleful of lime-water, repeated twice or even thrice a day if necessary.

Having thus premised these general recommendations, the Committee proceed to state, in detail, particular methods of treatment, classified under the heads of

A. DIAPHORETIC AND STIMULANT TREATMENT.
B. ACID TREATMENT.
C. RESTORATIVE TREATMENT WITHOUT DRUGS.
D. PROPHYLACTIC TREATMENT.

A. *Diaphoretic and Stimulant.*—The Committee are anxious to give a full trial to the method of exciting sweating by means of the vapor bath. The method of using this agent is as follows: The animal is to be placed in a stall inclosed on all sides, the height of the inclosure being a few inches more than that of the animal. Over the top of the box or inclosure thus formed is thrown a tarpaulin, which should cover it completely, with the exception that an opening is left in it sufficient for the animal's head to pass through. There is then to be placed on the floor of the inclosure, under the animal, a tub containing boiling water, to the depth of half a foot. A continuous evolution of steam is to be maintained for half an hour by means of red-hot bricks thrown into the tub one after another. Under the use of this steam bath, if properly managed, the animal may be expected to become warm and to perspire profusely. After each vapor bath the animal should be washed with tepid water containing McDougall's disinfecting soap, taking care to dry it well after the washing. It should then be covered with an ample rug, kept, as already stated, closely applied to its body by means of a roller, or band of any kind. The bath may be repeated either on the same day or following days, according to circumstances. During and after the bath the animal should be allowed a draught of cold water, which helps to promote perspiration. The objects chiefly aimed at by the use of the vapor bath are to promote the circulation at the surface, to relieve the congestion of the mucous membranes, and to eliminate the poison from the system. Combined with the vapor bath may be used various other remedies not incompatible with it, but calculated to aid its action.

Several of these remedies the Committee now proceed to mention, it being, however, understood that only one of them is to be used along with the bath in each case where the experiment is made; they are not to be used together in the same case. 1. Oil of turpentine. This may be administered in doses of four tablespoonfuls, well shaken up with a chopin-bottleful of gruel, and may be given twice a day. This remedy may be expected to act beneficially by its powers of stimulating and of exciting perspiration. It may probably, also, in most cases where it is used, supersede the necessity for giving any laxative medicine. 2. Infusion of coffee. The method of preparing this remedy is by infusing two ounces of ground roasted coffee, for a quarter of an hour, in a chopin-bottleful of boiling water. It must, of course, be allowed to cool somewhat before being administered, and may be given in the above quantity every six hours. In addition to its stimulant and nutritive qualities, the coffee may act beneficially in consequence of the empyreumatic oil and caseine which it contains. 3. Carbonate of ammonia. This medicine, which has been found in many cases to act beneficially as a powerful diffusible stimulant, may be administered three times a day, in doses of half an ounce, either alone or preferably combined with three drachms of niter, dissolved in a chopin-bottleful of gruel.

B. *Acid Treatment.*—This treatment is suggested in consequence of the alkaline state of the secretions which is found to exist uniformly in the cattle plague. 1. Diluted muriatic acid is said to have been successful in Holland. It may be given twice a day, in doses of three drachms, mixed with a chopin-bottleful of gruel. 2. Vinegar. This may be used in doses of two ounces, mixed with a chopin-bottleful of gruel, and may be given four times a day.

C. *Restorative Treatment without Drugs.*—This consists in carrying out in full the sanitary instructions of the Royal Cattle Plague Commission: in regulating the diet according to the instructions already given, in keeping the animal warm, and in administering two chopin-bottlefuls of good Scotch sweet ale three or four times a day. It is desirable that this system should be carried out in a certain proportion of cases, all drugs being rigidly abstained from.

D. *Prophylactic Treatment.*—The Committee would further desire to draw attention to the importance of experiments being made as to the efficacy of prophylactic (protective) treatment, either in preventing the development of the disease or modifying the intensity of the symptoms when the disease becomes developed in animals which have been exposed to the infection. In such cases, of course, all the sanitary measures of the Cattle Plague Commission should be strictly carried out. There may also be given, at the earliest possible period, prophylactic drugs, of which those most deserving of trial seem to be, 1. Sulphite of soda, given morning and evening, in doses of one ounce, dissolved in a bucketful of water. 2. McDougall's solution, of which a wine-glassful in a bucketful of water may be given twice a day. 3. A mixture of half an ounce of sulphite of soda and two table-spoonfuls of McDougall's solution, in a bucketful of water, may be given twice a day.

Prevention of the Cattle Plague.—There is but one rational and sufficient system whereby the Russian plague can be kept in check. That is by preventing direct or indirect contact between animals affected with the disease and those that are sound. All else is valueless. This is clearly established if we consider how and why we are losing the horned stock of Great Britain.

We should have prohibited direct importation from Russia.

We should have established foreign stock-markets and slaughter-houses.

We should not have trusted to the insufficient system of inspection at our ports and markets.

The disease should have been recognized earlier.

We should have killed the diseased and infected animals with the greatest determination from the very first.

The Government should have acted promptly, without trusting to the tardy development of public opinion and the hesitating action of country magistrates, mayors, and others intrusted with authority.

Greater reliance should have been placed in veterinary surgeons, who, knowing the disease and the desperate measures it required, could have saved the lives of thousands of valuable animals.

I did my best on the 29th and 31st of July, 1865, to rouse the Government to a true sense of our position. I then advocated the formation of a national association for the prevention of cattle diseases, of a national insurance fund, and created some astonishment when I said, on the 1st of August, that "the present calamity will not fall on a class, as in the case of the cotton famine. It must affect the nation throughout its length and breadth. It is too late now to avert such a result, and, with a view to enable us to cope with very extraordinary difficulties, there must be a general and extraordinary coöperation among the people." I afterward advocated the continental system, and said, "I quite agree with the Austrian veterinarians, that to cure is, in this case, to kill, because so long as sick and convalescent animals are kept about, the danger of propagating the malady is enormous. Kill by all means; and if you can compensate, kill all that have been near a contaminated animal."

SECTION XVII.

DISEASES OF SHEEP.

Improvement in Sheep—Rot, or Hydatids in the Liver—Yellows—Vertigo, or Giddiness—Jackets or Blankets for Sheep—Foot-rot—Grubs in the Nostrils—Ticks—Inflammation of the Eye—Inflammation of the Lungs—Common Catarrh—Diarrhea and Dysentery—Constipation of the Bowels—Tympanites, or Windy Distension of the Intestines and Abdomen.

Improvement in Sheep.

NO country in the world is better calculated for raising sheep than the United States. The diversity of climate, together with the abundance and variety of the products of the soil, united with the industry and perseverance of agriculturists, render this country highly favorable for the breeding, maturing, and improving the different varieties of sheep. The American people, as a nation, are stronger intellectually than any other on the face of God's earth; consequently they are all-powerful, "for the mind is mightier than the sword." Should this intelligent nation of husbandmen direct their whole attention to the improvement of sheep, then in a few years America shall outshine her more favored European rivals, and her husbandmen shall feel proud of their improved stock. What the American people have accomplished during the past half century, in the arts and sciences, cultivation of the soil, etc., is an earnest of what they can do in improving the constitution and condition of live stock, provided they take hold of the subject in good earnest. Let any one who is acquainted with the subject of degeneration, its causes and fatal results, not only in reference to the stock itself, but as regards the pocket of the breeder, carefully investigate the subject, and it will be perceived that there still exists a fine field for improvement. Much has already been accomplished in improving the different breeds in America, and our farmers deserve great credit for their praiseworthy efforts in endeavoring to raise fine stock, and I presume their labors have proved remunerative.

In order to show what a whole community of stock-raisers can accomplish, in view of improvement, when they have an eye single to the object, I here introduce some of the results attending such an enterprise, conducted by a single individual—MR. BAKEWELL.

"His breeding animals were, in the first place, selected from different breeds. These he crossed with the best to be had. After the cross had been carried to the desired point, he confined his selections to his own herds or flocks. He formed in his mind a standard of perfection for each kind of animals, and to this he constantly endeavored to bring them. That he was eminently successful in the attainment of his object can not be denied. He began his farming operations about 1750. In 1760 his rams did not sell for more than two or three guineas per head. From this time he gradually advanced in terms, and in 1760 he let some for twenty-five guineas a head for the season. Marshall states that, in 1786, Bakewell let two-thirds of a ram (reserving a third for himself) to two breeders for a hundred guineas each, the entire services of the ram being rated at three hundred guineas for the season. It is also stated that he made that year, by letting rams, more than one thousand pounds. In 1789 he made twelve hundred guineas by three 'ram brothers,' and two thousand guineas from seven, and, from his whole letting, full three thousand guineas. Six or seven other breeders made from five hundred guineas to a thousand each by the same operation. The whole amount of ram-letting of Bakewell's breed is said to have been not less that year than ten thousand pounds (forty-eight thousand dollars).

It is true that still more extraordinary prices were obtained for the use of rams of this breed after Mr. Bakewell's death. Pitt, in his 'Survey of Leicestershire,' mentions that, in 1795, Mr. Astley gave three hundred guineas for the use of a ram of this breed, engaging, at the same time, that he should serve gratis twenty ewes owned by the man of whom the ram was hired, making for the entire use of the ram that season four hundred and twenty guineas. In 1796 Mr. Astley gave for the use of the same ram three hundred guineas, and took forty ewes to be served gratis. At the price charged for the service of the ram to each ewe, the whole value for the season was five hundred guineas. He served one hundred ewes.

In 1797 the same ram was let to another person at three hundred guineas, and twenty ewes sent with him, the serving of which was reckoned at a hundred guineas, and the ram was restricted to sixty more, which brought his value for the season to four hundred guineas. Thus the ram made, in three seasons, the enormous sum of thirteen hundred guineas.

We have nothing to do, at present, with the question whether the value of these animals was not exaggerated. The actual superiority of the breed over the stock of the country must have been obvious, and this point we wish kept in mind. This breed of sheep is continued to the present day, and it has been remarked, by a respected writer, that they will 'remain a lasting monument of Bakewell's skill.' As to their origin, the testimony shows them to have been of mixed breed, though no breed is more distinct in its characters, or transmits its qualities with more certainty; and if we were without any other example of successful crossing, the advocates of the system might still point triumphantly to the Leicester or Bakewell sheep.

But what are the opinions of our best modern breeders in regard to the practicability of producing distinct breeds by crossing? Robert Smith, of Burley, Rutlandshire, an eminent sheep-breeder, in an essay on the 'Breeding and Management of Sheep,' for which he received a prize from the Royal Agricultural Society, (1847,) makes the following remarks: 'The crossing of pure breeds has been a subject of great interest among every class of breeders. While all agree that the first cross may be attended with good results, there exists a diversity of opinion upon the future movements, or putting the crosses together. Having tried experiments (and I am now pursuing them for confirmation) in every way possible, I do not hesitate to express my opinion that, by proper and judicious crossing through many generations, a most valuable breed of sheep may be raised and established; in support of which I may mention the career of the celebrated Bakewell, who raised a new variety from other long-wooled breeds, by dint of perseverance and propagation, and which have subsequently corrected all other long-wooled breeds.'"

Rot, or Hydatids in the Liver.

This parasite, which affects the liver of sheep, is known as the fluke, (fasciola hepaticum,) and is usually found in the biliary ducts. Rot, in its advanced stage, is a disease of a very formidable character, and its associations closely resemble dropsy. A serous fluid accumulates beneath the skin, hence some people call it the water rot.

Causes.—Wet pastures, and exposure to storms and changes of weather, with innutritious diet, are the exciting causes of this malady.

Treatment.—If flukes are present, it is evident that, in order to strike at the root of the malady, we must get rid of them, which can only be effected by bringing about a healthy condition of the system. Nothing that can be done by the application of medicine will act on them to affect their vitality. It is only by strengthening the animal powers that we are enabled to give sufficient tone to the system to throw off the flukes. For that purpose many advocate salt. Salt is an excellent stimulative to the digestive organs, and may also be of service in restoring the biliary secretion, from the soda which it contains. So well is its stimulative action known, that some individuals always keep salt in the troughs containing animals' food. That this is a preventive they have good proof, seeing that it matters not how much the soil might be in salt marshes, no sheep are ever attacked by rot in them, while those sent there infected very often come back free. Salt, therefore, must not be neglected. But then comes the question, can they not do something more? I believe they can. They must throw tonics into the system, especially those that are obtained in the mineral kingdom. I should prefer the sulphate of iron (iron is found in animal matter). It is one of the constituents of the blood, and, used in the form of sulphate, it gives a greater tone and energy to the frame than in any other form. Its use, therefore, ought never to be neglected in the earlier stages of the disease. I have already alluded to the fact that, when the liver does not perform its functions, a greater effort is made by the kidneys to depurate the blood. The kidneys should, therefore, be stimulated. But I must not be supposed to advise the exhibition of diuretics, which would induce debility, but of medicines, which would give strength to the frame, and, at the same time, act on the kidneys, for which purpose nitric ether is an agent which ought to be employed. The principles I wish to lay down are, to husband the animals' powers by placing them in a situation where they shall not be exposed to the debilitating effects of cold storms; to supply them with nutritious food, and such as contains but a small quantity of water; and to mix salt with the water; and likewise to administer sulphate of iron, and occasional doses of nitric ether.*

Yellows.

This term is used by shepherds to designate disease of the liver.

Symptoms.—The affected animal has a peculiar languid appearance, frequently shaking the head, as if parasites were in the nostrils; the head is pressed against any elevated ground, sometimes against the fence or a post; the animal moves lazily along, with its nose almost touching the ground; the membranes of the eyes and nose have a yellow tinge; the same is true of the skin; a marked yellowness is observed on the insides of the thighs and anus. As the disease advances these morbid appearances are augmented. The patient grates its teeth; stands with the head pendulous, almost touching the ground; then soon falls, and dies without a struggle.

The autopsy reveals the following: The liver has a mottled appearance, and its structure is easily broken down; the gall-bladder is usually full of dark-colored, tarry-looking bile; kidneys, stomach, and intestines, tolerably healthy. Should any urine be found in the bladder, it will be of a dark color. The heart is pale and flabby; the lungs, healthy, yet the chest usually contains a quart or more of dark-colored serum. On removing the skin, the surface of the body is yellow (jaundiced).

Treatment.—Remove the diseased animals from the flock and put them in a dry shed. Then prepare the following:

Fluid extract of leptandra (Culver's root)	1 pound.
Powdered hyposulphite of soda	6 oz.
Water	1 quart.

Dissolve the soda in the water, then add the leptandrin. Dose, one ounce (fluid) twice daily. Let the affected animals have salt; grass should also be cut and placed before them.

* Professor Simonds.

Vertigo, or Giddiness.

Vertigo, or giddiness, is a disease of the nervous system, occasioned, most frequently, by a parasite located in the brain. The parasite is named cænarus cerebralis, and belongs to the species known as hydatids. Lambs from the age of two months, or from four to twelve months, are, when predisposed, apt to become the subjects of it. The disease is very apt to end in organic disease of the brain and spinal marrow.

The disease is of hereditary origin, and comes from faults or defects in one or both parents, and also from the too early practice of breeding, which often obtains in some sections of country. In order to guard against the disease, we must put out of the breeding-fold both males and females that have shown any signs of the disorder, and not breed from the ewes under the age of thirty months, nor from rams until they have attained their second year.

Treatment.—In the treatment of the disease, our object is to give tone to the system, and saturate the blood with some agent (sulphur) which is known to be obnoxious to parasites in general. Take of

Sulphur	1 pound.
Powdered sulphate of iron.......	6 oz.
Powdered poplar bark...........	1 pound.

Let this be thoroughly mixed, place it in a stoppered bottle, and keep it in a dark place. Mix a table-spoonful daily in bran, and place it in the feed-trough, or mix it in a table-spoonful of syrup, and administer it by means of an iron spoon.

Some persons contend that turnips, when fed to sheep, are apt to produce hydatids. On this subject, and on that of protecting sheep from the inclemencies of the weather, the following article is offered:

Jackets, or Blankets for Sheep.

A writer in a late number of the "London Agricultural Gazette" says: "We find, on examining our mortality tables for the last twelve months, that out of six hundred Cheviot and black-faced Evehogs, the number of deaths has been but sixteen. Be it remembered, also, that, with the exception of about a score, none of these ever tasted a turnip, but fared with the ewes on the hill. Since we commenced the use of jackets, (small blankets,) we have especially noticed an extraordinary diminution of the cases of 'sturdy,' or water in the head. Hydatids in the brain are generally understood to be induced by long-continued heavy rains, cold winds, and general privation. Any one conversant with sheep must have observed the wool along the back parts in such a way as fully to expose the skin. The connection between the spine and the brain is obvious, and it can not be wondered that hydatids (little sacs filled with water) should be formed in the brains of sheep much exposed to severe storms, without due shelter. Hence the advantage of covering their backs with some material which will protect them, in a great measure, from the chilling effects of wind and rain. The material used is woollen, the size being twenty-three inches by fifteen. We lately purchased some coarse blankets that made excellent covers, each jacket costing fourpence. The rams were put with the ewes on the 22d of November, and we allow forty-five to each male."

The above remarks, from a flockmaster of large experience, in reference to the cause of hydatids, or what we should call water in the brains of sheep, are interesting in a medical and physiological point of view. We know one breeder in Vermont who covers the back of each sheep with a half yard of common sheeting, painted, to shed rain. The practice is founded in reason, and is likely to extend, literally making cotton tributary to the production of wool. The growers of the former staple will not object if every sheep in the United States and Europe has a cotton "jacket;" for one that will answer every intention can be made cheaper of cotton than of wool. The comfort of domestic animals at the South is sadly and most expensively neglected.

Foot-rot.

Causes.—General debility, exposure in wet pastures, contagion, foul habit of body.

Symptoms.—The animal is observed to limp in one or both of the fore or hind legs. Sometimes the whole four are affected. The parts are hot, tender, and swollen, and exude a fetid fluid. The animal is now incapable of walking, and, if not speedily relieved, death ensues. This form of rot is contagious, so that, if the diseased animals are not separated from the healthy, the latter soon become infected. To propagate malignant rot, it is quite sufficient that a flock should pass over a place which has a little before been walked over by a diseased sheep.

Treatment.—Endeavor to ascertain the exciting cause, and, if possible, remove it. If the disease has assumed a putrid type, the superfluous horn may be removed. The parts are then 'o be washed with

Pyroligneous acid	4 oz.
Water	3 oz.
Mix.	

A piece of lint is afterward to be saturated with the above, and applied as a dressing, and changed as occasion may require.

The local remedy will avail but little unless we sustain the living powers, and thus improve the secretions. Our usual remedies are,

Powdered golden seal	1 oz.
Powdered sulphur	$\frac{1}{2}$ oz.
Powdered charcoal	1 oz.
Powdered sassafras	1 oz.
Powdered assafetida	2 dr.
Flaxseed	2 lbs.

Mix, and give a table-spoonful twice a day in the food.

If I were writing exclusively for my medical brethren, I should recommend them to treat the disease according to its indications. The above agents will, however, generally prove efficacious, (even in the hands of the non-medical,) provided due attention be paid to the wants of the animal, and such additional assistance be rendered as common sense will suggest. Supposing a number of animals to be affected, it would occupy too much time to treat them singly; hence I recommend that they be made to walk slowly, or linger for some time in a wooden trough, the floor of which may be covered, to the depth of one inch, with the following:

Linseed oil	2 pt.
Pyroligneous acid	4 pt.
Kerosene	1 pt.

In the above proportions, the required quantity may be prepared.

Grubs in the Nostrils.

Grubs in the nostrils are occasioned by the gadfly, which deposits her ova in the nostrils of sheep. After a short time the ova bring forth parasites in the larvæal state; the latter migrate within the interior of the nostrils, causing the sheep much pain and annoyance. When the larvæ are capable of exercising an independent existence, they undergo the same evolution which obtains in the case of the bot parasite; namely, they burrow into the earth, and finally become metamorphosed into the gadfly.

It seems that the gadfly selects its subjects, and the weakest and most unpromising of the flock are usually its victims; hence close attention to the requirements and condition of a flock may, to a certain extent, act as a preventive. Some farmers, in view of preventing the attacks of the gadfly, smear the noses of their sheep with common tar. Others plow up a piece of land where sheep are pastured, into which they thrust their noses, and then, for the time being, they baffle the gadfly. I do not think it would be good policy to attempt, either by mechanical or medicinal means, to dislodge the parasites; for the remedy might be worse than the disease. When the ova have arrived at maturity, the sheep themselves aid in the dislodgment with acts of snorting, sneezing, and coughing.

Ticks.

These troublesome parasites may easily be got rid of by dipping the sheep in an infusion of tobacco. A compound tobacco sheep-dip is now manufactured, and can be obtained at the drug stores, with full directions for use.

Inflammation of the Eye.

Inflammation of the eye is very readily detected by an acute redness which pervades the lining membranes of the eyelids and that which affords a partial covering to the eyeball. The afflicted animal keeps the eyelids partly closed; an effusion of tears runs over the lower angle of the eye; there is intolerance to light, and the animal appears to suffer considerable pain.

Treatment.—Separate the patient from the flock, and bathe the eye occasionally with the following lotion:

Sugar of milk	1 oz.
Fluid extract of hops	1 dr.
Rain-water	6 oz.
Mix.	

Should the disease run on to cataract, the sight can not be restored.

Inflammation of the Lungs.

Inflammation of the lungs is usually the result of exposure; or it may arise in consequence of herding too many sheep together; sometimes it makes its appearance without any perceptible cause. An impure atmosphere, however, may be set down as the ordinary exciting cause of this malady.

Treatment.—Place upon the tongue ten drops of fluid extract of gelseminum, morning and evening. Dissolve one ounce of chlorate of potass in half a pint of flaxseed tea, and give it daily as a drench until the animal improves. Let the patient be placed in a secluded spot, under cover, and if the case is curable, health will soon return.

The most marked symptoms of pneumonia are panting and heaving at the flanks, quickened respiration, discharge from the nose, and cough. There is also a cessation of rumination. In short, the same symptoms prevail in this disease as in pneumonia of cattle.

Common Catarrh.

This affection prevails most extensively among sheep that have been exposed to rains and unpleasant weather. The disease manifests itself in the form of a defluxion from the nostrils of a mucoserous discharge, accompanied by frequent sneezing, and occasional cough. As soon as the disease is discovered, the affected animals should be placed in comfortable quarters. Then prepare the following drench:

Composition powder................	2 oz.
Boiling water	1 qt.

Pour the boiling water on the powder; let the mixture stand in a warm place for an hour; pour off the clear liquor, and add two ounces of sugar of milk. Dose: A wine-glassful once or twice daily.

Malignant epizoötic catarrh may be treated in the same manner, with the addition of one ounce of chlorate of potass per day, which can be dissolved in the above drench.

Diarrhea and Dysentery.

Curable cases of the above character are brought to a favorable termination by using the following drench:

Finely pulverized animal charcoal....	1 oz.
Scalded cow's milk..................	1 gill.
Hyposulphite of soda................	1 dr.
Mix.	

The above constitutes a dose. It may be repeated as often as the emergency seems to require; but should the subject be a young lamb one-half the above quantity will suffice.

Constipation of the Bowels.

Constipation is almost always the result of a deranged condition of the digestive organs. A deranged condition of the liver, for example, will result in costiveness, for which I recommend the following drench:

Glauber salts...................	2 oz.
Fluid extract of leptandra.......	1 tea-spoonful.
Thin gruel.......................	$\frac{1}{2}$ pt.

Dissolve the salts in the gruel, and drench the animal with the same.

Tympanites, or Windy Distension of the Intestines and Abdomen.

This disease is very easily recognized by the bloated appearance of the animal. It is occasioned by the food running into fermentation and generating gas. The following remedy is a sure cure for tympanites, administered as a drench:

Hyposulphite of soda..........	4 dr.
Fluid extract of golden seal....	1 dr.
Fluid extract of ginger.........	2 dr.
Water..........................	1 wine-glassful.

SECTION XVIII.

DISEASES OF SWINE.

EFFECTS OF IMPURE AIR ON SWINE—MEASLES IN PORK—QUINSY—HERNIA, OR RUPTURE—INTESTINAL WORMS—HOG CHOLERA—TRICHINA SPINALIS.

THE TREATMENT OF THE DISEASES OF SWINE.

THE nature of the most common diseases incidental to swine, and the treatment of the same, are subjects of great importance to those engaged in raising this description of property, and it is very gratifying to know that farmers are anxious to obtain reliable information on such subjects. It is only of late years that any special attention has been given to swine pathology in this country, either by farmers or surgeons, and in former years the treatment of swine diseases was extremely barbarous, and consisted of little else than of splitting their ears, cutting off their tails, and dosing them with poisons. Such treatment must have been any thing but pleasant to the poor brutes, and very unsatisfactory in its results.

Swine, in certain periods in the history of the world, have been denominated "unclean creatures, of gross habits," etc. If they are unclean and of gross habits, their owners gave them their first lesson, and are more to blame than the animal. How can it be expected that they shall exhibit better habits while confined in miserable quarters and filthy localities, where they are often compelled to wallow knee-deep in mud and excrement, dragging out a woful existence in the midst of a perfect hot-bed of filth, often respiring an atmosphere concocted from the decomposition of rotten excrements within their pest-hole, or local habitation. And the food that such poor creatures are compelled to devour, what shall I say of that? It is too beastly to describe, yet the cravings of an appetite, not naturally morbid, induce the animal to convert his stomach into a living cess-pool. Some persons appear to have an idea that any system of management is good enough for hogs; hence how can we expect that animals thus neglected and misused shall improve, either in habits or condition? Hence, if domesticated swine have lost their natural instincts, and acquired gross and filthy habits, the blame should fall where it belongs. Husbandmen know, from experience, that if young pigs are properly provided for and kept in comfortable quarters, and not too numerously herded, they will refuse to partake of the horrid garbage which their city cousins, occupying a down-cellar locality, are, from sheer necessity, compelled to devour, and they will exercise the same sagacity in the selection of nice morsels as the wild originals have been known to manifest.

The ancients were led to believe that "the use of swine's flesh was an abomination, and its touch pollution." This was, and is, a mere theory, unsustained by facts—the result of prejudice; for the Egyptians, Jews, and Mohammedans, who considered the flesh of swine as the exciting cause of leprosy and tape-worms, were the greatest sufferers, yet they never touched pork. On perusing the records of the Jewish historians, we are informed that the strangers sojourning in the camp of the Egyptians, partook freely of pork, yet no cases of scrofula nor leprosy appeared among them; yet the followers of Moses, who, from prejudice or antiquated religious custom, abstained from pork, were the greatest sufferers from the terrible diseases known as scrofula and leprosy. Pork is the principal article of food among the Romans, Greeks, Chinese, natives of the Archipelago Islands, and the negroes inhabiting the burning regions of Asia; also the more refined and straight-haired inhabitants of Northern Asia partake freely of pork.

The people of England consume an immense amount of pork, as do also the people of this country. Our soldiers in and out of camp, and when on the march, devour pork, both cooked and uncooked, with impunity; hence, if pork is really the cause of leprosy, scrofula, or tape-worm, we might expect to see many lepers in this country, and an equal number of unfortunate individuals infested with tape-worms; but we all know that the converse is the case, and many American physicians inform me that leprosy and tape-worm are very rare afflictions in this country; so that the uncomplaining and much-abused creature that I am writing about, has been most awfully slandered and ill-used.

I contend that the flesh of swine, when the animal has been judiciously fed, is nutritive, wholesome, and palatable, and in its excellency is considered a great delicacy. Like other substantial food, however, it does not agree with some persons; but the fault is not in the pork, but in the stomach of the invalid, who should not taste that which disagrees with him. Still, it would appear to be in perfect harmony with retributive justice, if the diseases alluded to were the result of man's criminal neglect of a class of animals that should claim his care and protection.

I have alluded to the condition of swine, such as are kept in cities. What shall I say of those which are kept and fed at the slaughter-houses in Chicago and at Cincinnati? We are all conversant with the facts in the case; they are too notorious to need repetition. I only urge those who have the power and will to inaugurate a reform where reforms are most needed. Credit is due, however, to our farmers, who pay much attention to the raising and welfare of swine. The errors I complain of are not so prevalent in the country as in our large cities. I contend that the hog does not thrive so well in the city as in the country. He was never cut out for a citizen; he never chews tobacco, nor does he "smile." He is one of Nature's pets, and thrives best on roots and fruit, in the universal sty. The city air does not vitalize his blood—does not agree with him. Down-cellar locations, and narrow, filthy pens, are abominations. They tend to toughen muscle and to tubercularize, often sending thousands of otherwise valuable animals into a galloping consumption, from which the knife of the butcher rescues them.

Effects of Impure air on Swine.

A great proportion of the diseases which afflict swine are, no doubt, caused by bad management, and the crowding of them together on a limited space, where they must necessarily breathe a highly-contaminated atmosphere. It is one of the chief causes of pulmonary apoplexy, and other pneumonic affections which are so notoriously prevalent. I have often seen a lot of swine disembarked from the cars the subjects of congestion of the lungs, the external surface of the bodies of some being as blue as indigo, (quite livid,) showing very conclusively that their blood was highly charged with carbon; that either for want of pure air, or from temporary incapacity of the lungs, in consequence of crowding too many animals together, the lungs failed to oxygenize the blood, and thus they suffered. Swine require pure fresh air as much as we do for the vitalization of their blood, and can no more live without it than did the unfortunate individuals that perished in the Black Hole of Calcutta. Under such circumstances, whether the animals be confined in close cars or in filthy pens, it makes but little difference—they are liable to become diseased; and it often happens that when certain forms of disease are engendered spontaneously in this way, other animals exposed to the infection are attacked, and thus we have an epizoötic, which is sure to commit sad havoc ere it dies out or can be arrested. It is probable that bad air, inferior diet, and crowding animals into filthy locations have more to do with the production of the so-called "hog cholera" and the well-known pleuro-pneumonia than some persons are apt to realize. If this be true, and I think it is, then our husbandmen must see the necessity of paying great attention to the hygienic management of swine. The latter are generally the most neglected and despised of all our domestic animals, except when they are of aristocratic breed, and owned by amateurs of means, or when they are designed for "home-fed pork." Now, if it pays the amateur and lover of "home-fed" to give the animal that attention and care which he not only requires, but is entitled to, then a similar course of practice must increase the gains of those who raise their animals for the market.

Pure air, good food, plenty of space, and comfortable quarters are the best preventives of disease that I know of. Much better are they than all the drugs in the country; and when the animal becomes sick, without proper attention to hygiene, medicine is not worth a straw. It is well-known to the scientific farmer that when swine are crammed on a limited portion of land whence they derive their food, without regard to the laws which govern the distribution of living beings throughout creation, disease and death run riot, and the bodies of such animals are almost sure to be infested with various kinds of parasites.

The same facts have been observed in regard to sheep, when they are crowded and the land overstocked. It is the forerunner of parasitic disease. An English writer, having considerable experience in the matter, contends that it is the crowding of sheep on the low lands which has engendered "rot" and "scab," and which causes thousands to die, with the respiratory organs filled with strongyli, or the intestines with tape-worms. The Australian farmers can testify to the ravages of the tape-worm in sheep as the result of crowding land to an unnatural extent. On our vast prairies, however, there may be no danger of overcrowding, yet it is right that we should be conversant with the danger, in order to avoid it in the future.

MAJENDIE, the celebrated French physician, contends that very many grave and fatal diseases are introduced into the system through the respiratory organs: "And although we with difficulty arrive at any certain knowledge of the miasms rising in marshy grounds from the decomposition of putrid vegetable and animal substances, there can be no doubt whatever of their entering into the blood through the medium of the air, and so producing many fatal diseases. In some countries, epidemic affections especially rage with extreme intensity. In hot, humid climates, and especially on the sea-coast and borders of certain rivers, as, for instance, the Gulf of Mexico, Vera Cruz, New Orleans, etc. Such causes admit of demonstration, since, by introduction of them into the blood experimentally, may be produced, though not exactly yellow fever, symptoms bearing the greatest resemblance to it, with black vomit and speedy death. Lower Egypt, where the plague formerly prevailed so alarmingly, owing to such causes, has been rendered comparatively rare by the improved condition of the country."

MEASLES IN PORK.

Measles in the hog is identical with tape-worm in man. It has been discovered that the hydatids of the hog, known as measles, (named in the zoölogical system cysticercus cellulosa,) have exactly the same head as the common tape-worm of man (tænia solium). Many experiments have, from time to time, been made, setting the matter beyond a doubt. KUCKENMEISTER, who wished to make sure of the fact, made the experiment upon a criminal who was soon to be executed, and, as was to be expected, with perfect success. Measles taken from fresh pork, and put into sausages which the criminal ate raw, at certain intervals, before his death, were found again, in the *post mortem* examination, as tape-worms in his intestines, and in different stages of development, according to the intervals in which the measles had been taken. Thus it was discovered that all measles in swine are tape-worm larvæ, which, when swallowed with a portion of the animal in which they live by another animal, develop the tape-worm. In zoölogy tape-worms are named cestoidea. About two hundred different species are described by naturalists, which vary much in size, the smallest being barely visible to the naked eye, while the largest will sometimes measure one hundred feet in length.

Different species of animals are infested with different species of tape-worms. They are found in the intestines of the horse, ass, sheep, goat, dog, deer, antelope, rat, mouse, and many other animals and insects. All tape-worms are hermaphrodites; the sexes are not only united in the whole of the tape-worm, but each joint of the compound parasite for itself has its own independent male and female sexual organs, testicles, and ovaries.

Treatment.—Put into the food of each hog, daily, two drachms of powdered sulphur, half an ounce of powdered poplar bark, and half a table-spoonful of fine salt. The best method of preventing measles in swine is to keep their lodging-places perfectly clean and dry, and to allow them pure air and exercise. Their food should be of a very nutritious quality. Swine may be suspected to have measles when they do not fatten nor thrive well.

Quinsy.

This is a very common disease among swine, and affects the lining membrane of the respiratory passages, which become inflamed and tumefied. This condition occasions great difficulty in swallowing either fluids or solids, and the respiration is much embarrassed; the neck appears to be stiff, and the nose is protruded. A distressing cough is usually present; the animal froths at the mouth as if he were choking; the glands in the region of the throat are enlarged, and this adds to the difficulty in breathing.

Treatment.—A mild case of quinsy, unaccompanied with tumefaction of the throat or the thyroid glands, may be cured by transferring the animal to a warm pen where he can burrow in clean straw. Let him have a mess of thin gruel three times daily, into which stir half an ounce of powdered chlorate of potass. It is not safe to drench an animal the subject of quinsy, for he may choke to death; therefore, if possible, the medicine must be incorporated with the food. In bad cases the throat must be lubricated with cod-liver oil occasionally. Should the bowels be constipated, a few ounces of Epsom salts or a couple of ounces of castor-oil are indicated; whereas a looseness or temporary diarrhea must be held in check by means of pulverized anthracite coal, or else by means of animal charcoal. These ingredients should be mixed in scalded milk, and placed in a clean trough. It is very evident, however, that, in the absence of pure air, comfortable quarters, and good nursing, medicine will have but little if any effect.

Quinsy mostly owes its origin to exposure, fatigue in traveling long distances, and to bad accommodations; therefore proper attention to the wants and comfort of these animals will act as the best of preventives.

The wretched condition in which some of these animals are compelled to exist, and the vile garbage which is often fed to them, is the exciting cause of most of their maladies; therefore such matters should command the attention of husbandmen.

Hernia, or Rupture.

Pigs are very frequently born in a ruptured condition. The disease is then called congenital, and scrotal when within the scrotum. The disease consists of adhesion of a protruded portion of intestine to the testicle after its descent into the scrotum. This adhesion often takes place while the testicle is yet in the abdomen. On the descent of the testicle into the scrotum the intestine descends with it.

Treatment.—Secure the limbs, or engage some persons to hold them; then place the animal on a bench, and cut carefully over the region of the enlargement until the testicle is exposed. Carefully dissect the intestine from the testicle; remove the testicle in the usual way; then return the intestine within the abdomen. Should the intestine be so large that it seems impossible to return it, then enlarge the opening by means of a probe-pointed knife; then raise the hind-quarters of the pig, and the bowel will return into the abdominal cavity, after which take a couple of stitches through the skin and superficial tissues, and the operation is finished. In a few days the stitches may be cut away; there is no need of any dressing.

Intestinal Worms.

When swine are infested with intestinal parasites they generally become unthrifty—will not fatten, yet have a voracious appetite, and will devour greedily every thing that is placed before them.

Treatment.—For solitary cases give the animal an occasional dose of the following:

Castor-oil	2 oz.
Oil of wormseed	1 dr.
Mix.	

When a large number of animals are infested with intestinal parasites, prepare the following:

Pulverized anthracite coal	2 lbs.
Powdered poplar bark	1 lb.
Powdered sulphur	½ lb.
Powdered salt	4 oz.
Mix.	

Give a table-spoonful with the food twice daily, until the animal takes on a more thrifty condition.

Inflammation of the Lungs (Pneumonia).

Inflammation of the lungs, or what may very properly be termed apoplexy of the same, is a very fatal malady in swine, and runs its course to a fatal termination very rapidly.

Symptoms.—The early symptoms are accelerated and laborious respiration, shivering fits, cough, loss of appetite, and rapid wasting of fat and flesh.

Treatment.—Dissolve half an ounce of nitrate of potass in about a quart of thin gruel and set it before the patient; if he refuse to drink it, then a drench of the same must be given. In the mean time place on the tongue ten drops (three times daily) of fluid extract of gelseminum until the febrile symptoms have subsided; then give every morning half an ounce of hyposulphite of soda until the animal is convalescent. Bleeding and purging, as recommended in ancient works, is sure death to the animal.

Hog Cholera.

The disease to which the name of "hog cholera" has been generally but improperly applied, has prevailed more extensively in this country than most persons are aware of. The first appearance of the disease, of which I have been able to find any notice, was in Indiana, in the summer of 1856. It has continued, to a greater or less extent, since that time in our Western and Southern States, in nearly all of which it has, at some period, attained the character of a wide-spread and fatal epidemic. Its victims in those States are numbered by hundreds of thousands, if not by millions. During the last five years this disease has been seen, from time to time, in portions of the more eastern States, sometimes, as in Western New York in 1856, proving quite severe and fatal in comparatively limited localities; but in the Eastern States it has, to a great extent, originated with and has generally been confined to, hogs imported from the West. I think that in no State east of Ohio has the disease prevailed extensively, or attained the character of a wide-spread epidemic. In the vicinity of Providence, Rhode Island, it has prevailed to some extent, more particularly among large herds of swine, during each of the last five winters, but has been mostly confined to hogs brought from the West, and has usually disappeared with the approach of warm weather. During the last winter it was more severe than in any preceding, and was not confined to Western hogs. Neither did the disease, as heretofore, cease with the cold weather, but it continued until August, having destroyed more than five hundred hogs in Providence and in the adjoining towns during the first seven months of the year 1861. I have also heard of its prevalence in various towns in Massachusetts during the same period.

It is evident that a subject of so great importance to the agricultural interests of the community deserves attention. It is also interesting to all classes of the community, on account of the relations of this disease to epidemic diseases which afflict the human race, and on account of its effects upon the supply of animal food for cities. For these reasons I have, in connection with Dr. Collins and other physicians of this city, made some investigations upon the subject. We have visited and examined many sick hogs, and have examined the bodies of some of them after death. I have also made inquiries of those who have had the care of the hogs in relation to the symptoms, and have obtained information, so far as possible, from those who have seen the disease at the West, where it has prevailed so extensively. The results of these investigations I propose to give briefly as follows:

Symptoms.—The symptoms, as described by persons unaccustomed to such observations, are extremely various. By combining the information obtained from others with the results of my own observations, the symptoms, as seen during the life of the animal, are nearly as follows:

1. *Refusal of food.*—This is the first symptom usually noticed by those who have the care of the animals, though, as will be seen hereafter, this symptom by no means indicates the beginning of the disease. The refusal of food, after it is first noticed, generally continues through the whole sickness, and food of every description is mostly refused.

2. *Great thirst.*—This is constant, and large quantities of cold water will be swallowed if it can be obtained. Even after the animal is unable to stand alone it will drink cold water with eagerness.

3. After a time, the length of which varies very much, the animal begins to show signs of weakness; reels, staggers, and, in attempting to walk, often falls down.

4. In most cases there is a diarrhea, with copious fluid discharges of dark, bilious, and very offensive matters. In a few cases there is no diarrhea, but evacuations of hard, black balls; but in some of these cases the fluid offensive matter is found in the intestines after death.

5. In a few cases there is vomiting; but this is not often severe, nor is it continuous for any length of time.

6. The external appearance of the animal is at first paler than usual; but toward the last of the sickness purple spots appear, first on the nose and sides of the head. These extend along the sides and belly, and between the hind legs; after which the animal soon dies.

7. In many cases, perhaps a majority, ulcers are found on the different parts of the body. These were particularly noticed on the inside of the lips and gums, and on the feet, and were often quite deep and excavated. In some cases these ulcers were seen in the nostrils, and in one case there were extensive ulcerations in the back part of the mouth, on the tonsils.

8. In some cases the legs are swelled, and the animal is lame; sometimes the ears and sides of the head are swelled and red; sometimes the eyes are sore and inflamed; sometimes swellings, like carbuncles, are seen; and, generally, the glands near the surface seem to be enlarged.

9. In most cases the pulse is quickened, the breathing is hurried and difficult, and there is much cough; but in some genuine cases there is no perceptible trouble with the lungs, and no important signs of disease are found in them after death.

10. The duration of the disease in fatal cases, after the first symptoms are noticed, is extremely variable. We have seen some which have died within two or three hours; others have lived many days. It is difficult, however, to fix the time of the appearance of the first symptoms. The first noticed is usually the refusal of food; but it is probable, indeed it is certain, that the sickness is in progress for a considerable period before the animal refuses food. Cases like the following are sometimes seen: A hog refuses to eat; it soon grows weak; staggers in walking; turns purple on the sides and belly, and dies within two or three hours after the first symptom is noticed. But, on examination after death, extensive disease is found in the intestines, or in the lungs, or in both, at a stage of development which must have required many days to reach.

Such are the symptoms as obtained from inquiries and observations in this vicinity. Since the preceding description was written, I have obtained a valuable article upon the disease, written by Dr. GEORGE SUTTON, of Aurora, Dearborn County, Indiana, and published in the "North American Medico-Chirurgical Review," for May, 1858.

Dr. SUTTON made extensive and careful observations of the disease as it prevailed in Indiana, and his articles comprise the only published information I have been able to obtain in relation to it. His description of the symptoms is as follows: "The hog at first appears weak; his head droops; and sometimes, in a few hours after these symptoms, diarrhea commences. There is frequently vomiting. In some cases the discharges were serous and clay-colored, sometimes dark, also bloody and mucous, resembling those of dysentery. The urine at first was generally small in quantity and high-colored, but as the animal recovered it became abundant and clear. This was one of the symptoms by which the men, who were attending the hogs at the distillery, ascertained that they were recovering. In a large number of cases the respiratory organs appeared to be principally affected, and there was coughing, wheezing, and difficult respiration. In some instances the animal lost the power of squealing, and the larynx was diseased. There was frequently swelling of the tongue and bleeding from the nose. In those cases where the respiratory organs were the principal seat of the disease there was generally no diarrhea or dysentery. In many instances the disease appeared to be principally confined to the skin; sometimes the nose, the ear, or the side of the head were very much inflamed—the ear swollen to twice its usual thickness. This inflammation would spread along the skin sometimes over the eye, producing complete blindness. Sometimes one or more legs were inflamed and swollen, and the inflammation also extended along the body. The skin, where it was inflamed, was red and swollen. Some had large sores on their flanks or sides, from three to six inches in diameter. In one instance, at the distillery, the inflammation extended along the fore-leg, the foot became ulcerated and sloughed off, and the animal recovered. Some appeared delirious, as if there was inflammation of the brain. Sudden changes in the weather, particularly from warm to cold, appeared to increase the fatality of the disease."

The symptoms, as described by Dr. SUTTON, are similar to those observed in this vicinity, and the descriptions already given are sufficient to enable any one to recognize the disease wherever it prevails. It will be noticed that there is a very great variety in the symptoms described, and that they affect nearly every part of the animal. This would be expected from the nature of the disease itself, as will be seen hereafter.

Post-mortem Appearances.—Having described the symptoms as seen while the animal is living, I will now give, briefly, the appearances found on examination of the bodies after death. In the course of our investigations, during the last winter and spring, the bodies of nine hogs were carefully examined by Drs. G. L. COLLINS, J. W. C. ELY, and E. T. CASWELL, of Providence, in the presence of several other physicians. A minute account of each case was prepared by Dr. COLLINS, and published in the "Transactions of the Rhode Island Medical Society," for 1861. It will be sufficient for the objects of this paper to give a brief synopsis of the diseased appearances which were found in these examinations.

Lungs.—In two cases the lungs were healthy. In the remaining seven cases one or both lungs were more or less inflamed, having a liver-like appearance, called hepatization. In some cases the inflammation was more advanced, and the substance of the lungs was breaking down into a mass of disease. In all cases where the lungs were inflamed there was also pleurisy, and the lungs were adherent to the walls of the chest, the inflammation of the lungs and the pleurisy together constituting true pleuro-pneumonia. In two cases there were tubercles, or consumption in the lungs; but this is not uncommon in hogs, and is not supposed to have any connection with the special disease we are considering.

Stomach.—The stomach and the small intestines were generally healthy. The stomach was frequently distended with an offensive mixture of food, and in one case the inner surface was ulcerated to some extent. In two cases worms were found in the small intestines; but this was probably a mere accidental occurrence, and had no necessary connection with the disease.

Large Intestines.—The inner coat of the large intestines was generally inflamed and softened, with ulcerations to a greater or less extent, and they were frequently so tender as to be easily torn with the fingers. On account of their diseased condition, their inner coat was frequently discolored. The inflammation and ulceration of these intestines are probably the principal cause of the diarrhea in this disease.

Kidneys.—These organs were, in every case, much more pale and yellow than natural; this condition was well marked.

The liver and bladder were generally healthy. In some cases water was found in the cavity of the belly and of the chest, and in the membrane surrounding the heart (heart-case). In two cases numerous minute purple spots were seen upon the membrane lining the walls of the belly. The urine was often changed from the healthy condition, containing albumen and other diseased products, not, however, noticeable to the eye. Ulcers upon the feet and in the mouth were often found. The brain was not examined, as there were no symptoms observed which seemed to indicate disease of this organ. It may be, at times, affected, but is probably more rarely so than the other organs of the body.

Such are some of the most important appearances which are found on examination of the bodies of hogs which have died with this disease. It will be noticed that three of the diseased conditions I have described are prominent, important, and such as would be readily recognized by the most ignorant observer. These are, first, the pleurisy and inflammation of the lungs; second, the inflammation, ulceration, and softening of the inner coat of the large intestines; and, third, the pale and yellowish color of the kidneys. One or more of these diseased conditions will be found in every case, and in, perhaps, a majority of cases, they will all be found in the same animal.

Dr. SUTTON, of Indiana, in the article from which I have already quoted, gives an interesting account of the *post mortem* appearances in hogs dying from this disease. He examined the bodies of sixty-seven hogs, and it is evident, from this article, that he had the opportunity of observing the disease in a more malignant form than it has presented in this vicinity. He mentions every diseased condition that I have described, and also found unmistakable marks of similar disease in almost every other organ of the body.

With the description already given of symptoms and *post mortem* appearances, most persons, even without medical knowledge, will be able to recognize the disease. It remains for us to consider, briefly, its nature, causes, prevention, and treatment.

Nature of the Disease.—The first question which arises in the minds of most persons is this: What is the disease? and the question is asked with a special desire to have it answered by a definite name. This can not be done. There is no name which would convey, even to physicians, and certainly not to others, a precise idea of the disease. But though there is no specific name by which it can be called, the facts, as already given, can not fail to suggest, at least to medical men, a correct idea of its nature. Sometimes in the human subject, particularly when portions of the body are undergoing the process of inflammation and suppuration, pus and other diseased products are absorbed, and, entering into the circulation, poison the blood and produce that condition of the system known as pyæmia. In such cases the general poisoning of the system is shown by a low form of fever, great weakness and prostration of the vital powers, frequently accompanied by vomiting and purging, and often resulting in pleurisy, with inflammation and deposits of matter in the substance of the lungs, superficial swellings and abscesses, inflammation and suppuration in the joints, and other diseased phenomena. So in severe forms of typhus or ship fever, and in malignant cases of some other diseases, when the whole system seems to be filled with a powerful poison and utterly prostrated, the same or similar effects are seen. So in this disease among hogs there seems to be a general poisoning of the blood, producing local inflammations and ulcerations in various parts of the system, though more frequently in some portions than in others.

This, then, is a general disease of the whole system, resulting from some poisoning of the blood; and the pleurisy, the inflammation of the lungs, the ulceration of the intestines, the superficial ulcers and swellings, and other effects I have described, are only the local effects or results of the general disease. The diarrhea, which exists in a majority of cases, and on account of which the name of "hog cholera" has been given to the disease, is probably caused by the local inflammation and ulceration of the large intestines. The name "hog cholera" is, therefore, entirely improper, as it represents only one of the several prominent symptoms. The disease might as correctly and as incorrectly be called a "pleuro-pneumonia."

In this connection, it is proper to notice the similarity which exists between this disease in swine and some epidemic diseases which have prevailed among cattle. Some two thousand years since a disease, to which the name of "murrain" was given, was described by Virgil as "a highly inflammatory fever among cattle, accompanied with tumors, carbuncles, ulcers, and purulent deposits throughout the whole body." Any one who reads this and other descriptions of murrain, as given in the "New American Cyclopedia," can not fail to notice the striking similarity between that disease among cattle and the disease among swine which we are now considering. The same is true of the disease which has caused so much excitement in New England, within the last two years, under the name of "pleuro-pneumonia." Its symptoms and *post-mortem* appearances, so far as described in the reports I have seen upon the subject, are very similar to those observed in the disease among hogs which we have examined. The only case of the disease called "pleuro-pneumonia" that I have seen was in the vicinity of Providence, in July, 1861. In that case, in which a *post mortem* examination was made by Dr. Collins, it was the unanimous opinion of the physicians present that there was a remarkable similarity in the symptoms and appearances to those observed in the hogs examined previously.

The conclusion to which I have arrived is, that the "hog cholera" I have described, the "murrain" of Virgil and of all ages since, and the "pleuro-pneumonia" of New England, are similar diseases, having the same general features, producing similar diseased changes in the body, and are the result of similar causes. If a definite name is required, the name of "murrain," which is derived from a Greek word which means to waste or to weaken, is the best. The names "hog cholera" and "pleuro-pneumonia" are both improper, and give very erroneous ideas in relation to the disease.

Causes.—In this and other similar diseases among animals, as well as in epidemic diseases in the human race, the universal tendency of the public mind is to ascribe their propagation to contagion. Dr. Sutton, whom I have already quoted, says: "Although this disease must occasionally have a spontaneous origin, yet, when once produced, it will spread rapidly by contagion." The investigations of the cattle disease in Massachusetts in 1860, and the action of the Legislature in regard to it, seem to have been based upon the theory that the disease was a "pleuro-pneumonia" only, and that it was contagious.

If this be an epidemic or epizoötic* disease, its causes are similar in their nature and operation to those of other epidemics. The following, then, according to my understanding of the subject, are the causes not only of this disease among swine, but also of the disease referred to among cattle, as well as of epidemics in the human race:

1. An epidemic atmospherical poison.
2. The local conditions or circumstances adapted to receive and propagate the poison existing in the atmosphere.

With regard to the first cause, the atmospherical poison, very little is certainly known. It may be an animal or vegetable exist-

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* The phrase "epidemic disease among animals" is incorrect, as the word "epidemic" can properly be applied only to diseases of the human race. The word "epizoötic" has the same meaning with reference to diseases among animals that the word "epidemic" has with reference to diseases among men.

ence, or a chemical or electrical change in the atmosphere. Nor do we know any thing of the differences in the condition of the atmosphere by which such dissimilar epidemic and epizoötic diseases are produced at different times. But, judging from their effects, we conclude that these primary causes of epidemics probably exist in the atmosphere; that they progress over a greater or less extent of country, in accordance with laws with which we are not acquainted, and, lighting upon the earth, produce their effects wherever they find the local conditions adapted to their propagation.

The local conditions, or causes of this disease among swine, are more obvious and better understood. They are, briefly, impure air, arising from the filth with which the animals are surrounded, the location and want of ventilation of the pens in which they are kept, the use of improper and unhealthy food, and the want of pure water. Common sense shows that cleanliness, good food, pure air, and pure water are as important to prevent disease in hogs as in men, though the fact is generally ignored by those who have the care of these animals. Another condition, though not absolutely essential to produce the disease, has a very great influence in increasing its severity and fatality. It is the crowding of large numbers of animals together. It is a well-established fact that the severity and fatality of cholera, and of other epidemics in the human family, is in direct proportion to the density of the population. The coëxistence of both the causes given—namely, the atmospherical poison and the local conditions—is necessary for the extensive development of the disease. When both these causes are present in any locality, and healthy animals are brought into the locality, a portion of them, and sometimes all, will contract the disease. But this important fact is to be remembered, that both these causes may exist in a locality whethei any animals are present or not.

Perhaps I have said more than some might think necessary in relation to the causes of the disease; but the subject is of the utmost importance in its relations to preventive measures. If this and other similar diseases are not contagious, but arise from causes which may, and do, originate and exist wholly independent of the presence of animals, it is manifestly absurd to attempt, as has been done in some cases, to prevent and eradicate them by the wholesale destruction of the animals.

Prevention.—Keeping in mind the causes of the disease as I have given them, the measures necessary for prevention are obvious, and may be stated in a very few words. They are, to remove, as far as possible, the causes. The general cause existing in the atmosphere can not be removed, nor can it be avoided, except by the removal of the animals beyond the limits of its existence, and this is not usually practicable. But the local causes can, to a very great extent, be removed, and without these the general cause can not produce any very serious results. The hogs can be removed from their filthy pens and can be kept clean; they can be removed from low ground to more elevated places; they can be separated and isolated as far as possible; they can be allowed an abundance of pure air and of pure cold water; and they can be supplied with nourishing, healthy food. In a word, they can be placed in the conditions which common sense shows to be essential to health, whether of hogs or of other animals. When this is done, every thing is done that is necessary or possible for the prevention of this as well as of other similar diseases.

Treatment.—In the treatment of a disease of this character, we have little to expect from the specific or direct action of medicine of any kind. The most that we can hope to do is to support the system so as to enable Nature to overcome the disease. In a human being, with a disease of a similar character, we should first remove the patient to a healthy locality, and provide for an ample supply of pure air and good nursing. This, faithfully done, would be the most important step toward recovery. We should then give, as the symptoms might require, beef-tea or broths, milk, wine-whey, brandy, quinine, and other similar preparations, always remembering that the object is to sustain the animal powers so as to enable the system to withstand the depressing effects of the poison and free itself from its presence.

The treatment of hogs with this disease must be of a similar character. Stimulants and tonics of some description, with plenty of pure air, pure water, and suitable nourishment must be given. Chlorate of potash, in full doses, from its known effects on the human subject, has been proposed as a remedy, but of its value I am unable to speak. Powdered charcoal is undoubtedly of some value, when scattered freely about the pens and given to some extent in the food. But, in the severer cases, treatment of any kind is generally unsuccessful, and if successful would cost more than the animal is worth. We might succeed, by the use of the remedies named, and by careful nursing, in prolonging the life of the diseased hog; but success of this kind would hardly compensate the trouble and expense necessary to secure it. But a large number of the milder cases will recover without treatment of any kind, and in this, as in other epidemics of a similar nature, it will be found that the first cases that occur will be very severe, and will nearly all prove fatal; while, after the epidemic has existed for a time, the disease will seem to become more mild, and a much larger proportion will recover. The important fact to be remembered is, that it is for the interest of the owner of these animals to use every possible means to prevent the disease, as prevention is of infinitely more importance to him than treatment; but if the disease becomes established, it should be treated in a rational manner, not forgetting that Nature, when properly aided, will do infinitely more than medicine for the cure.

NOTE.—The above valuable article on "Hog Cholera" is from the pen of Dr. E. M. SNOW and is the most reliable one ever published on this disease.

DR. DADD'S REMEDY FOR "HOG CHOLERA."

Powdered anthracite coal...........	4 pounds.
Powdered ginger.................	1 pound.
Powdered sulphur................	$\frac{1}{2}$ pound.
Salt...........................	7 oz.
Phosphate of lime................	1 pound
Mix.	

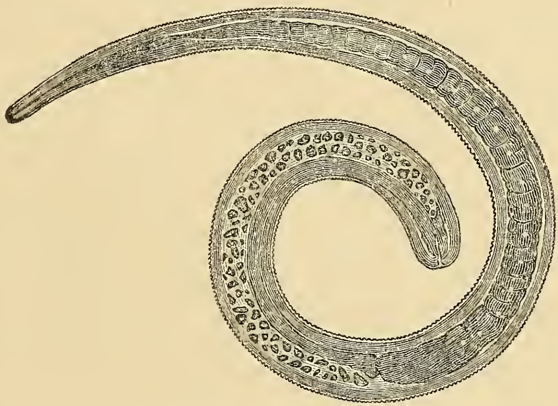
Let each affected animal have one handful of the above mixture every day. Mix it in a pint of dry oatmeal. If the animal refuses to eat it, liquefy the same with cow's milk, and give as a drench.

TRICHINA SPIRALIS.

THE American people have been startled lately by the published accounts of a new and terrible disease in Germany, and especially in Saxony, which brings to mind some of the most dreadful plagues of Egypt. The disease in question, termed TRICHINIASIS, caused by the ravages on the human muscle of a minute worm, called TRICHINIS SPIRALIS, coming so close upon the cattle disease, did, in-

TRICHINA SPIRALIS AND OVA, AS SEEN IN THE MUSCLES OF THE HUMAN SUBJECT, MAGNIFIED ABOUT TWO HUNDRED AND FIFTY TIMES.

deed, to the ignorant, appear to justify some of the recent prophecies of Dr. CUMMING, but to the more intelligent, and especially to the medical mind, it came as an old story. Singularly enough, the worm which is now occupying the attention of German anatomists was discovered as long ago as 1835, by Professor OWEN. Both Mr. JOHN HILTON, a demonstrator of anatomy at Guy's, and Mr. THORMALD, the demonstrator at St. Bartholomew's, had, two years previously, observed small white bodies interspersed among the muscles of subjects under dissection, and that they were of a gritty character was evident from the manner in which they turned the edges of the knives. One of these specimens of affected muscle was, in the year mentioned, given to Professor Owen by Mr. Paget, then a student, for inspection. These speckles the distinguished anatomist discovered, under the microscope, to be the capsule of a very fine worm, which was seen coiled up closely within it. From its hair-like fineness, its discoverer derived the term Trichina, and from the spiral manner in which it was invariably found coiled up within its envelope, he added the word Spiralis; hence the name by which it is known.



TRICHINA SPIRALIS IN PORK, MAGNIFIED ABOUT TWO HUNDRED DIAMETERS.
AFTER AN ORIGINAL DRAWING BY MR. DRAPER.

An account of this newly-discovered parasite was published by Professor Owen, in the "Transactions of the Zoölogical Society," in 1835, headed, "*Description of a Microscopic Entozoön infesting the Muscles of the Human Body.*" This paper gave a very minute account of the creature, illustrated with drawings, and established his claim to be the discoverer of one of our latest-found inhabitants, which has made such a sensation in the world. The discovery made much noise at the time throughout Europe, and the Professor's paper drew the attention of the anatomists of Europe to the worm. But one or two cases were recorded of the presence of the parasite in the human body, and the matter remained in abeyance for some years, until the German professors again drew attention to it, and completed our knowledge of its method of introduction. Professor Luschka, of Tübingen, carried our knowledge of the worm, perhaps, up to the highest point anatomically, and in the same year the method of transmission of the worm from one animal to another was made out by a series of experiments instituted by HERBST VON NACHRICHTEN. He gave the flesh of a hedge-hog, which he knew to be infested with trichina, to young dogs, and speedily found that all their voluntary muscles were full of these worms. But, although this important step was made out, little notice was taken of it. His experiments were repeated in Scotland and England, but the peculiar manner in which the worm got into the muscle was yet undiscovered.

KENKER, in 1860, was lucky enough to supply this knowledge. The body of a servant girl, who had died with many of the symptoms of typhus fever, came under the inspection of the anatomist. He found her voluntary muscles to be full of trichinæ; and upon inquiring into her case, he found that she had assisted in the making of sausages about three weeks before she was taken ill, and that she had eaten some of the raw meat a few days before her illness commenced. The butcher who had killed the pig, and several members of the family, had been affected in the same manner as the girl, but had recovered. The sausages and hams were examined, and were found to be full of worms, encapsuled, as it is termed, or surrounded with an envelope; but in the girl the worms were found among the muscles, in a free state.

From this evidence the manner in which the parasite obtained entrance to the human body was fully made out. Pork (uncooked pork) was the vehicle by means of which the parasite was enabled to enter the human body. But, says the reader, why should pork only be the means of conveying the entozoa to the human body? The reason is that the pig is the only animal eaten by man that is partially a carnivorous feeder. It is supposed that the pig obtains them from dead rats, which are often infested with these worms, or other garbage. Birds, although carrion feeders, can not, for some unknown reason, be infested with the worms. In the horse, calf, and the young and old dog, says Dr. THUDICHUM, the young trichinæ are born, but they can not pierce the intestines, and, therefore, can not immigrate into the flesh. Of course, it is just possible that the worm may be conveyed, like the tape-worm, through the medium of impure water. We are not likely to drink this, but it often happens that fruit and vegetables are watered from impure tanks, into which these creatures may have got.

It is certainly an objection to the modern system of watering with liquid manure, that in this way the tape-worm, and possibly the trichina, may find their way on to the vegetables which we eat, and in this way we may be receiving noxious intestinal worms into our system. For instance, some people water their strawberries with liquid manure, not thinking of the little serpent that may be hidden in the fruit. It is now known that, after entering the alimentary canal, the parasite finds its breeding-ground, and brings forth immense numbers of young, which immediately begin to make their way through the coats of the intestines and migrate into the muscles.

It is a singular fact that these disagreeable adventurers always select the voluntary muscles, or those which are moved at our will. The heart and kidneys, and those parts of the viscera which act independently of the will, are scarcely ever affected. It is, indeed, a matter of dispute how the worms get distributed so generally over the body, some anatomists asserting that they make their way directly by boring, as the ship-worm bores through a piece of timber; but Dr. THUDICHUM, who was appointed, in 1864, to investigate the subject, by the medical officer of the Privy Council, asserts that they enter the circulation, and are, in this manner, distributed equally over every part of the body. To use his words: "Arrived in the capillaries (terminal blood-vessels), they penetrate their two-coated walls, separating the fibers as a man separates the branches of a hedge, when creeping through it, and are now either at once in muscular tissue, their proper feeding-ground, or get into inhospitable tissues and cavities, and there either perish or escape from them by a renewed effort at locomotion, enter the circulation a second time, and ultimately perish in the lungs, or arrive in some muscle to obtain a late asylum."

This hypothesis, certainly, seems the most reasonable, as it is in agreement with the known means by which other entozoa migrate. Arrived at the muscular tissues, it seems again questionable whether the worm attacks the muscle only, or whether it is not deposited in the intervals which occur between the bundles of muscles. LEUCKHART says they penetrate the sarcolemma, and eat the muscular fiber itself. Dr. THUDICHUM says that he has never seen but once the worm in the muscle, but always outside of it. It is certainly a strange fact that, in many cases, persons attacked with trichiniasis have not only perfectly recovered from its effects, but have become as strong as ever. It could scarcely have happened that the muscles of these patients had been fed upon by vast colonies of worms, which would have inevitably destroyed them beyond repair. The probability is that the worm finds its way into all the tissues. Between the third and fourth week after immigration, the trichina has become full-grown, and now it begins to prepare its capsule. It becomes fixed to the spot in which it is, solid matter is deposited around it, and, curled up, it lies immovable in its plastic capsule, and dies unless received again into the alimentary canal of another animal, which, in this case, of course, it never does. The presence of these encapsuled trichinæ in the muscles may cause irritation, but that speedily subsides; and it is pretty clear that many persons suffer little harm from them while thus curled up, as they have been found in the bodies of subjects that have been dissected, and whose previous history gave no evidence of their existence.

On the other hand, the disease, when severe, puts on many of the characteristic symptoms of well-known diseases. The fever caused by the presence of the parent worms in the intestines may be, as, indeed, it often has been, taken for gastric fever. Then, again, when the young worms are immigrating into the muscles, the most excruciating agony seizes the patient. He can not move a muscle without the utmost pain, and he lies generally upon his back, with his legs a little apart, covered with perspiration. The face and neck become tumid with a dropsical effusion, which generally extends to the legs and abdomen. An attack of acute rheumatic fever appears to have seized the individual, but for the want of the heart symptoms. Again, the disease stimulates cholera and typhus, and, indeed, poisoning, in many of its symptoms; but those who have seen a genuine case of trichiniasis can not be deceived, as the whole symptoms present are consistent with no other disease. In cases of doubt, a piece of the living muscle has been excised from the biceps muscle of the arm; and this test is almost certain to be conclusive, as the worm is distributed, in severe cases, in profusion through every voluntary muscle of the entire body.

Dr. THUDICHUM, speaking of a child who died of this disease, says, in his report to Mr. SIMON: "One preparation from the biceps muscle of a child, four and a half years of age, which died on the seventy-ninth day, contained the astounding number of fifty-eight. Such a preparation was estimated to weigh one-fifth of a grain, and, therefore, every grain of muscle contained, on an average, one hundred trichinæ. Now, assuming the weight of the muscles of an adult to be only forty pounds, and assuming him to be a victim of trichiniasis, and the parasites equally distributed throughout his body, he would contain upward of twenty-eight millions of these animals." The agony of this plague of worms attacking the fine fibers of nerves distributed throughout the frame can, from this estimate, be thoroughly understood in the fever and weakness caused by the destruction of fiber, and the irritation is accounted for with equal ease.

The progress of the disease is pretty much as follows: During the first stage, which lasts from a week to ten days, there is great intestinal disturbance, caused by the presence of the parent trichinæ in the intestines, giving rise, in severe cases, to alarming diarrhea, as may be expected. The second stage lasts a fortnight or three weeks, seldom longer. During this time the immigration of the young trichinæ, hatched in the intestinal passage, is taking place; hence the agony throughout the body, the dropsy in the face, the hurried breathing, and the fever. Although the dropsy becomes genuine, it in no manner depends upon kidney disease, as that organ is never affected in any way. In the fourth week the immigration has entirely ceased, and the worm is beginning to be incapsulated. From this time the patient begins to recover, the appetite improves, the pains become less, and, unless complications arise, as in other severe fevers, the patient gradually passes into a state of health. Death may, however, take place at any stage of the disease. At the great outbreak of this disease which took place at Calbe, in Germany, it was observed to happen on the fifth, eighth, fourteenth, twenty-first, and forty-second days of the illness. Death generally is brought about by exhaustion. The exhaustive diarrhea which sometimes occurs, together with the inability to take food, and the terrible agony, easily explains this termination.

The difficulty connected with the treatment of this disease is consequent upon the impossibility of knowing what is really the matter in its early stages, when treatment is alone useful. In regular outbreaks of the disease the physician is led to suspect the evil in the beginning, and then it can be cut short by destroying and expelling the parent worms before they have had time to colonize the intestines with their young. But at the commencement of an outbreak, or in isolated cases, the symptoms are too like those of gastric fever to lead to a suspicion of the real nature of the affection.

A prevention is far better than cure, and, happily, this can be easily accomplished. As pork is the only means by which the parasite can enter the human frame, we have only to take care that we eat it thoroughly cooked. The Englishman has a very strong prejudice in favor of doing his leg of pork well, however much he may like beef and mutton underdone. The Germans are apt to suffer desperate outbreaks of this disease because they are fond of smoked sausages, in which no heat is applied to the meat. The severity of the infection depends, indeed, upon the amount of cooking to which the trichinous meat has been subjected, and the order in which it is affected is as follows: Raw meat, smoked sausages, cervelat sausages, raw smoked ham, raw smoked sausage, fried sausage, fried meat-balls, brawn, pickled pork, blood sausage, boiled pork. As few people are likely to eat raw pork, there seems little danger to be apprehended from the most dangerous item in the list; but it is well to know that boiled pork is, in all cases, the most harmless. The power of the worm to resist heat and cold is very remarkable. They have been frozen to five degrees below centigrade, and been thawed to life again. Ordinary vermifuges are powerless against them. Their vitality is as great as the wheel-worm, which seems almost indestructible. Let our friends, then, take care never to touch the smallest portion of underdone pork, and beware of German sausages, bolognas, and things of the same kind, as they would beware of an assassin.

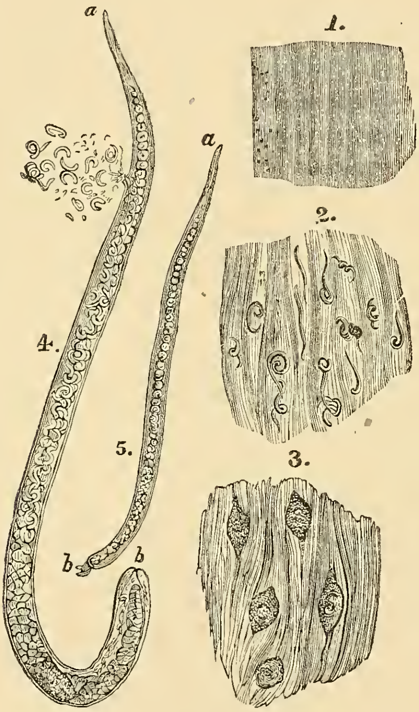
Before the discovery of the new disease, trichiniasis, several epidemics occurred in Germany, which very much puzzled the physicians. In two or three cases it was supposed that the persons suffering had been poisoned in some mysterious manner, and judicial inquiries were instituted without any result. More generally, however, the outbreaks were ascribed to rheumatic fever, or typhus fever. It was observed, at the time of their occurrence, that the outbreaks were confined to particular families, regiments, or villages. The symptoms, then obscure, are now recognized as those of trichiniasis; indeed, there seems to be little doubt that they were outbreaks of this disorder. They all occurred in the spring of the year, the time of pig-sticking in Germany, and the very characteristic swelling of the face, in the absence of any kidney disease, was observed.

The mortality arising from this disease is in direct ratio of the severity of the attack, and this depends upon the number of worms which may chance to be introduced into the body. One pig is sufficient to cause an epidemic far and wide; indeed, many of those which have ravaged Germany within these last three or four years have been traced to one trichinous pig. At the outbreak at Planen one person died out of thirty attacked. At Calbe, where the epidemic was more severe, seven persons died out of thirty-eight infected; at Hettstädt, where one trichinous pig infected one hundred and fifty-eight persons, twenty-eight died. From these facts the formidable nature of the infection may be gathered.

If sudden epidemics can be traced to the action of an obscure worm, may we not hope that many of our disorders, now obscure in their origin, and, consequently, unmanageable and incurable, will in time come to light, and be amenable to treatment? Possibly some more subtle power even than the microscope will be discovered, and give us the power of scrutinizing diseased conditions, and finding out the agents so stealthily at work in bringing the human machine to misery and premature death.

The following very interesting and valuable article on the subject of Trichina is translated from the German, expressly for this work, by E. F. Brown, V. S., of Chicago:

The Trichina (Trichina Spiralis) was known to exist as early as 1832, and in 1835 received its name from Mr. Owen. It was considered, until the year 1860, to be perfectly harmless. Autopsies revealed the parasite as a very small speck, surrounded by a white, chalky capsule. In the Infirmary of Dresden, the servant girl of a butcher died after suffering violent pains in the muscles. The autopsy revealed numerous trichinæ not surrounded by capsules, hence they were not to be seen with the naked eye. After this, closer inquiries were made into the nature and habits of the trichinæ. The result of the investigations proved that the trichinæ are generated in the hog, and introduced into our system, not with the fat or liver, but with the lean pork; and they are sometimes found in capsules, and at others without them, and that the capsules are very soon destroyed, after their introduction into the system, and thus the inclosed parasites are set free. The hybernated trichinæ grow very fast, so that they attain, in about three days, twice their original length, and in the same ratio alter their appearance. Nothing of their generative organs was then known, but now the creatures can be plainly distinguished as male and female. They enter into very productive marriages, because one



EXPLANATION.—Fig. 1, Trichinous pork, as seen with the naked eye; 2, Young minute trichinæ roving about, magnified forty diameters; 3, Trichinæ in capsules, magnified forty diameters; 4, Female trichina; 5, Male trichina, magnified two hundred diameters. (*a*) Head; (*b*) the tail. Near the female trichina is seen the ova and their young ones, just escaped from the genital organs.

female brings forth, in a very short time, hundreds of live young ones. These new-born trichinæ do not resemble their producers, for they are without any generative organs. They are very much like the parasite when first introduced into our system with the pork.

The young trichinæ remain not at home, like the old ones, but at once commence to travel. They break through the intestines and enter the muscles known as the voluntary, where they continue their march until they have found, in the finest fibers, a place fit for their encapsulation. On their journey to such locality they can not be seen with the naked eye, but only by means of a microscope. They wander in the shape as presented in fig. 2, straight, or slightly bent. After they arrive at their destination, they curve or bend themselves in various ways, and thus make their way into the flesh fibers, and then they roll themselves up in their spindle-formed nest, which is spiral in form, like a watch-spring. The mass around the nest is, in the beginning, soft and transparent, but by degrees it becomes converted into a hard, impenetrable shell. These shells can be seen in the flesh with the naked eye. They are the fine, white spots as seen in fig. 1. The trichina lives now in a perfectly-closed sac, or lemon-formed capsule, and is perfectly harmless. In this state, it seems that the trichina can exist in a latent state, for many years. From some cause or other, the chalk capsules get dissolved, and the hybernating parasites (until now without any genital organs) become males and females, and produce young ones, who live and act just as their predecessors—namely, generate, travel, etc. Accordingly, we find in the human and animal body (mostly in the hog) male and female trichinæ, and those in the stomach either straight or slightly bent. These new-born trichinæ, in the stomach and intestines, very soon become muscle trichinæ, to be encapsuled, like the hermit in his cell.

Every trichina is pointed at the mouth (*a*) and rounded at the other end (*b*), the pelvis. Between both openings is the gullet and intestines. The female trichina is about an eighth of an inch long, and has in its hind part (*b*) a bag containing about sixty or eighty balls (the ovary with eggs). Connected is a pipe conveying the trichinæ, which come from the ova as live parasites, by the vagina. How long the parent can exist and generate can not be told, though it is supposed that it exists for three or four weeks after giving birth to the offspring. The male trichina is about half as large as the female, and on its posterior end (*b*) is a prominence divided into two flaps. His anterior construction shows the spermatic vessels. The new-born trichinæ without genitals are only to be seen when well magnified. They are very small, and are those which, after penetrating the intestines and the cellular texture of the abdomen and cavity of the chest, enter the muscles, to be encapsuled.

The traveling trichinæ (fig. 2) grow very fast on their journey. Finding food on their way, they roll themselves up just as they are about becoming encapsuled. In the course of a few weeks the parasite has almost attained its full length, but, not having any generative organs, it can not multiply. It is supposed that the encapsulated trichinæ can live for several years, whereas the parents die in about six or eight weeks.

It is not denied that the trichinæ are dangerous to the human subject, but the danger only occurs when the parasites are very numerous in the intestines and muscles. It is certain that a very few small pieces of trichinous pork can introduce a great many males and females into the system, that in a few days may send millions of young parasites into our muscles. The more trichinous food is eaten, and the more those parasites are introduced into the system, and the longer they remain there, the greater must be the suffering and danger. The parts affected or visited by the trichinæ are the stomach, intestines, and muscles; and if this parasite is once introduced in the animal system, it produces an incurable disease, for which there is no remedy. It is well for those who are fond of pork to be very cautious, and cook it thoroughly, because, if well cooked, the death of the parasite is sure.

A LIST OF FLUID EXTRACTS,

RECENTLY INTRODUCED INTO VETERINARY PRACTICE,

By G. H. DADD, V. S.,

WITH INSTRUCTION REGARDING THEIR ACTION, AND THE QUANTITY TO BE ADMINISTERED.

THE introduction of medicines, in the form of FLUID EXTRACTS, for the treatment of diseases incidental to domestic animals is considered a very great improvement over the old method of drenching by the pint or quart, to the great disgust of the patient as well as the practitioner, and the great danger attending the administration of a large quanty of fluid which was necessary when crude materials were used. In the use of fluid extracts all danger is obviated and much labor saved, for the doses are quite small, rarely exceeding one fluid ounce. This can be merely placed on the tongue, the animal's head being slightly elevated, and he swallows it without any difficulty or resistance.

The fluid extracts bear an exact relation to the crude materials—that is, ounce for ounce—yet, from a variety of circumstances, they may vary slightly from this standard. It is, however, the intention of the manufacturer to completely exhaust the active principle of the crude material and render the medicine uniform in strength. The fluid extracts used by the author are manufactured by Messrs. GARRISON & Co., manufacturing chemists, of Chicago. They conduct their evaporations at a very low temperature, by means of an improved steam bath, and use only select drugs, thereby preventing the possibility of adulteration. I have used large quantities of medicine manufactured by the above-named firm, and find them equal if not superior to any in the market; therefore I do not hesitate to recommend them as efficient and reliable medicines. *The doses here recommended apply to both horses and cattle.*

Fluid Extract of Chamomile.

(*Anthemis Nobilis.*)

This is a valuable tonic, and is used in cases of derangement of the digestive organs. Dose, from two to four drachms.

Fluid Extract of Arnica.

(*Leopard's-bane.*)

Arnica is chiefly used in veterinary practice as an external application in the treatment of wounds, sprains, and bruises. It is prepared as follows:

Fluid extract of arnica........................	4 oz.
Proof spirits (equal parts of water and alcohol)...	1 pint.
Mix.	

Apply a portion to the affected part two or three times daily.

Fluid Extract of Wormwood.

(*Artemisia Absinthium.*)

This is used as an anthelmintic for the expulsion of worms. The dose is one ounce (fluid), to be given every morning for a week, just before feeding-time. It not only has a tendency to expel worms, but gives tone to the digestive organs, and corrects a morbid appetite.

Fluid Extract of Pleurisy Root.

(*Asclepias Tuberosa.*)

This is used in pleurisy and irritable sore throat. Dose, four drachms, night and morning. The powdered root enters into the composition of some of the most celebrated cough powders.

Fluid Extract of Male Fern.

(*Aspidium Filix Mas.*)

This is the celebrated remedy for the treatment of tape-worm, which is sometimes to be found in the intestines of young colts.

Dose, four drachms, to be given every morning, on an empty stomach, for six or eight successive days, and longer if necessary.

Fluid Extract of Buchu.

(*Barosma Crenata.*)

This is used exclusively for the treatment of diseases of the urinary organs, retention of the urine, and for the treatment of the various forms of dropsy. Its direct action is diuretic, yet it also gives tone to the parts on which it acts. Dose, from four to eight drachms. Should an animal be suffering from retention of the urine, the diuretic action of the buchu may be augmented by adding to it a small quantity (equal parts) of sweet spirits of niter. For the treatment of spasm at the neck of the bladder, add to the dose of buchu an equal quantity of tincture of assafetida.

Fluid Extract of Indian Hemp (Foreign).

(*Cannabis Indicus Sativus.*)

This medicine acts as a narcotic and antispasmodic. Its use is indicated in all diseases attended with pain and restlessness, but is chiefly used for the treatment of tetanus or locked-jaw. Dose, two drachms, to be repeated as occasion may require.

Fluid Extract of Prince's Pine.

(*Pipsissewa.*)

Prince's pine is a very excellent tonic and diuretic in chronic diseases of the urinary organs, and has been used with much success in cases of local dropsy of the limbs, known as swelled legs. Dose, from four to six drachms.

Fluid Extract of Black Snakeroot.

(*Cimicifuga Racemosa.*)

This extract is considered a valuable agent for the treatment of spasmodic affections, which arise in consequence of derangement of some portion of the nervous system. It is an efficient remedy in hysteria.

Fluid Extract of Colchicum.

(*Colchicum Autumnale.*)

This extract is prepared from the roots and seeds of the plant. It is celebrated for the treatment of rheumatism, inflammatory diseases of the joints, and inter-articular lameness. Dose, one drachm, two or three times per day.

Fluid Extract of Yellow Jessamine.

(*Gelseminum Sempervirens.*)

This agent is used as a sedative in the treatment of pleurisy and pneumonia in the early or acute stage. It is also a powerful febrifuge, hence it is indicated in all acute fevers. It entirely dispenses with use of the fleam. Dose, from one to three drachms.

Fluid Extract of Witch-hazel.

(*Hamamelis Virginica.*)

Witch-hazel is used as a local astringent in the treatment of "bog and blood spavin." It is prepared for use as follows:

Fluid extract of witch-hazel..................	6 oz.
Proof spirits..............................	1 pint.

Mix.

Apply a portion twice daily.

Fluid Extract of Hops.

(*Humulus Lupulus.*)

This preparation of hops is used as a tonic in general debility, and as a narcotic in diseases of the nervous system. It is a reliable remedy to induce sleep and relieve pain. Dose, from two to four drachms, to be repeated as occasion seems to require.

Fluid Extract of Golden Seal.

(*Hydrastis Canadensis.*)

The golden seal is a pure tonic, and its use is indicated in all cases of debility, loss of appetite, derangement of the digestive organs, and torpidity of the liver. Dose, from two to four drachms.

Fluid Extract of Sassafras.

All the preparations of sassafras are more or less alterative. The fluid extract is used in view of purifying the blood in diseases of the skin, and in cases of chronic rheumatism. Dose, from four to six drachms.

Fluid Extract of Culver's Root.

(*Leptandra Virginica.*)

This is employed, in the author's practice, as a substitute for calomel, in the treatment of acute and chronic diseases of the liver. Dose, from two to four drachms.

Fluid Extract of Lobelia.

Lobelia is a very valuable antispasmodic, and is useful in diseases of a spasmodic character. The author has used it, with great success, in obstinate cases of spasmodic colic. Dose, two drachms.

Fluid Extract of Bayberry.

(*Myrica Cerifera.*)

Bayberry is successfully used as a stimulant and astringent in scours, diarrhea, and super-purgation. Dose, two drachms, to be administered in a small quantity of milk porridge.

Fluid Extract of Poppy-heads.

(*Papaver Somniferium.*)

This is used as a narcotic, in all cases that seem to require the exhibition of opium. It mitigates pain, induces sleep and rest, and is much safer than crude opium. Dose, from two to six drachms.

Fluid Extract of Poke-root.

(*Phytolacca Decandra.*)

This is used as an alterative in a disease occurring among cows, known as "garget," or "caked udder." Dose, from two to four drachms.

Fluid Extract of Matico.

(*Piper Angustifolium.*)

This is used as a styptic to bleeding wounds, internal hemorrhages, and chronic diarrhea. Dose, from four to eight drachms.

Fluid Extract of Cubebs.

This is a very valuable agent for the treatment of leucorrhea, gleet, nasal gleet, or discharges from mucous surfaces. Dose, from three to six drachms.

Fluid Extract of Black Pepper.

(*Piper Nigrum.*)

This is a carminative and stimulant to the digestive organs, and is often used successfully in the treatment of stomach staggers. Dose, from two to four drachms.

Fluid Extract of Mandrake.

(*Podophyllum Peltatum.*)

Mandrake is now used as a laxative and cathartic, in lieu of aloes. About one ounce will usually purge a horse, if followed up by sloppy bran-mashes.

Fluid Extract of Bloodroot.

(*Sanguinaria Canadensis.*)

This is used as an escharotic in the treatment of foul ulcers, and fungus growths. It is used, also, as a gargle in suppurative laryngitis, croup, putrid sore throat, etc. The gargle is prepared as follows:

Fluid extract of bloodroot	4 oz.
Vinegar	1 pt.

Mix.

It is applied to the mouth and throat by means of a sponge, affixed to a piece of rattan or whalebone.

Fluid Extract of Valerian.

(*Valerian Officinalis.*)

This is a very useful antispasmodic, and its use is indicated in all cases marked by irregular nervous action and hysterical affections. Dose, four drachms.

Fluid Extract of Ginger.

(*Zinziberis Officinalis.*)

Fluid extract of ginger is one of the most valuable diffusible stimulants to be found in the whole materia medica. The Jamaica ginger is preferable to any other; it is used in cases of indigestion, flatulency, etc. Dose, from three to six drachms.

Fluid Extract of Ginger enters into the composition of the celebrated colic drench, used by the author of this work and his students, during a period of twenty-five years, with marked success. The following is the formula:

Fluid extract of ginger..... } each.........	1 lb. fluid.
Fluid extract of golden seal.. }	
Hyposulphite of soda......................	6 oz.

Dose, four ounces (fluid) every four hours, until relief is obtained.

Remedy for Wounds.

Apply a compress of several folds of cotton cloth, soaked in a portion of the following:

Balsam fir..................................	1 lb.
Hyposulphite of soda.......................	2 oz.
Proof spirit................................	1 pt.
Mix.	

Remedy for Tedious Labor.

The natural labor-pains may be excited by administering: fluid extract of ergot (ergota), two drachms, every half hour, until delivery is accomplished. The ergot operates with great energy upon the contractile function of the uterus, of both mares and cows, and to a certain extent prevents inordinate hemorrhage after parturition.

Remedy for Hemorrhage in Performing Operations.

Apply, by means of a compress of linen or sponge, a small quantity of persulphite of iron. This is the most valuable styptic known to veterinary science.

Fluid Extract of Aconite.

(*Aconitum Napellus—Monk's-hood.*)

This medicine is used as a very powerful sedative and narcotic, in all cases of active or inflammatory disease of the lungs or brain It is highly recommended by the professors of our art as a reliable antiphlogistic in the treatment of acute affections. The dose is from ten to twenty drops. This medicine is said to be very efficacious in inflammatory rheumatism, and as a fine topical remedy in localized painful affections, such as laminitis, myalgia, etc.

Hyposulphite of Soda.

The hyposulphite of soda is useful in all kinds of diseases known as rinderpest, pleuro-pneumonia, typhoid affections, and in enzoötic affections, and in all diseases caused by fermentation in the blood, such as Texas fever, malignant scarlet fever, typhus, etc. The hyposulphite of soda can be used with great success in the treatment of the above and other affections of an enzoötic origin, yet I have found it more efficacious and reliable when prepared as follows:

Hyposulphite of soda	each	1 oz.
Hypophosphate of lime		
Hypophosphate of potass		
Fluid extract of ginger		2 oz.
Sugar of milk		1 oz.
Proof spirit		1 pt.

Dose, two ounces, two or three times daily.

GLOSSARY

OF

MEDICAL AND SCIENTIFIC TERMS.

ABNORMAL—Irregular.
ABSORBENTS—Medicines used for absorbing; also the vessels of the body which suck up.
ACUTE—Sharp, severe.
ADIPOSE—Fatty.
ADYNAMIC—Debilitated.
ALAE—Wings.
ALTERATIVES—Medicines which change a disease for the better.
ANASARCA—Dropsy of cellular membrane.
ANASARCOUS—Dropsical.
ANÆMIA—Bloodlessness.
ANTISEPTICS—Medicines opposed to putrefaction.
ANTISPASMODICS—Remedies opposed to spasms or convulsions.
ANTIPHLOGISTIC—Opposed to inflammation.
APERIENTS—Medicines which open the bowels gently.
AQUEOUS—Watery.
ASCITES—Dropsy of the belly.
ATAXIC—Disordered.
AUSCULTATION—Examination by sounding and listening.
AUTOPSY—Post-mortem examination.

BIFURCATION—Division into two branches.
BOLUS—A large pill.
BUCCAL MEMBRANE—The lining of the mouth.

CANTHUS—Corner of the eye.
CAPSULE—Shell or case.

CARBONACEOUS—Containing carbon.
CARMINATIVES—Medicines which relieve pain by expelling wind from the bowels.
CARTILAGINOUS—Composed of cartilage.
CATHARTIC—Loosening.
CELLULAR—Cell-like.
CEREBELLUM—The brain.
CEREBRUM—The brain.
CHANCROUS—Cancerous.
CLINICAL—Relating to individual practice.
COMA—Stupor.
COMATOSE—Stupefied
CONJUNCTIVIAL MEMBRANE—The membrane which lines the eyelids and covers the eyeball.
CORNEA—Transparent coat of the eye.
CRANIAL—Pertaining to the skull.
CRANIUM—Skull.
CRUCIAL—Shaped like a cross.

DECARBONIZE—To purify by air.
DIAGNOSIS—The art of telling the nature of diseases.
DIAPHORETICS—Medicines which promote perspiration.
DIATHESIS—Predisposition to certain diseases.
DIETETICS—Regulation of diet.
DIURETICS—Medicines which increase the flow of urine.
DUCT—Canal.
DYNAMIC—Relating to the vital forces.

EMOLLIENTS—Substances used to reduce inflammations.
EMPHYSEMA—Distention by gas or wind of certain portions of the body.
EMUNCTORIES—Organs which carry off waste matters.
ENCEPHALON—The brain.
ENEMA—Injection.
ENZOOTIC—Endemic diseases among animals.
EPIZOOTIC—Epidemic among animals.
EQUILIBRIUM—Balance.
EQUINE—Relating to the horse.
ETIOLOGY—The doctrine of the causes of disorders.
EXCREMENTITIOUS—Useless.
EXCRETORY—Relating to vessels which throw off useless matter.
EXTRAVASATION—Escape of a fluid of the body from its vessel into surrounding parts.

EXUDATION—Oozing through a membrane.

FAUCES—The throat.
FLEAM—Used in bleeding.

GRAMINIVOROUS—Feeding on grass.

HEMATOSINE—The red coloring matter of the blood.
HEMORRHAGE—Bleeding.
HIPPIATRIC—Relating to diseases of the horse.
HISTOLOGY—General anatomy.
HYDROCEPHALUS—Water in the head.
HYGIENE—Preservation of health.

ICHOROUS—Humory.
IDIOPATHIC—Primary affections.
IDIOSYNCRASY—Peculiarity of constitution.
INDURATED—Hardened.
INGUINAL—Belonging to the groin.
INTERCOSTAL—Between the ribs.
INUNCTION—The act of rubbing in.

LACHRYMAL GLANDS—Those which secrete tears.
LANCINATING—"Shooting."
LAXATIVES—Loosening medicines.
LESION—Disorder.
LIGAMENT—The substance which joins bones together.

MAMMÆ—Breasts.
MASSETERS—Muscles of the jaws.
MORBID—Diseased.
MORBIFIC—Producing disease.

NAVICULAR—One of the bones of the foot.
NEURO-PATHOLOGY—The nervous system in disease.
NODULOUS—Like a knot.
NOSOLOGY—Classification of diseases.

ŒDEMATOUS—Swollen.
OPAQUE—Not transparent.
OS CALCIS—Bone of the heel.
OSSEOUS—Bony.
OVOID—In form of an egg.

Palatine—Relating to the palate.
Panzootic—An epidemic affecting animals generally.
Parasite—An animal which lives on another.
Parotid—Largest salivary gland.
Pathology—The study of the body in disease.
Pedicle—Narrow part of a tumor.
Petechial—Resembling flea-bites.
Phthisis—Wasting away.
Pituitary Membrane—Lining of the nostrils.
Pseudo-membranous—Relating to false membranes.
Pus—Matter.
Pylorus—Entrance into intestines.

Rale—A watery sound heard in sounding the chest in some diseases.

Sanative—Health-giving.
Schneiderian Membrane—The lining of the nostrils.
Sebaceous—Of the nature of suet.
Sedatives—Medicines which produce sleep.
Serous—Watery.
Serum—Watery part of the blood.
Solvent—That which dissolves.
Sporadic—Scattered.
Submaxillary—Beneath the jaw.
Sudamina—Small eruptions.
Supra-renal—Above the kidney.

Thoracic—Relating to the chest.
Thyroid—Shaped like a folding door.
Tonics—Medicines which give tone and strength to the body.
Tubercular—Relating to tumors in the structure of an organ.
Tumefaction—Swelling.
Turbinated Bones—Bones of the nose shaped like a top.
Turgescence—Great amount of humors in any part.

Vascular—Full of blood-vessels.
Ventricle—Cavity.
Virus—Poison.
Vis a fronte—Force from the front.
Vis a tergo—Force of propulsion.
Viscous—Sticky.
Voice-box—Larynx.

A GUIDE TO DIAGNOSIS;

OR

COMPLETE INDEX OF SYMPTOMS.

THE following Index of Symptoms is arranged alphabetically, so that ready reference can be made to any symptom.

HOW TO USE THIS INDEX.

Animals when taken sick, not having the power of speech, can not make known the seat of their disease, except by certain signs or invariable symptoms. It therefore becomes of the highest importance to be able to understand the mute language of the poor dumb brute, and thus to find out what ails him, in order that the proper means of cure may be speedily made use of.

An instance of the use to be made of this Index may be found in the following case: A cow is seen to "get down and moan from incessant pain," "rumination has ceased," "dung is hard, and streaked with blood," "the flanks heave," "legs tremulous," "has a staggering gait." Now, by referring to the "Index of Symptoms," which is alphabetically arranged, it will be seen that the foregoing symptoms point to page 76 where "Inflammation of the Bowels" is fully described, and we conclude at once that this is what ails the cow, and we can proceed to administer the proper remedies. This mode of ascertaining the nature of the disease may be styled the "Natural Method," inasmuch as it first observed the *symptoms* or *signs* which the case presents, and from them decides as to what form of disease is present. It is a mode of procedure original with this work, and it is believed to be the only practical way in which an unprofessional person may arrive at the truth in the premises. The same plan is used in Dr. Dadd's REFORMED HORSE BOOK, published by R. W. Carroll & Co.

In observing symptoms, attention should be directed to the various parts of the body of the animal which give the earliest warnings of disease. These are, usually,

THE EYES, TONGUE, MUZZLE, THROAT, PULSE, CHEST, HEART, BREATH, BREATHING; DISCHARGES FROM THE MOUTH; DISCHARGES FROM THE NOSTRILS; THE SKIN, THE COAT, THE BACK, THE ATTITUDE, AND GENERAL APPEARANCE OF THE WHOLE BODY.

BOVINE DEPARTMENT.

PAGES

DISEASES OF SHEEP.

DISEASES OF SWINE.

TABLES OF WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHTS.

20 grains	make one	scruple,	marked	℈j.
3 scruples	do.	drachm,	do.	ʒj.
8 drachms	do.	ounce,	do.	℥j.
12 ounces	do.	pound,	do.	℔j.

LIQUID MEASURES.

60 drops	make one	drachm,	marked	ʒj.
8 drachms	do.	ounce,	do.	℥j.
20 ounces	do.	pint,	do.	Oj.
8 pints	do.	gallon,	do.	Cong.

ORDINARY MODES OF MEASURING LIQUIDS.

A *tea-spoonful* of liquid	equals	60 *drops*, or *one drachm.*
A *table-spoonful* of	do.	$\frac{1}{2}$ *ounce*, or *four drachms.*
A *dessert-spoonful* of	do.	180 *drops*, or *three drachms.*
A *wine-glassful* of	do.	$1\frac{1}{2}$ *ounces.*

The doses vary in quantity in different animals. The amount to be given in any case will be found clearly stated in the *treatment* of each disease, whether of horses, cattle, sheep, or hogs.

INDEX.

SHEEP AND SWINE.