SEQUEL

TO THE

REPORT OF THE COMMITTEE,

CONVENED BY THE

LORD LIEUTENANT OF IRELAND,

TO

CONSIDER THE MEASURES TO BE ADOPTED FOR ARRESTING THE PROGRESS OF THE CATTLE PLAGUE, IN CASE OF ITS APPEARANCE IN IRELAND.

Presented to both Houses of Parliament by Command of Her Majesty.

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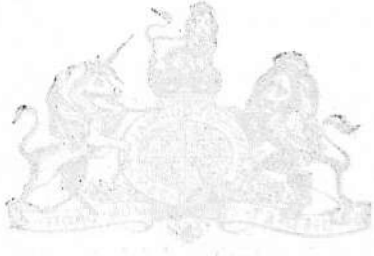

REPORTS.

In conformity with the recommendations of the Cattle Plague Committee, arrangements were made for sending to England properly qualified persons to make themselves acquainted with the symptoms, and to observe and consider the most approved and successful mode of treatment of the Cattle Disease.

His Excellency was pleased to select

E. D. MAPOTHER, esq., M.D.
ARTHUR WYNNE FOOT, esq., M.D.
PATRICK J. HAYES, esq., M.D., and
JAMES TUCKER, esq., M.D.
T. D. LAMBERT, esq., Veterinary Surgeon,
OWEN REILLY, esq., Veterinary Surgeon, and
EDWARD BARRON, esq., Veterinary Surgeon,
AUGUSTUS WARBURTON, esq., Kill, Naas, and
CHARLES CANNON, esq., J.P., Moyglare House, Maynooth,

also

THOMAS BALDWIN, esq. (Superintendent of the Agricultural Department of National Education),

to be so employed, and they were requested to proceed to London for that purpose, and in the first instance wait on Mr. Helps, of the Privy Council Office, with an intimation that that gentleman would be prepared to assist them with advice and instructions as to the course it might be best for them to pursue, and the persons with whom it would be most desirable that they should communicate.

The Reports of these gentlemen are appended, and one from William Pallin, esq., Veterinary Surgeon, who was sent over to England by the Carlow Agricultural Society and Athy Farmers' Club.

Copy letter from the UNDER SECRETARY, Dublin Castle, to the CLERK of the COUNCIL, Council Office, London.

Dublin Castle,
January 10, 1866.

SIR,

I am directed by the Lord Lieutenant to acquaint you that His Excellency has, in conformity with the recommendations of the Cattle Plague Committee, made arrangements for sending to England properly qualified persons to make themselves acquainted with the symptoms, and to observe and consider the most effective and successful mode of treatment of the Cattle Disease. These gentlemen have been requested to wait upon you, and His Excellency would feel obliged if you would instruct them as to the course it may be best for them to pursue, and the persons with whom it would be most desirable for them to communicate.

I am, Sir, your obedient servant,

THOMAS A. LARCOM.

Arthur Helps, esq.,
Privy Council Office, London.

CONTENTS.

Observations on the Cattle Plague, made in London, Surrey, Hertfordshire, Norfolk, and Cheshire, by Drs. Mapother, Foot, and Hayes.

Having been honoured by instructions from His Excellency the Lord Lieutenant "to make ourselves acquainted with the symptoms, and to observe and consider the most approved and successful mode of treatment of the Cattle Disease," we proceeded to London, and waited on Mr. Helps, of the Privy Council Office, on Saturday morning, 13th of January. That gentleman requested Professors Simonds, Spooner, and Browne to afford us every facility for studying the disease at the Royal Veterinary College, at the cowsheds within the Metropolitan District, and also at the Knackers' yards, to which the animals destroyed by the disease are conveyed.

13th instant.—We dissected a cow which had died of the Plague on the evening of the 11th instant, and found the following diseased conditions:—The eyes appeared sunken in the head, from the swollen condition of the lids; the surface membranes of the eyes were infected with blood, and from their corners the remains of the characteristic muco-purulent discharge could be seen staining the hair of the cheek, and matting the eyelids together; the surface-membranes of the lips and gums exhibited shallow abrasions or excoriations, of various extent and irregular shape; similar appearances were visible, but to a less degree, upon the palate; the conical elevations at the angles of the mouth, naturally white, were pinkish, enlarged, and in some places looked like pointed pustules; the vulva was congested, and a reddish discharge was issuing from that genital canal.

About the bases of the teats there was a scabby eruption, in the form of flattened, dirty, yellow crusts, upon the removal of which the underlying skin exhibited a congested stain, but there was no evidence of any loss of substance or depression in it; the eruption was not confined to the udder, but was observable along the abdomen and in other places. The presence of air under the skin was detected by the pressure of the hand along the inside of the thighs and about the udder, where it crackled. The hide was unusually adherent to the muscles; the intervening cellular tissue was very much congested, and of a red colour, which contrasted strongly with the whiteness of this structure in health. In many parts it was greenish, from incipient decomposition. Putrefaction had already set in, although the temperature was low, and snow lying on the carcase.

The gas which escaped on opening the peritoneal cavity of the abdomen was remarkably offensive. The first stomach was filled with undigested food, the result of interrupted rumination. The interior of the third stomach was of a uniform, purplish colour, and the plaits were streaked with darker lines, corresponding to the course of the blood vessels. The gall-bladder was distended with thin, orange-coloured bile, and likewise contained air, probably of a septic origin; the liver was normal. Parts of the small intestines presented congestions of the mucous surface in various degrees, but no indications of disease of the Peyerian glands were discovered. In the cæcum were enlarged solitary glands, forming small, soft nodules, the size of duck shot. The mucous lining of this bowel was most abnormally vascular; the congestion assumed the form of streaks, patches, and stellate markings. The interior of the windpipe and larynx was intensely congested, of a deep red or plum colour. A red, gluey muco-purulent secretion adhered to the infected membranes; when removed with the finger it was ascertained not to be of a diphtheritic nature, and under the microscope contained no lymph. The margins of the lungs, and the spaces between their lobules, were filled with air.

We then examined the body of a sheep which had been infected with the Plague, by having been placed in a stable in which a cow had died of it on the 30th of December. The sheep first took ill on the 8th of January, and died on the 13th. The only diseased appearance on its body was intense plum-coloured redness of the fourth stomach, especially in the neighbourhood of the intestinal orifice. Its lungs also contained many nests of thread-like animals, named filaria, which had caused the pouring out of a quantity of blood round each. The windpipe was more vascular than it should normally be, but by no means to the same degree as was seen in the cow; the secretion upon its surface was also similar, but proportionally less.

14th.—Sunday.

15th.—In company with Mr. Tegg, the Inspector of the Metropolitan Market, we examined several bullocks and heifers in the pens, which were affected with "foot and mouth disease." This eruptive disease removes the surface skin of the lips and gums, and of the cleft between the hoofs, in circular patches, from one-eighth to one-half of an inch in diameter, produces great dribbling of fluid from the mouth and lames the animal. Rumination, however, generally continues, and the animal does not assume that dejected aspect which appears early in the Plague. Very many of the beasts in the market had reddened eyes, due, probably, to injury, or to the irritating effects of the chloride of lime in the railway trucks.

We next examined the body of a cow, which was stated to have died of the Plague, and in so doing found by the absence of all characteristic appearances that this was not the case, but that the beast had perished by an accidental injury to its neck. In company with Mr. Priestman, Veterinary Inspector for North London, we examined the following cases of Cattle Plague:—In the stable of Mr. Tilston, of Upper Holloway, we saw a Dutch cow in the 5th day of its illness. The stable was a low one, badly lighted and ventilated, constructed with four stalls. Eight cows had died in this building, and one of them was lying on the floor, having died two hours before, after an illness of four days. The live cow became ill on Thursday, the 11th; she had given fourteen quarts of milk on the day before, but then "got slack in her milk, and went off her food;" she now gives half a pint of milk, purulent and unfit for use. She was lying down, and so weak that she could only be made to get up with great difficulty, and staggered about when on her legs, finally falling down in an attempt to turn round. The ears were lapped, the surface of the body cold; there was muco-purulent discharge from the eyes and nose, and profuse flow of ropy, tenacious saliva from the mouth; the vulva was congested; the usually characteristic abrasions upon the inside of the lips and gums were not observable in this case, and the excrement was natural. It may be here remarked that we observed that an individual case seldom presents all the symptoms of the disease; some symptoms predominate in one case, others in another, and an animal may die without having exhibited some of the most usual signs of the disease.

We saw this animal again on the 18th; it was then in the 8th day of its illness, and was decidedly worse. The respiratory phenomena peculiar to the complaint, such as the quadrupling of the frequency of breathing, and the occurrence of a very characteristic grunt or groan, at the end of each expiration, were well established; the beast was cold, unable to rise from weakness, and all the symptoms observed at our former visit were aggravated.

We had no opportunity of seeing this animal again, but were subsequently informed of its death by the inspector. We had an opportunity of seeing carried out the process of disinfection directed by the Privy Council to be employed prior to the removal of a dead animal, namely, scrubbing all the surface with a mixture of four pounds of chloride of lime, and four gallons of water, and plugging all the apertures to prevent any discharge escaping along the road. Upon the following day we attended at the *post mortem* examination of the body of this cow on the premises of Mr. Stronach, horse-slaughterer in Brandon Road.

We next saw two cows which had recovered from the disease, being the only survivors out of eight attacked; these two had been ill at the same time, about three months previously; one of them had suffered from universal effusion of air under the skin (usually a very fatal symptom), to an extreme degree; the hide had been punctured, and as much as possible of the air patted out; both of them had preserved their appetite during illness, but their milk had completely failed; they had had muco-purulent discharge from the eyes and nose, congestion of the vulva, and the abrasions of the mouth, from which circumstances there is no doubt they suffered from the Plague. They had been treated with chloric ether in two ounce doses, till the fever subsided and then with a tonic mixture consisting of tinctures of gentian, ginger, and ammonia, a plan which has been the most successful; they are now yielding a full allowance of milk, and are apparently in perfect health. On the same day we visited the stables of Mr. King, of Holloway, who had lost sixteen beasts; we saw three cows, one ill with the Plague, one which had recovered from it, and one which had not yet taken it. The beast affected, an English cow about seven years old, was in the sixth day of its illness, and presented the usual features of the disease in a marked manner; it died on the eighth day, and we attended at its *post mortem* examination on the 18th of January. The cow which had recovered had been treated by chloric ether, and carefully nursed by warmth, mashes, and bottle feeding.

16th instant.—Attended at the *post mortem* examination of the animal, which had died the day before in Mr. Tilston's premises. The interior of the body was still warm;

the subcutaneous cellular tissue very much congested, of a purple colour; the first stomach full of partially digested fodder, the second quite natural, as is always the case; the third also contained a quantity of food, its mucous lining was softened, the surface peeling off; purple streaks radiated from the bases of the plaits towards their free edges; one pinhole aperture was discovered in a plait; the interior of the fourth stomach presented an almost uniform purple colour, varied here and there by congested patches of a lighter hue; some whitish markings were scattered over the vascular membrane; the folds were particularly red. The upper portion of the small intestines partook of the congestion of the fourth stomach, the colour being identical and continuous from it; the cæcum was streaked with dark lines, which on the reddish ground-colour of the congested bowel, gave "the Zebra appearance," so called by Boulay. The larynx and upper half of the windpipe were very much congested and covered with a tenacious mucous secretion; the middle part of the windpipe was comparatively pale, but the redness appeared again towards its division, and spread along the tubes to the lungs, which were distended with effused air in their apices and anterior margins, congested considerably posteriorly. Beneath the lining membrane of the left ventricle of the heart, there were blood spots very characteristic of this disease; the same appearances in a less degree were observed under the lining membrane of the right ventricle. We visited also on this day one of the metropolitan abattoirs, and inspected the viscera of healthy animals, by which means we were able to contrast healthy with morbid appearances. We then went through the dairy of Mrs. Nichols, at Islington, where the Plague first appeared, and saw several animals which had recovered from it. Afterwards we returned to the Royal Veterinary College, and with Professor Spooner, examined the valuable wax models illustrative of the effects of the Plague.

17th.—Went to Wimbledon with Professor Browne and Mr. Lupton, V.S., and saw many animals suffering from the disease, also four which had recovered. On our return to London, we went to the Albert College, and saw the subjects and results of the various experiments made there by Professor Gamgee and Dr. Sanderson for the Royal Commission; also animals ill and dead. These important investigations will be immediately published.

18th.—Attended at the *post mortem* examination of the animal we had seen ill on the 15th, visited cowsheds in the metropolis, and went afterwards to the Albert College, where we saw dissections of animals we had seen alive the night before.

19th.—Went to Mr. Fordham's estate in Hertfordshire, where we saw experiments to test the efficacy of the inoculation of the cattle poison, which had been made on sixty-one animals, by Professor Gamgee. On this day, Drs. Foot and Hayes proceeded from Hertfordshire to Norfolk, and Dr. Mapother returned to London, to set out for Cheshire.

20th.—Drs. Foot and Hayes had an interview with Mr. Read, M.P., at Norwich, and were present at a meeting of the Norfolk Cattle Plague Association; they were also introduced to the inspectors of the district, and communicated on the subject of the disease with them and the local veterinary surgeons.

21st.—Drs. Foot and Hayes visited farms in the neighbourhood of Norwich, with Mr. Whitwell, V.S., and saw cattle in various stages of the disease, and also beasts which had been vaccinated, as well as one which had been inoculated with "the grease" from the horse. They returned to London in the evening of the same day, having ascertained that there was not then opportunities of seeing the disease in the neighbourhood of Norwich, and considering that there were more opportunities of acquiring information on the subject in London, where they remained three days more.

Dr. Hayes visited the Veterinary College, and ascertained the result of an experiment by Professor Spooner, namely, inoculating with the Plague poison, diluted with six parts of milk, and introduced by a seton. The calf took ill on the sixth, and died on the ninth day after this operation. Visited the Albert College, and examined a calf which on the 13th instant had been inoculated by injecting under the skin two drachms of the serum of the blood of a cow suffering from the Plague. On the 22nd the disease was developed, but on the 25th the animal was living, and suffering from a comparatively mild form of the disease; also saw a calf successfully vaccinated from the arm of a child about four weeks previously. Two children were successfully vaccinated from this animal; on the 15th it was placed in a stall previously occupied by a cow with the Plague, but up to the 25th it had escaped.

20th.—Dr. Mapother visited the cases on the estate of Mr. Wilbraham Tollemache, Dorfolk Hall, Nantwich, Cheshire, and saw four cows which had been vaccinated with human lymph on the 28th of December. In all vaccine vesicles were produced on the eighth day, and they remained free from disease till the 20th of January, when one was attacked with mild symptoms of the Plague, and another has since fallen ill. An Alderney heifer, aged thirteen months, was also vaccinated on the 28th December, and

sixteen days after it was placed in a stall with calves affected with the Plague. It remained free from disease until the 18th, and on the 20th was suffering from a slow form of the disease, which proved fatal in eight days. Many other cases of the disease, and many vaccinated cows on Mr. Tollemache's estate were examined, and in none of the Plague cases was any eruption on the body visible. The bowels had been in nearly every instance very costive, and the following drench had been used:—1 lb. of salts, 1 oz. of sulphate of iron, in 2 quarts of water.

It was also noted that of nine cows which had aborted while suffering from the Plague, eight had recovered, while the general recoveries were under fifteen per cent. Thirty cows affected with the disease were examined at Mr. Reddrop's dairy farm, near Nantwich, on the 7th instant, after deaths by the Plague had occurred in the same houses, and the remaining beasts were vaccinated with lymph from a cow vaccinated from the child, in one point only, on the tail, and in eight days one vesicle was produced, in all but four. On the 18th they were vaccinated again, in a second point, but up to the 20th nothing had followed the latter operation. On that day all the animals were affected with the Plague, with different degrees of severity, but the results are not yet ascertained.

21st.—Dr. Mapother visited the dairy farm of Mr. Challoner, Beeston, Cheshire. There were there forty-eight cows which had had cowpock naturally in July, 1864. The Plague has now been in his neighbourhood for seven weeks; his brother-in-law, who lives within fifty yards of him, having lost thirty-seven out of forty-four cows, yet none of his have taken the disease. He states that out of fifty-five cows belonging to his son, at Bridgemore Hall, near Nantwich, thirty-five had cowpock in April, 1865. The Plague now closely surrounds his farm, but these cows have not taken the disease. It is right, however, to state that twenty-five other cows purchased since the cowpock was among his cattle, have enjoyed a similar immunity. Mr. Neild's houses were also visited by Dr. Mapother. Out of 140 cows 110 had, up to the 21st inst., died of the Plague, and all the remaining thirty were affected with the malady. None had been vaccinated, or had had cowpock.

We hope His Excellency will be satisfied that we have done all it was possible for us to achieve within the time to which we were limited, and that to the shortness of this period he will be pleased to attribute such deficiencies as may exist in our observations, especially as to preventive and curative treatment, the full study of which would have required a more lengthened stay.

E. D. Mapother.
Arthur Wynne Foot.
P. J. Hayes.

January 30, 1866.

125, Stephen's-green,
February 1, 1866.

SIR,

In reply to your letter of the 30th ultimo, I have the honour to inform you that, in conjunction with Doctors Foot and Hayes, I submitted to you, for His Excellency's inspection, "Observations on the Cattle Plague, made in London, Surrey, Hertfordshire, Norfolk, and Cheshire," from the 13th to the 25th instant, on last Tuesday. As you request, in your letter of the 30th ultimo, that I should report all particulars which, in my opinion, are likely to be of future use in the matter, I venture to make the following memoranda, founded on my study of this disease in England, and my experience of preventive measures in the treatment of and suppression of human maladies.

1. *Inoculation with Cattle Plague matter.*

I have seen enough of this proceeding to convince me that it does not mitigate the severity or lessen the mortality from the disease, and is unadvisable because of its multiplying contagion.

2. *Vaccination.*

(*a*). With humanized lymph, or with lymph derived from a cow which has been vaccinated with humanized lymph.

I have seen on Mr. Tollemache's estate many cows with well formed vaccine vesicles, produced in this way, attacked with the Plague, the severity or mortality of which was by no means diminished.

(*b*). Natural cow-pock.

Many cows which had previously had natural cow-pock have hitherto escaped the Plague, although closely surrounded by its contagion, of which Mr. Challoner's case, recorded in my observations of the 30th ultimo, is an example.

It seems to me very desirable that a few cows which have had natural cowpock should be exposed to the contagion of the Plague, in order to ascertain if that disease protects from Cattle Plague or mitigates its severity.

(*c*). With the matter of human small-pox. In this way the cow may be readily made to take cow-pock.

I may mention that I saw in the Royal Veterinary College a sheep which, having recovered from the Cattle Plague, was inoculated by Professor Spooner with human small-pox matter, and yet two well-marked small-pox pustules were produced.

(*d*). With the eruptive matter of the "Grease" in the horse. In this way cow-pock in the bovine species may be produced readily.

3. *Feeding with fluid food.*

In every postmortem examination which I made, the first stomach was distended to the utmost with dry undigested food, rumination being always suddenly stopped. This circumstance points to the advisability of feeding on fluid food previous to the accession of the disease.

4. *Disinfection of Clothes, &c.*

For some years it has been habitual to disinfect the clothes of persons attacked with fever, smallpox, or other contagious diseases, in Liverpool, by exposing them to a dry heat of 212 degrees; and it was stated in evidence before the Royal Commission that the same plan was successfully adopted with regard to Cattle Plague in Prussia.

The necessary apparatus is a metal chamber of about twelve feet in cubical contents, consisting of two layers, between which water is constantly kept at the boiling point. In this chamber clothes may be hung for hours without injury to them, and as the contagion of Cattle Plague is organic, that degree of heat must suffice to destroy it.

I make these memoranda with great diffidence, and in order that they may be dealt with by experienced authority.

In conclusion, I venture to express my conviction, founded on the modes in which I have observed the Plague to spread in England, that no more efficient means for its suppression, if conveyed to this country, could be devised than those which are contained in the recent Order in Council, when carried out by an efficient staff of Inspectors.

I have the honour to be, your faithful servant,

E. D. MAPOTHER, M.D.,
Professor of Hygiene,
Royal College of Surgeons.

Major-General Sir Thomas Larcom, K.C.B.,
Dublin Castle.

21, Lower Pembroke-street,

February 1, 1866.

SIR,

In answer to your communication of the 31st ult., I have the honour to say that, in the joint report signed by Dr. Mapother, Dr. Hayes, and myself, the appearances of animals affected with the Cattle Plague, during life and after death, are briefly described.

I gladly comply with your request by now submitting to you, for His Excellency's information, the results of my observations more in detail, and also of alluding to some subjects bearing most materially upon this matter, though not perhaps coming quite within the province of a special medical report. With your permission, for the sake of clearness and conciseness, I will put my remarks in the form of detached sentences.

Remarks.

1. From what I have seen of the external appearances of animals suffering from the Plague, and of the internal appearances of the same animals when dead, I am forced to consider that the analogies between this disease and small-pox in the human subject have been over-estimated by high authorities, and that a belief in the identity of these two maladies is calculated to lead to disappointment in the results of vaccination with lymph *from the human subject* as a certain preventive of the Cattle Plague.

2. The opinion I am inclined to form of the nature of the Cattle Plague is, that it is a specific disease, *sui generis*, vitiating the blood, affecting with peculiar virulence the bovine race, and fully capable, but in a modified degree, of affecting sheep also.

3. Though unable to admit the identity between the Cattle Plague and small-pox in the human subject, I do not mean to maintain that vaccination with lymph from the human subject may not materially *mitigate*, or even prevent the progress of the disease in cattle. This opinion I am led to form from medical knowledge of the neutralizing effects of diseases upon one another.

4. I would emphatically protest against the practice of inoculation of healthy cattle with the virus of the Plague, regarding it as an *active* mode of propagating the disease, and promising little better results than a natural visitation of the Plague does.

5. I am inclined to discountenance all methods of treatment of diseased animals, medicinally or otherwise, having seen that the results as to recovery are very much the same, whether animals are treated for the disease or not treated; and from knowing that it has been found that a remedy or course of treatment successful in one case proves worthless in the next; and particularly from the fact that as long as a diseased animal remains alive under treatment (no matter whether it will ultimately recover or not), it remains a focus of infection and contagion, and the salvage in the end is not worth the loss occasioned by the multiplication of the virus.

6. I cannot see any other course to be adopted, in case this disease should reach this country, than to kill and bury (with all proper precaution and care) the first animals attacked, and to isolate and disinfect the place or district where the disease appeared. I am satisfied that the practice of the Continent in this matter is the method to be adopted in dealing with this disease, as far as can be done consistently with the institutions of this country.

7. I would earnestly hope that a staff of persons competent to detect the early symptoms of this disease (which has some points of close similarity to other complaints of much less gravity), will be in readiness in case of the appearance of the disease in this country, as it must be evident that, if mistakes in the diagnosis are made, the dissatisfaction of the owners of cattle with this mode of treatment, (killing the first cases), will be very much increased.

8. I would suggest the consideration of the question as to whether the holding in Ireland of large fairs or of cattle shows, such as the approaching Spring Show, may not be a source of danger to this country, by inducing many English buyers and persons otherwise interested in cattle to come to these fairs or shows from infected districts.

9. I would also suggest that, if it could not be made obligatory to do so, it should be very strongly urged upon owners of cattle in Ireland to have all their cattle at once *vaccinated with the natural cow-pock*, and that every facility to have this operation properly performed be afforded to them, and fresh and genuine vaccinia be supplied to them gratis, or at a nominal rate. Knowing that such is difficult to obtain, I would suggest that the Irish Government, having procured some of that on its way from Italy, should first generate a large quantity of it in carefully tended cattle, (bulls preferably), then have it carefully collected by those who understand the best time and means of doing so, and then have the operation of vaccination with this matter entrusted to properly qualified persons, who should visit and operate on the cattle of all who would consent to their doing so.

Much of the success of this method depends upon strict attention to minutiæ. I am aware that cattle naturally affected in this way (*i.e.*, having had cow-pock), are stated not to have been proof against the Plague, but with so much evidence in its favour, and considering that the health of the animal is not thereby disturbed, and that there is a good opportunity for doing so, while the country is yet free from the Plague, I am of opinion that it would be judicious to anticipate the disease in this manner.

In conclusion, I must express the hope that, if in these remarks I have discussed subjects which do not come within my province to refer to, it may be attributed to over-anxiety to contribute in any way I can to the protection of this country from such a calamitous visitation as is dangerously near.

I have, sir, the honour to remain,

Your obedient servant,

ARTHUR WYNNE FOOT, M.D., T.C.D.

Major-General Sir Thomas Larcom, K.C.B.

Whitworth Hospital, Dublin,
February 1, 1866.

SIR,

I beg leave to inform you that in obedience to the directions of His Excellency the Lord Lieutenant, I proceeded to England on the 12th of January, for the purpose of making myself acquainted with the symptoms, and to observe and consider the best mode of treatment, of the Cattle Plague.

In accordance with His Excellency's directions, I waited on Mr. Helps at the Privy Council Office, on the morning of Saturday, 13th January.

Mr. Helps recommended that at first I should observe the cases of Rinderpest in the Metropolis, and afterwards go to either Norfolk or Yorkshire, where the disease extensively prevailed.

I remained in London until the 19th of January, and under the guidance of Professor Browne, of the Veterinary Department of the Privy Council Office, daily visited cases of Rinderpest, examined the bodies of animals that had died of the disease, and observed experiments at the veterinary colleges.

I received great kindness and assistance from Professors Simonds and Spooner, at the Royal Veterinary College, from Dr. Sanderson and Mr. Gamgee, at the Albert Veterinary College, and much practical information from Messrs. Priestman and Lupton, Veterinary Surgeons and Cattle Inspectors.

I observed the morbid appearances produced by Rinderpest in the bodies of six cows, also in that of a sheep that died of the disease, at the Royal Veterinary College.

In London and at Wimbledon I studied the symptoms in six cows suffering from Cattle Plague, saw others that were recovering, and noted the treatment which had been adopted.

On the 19th of January I left London, and visited the cattle sheds of Mr. Fordham, in Hertfordshire, where I saw fourteen cows and four calves labouring under Rinderpest. They had been inoculated with the virus, after the disease had appeared amongst them.

I next proceeded to Norwich, and on 21st January, at the farm of Mr. Bloomfield, saw eighteen head of cattle that had been exposed to contagion; amongst them were cases of Rinderpest, in various stages of the disease. Mr. Whitwell, V.S., informed me that some animals of this herd had been vaccinated a few days before, and two, inoculated with grease from a horse. I expect to hear the result of those experiments, from Mr. Whitwell, in a few days. As I could not ascertain that the disease existed elsewhere in the neighbourhood of Norwich, I returned to London, and again visited the veterinary colleges for the purpose of learning the results of some experiments in connexion with vaccination and inoculation of bovine animals. I left London on the evening of the 25th January, and on my return to Ireland, I joined Drs. Mapother and Foot, in the preparation of some observations on the Cattle Plague, which we had the honour of forwarding to you on Monday, 29th ult.

The symptoms I have seen in cases of Plague, are as follows:—The affected animals, early in the disease, refuse food, or eat but little and ruminate imperfectly; the coat assumes a dull and rough appearance. If a milch cow happens to be attacked, the secretion of milk is at once interfered with, and afterwards suppressed. When the animal stands, the head is usually lowered, the ears are directed backwards and outwards, and they sometimes droop. In one case I noticed muscular twitching in the flanks. When the animal walks, a peculiar stiffness in the hamstring muscles may be observed, and in the latter stages of the disease, the animal totters, and even falls, when it attempts to walk or run. The pulse is quickened, so is respiration, and the act of expiration is often accompanied by a wheezing sound. As the disease advances, the following peculiarities in connexion with respiration may be noticed. After inspiration, which is rather short, there is a sort of click, seemingly caused by a sudden arrest of the effort; this is followed by a pause, then expiration occurs, the expiratory act being accompanied by a sound resembling a grunt or even moan. Professor Browne mentioned to me that grinding of the teeth is a characteristic sign, but it is not always present; cough is often heard. The bowels may be constipated at first, but diarrhœa generally appears in the latter stages. I have seen a fatal case of the disease in which constipation continued throughout the malady. The evacuations have a peculiar and offensive odour; they are sometimes streaked with blood. The temperature is at first increased but afterwards falls, and the limbs, ears, and horns, feel cold to the hand. The conjunctivæ become injected, tears flow down at the sides of the nose, and after a time a thin muco-purulent discharge trickles from the inner angles of the eye-lids. The mucous membranes

of the nose and mouth become redder than natural, and their secretions increased in quantity; sometimes there is froth about the mouth and lips, soon the nasal secretion assumes a muco-purulent character, and there may be some swelling around the nostrils. The membrane of the mouth frequently presents patches denuded of epithelium, and resembling superficial excoriations, also, there may be patches covered with soft thickened epithelium, in such cases a cheesy deposit is usually found between the lower lip and gum. The papillæ situated near the angles of the mouth are generally of a peculiar pink colour, rather swollen, and not so pointed as in healthy animals; the breath is offensive. When a cow or heifer is attacked the mucous membrane of the vagina will frequently be found red, and sometimes there is abrasion of the epithelium; also a muco-purulent discharge may be seen oozing from the orifice.

In most of the cases I have seen, a purplish line existed on the gum, near the teeth of the lower jaw.

The eruption found in Rinderpest, seems to me vesicular in character; the vesicles dry up soon, and scabs or crusts composed principally of epidermis mark the site of the eruption; the true skin is quite sound under the scabs. Mr. Lupton stated to me, that when patches of eruption are covered and kept warm, the eruption points. This, I understood to signify, that under such circumstances pustules would form. He also mentioned that when the eruption is very profuse, the sick animal is more likely to recover than if it were scanty. I noticed on the necks and shoulders of some calves that were recovering, a number of yellowish scabs, but the man who had charge of the calves told me a similar eruption appeared on others to even a greater extent, yet they died. The eruption occurs principally on the neck, shoulders, inner sides of the thighs, and udder. Subcutaneous emphysema along the back and over the hips is present in some cases. When emphysema is extensive, it is looked on as an unfavourable indication. The animals will drink during the disease, but refuse food unless they become convalescent, then the appetite returns, and it is necessary to give them but little food at a time, and that only which can be easily digested. The body has a characteristic smell during life, and after death. In the last stages of the disease there is great prostration, the eyes become sunken, the pulse is weak and rapid, and the animal dies from exhaustion.

Mr. Priestman informed me that he has noticed, as one of the earliest indications of Rinderpest, that the affected animal gives its head a peculiar shake from time to time, which is quite different from that seen after other symptoms have appeared. Dr. Sanderson considers that increase of temperature is the earliest sign of the disease, this he ascertains by introducing a self-registering thermometer into the rectum.

The Treatment.—The mode of treatment which has been found most successful, is that adopted by Mr. Priestman. He recommends that attention should be paid to hygienic conditions, the animal is to be allowed plenty of fresh air, but to be covered and kept warm. The diet to consist of a little bran, boiled linseed, and oatmeal gruel.

As prophylactic treatment, he gives half ounce doses of carbonate of ammonia, and nitre, in a pint of cold water, morning and evening. When symptoms of the disease appear, two ounces of chloric ether are to be given in gruel three times daily, instead of the ammonia and nitre. If the disease abates, two ounces of a mixture, consisting of equal parts of tincture of gentian, tincture of ginger, and aromatic spirit of ammonia, to be given morning and evening.

So far as I have been able to ascertain, one attack of Rinderpest seems to exhaust the susceptibility of the constitution to the disease.

I beg leave briefly to state some of the pathological conditions that I have seen in the bodies of Rinderpest animals. The subcutaneous areolar tissue is discolored, being of a dirty yellowish hue; it often contains air; the muscles are rather dark in colour, and decomposition occurs soon after death. The abdominal cavity contains offensive air. The conditions of the mucous membranes of the eyes, nose, and mouth, have been mentioned under the head of symptoms.

The fauces are sometimes deep in colour owing to congestion. I have seen the larynx plum-coloured on its mucous surface from the same cause. The trachea was reddened in most of the cases which I examined, this was also due to congestion of the vessels of the mucous membrane, and in parts I observed claret-coloured spots and stripes. The surface of the mucous membrane in two instances had the appearance of being covered with a diphtheritic exudation, this was caused, however, by thickened and softened epithelium, with some adherent mucus; the lower half of the trachea and bronchial tubes contained a reddish froth.

In the left ventricle of the heart, beneath the endocardium, I have seen blood-staining. Professor Browne informed me that he had frequently seen similar stains, and only in animals that had died of Cattle Plague. I have not seen the first or second stomachs diseased, the first is usually distended with undigested food.

The third stomach frequently contains hard masses of food, to which the epithelium often adheres, and separates from the mucous membrane in eel-skin like laminæ; the mucous membrane is sometimes pink in patches, owing to congestion of its vessels; the larger vessels of this stomach may also be seen distended with blood. In one case a small aperture existed in a plait of the mucous membrane; this was supposed to have been the result of ulceration.

The fourth stomach is usually nearly empty; its vessels more or less congested, the epithelium of the mucous surface is thickened, softened, and can be easily scraped off. The mucous membrane sometimes has an abraded appearance, especially near the pylorus; it is soft, its colour varies according to the degree of congestion; it sometimes has annular patches of a purplish colour, surrounding paler spots in which the mucous follicles are situated. Once I saw a small oval ulcer near the pylorus, it was somewhat depressed, and the base was whitish and granular. The duodenum is also congested, and at other parts of the small intestine, congestion and alteration in colour may be observed.

In the large intestine blackish lines are to be seen; the larger ones running parallel to the gut, and causing the zebra markings described by M. Bouley.

The ileo-cæcal valve is generally of a purplish colour, and spots of similar hue are to be found in its vicinity. I examined a fœtus taken from the uterus of a cow that died of Rinderpest at the Albert Veterinary College; it was quite free from all morbid appearances.

Mr. Duguid, V.S., informed me that some time previously he had seen a cow that recovered from the Cattle Plague. A fortnight after recovery she cast a calf that appeared to have been dead about a fortnight; he examined the body, but found no evidences that it had been affected by the disease.

I have seen the following experiments performed on animals at the Royal Veterinary College.

Two sheep that had recovered from Rinderpest were inoculated with the matter of variola ovina, a disease in sheep corresponding to small-pox—in both animals the inoculation succeeded.

A calf was inoculated with Rinderpest virus in the following manner:—Some serum of the blood of a sheep that died of the disease was mixed with six times its volume of milk, a worsted thread was saturated with the fluid, and introduced as a seton beneath the skin over the shoulder of the calf, with the view of ascertaining whether a mild form of the disease might be so produced. On the sixth day after the operation the calf exhibited symptoms of Rinderpest, and on the third day, after being attacked, it died.

At the Albert College, I saw a calf that had been inoculated with serum of the blood of an animal suffering from Rinderpest; on the fifth day after the operation, symptoms of the disease appeared. I have not yet heard whether it recovered or not. The only particular point in this experiment was, that the serum with which the calf was inoculated was obtained from a living animal. I saw another calf which had been successfully vaccinated, then exposed to contagion and inoculated with Rinderpest virus; up to the time of my departure it had escaped the disease. I have written for further information regarding it, and shall have the honour of communicating the result to you.

I have the honour to be, Sir, your obedient servant,

PATRICK J. HAYES.

Major-General Sir Thomas Larcom, K.C.B.,
Dublin Castle.

Whitworth Hospital,
North Brunswick-street, Dublin,
February 14, 1866.

SIR,

In reference to my communication of the 1st instant concerning the Cattle Plague, I beg leave to state that I received on yesterday a letter from Mr. Duquid, of the Albert Veterinary College, in which he mentions the results of some experiments that I alluded to in my letter to you. Therefore I beg leave to submit the following information.

A healthy calf inoculated with Rinderpest-matter, taken from a living animal, died of the disease eleven days afterwards.

A healthy calf successfully vaccinated with lymph taken from the arm of a child, was inoculated with Rinderpest virus on the 22nd January. The temperature of the body rose on the 26th; the mouth eruption appeared on the 29th; from the 31st the temperature fell; and by the 3rd February the animal seemed quite convalescent, and has done well since.

Two pregnant cows that had been successfully vaccinated, were taken into the College on the 1st February. One was then inoculated with Rinderpest virus. The temperature rose on the 4th; mouth eruption appeared on the 6th; she seemed very ill and as if about to calve on the 10th; on the 11th a fully developed male calf was extracted, after which the animal seemed very prostrate, then rallied a little, but was found dead on the following morning. The second cow was not inoculated, but placed in a stable with diseased animals. Temperature rose on the 6th; the mucous membranes were affected on the 8th; and the animal was found dead on the morning of the 12th.

The animals that were vaccinated at Mr. Bloomfield's farm, near Norwich, have hitherto escaped the Rinderpest. Those inoculated with matter taken from the greasy heel of a horse have since died.

Sir, I have the honour to be, your obedient servant,

PATRICK J. HAYES.

Major-General Sir Thomas Larcom, K.C.B.,
Dublin Castle.

Sligo,
February 2, 1866.

SIR,

I have the honour to acknowledge your letter of the 30th ultimo, desiring, for the information of the Lord Lieutenant, a report of my observations of the symptoms and best mode of treatment of the Cattle Plague, and to furnish all particulars which, in my opinion, are likely to be of future use in the matter. The veterinary authorities afforded me several opportunities to observe the Rinderpest in London. I also observed it in Hertfordshire.

The symptoms which I observed showed great depression of the vital powers of the sickened animals—loss of appetite and of rumination, constipation, diminished secretion of milk, and of urinary secretion, depressed look, eyes suffused and deeply sunk; as disease advances, drooping head and ears, respirations oppressed and laboured, with moaning; expirations prolonged; the orifice of the vagina reddened, irritated; a red line on the under gum, epithelial peeling of the mouth and gums; discharges from the eyes, the mouth, and the vagina; dysenteric fetid fluid bloody discharges from the bowels; abdomen swelled; emphysematous condition of the hind legs, and quarters, crepitating on pressure, and gas escaping upon puncture of the parts; pulse frequent at first, finally weak. Temperature falls towards the fatal termination.

As the scientific treatment of the Rinderpest must be based upon our knowledge of the nature of the disease, it will be necessary to state briefly the post mortem appearances—the pathological effects, before we can arrive at correct conclusions, upon the proximate cause of the disease, and the treatment founded thereon.

The postmortem appearances indicated lesions of the lungs, the heart, the kidneys, of the bronchial tubes, the larynx, the windpipe, the glottis, the epiglottis, of the third and fourth stomachs, and of the large and small intestines. Epithelial peelings of all the mucous membranes—softenings and slight ulcerations of some parts, were observed. The serous membranes indicated no morbid adhesions. The gall bladder was observed replete with bile, the liver natural to all appearance. The congested condition of the other organs, arising from unhealthy fibrinous black blood, was very remarkable. I observed kidneys that were olive black, and thick tenacious black blood, which presented a perfect cast of the tricuspid valves of the heart, and of the vein to the extent of one foot, when drawn out of the right chamber of the heart. The congested condition of the large intestines was marked by varicose lines, upon a white ground, resembling striped stockings. The hæmorrhoidal state of the rectum was the termination of this venous congestion. I observed in one case a diphtheritic exudation, and a congested, passive, inflammatory state of the glottis and epiglottis, which gave it the character more of scarlatina than of small-pox, and enlarged Peyers patches of the large intestinal mucous membrane, which gave that case also a typhoid character.

The symptoms and postmortem appearances were very variable; in some cases those of the pulmonary organs were the most manifest, in others, those of the gastro-intestinal, but in all, the mucous membranes were those specially engaged. From my observations of the symptoms and postmortem appearances of the Rinderpest I submit the following conclusions upon its nature and treatment:—

First. That the disease is a pestilential poison, sui generis, that wars with bovine blood that belongs to the family of fevers, and, therefore, resembles in many points, small-pox, scarlatina, typhoid fever, and the African typhus, or the yellow malignant contagious fever of the West Indies, which is graphically sketched by Dr. Stevens in his book on the blood and fevers, dedicated to Frederick VI., King of Denmark. The "purple gum," the black saltless blood, and some other symptoms of the African typhus may be recognised in the Rinderpest.

Second. That the indications of treatment are, to recruit the saltless state of the blood, so as, to maintain its electro-chemical conditions, to counteract this animal blood poison; that common salt, the alkaline carbonates and sulphite of soda, the iodide of iron, the combination of sulphur and lime, in dilute solutions, and garlic juice, which I recommended in my essay published four months since, seem therefore to be essential elements of medical treatment.

Third. That as febrile heat is nature's animal heat cure to consume a blood poison, and to eliminate its remains, by copious perspiration, the crisis or cool in fevers; as hot air baths are found to cut short, and to prevent various malignant febrile diseases, I would strongly urge that they be fully and fairly tried in the first stage of the Rinderpest. I would also recommend, at the same time, the administration of oxysaline, and iron tonic medicines, in dilute solution, to recruit the mineral constitution of the blood, for the reasons set forth in my essay on Cholera, Cattle Plague, &c. When the veterinary authorities in London have no treatment to recommend, the thermo-electrical Turkish

bath introduced into Great Britain by Mr. Urquhart should be had recourse to, with the medical remedies prescribed. High heat is a powerful sanitary and curative agent and disinfectant at 240°, well calculated to prevent disease, and to cure it in the first stage.

I have the honour to remain, sir,

Your most obedient servant,

JAMES TUCKER, M.D., M.R.C.S., ENG.,
Medical Officer, Sligo District, and Sligo National Model School.

Major-General Sir Thomas Larcom, K.C.B.,
Dublin Castle.

APPENDIX TO REPORT ON CATTLE PLAGUE.

IT seems essential that I should briefly solve the science of the foregoing suggestions upon the medical treatment of the Rinderpest, give the reasons why I would prescribe oxysalines, common salt, Rochelle salt, bicarbonate of soda, chlorate of potass, sulphite of soda, solutions of iron, of lime, and sulphur, garlic juice, and hot air baths. It is now very well known that salines are the most essential constituents of the blood, that they are constantly being consumed and replenished, otherwise the blood would become black, saltless, and stagnant, as is the case in Rinderpest, yellow fever, and several other febrile diseases. Men and animals are electro-chemical living laboratories, in which all alimentary principles are decomposed, and animal heat and carbonic acid developed through the electro-chemical force of the electro-excitant salines of the blood.

The oxen, the sheep, and the wild animals of the forests of inland North America, seek salt with great avidity; the careful herd there doles it out to his flocks three days in each week; the sheep could not resist the cold winter climate without the use of salt.

The Red American Indian applies salt immediately to the poisoned wound inflicted by the rattle-snake, with success. Those who used salines or mineral waters in Russia and in the West Indies, are said to have escaped the epidemics of cholera and yellow African typhus fever, or to have had those diseases mildly. The most horrible death that could be inflicted upon a human being, would be food without salt; it would be a living death, to be devoured by worms engendered within them. There can be no animal heat generated—no electro-chemical combustion of the refuse noxious materials and pestilential poisons of the living body in health or in disease of men and of animals—without the oxygenating influence of salines in the blood. If we remove salines from our medical treatment of febrile disorders, nothing remains to rely upon. They are as essential to the healthful existence of man and animals as the air we breath, they promote oxygenation, *i.e.*, the chemical combination of oxygen, with the combustible matters of the body. High heat, which is the primary paramount salutary symptom of all fevers, depends upon the saline state of the blood in the first stage, there may be malignant pestilential blood poisons, but no fever, without salines to develope animal heat.

Iron solutions are also essential to healthful existence in man and animals, for the minute sparks of electro-magnetic iron are the centres for the construction of the red globules of the blood,—those carriers of oxygen all round the circulation. Sulphur and lime are essential materials in the animal fabric, but in solution they are antiparasitic. Garlic, onions, and assafetida contain sulphur, and owing to their sulphuretted oils are antiparasitic against worms, and other vital germs. Professor Polli, of Milan, neutralized the poison of glanders in dogs by the use of sulphites of soda; he contends that they will prevent or cure all pestilential blood poisons. Dr. De Ricci advocates their power to arrest fermentible diseases. "Caloric at 240° kills vermin and their eggs, which boiling water at 212° cannot; heat at 160° will kill animal poisons, contagions of every kind, and stop fermentation."—See page 17, Dr. Tucker's Essay on the Bath, dedicated to the Earl of Carlisle, 1860. We can, therefore, perceive the thermo-electrical influence of dry hot air baths (not vapour baths), to aid the febrile efforts of nature to consume the pestilential blood poisons, and thus to purify the system by copious perspiration, and surface washing afterwards. It seems an outrage upon the laws of nature to force fat upon, and milk from cattle, which have been confined in foul, ill-ventilated sheds. The pure air of heaven, exercise, cleanliness, purification of blood by perspiration, ventilation of the whole system, are as essential to the healthful existence of cattle, as they are to man; wanting these, they become an easy prey to every pestilence that may prevail. The British Medical Association, at their last meeting, recommended that baths be established in every city, town, and village. Wherever there was a Roman camp in ancient Britain, there was a Roman bath. As sanitary economy is the most important condition of political economy, for the prevention of epizootic and epidemic diseases, these sanitary institutions are urgently called for just now.

Dr. Richardson, of London, states that the infectious poisons of small-pox, scarlatina, measles, whooping cough, diphtheria, glanders, plague, typhus and typhoid fevers, cholera, yellow fever, erysipelas, hydrophobia, pyæmia, puerperal fever, and serpent poison, are destroyed by exposure to a heat of 212° Fahr. (see *Social Science and Sanitary Review*). A strong case in favour of hot air baths, cheaply constructed for men and animals.

The unwashed clothing of those who recovered from West India yellow fever, when packed up in that state, and opened for washing at a healthy northern port, in some weeks after, spread a more malignant fever than the sickened patients at the original West India centre. The traffic of old clothes from England to Ireland, should, therefore, be subjected to close inspection, to washing, to high heat, as a disinfectant, and the various fumigants, as gunpowder, chloride of lime, iodine vapour, &c.

J. TUCKER, M.D.

5, Wicklow-street, Dublin,

5th February, 1866.

SIR,

I have the honour to state, for the information of His Excellency the Lord Lieutenant, that in accordance with the instructions given in your letter of the 9th of January, I proceeded to England, and studied the Cattle Plague in London and other parts of the country, more particularly in Cheshire, where it is committing fearful ravages. I have seen very many cases in all the various stages, and assisted at numerous *post mortem* examinations with eminent veterinary surgeons.

Rinderpest or Cattle Plague is, in my opinion, a specific contagious fever, presenting the following symptoms :—After receiving the infection, a cow shows the disease in from two to fifteen days. She is dull, the appetite impaired, if moved suddenly appears weak, and will occasionally give a short cough. The bowels, in the early stages, are generally a little constipated ; there is hanging of the head, the ears are drawn backwards, rumination ceases, the pulse is quick, the nose dry, surface heat irregular, the coat stares, particularly along the dorsal region, and the respiration is accelerated. The mucous membrane of the vagina is injected, of a scarlet colour, and *this symptom is most important, being very diagnostic, and cannot be mistaken by one who has particularly studied the disease, as it is always present in the mildest cases*, and after a time there is a slight discharge of pus from it, and streaked in it. As the disease progresses there is a watery discharge from the eyes, and of mucus from the nose, both of which in time become muco-purulent. Another symptom which cannot be mistaken is abrasion of the mucous membrane, below the incisor teeth, and rose-coloured spots on the hard palate. In some cases there is great thirst, but the animal swallows with difficulty, owing to the existence of so much disease in the larynx and pharynx. The fœces after a time become soft and watery, sometimes mixed with blood, and very fetid. The animal frequently moves the hind feet, and kicks at the belly, indicative of abdominal pain. There is not much alteration in the urine, it being perhaps voided in less quantity, and often. The pulse in the latter stages can scarcely be felt, and the heart's action is irregular. When the animal opens its mouth a large quantity of frothy saliva flows from it. The breathing now is very laborious, with a peculiar double action during expiration, and accompanied by a grunt not heard in any other disease of cattle, being quite distinct from that of pleuro-pneumonia. The animal lies down very often, and is uneasy, sometimes becoming delirious. The eyes are now sunk in the head, the beast is unconscious, and death supervenes generally in from three to fifteen days, but occasionally the animal lives for three weeks, and then succumbs. If the subject be a milch cow, there are often peculiar eruptions on the mammary gland, between the teats, which have by some been mistaken for variolous pustules. Emphysema along the back and loins I have only observed in four cases, consequently it cannot be considered a usual symptom.

When recovery takes place there is generally a marked change for the better about the fifth or sixth day.

Post mortem appearances have been so often accurately described that I do not consider it necessary to introduce them here, and will at once go on to treatment and prevention.

Treatment, with the exceptions stated below, should be by all means discouraged, being highly dangerous, as keeping the sick animal alive only preserves a hotbed of contagion. In some countries treating cattle for Rinderpest, and recommending and advertising remedies have, I think, been wisely made punishable by heavy fine and imprisonment. Treatment and experiments should only be allowed under Government supervision, in proper places appointed for the purpose.

Prevention is the only sound practice, as Rinderpest is the most infectious, contagious, and fatal of all diseases, and it can, I am convinced, be carried a certain distance in the atmosphere. Should it unfortunately break out in this country, the remedy must undoubtedly be the short, sharp, and decisive "stamping out," found so effectual on the Continent.

I beg respectfully to state that I consider it of the utmost importance that every stockowner in Ireland should be made acquainted with the extremely dangerous properties of the disease, in order to avoid the lamentable ignorance which was the great

cause of its spreading with such rapidity in England, where the warning given by the leading Veterinary Surgeons was unfortunately disregarded. Even now it is spreading for the want of that information which might easily be conveyed in a small pamphlet, written in plain language, without unnecessary technical terms.

If such a pamphlet were published here, the distribution of copies to every farm, &c., might be accomplished through the aid of the Constabulary and Police, and all stock-owners being thus made aware of the dangerous nature of the plague, would not be unprepared in the event of its breaking out in Ireland. Several English farmers, who have lost their stock, assured me that had they known the contagious properties of Rinderpest they think they could easily have preserved them. Nearly all I conversed with could tell me how they got it. Some by buying beasts in fairs and markets, &c., which they never would have done had they been made acquainted with the danger. Many will not now visit a market, or allow a butcher or cattle dealer to come near their farms.

From my knowledge of the fat cattle trade, I beg to state that the cry of the "Butcher to the Ox," in a country where the plague is raging, is dangerous. Butchers from towns, going from farm to farm, will be a sure means of spreading the disease. I would therefore suggest instead what is being done in several petty sessional divisions in England; viz., that if Rinderpest appears here, fat cattle should be passed and branded, under the direction of a Veterinary Surgeon, and sent into the towns for immediate slaughter. In the different localities I have not omitted to note the most successful disinfectants (burning of gas tar is, in my opinion, the best), also other modes of prevention employed where the disease has become unfortunately prevalent, which at present would not be of interest in this report.

I have the honour to be, sir,

Your most obedient servant,

T. D. Lambert,

Veterinary Surgeon.

Major-General Sir Thomas Larcom, K.C.B.

Navan,
February 18th, 1866.

Sir,

In accordance with the instructions received in your letter of the 15th ult., relative to proceeding to England for the purpose of studying the Cattle Plague, I went in the first instance to London, where with the kind assistance of Professors Browne and Simonds, I was afforded ample opportunity of seeing numerous cases of the disease in its different stages and *post mortem* appearances.

It required but little observation to see that it is a disease peculiarly distinct in the character of its symptoms from any other as yet known to us. In London few dairies escaped its attack or were free from its sad consequences. In Cheshire, however, I found the disease more fatal, particularly in the neighbourhoods of Crew and Chester. In both these places I saw several valuable herds carried away in a few days. The disease is undoubtedly both contagious and infectious, and capable of being conveyed (by means of the respiratory organs) into the system, where it remains in a state of incubation for several days, before there are any evident indications of the malady.

The following are the general symptoms which I observed. In the earliest stage of the Rinderpest (even before the animal refuses food or ceases to ruminate), you can (by a careful examination of the mouth), detect an unusually red or pink hue over the inside of the cheek, and under the incisor teeth. This appearance may be general or confined to blotches of various sizes.

The vagina is usually found in a similar state. About the seventh day after the infection has entered the system, the animal is noticed dull, and the appetite impaired; the coat stares, extremities cold, and the milk diminished in quantity. The nose is poked out in a peculiar manner, the ears droop, and rumination is entirely suspended. Occasionally I have seen muscular twitchings of the hind quarters and neck. The bowels at this stage are generally constipated. On the second day of the attack these symptoms become more developed, and in addition, the breathing is often accelerated, sometimes accompanied by a grunt, and generally by an apparently painful cough. The temperature of the body is variable.

In the beginning there is a slightly increased warmth of the skin, which soon, however, gives way to chillness or extreme coldness of the ears, legs, and horns.

The expression of the countenance is very characteristic of the disease, particularly if the attack be an acute one; the eyes become dull, and retracted in their sockets, the conjunctiva highly injected, and often of a leaden hue. There is sometimes a discharge from both eyes, and occasionally from one only, of a clear fluid, somewhat like tears, but of a sticky consistency. On examining the gums, you find abrasions of the mucous membranes, and an exudation of thick yellowish lymph. According as the disease advances, this becomes more copious, and there is often a discharge of ropy saliva from the mouth and nose. The interior of the vagina presents a scarlet appearance, and is not unfrequently studded with small but well-marked pustules. The epithelium loosens its attachments to the mucous membranes, and can be easily peeled off, leaving beneath an extremely tender irritable surface. The pulse from the commencement is quick and feeble, and sometimes towards the latter stages it is imperceptible except at the heart. About the third day the animal is much prostrated, the breathing is quicker, more laborious, and accompanied by a grunt at the commencement of every expiration. There is a great disinclination to move, but when made to do so, the animal staggers as though partially paralyzed. There is generally thirst from the commencement, and except in very bad cases, the sufferer will partake freely of a drink of gruel or cold water. Emphysema is no unusual symptom, particularly in dairy cows. In most cases it is to be found in the lungs, and not unfrequently in the tissues under the skin.

Dysentery sets in about the third or fourth day, and rapidly increases the debility and emaciation, both of which are prominent features of the disease from the beginning.

The animal is generally found lying, and the head turned towards the side, except when the lungs are much affected, or the breathing difficult. About the fifth day from the first appearance of the attack, the organs cease to perform their functions, and the animal dies from utter prostration. In those that recover, the symptoms become abated about the fourth day, the discharge from the bowels becomes less frequent, and of a thicker consistency, the countenance brightens up, and the animal looks about for some favourite morsel of food, which, however (from the soreness of the mouth), it can use but very sparingly. Gradually the strength returns, and with proper nursing, the animal begins to thrive in about eight weeks or so, according to the state of the constitution.

I am sorry to say that no successful treatment has been as yet discovered. Numerous remedies have been tried, but as a rule none have proved to be of much service. In my opinion, more good can be done by preparing the animal to receive the attack, than by drenching and torturing the sufferer when the disease once sets in.

In infected districts this can best be done by withholding all solid food, and substituting mashes and well made flaxseed tea. By this treatment the digestive organs are less liable to get out of order, and, if attacked, better able to withstand the disease. If there should be a tendency to constipation, an occasional dose of linseed oil and spirits of nitre might be of use. It is most desirable to use every sanitary precaution available even in districts where the disease is unknown.

Post mortem Appearances.—The characteristic post mortem appearances of the Rinderpest are to be found in the mucous membranes almost throughout the whole body, but particularly in the alimentary canal. On the gums, under the incisor teeth, are to be found numerous abrasions, covered with a layer of thick yellowish lymph; the tops of the papillæ highly inflamed, and the epithelial covering loose and easily peeled off. Ulcers are sometimes found at the root of the tongue, and in the pharynx and larynx. These parts are generally covered with an exudation of thick yellowish white lymph, which, when removed, discloses the inflamed red or scarlet colour of the membrane beneath. The trachia and bronchial tubes not unfrequently present the same appearance. The lungs are sometimes healthy, but often emphysema is found either in one or both. In two animals that died of Rinderpest, I found, on post mortem examination, that pleuro-pneumonia and emphysema were present in the same lung, but this is not a usual occurrence.

The pericardium sometimes shows traces of inflammation, and the heart looks soft and flabby. Except in bad cases the œsophagus, rumen, and reticulum are found tolerably healthy, but occasionally their lining membrane is highly congested, and exhibits red stripes or patches throughout its surface. This is most frequently the case where the bowels had remained long constipated; and in such cases you will also find a quantity of food in the rumen, which the animal had not partaken of for five or six weeks previously. The third stomach, or "manypies," generally contains a quantity of hard, dry, indigestible food, impacted between its leaves. On removing this, the membrane beneath will be found congested in various places, especially along the margin of the folds. In all cases of Rinderpest, no matter how slight or how short its duration, a post mortem examination of the fourth stomach will at once detect its existence, but the appearances may vary according to the duration or severity of the attack. In bad cases the whole of the internal surface will present a congested appearance, and eruptions will be found in various parts covered with a quantity of yellow lymph, particularly near the pylorus. The coats of this stomach are sometimes perforated in spots as large as a shilling. In some cases where the attack is of a milder form, or when the animal is slaughtered in the incipient stage of the disease, the lesions will not be so great, but invariably the membrane is congested to a greater or less extent. The small intestines present the same appearance as the other parts affected, and not unfrequently the cœcum, colon, and rectum, show evident traces of the disease. Peyers glands are also frequently diseased, and covered with layers of lymph. The gall bladder is almost invariably found distended. The kidneys are seldom affected; however, they are occasionally found smaller than usual, but this cannot be said to be a result of the Rinderpest.

Such are the symptoms and post mortem appearances of the Rinderpest which came under my observation in England. The treatment is unfortunately very unsatisfactory, but this is probably owing to the virulence of the disease and the rapidity with which it runs its course. All our efforts should therefore be unanimous to keep it out of Ireland, if possible; and if we should unfortunately fail in doing so, to stamp it out on its first appearance and isolate the infected districts.

I have the honour to be, sir,

Your obedient servant,

OWEN REILLY, V.S.

Major-General Sir Thomas Larcom, K.C.B.

To His Excellency John, Baron Wodehouse, Lord Lieutenant-General and General Governor of Ireland.

May it please your Excellency,

In accordance with your Excellency's instructions I proceeded on the 13th ultimo to London, for the purpose of making myself practically acquainted with the epizootic at present committing such devastations among the bovine live stock of Great Britain, and reporting thereon to your Excellency.

On my arrival in London, according to instructions, I at once proceeded to the office of Her Majesty's Privy Council at Whitehall, and reported myself to Mr. Helps. From that gentleman I received a note to some of the officers of the Government Veterinary Department, from whom I received great facilities in the prosecution of the investigation intrusted to me, with others, by your Excellency.

Although your Excellency was pleased to desire, that, with other features of the subject, I should make myself acquainted with the best curative treatment that could be adopted for the Cattle Plague, I regret exceedingly that the results of careful personal observation, as well as of most numerous and anxious inquiries, do not justify my holding out any reasonable hopes, at least according to the present state of either human or veterinary medical science, that any mode of treatment as yet known will be successful, in severe cases, even in mitigating, still less in curing the disease. Indeed, as far as my limited observations have gone, and the experience of others, it seems to me that all modes of treatment have equally failed, and that many of them have but hastened the fatal termination by an injurious interference with nature. When animals do recover from Cattle Plague it seems to be more as a result either of an individual constitutional peculiarity, or a mild form of the disease, than from any interference of medical art.

Much has been written, and much vaunted, about the powers of homœopathy in the treatment of Cattle Plague; but, like its effects in many other maladies, not alone of the brute creation, but also of the human species, the most favourable report that can be made of it by the unprejudiced is that, although it effects but little good, it does even less harm; as the true standard of homœopathic dosing being so infinitesimally small, that it interferes not sufficiently with nature to cause any appreciable difference in the progress of disease, the preliminary decadence from health, or the return of convalescence.

I seek not to combat nor subvert some of the ingenious elementary principles of Hahnemann, as far as regards the therapeutic effects of some medicines; but, as a result of much reflection and no inconsiderable amount of observation and experience, I denounce the principle of infinitesimal dosing in the practice of medicine, as sought to be applied to bovine animals suffering from Cattle Plague, as a most delusive absurdity. As well might an attempt be made to fatten an ox with food given in homœopathic infinitesimal quantities, as to cure one affected with Cattle Plague, or any other disease, by homœopathy.

It is not what medical homœopathy does, that constitutes its virtue—that lies in what it does not. It does not kill, it merely lets die; whereas injudicious drugging too frequently causes death.

I have thought it desirable to thus allude to homœopathy in consequence of the many advocates, despite of all its failures, it even still has, in connexion with Cattle Plague, on some parts of the Continent. My attention was particularly directed to the consideration of it and the alleged similarity between Cattle Plague and Small-pox, by Professor Ferguson, at whose request I made as many experiments and observations as I could, within the limits of so short a space of time as I remained in England.

Having thus disposed of homœopathy as a proposed principle of medical treatment for Cattle Plague, I shall now proceed to make a few cursory observations, relative to the fancied identity of Cattle Plague and Small-pox, about which, and vaccination, so much has been written lately, particularly by some of the most justly eminent of the medical profession, as well as some veterinarians in England, who, however, have been unfortunately misled and, consequently, mistaken.

Well may it be recorded as "unfortunately," for, had they been right in their conclusion that Cattle Plague was identical with Small-pox, and in their inference that it could be averted by vaccination, no greater boon could science or an all-wise and benevolent Providence have given to this country, the chief and most vital sources of whose prosperity at present depends on its agricultural stock.

Mr. Ceely, in the 10th volume of the Medical Transactions, cites instances of a number of cows having contracted genuine small-pox by being turned to graze into a meadow in which were exposed for purification the bed and other clothes and bedding used by persons affected with small-pox, one of whom died of that disease.

Mr. Ceely also relates satisfactory evidence that the man who owned the cattle himself contracted the disease from them when they had had the malady for some time.

Notwithstanding the strength of evidence mentioned by Mr. Ceely, and that gentleman's justly acknowledged high character for veracity as well as scientific zeal, I am bound to confess that I have been unable to produce true small-pox in bovine animals by exposing them to its infection, and I have frequently attempted its accomplishment; nor in any instance that I have ever seen or heard of has even the most carefully performed inoculation with the virus of small-pox caused any disease at all resembling Rinderpest or Cattle Plague; neither does inoculation with Cattle Plague virus ever produce a malady that any practical observer of the diseases of cattle could mistake either for small-pox, or the more ordinary cow-pox which furnishes the original virus for the vaccination of human beings as a preventitive against small-pox.

With respect to the vaccination of cattle as a prophylactic measure against Cattle Plague, it is now generally admitted to be a failure; and the inoculation of cattle with the virus of Cattle Plague, with the hope that they would have the disease in a milder and much more manageable form than if the disease was contracted in the ordinary way, has proved most delusive, as the results, with comparatively few exceptions, have been fatal.

Something similar to this is markedly observable in farcy and glanders. Many horses get farcy, and a few glanders, in the ordinary way, in fact idiopathically, and recover from these diseases; but when glanders or farcy is contracted as a result of inoculation, the result is almost invariably fatal; it, however, is desirable to state that in the pathological essentials of these diseases, there is not the slightest similitude between either glanders or farcy and Cattle Plague, also that glanders and farcy are the same disease, but affecting different parts of the animal—glanders is but farcy within the nasal passages. No animal dies from what is usually recognized as mere simple glanders, without becoming also farcied previous to death; and all horses that die from farcy become what is usually termed glandered before the fatal termination.

The introduction of horse diseases into this report, however irrelevant it may seem, naturally leads to the consideration of Jenner's doctrine that cow-pock, which furnishes the original matter for human vaccination, is caused by the discharge from the heels of horses suffering from the disease familiarly called "grease," coming in contact with the udder and teats of the cow, either through the medium of the hands of the attendants, or of the litter upon which the animals stand or lie. Professor Ferguson, who seems to disbelieve this doctrine, is, I believe, about to institute a second series of experiments on this very important subject. I regret that while in England I had no opportunity of doing as he requested, by inoculating the udders of cattle with the discharge from greasy-heeled horses, and thus enabling me to report on the subject to your Excellency—a subject which certainly seemed to be one of great importance, while it was generally thought that vaccination would turn out to be an effectual preventitive of Cattle Plague.

Cattle Plague unlike any other known Disease.

As your Excellency is already aware, the Cattle Plague is designated differently by different persons, some asserting it is typhus fever, some that it is typhoid fever, while others consider it to be small-pox, or some disease nearly similar to it, and subject to the same laws.

Of late years practitioners of human medicine have made some distinctions between typhus and typhoid, and typhous fevers, which seem inconsistent with the previous acceptation of these adjectives; but, in the case of Cattle Plague, it matters very little what technical name it is called, so as the true peculiarities of the disease, such as its symptoms, the exact parts affected, its progress, its terminations, and the effects of the different modes of treatment are known. For upwards of two centuries the malady has been generally known in Europe as "bovine epizootic typhus," and by that name I shall be content to designate it in this report.

It is a disease quite peculiar in itself, totally unlike any other malady affecting either the human being or any of our domestic animals, unequalled for its infectiousness and contagiousness, and certainly unsurpassed by any other malady excepting rabies in the brute creation, and hydrophobia in human beings, for its mortality. Certainly neither typhus nor typhoid fever is anything like as numerically fatal to those persons affected with them as Cattle Plague is to its bovine victims, which are generally upwards of ninety per cent. of the animals attacked, when the disease assumes its virulent form in a locality.

Pathological Characteristics of Cattle Plague.

The essential characteristics of Cattle Plague are its being a highly contagious, infectious, and fatal fever, as yet unknown to be spontaneously developed in Great Britain, having the chief seat of its local action in the mucous membranes; those lining the fourth stomach and the duodenum, or first of the small intestines, being the ones most frequently, in fact almost invariably, as well as the most intensely affected; also those of the respiratory passages, particularly at their upper parts, being generally involved in the diseased action; the skin, particularly at its thinnest parts, being occasionally (but only occasionally) subject to a slight, though visible eruption of a sympathetic, yet by no means invariable character. What many have exaggerated into a true pustular eruption is in most cases nothing more than a slight rash that often is not perceptible during life, although easily discoverable in the hides when they are being finished by the leather-dressers.

Incubation.

The length of time which bovine typhus from exposure to infection takes incubating in the system, before the first recognisable symptoms of the disease's existence, has been found to be about six or eight days; but I have seen it take as much more, sometimes quadruple that time from last contact with diseased animals to the appearance of the first symptoms of the malady. Perhaps this may have arisen from the infection having clung merely to the skin and hair of the animal for some days before it entered the system. If the infection can cling to inanimate objects for a long time, how much more likely is it to adhere to the coat of a living animal! Indeed there is strong circumstantial evidence of a beast's having retained the infection on the surface of the body for weeks, at the expiration of which he gave the malady to sound animals, although his own internal system never became affected.

(*Vide* report of "Professor Ferguson's Lecture" at the Albert Model Farm, Glasnevin.)

Symptoms.

So much has been already written, and so ably, relative to the symptoms, their variation, and the course of the Cattle Plague disease in living animals, from their first change from health until death sets in or recovery takes place, which it sometimes does, although comparatively seldom in the severe form of the malady, that I shall confine myself to a summary of the most ordinary symptoms. Those of Cattle Plague, like those of most other bovine diseases, must be seen to be understood to the extent of sure clinical recognition. An idea certainly may be got of them by merely reading, but it would be as likely to be a false as a true one.

It has been too general a habit, particularly among those who know practically the least about their subject, in drawing out zoopathological reports to be as minute as possible, even in the description of already well-known details, with the view of impressing their readers with an idea of the vastness of their information, too often mistaking tediousness and useless repetition for necessary explicitness—a defect which I am desirous of avoiding, particularly as I have nothing novel to offer on this point of the subject, excepting, perhaps, in physiological and pathological explanation.

The disease may be divided into three stages:—

First Stage.

At first the animal seems depressed; to use a familiar phrase among the lower orders, "out of sorts." The head is held lower than usual; the ears are inclined backwards; the eyes are suffused; the surface of the body cold; the skin harsh, dry, and more tightly adherent to the parts beneath; the coat often staring, as a result of cutaneous contraction, altering the direction of the hair roots; the appetite diminished and capricious; the spine very sensitive to pressure. If the case be a female one, the interior of the genital organs is in its colour more red than natural; alternate heats and chills, particularly at the roots of ears and horns soon succeed; the bowels are costive; rumination ceases; there is thirst, and a thorough distaste for green food. The animal evidently commences to suffer acutely internally; there is grinding of the teeth; he either mopes his head, if in a byre, leaning the chin on the trough for support. The action of the supporting and elevating muscles of the head evidently causes pain; thus their relaxation to ease them; or he evinces paroxysms of uneasiness, by a tossing movement of the head, and frequent lying down and getting up; tremblings are observed in many parts of the frame; they are conspicuous in the thighs, and that portion of the sides immediately behind the shoulder.

If a milch cow, the milk which from the first was diminished now is still less, the belly is enlarged, particularly at the right side; frequently some of the joints become sore to the touch; the front legs are kept more separated than in a state of health; the hind ones are brought more forward under the centre of gravity, occasionally accompanied with some knuckling forward of their pasterns. With these symptoms the back is often arched.

The peculiar position of the limbs, in their relation to the superincumbent body, is such as to relieve the contents of the abdomen, particularly those parts forming the principal seat of the disease, as much as possible from compression.

If the pulmonary organs are intact, it will be found that the animal arranges his frame to relieve some parts within the abdomen that are acutely suffering, more than for the purpose of facilitating breathing, which is the instinctive object in *pleuro-pneumonia;* nor is there in Cattle Plague that uneasy shifting of the feet and evident pain in them when moved, so observable in foot and mouth distemper. The eyes become fixed and more animated as the disease advances; yet they are tearful; the pupil becomes dilated, and, in short, they plainly tell, in the language of animal suffering, of the terrible revolution that the entire system is undergoing. The appearance of the eyes, the tremblings already described, and many other symptoms, indicate that the nervous system is seriously involved at a very early stage of the malady.

The mucous membrane covering the front of the eyes and the haw becomes injected. Parts that in health presented no appearance of blood vessels become injected with that fluid, by congestion, and assume a bluish-red appearance. The lining membrane of the nose presents the same colour, as well as having its temperature exalted. It frequently has its secretion greatly augmented, as well as variably changed in character; sometimes it resembles in colour the froth seen on troubled waters; at others it is glairy and viscid.

There is also a somewhat similar discharge from the mouth, frequently in an astonishing quantity, but not accompanied with that peculiar sucking action and movement of the lips so peculiar in "mouth distemper," but there is frequently a grinding of the teeth, which is not observable in the latter disease. This difference may, perhaps, result from there being severe ulceration within the mouth in the latter disease, while it is not, at least of the same character, in Cattle Plague. The grinding of the teeth in that disease and in pleuro-pneumonia is caused by severe internal bodily suffering, while the peculiar action of the tongue and lips in mouth and foot distemper is caused solely by the sore state of the interior of the mouth and its contents, which are either suffering from primary blisters, or the severe secondary ulceration which takes place on their being broken, if the cases be severe, and judicious treatment be not adopted.

The grinding of the teeth would add too much to the suffering arising from the blisters and the ulcers of the tongue and buccal membrane in mouth and foot distemper, for the animal to attempt it. In Cattle Distemper the grinding of the teeth causes no pain to the interior of the mouth or its contents. In Cattle Plague, at an early stage, the tongue is rougher and drier than in health. In fact, it retains the former characteristic throughout the entire disease.

But few have directed sufficient attention to the cough which is frequently present in the disease, although there may not exist a trace of pleuro-pneumonia, or lung distemper, as a complication.

The presence of cough, without there being actual organic disease of the respiratory organs, is easily accounted for as a functional phenomenon, by the great sympathy that exists between the digestive and the respiratory organs, they being both supplied from the same system of nerves. If the nerves supplying the stomachs of an ox be divided it will be found that the most fatal mischief is done, not to the digestive organs, but to the lungs and other parts of the respiratory apparatus, and that the animal dies from the effect produced on the breathing organs. In Cattle Plague the breath, early in the disease, becomes warmer than natural, and tainted in odour. The urine is sometimes clear and colourless, often reddish, and in small quantity. From the first there is great thirst.

Sometimes the animal evinces, by its lethargic, stupid state, symptoms of congestion of the brain; at other times the cerebral derangement produces an effect quite different from drowsy stupidity, the animal being evidently affected with active delirium.

There is observable towards the evenings an exacerbation of the symptoms. In the latter part of the first stage the gait becomes unsteady; the animal is evidently becoming rapidly enfeebled. It frequently lies down, and evinces some difficulty in rising again. Soon after the accession of the attack the pulse augments in frequency. If the animal is out in the open air, as in a field, the pulse, whether in health or disease, will be found to be ten or fifteen per minute less in number than if the beast were housed, consequent

on the action of the heart being so much slower out in the open air than when the animal is housed or stabled.

The healthy pulse, in the open air of an average temperature, is from 38 to 47 per minute. In Cattle Plague it rapidly gets up to from 75 to 100, according to the stage of the disease and the intensity of the attack. As the action of the heart, which governs the pulse, becomes increased, the breathing becomes quickened, sometimes to as much as an inspiration and its following action every second, instead of each inspiration and expiration occupying threefold that amount of time. The respiration becomes not alone quickened, but changes in its character. It is no longer silent, but is frequently easily heard, and a prolonged moaning noise is made in expiration, but not at all like the grunt that accompanies lung distemper in its advanced stages—a grunt that indicates thoracic, principally pleural, pain—while the Cattle Plague moan clearly points to the abdomen as the seat of suffering. The state of the genital organs in the female, at a very early period, affords unmistakable evidence of the existence of the disease. Their mucous membrane, even where it joins the external skin of the labia, becomes reddened from congestion. On examining it as far as possible internally, with a speculum, the whole of the lining membrane of the vagina is found to be congested, but most so near the vulva, and frequently also to present the appearance, within a couple of inches of the external orifice, of deep *mauve* coloured lines.

One of the earliest symptoms is an increase of temperature in the vagina. There is also generally a discharge from it, which in different states and in different cases varies much in character. The lining membrane of the mouth becomes affected in the early stage of the disease, nearly at the same time as that of the vagina. A half light violet, half reddish appearance presents itself on the margins of the gums, at the roots of the incisor teeth in the lower jaw, similar in development but not in colour, to the slate-coloured margin presented by the gums of persons suffering from chronic lead poisoning, as is frequently observed in house-painters and persons employed in the smelting of lead ore, and has been demonstrated by Professor Ferguson, to be a markedly characteristic symptom in the majority of animals, whether horses, cows, goats, or sheep, so frequently attacked with fatal illness in the vicinity of the Ballycorus Lead Smelting Works, near Shankill, in the County of Dublin, as a result of the atmosphere there being impregnated with lead particles from the chimney of the smelting furnaces, which, falling from the air when cooled, become deposited on the vegetation of the surrounding district.

In Cattle Plague the buccal membrane, particularly at the junction of the interior of the lips with the gums, becomes abraded or excoriated. The membrane peels off in little irregularly shaped spots, presenting what Mr. Baldwin, in a conversation with me, so aptly compared to a "mouse-eaten," or "mouse-gnawed" appearance. The papillæ of tongue and cheeks are enlarged.

I avail myself of this opportunity of acknowledging how much is due to Mr. Baldwin, for the indefatigable pains he takes in contributing his valuable assistance to all practical investigators, relative to either the diseased or sanitary state of live-stock, and also the, in this country, unequalled facilities for the study of the hygeinic management of cattle afforded by the Agricultural Institution at Glasnevin, of which he is the principal, in connexion with the Board of National Education.

The duration of the symptoms already described, and which may be termed the first recognisable stage of the disease, is generally three days, seldom less, seldomer more. It, however, is desirable to mention that in some cases, but certainly exceedingly rare ones, generally in calves, the Cattle Plague poison has proved fatal in a few hours, leaving scarcely any discoverable *post-mortem* lesions, although in this class of cases its rapid destructiveness of life is not surpassed even by what is called "blackleg," or "quarter evil," a malady in which the disorganization of the affected parts is as extensive and well marked as its effects are rapidly fatal.

Second Stage.

All the symptoms become aggravated. The general temperature rises considerably. The increase is easily felt by the mere application of the hand to the surface. Yet there are often alternate hot and cold fits; nor is the temperature the same over the entire surface, nor always equilateral. The horns and ears are alternately cold and hot, and often one side of the body is warm while the opposite one is cold. Sometimes there is partial localized perspiration, and that perhaps but on one side. The feet too, are subject to great irregularities with respect to temperature, alternating between heat and cold, sometimes the temperature of the feet markedly differing from each other in the same animal, one or two being burning hot, as the term is, while all the rest are as cold as if they belonged to a dead animal.

It is principally during the second stage of the disease that air-inflated swellings take place beneath the skin; most frequently at each side of the spine of the back. The swelling on being pressed conveys to the hand the sensation of air crackling beneath the skin, when being forced by the pressure through the cells of the membrane into which it has either been secreted, or disengaged by some species of decomposition, but certainly not one of putrefaction, as observed in "blackleg" and "quarter evil," for on either cutting into a Cattle Plague emphysematous tumefaction, or puncturing it, no matter how freely, in its early stage no putrid or gangrenous odour can be detected.

There, however (but only very occasionally), sometimes occur sudden effusions of a *semi*-fluid *semi*-gelatinous nature beneath the skin in Cattle Plague that, as well as the tissues involved in them, quickly undergo decomposition, or in other words, become gangrenous, and that almost coeval with their appearance, very similar to the morbid process of blackleg; but, although this state is sometimes found in Cattle Plague, it is an exceedingly rare complication, that is, the gangrene being so instantaneous.

Although the back is most frequently the seat of these emphysematous tumours, there is scarcely a part of the body they have not been observed in. Sometimes they may be seen near the root of the tail, at others in the neck and throat, evidently interfering mechanically with the breathing, and often causing protrusion of the tongue, which under such circumstances is seen to be of a dark-bluish colour and much swollen as a result of congestion, the animal at the same time breathing by the mouth instead of the nostrils.

The emphysema in some cases extends over the entire frame, just like the body of a calf that had undergone the process of "blowing" after death, previous to being skinned by the butcher. An ox or a cow may have been reduced to the appearance of a mere skeleton covered with skin, and in the course of a day, or a night, or even a few hours, become so blown out by the accession of general superficial emphysema as, at a distance, to present the outline appearance of extreme obesity.

It is generally with the appearance of subcutaneous emphysematous tumours that the breathing of the animal suddenly becomes altered in its character, presenting something like the double action in respiration so characteristic of broken wind in horses, and of one particular kind of asthma in the human being. The cause of this peculiarity of respiration is the same in all of the three cited examples—emphysema of the lungs, however different may have been the original derangements that lead to such a similar physical state of the pulmonary organs in each.

A recent medical author on Cattle Plague states that when emphysema of the lungs is found on *post-mortem* examinations of cases of that disease, it is "always" as a chronic complication that had pre-existed long previous to the attack of Cattle Plague, also that pulmonary emphysema never occurs as an effect of Cattle Plague. However great among the Edinburgh comparative pathologists may be considered this fancied discovery, for it is but of fancy's creation, it is frequently demonstrable by auscultation and percussion, that pulmonary emphysema can become a sudden accession to the previously existing organic derangements of Cattle Plague.

In the second stage of Cattle Plague the eyes become still more larmonious, and seemingly inflamed and incapable of correct vision. Their lids drop or nearly close, and often present a swollen appearance. Also the eye-balls are more sunken in their sockets, the fat that in health is always in a large quantity behind them in the orbits having become considerably absorbed in common with the adipose tissue of every other part of the animal.

It is worthy of remark that although the eye is suffused and sunk far back in the socket, the haw, or third eyelid, technically called the *membrana nictitans*, is not protruding over it, as it would in any ordinary ophthalmic inflammation. This is accounted for by the previous absorption of the fatty matter at the back of the eye. Before its absorption, whenever the eye is retracted into the orbit by the proper muscle, it displaces the movable fat behind it, which, in being moved, in its turn displaces the cartilaginous haw attached to it, and, in forcing it out of the orbit at the inner side of that cavity, pushes it, as a sort of third lid, over the front of the eye, shielding it from injury, and clearing its highly sensitive and polished surface from any particles that may have lodged on, and were irritating it. This haw apparatus is a beautiful instance of the wisdom of nature in animal construction.

The ox, like many other animals not having hands, could not free its eye from anything that got into and was irritating it, unless it were provided with the haw apparatus just described, which does not require for its action even the will or consent of its owner, but from a vital instinct, involuntarily, but most effectively performs its duties. Let any person attempt to open the eyelids of an ox, and the haw will be observed to be instantly shot across the eyeball to shield it from injury.

In the second stage the tongue becomes much more "foul." It is charged with a

dirty, yellowish, offensively odoured mucus. From both mouth and nostrils the discharge becomes considerably increased in quantity and stench; that from the nose is frequently mixed with blood, having a *semi*-purulent *semi*-sanguinous appearance, and, as it were, corroding the margins of the nostrils with its irritating effects.

The lining membrane of the vagina becomes still more congested, and shortly assumes at some parts near its external orifice, or, more properly speaking, the inner margins of the lips of the genital entrance, at some parts of them, an eruptive appearance which, however, when carefully examined, is found not to be truly pustular, but merely aphthous in its character. As already stated, from the first there is a discharge from the vagina, but at this stage of the disease it is greatly increased. This discharge is not always of the same character, sometimes it, although profuse, is thick and glairy, resembling the white or albuminous portion of a raw egg; at others it is more purulent in character and larger in quantity. Often, as far as colour and consistency, it partakes of both of these characters, and sometimes is observed to be streaked with blood.

The bladder becomes irritable. After passing water the animal, particularly if it be an adult female, stands spraddled with its croup depressed, its back arched, and tail set, as if the genital organs were in æstrum, making straining efforts, which sometimes cause the ejection of a quantity of mucus, at others jerking jets of urine which is generally highly charged and sometimes much changed in colour.

This irritability of the bladder most frequently arises from the sympathy with the state of the genital organs, and has led many to mistake it for pure renal complication, which is not frequently the cause of this symptom, although it undoubtedly is occasionally so.

The seeming irritability of the bladder, particularly in the more advanced stages of the disease when the anal end of the rectum becomes seriously involved after purgation has set in, is often caused by the functional sensations of the terminal extremity of the digestive canal, which at the middle and latter stages of Cattle Plague are frequently those of intense suffering.

In the second stage of the disease the cough becomes less frequent, but more oppressive, and is attended with an increase of suffering. There is an evident attempt to modify the shock it gives the frame, so that the suffering parts within the abdomen may not be shook by it. The respiration becomes more difficult, and is interrupted by moans at each expiration. At this period there are frequently observed eructations, and sometimes a peculiar action not much unlike that hiccough, so frequently seen in the latter fatal stages of some febrile diseases of the human being. Before this there is a total suspension of rumination; but the thirst is continued generally long beyond the discontinuance of that act of bovine alimentation. Of course ere this the animal has ceased to evince any inclination for food, although it not unfrequently happens that, if not too prostrate, it will evince a depraved appetite, and attempt to eat matters totally deficient in nutrition, and not fitted in any way for food, notwithstanding the difficulty of swallowing. Although, as a general rule, in this stage there is great sleepiness, that state is frequently interrupted with involuntary jerks of some part, occasionally of the entire of the frame. These involuntary movements are evidently convulsive; the drowsy state is alternated with one of uneasiness; the vital forces are becoming prostrate; the senses become duller; the muscular system becomes more feeble and less under the control of the will; there is an evident jerking of the tendons; many of the symptoms become thoroughly spasmodic; the pulse becomes much more rapid, but at the same time more feeble, so feeble that it frequently cannot be felt. At one period of the day the fever will appear to have abated. In a few hours, perhaps only one, it will have increased, so as to be even more intense than it had ever been previous to its temporary diminution. The abdomen generally at this stage swells, although the emaciation that has taken place is extraordinary. It is a pitiful sight to see the poor animal's attempts at lying down and getting up. The bowels, which at the first stage of the malady were costive, are now affected with diarrhœa, and that of an intense description. At first, in this stage, the fœcal excrements, from being hard in consistence and scanty in quantity, become softer, more frequently profuse. Then they become still more frequent, liquid, and changed in character; from a brown colour they become of a brownish red, and are voided much more frequently, in many cases the increase amounting to four or five hundred per cent. The matter voided from the anus is most fetid, even when it has become most fluid. As the diarrhœa progresses the evacuations become more distinct from the healthy colour and consistence. At last they resemble water in which the stomachs and intestines of animals had been washed as in the preparation of tripe for eating, and the intestines for the different uses generally made of them.

The earlier diarrhœa sets in the more rapidly the disease runs its fatal course. Sometimes the animals die in this, the second stage of the disease, the duration of which is generally about two days before the still further aggravated symptoms of—

The Third Stage.

After about the fifth day, if there be no amelioration of the symptoms, such as diminution of the diarrhœa, and an abatement of the general fever, the animal gets rapidly and intensely worse, the temperature increases, the skin becomes clammy, and from its pores at some parts oozes sweat of an odour that is as characteristic of the disease as that of a human being suffering from variola is of small-pox.

Then the horns, ears, and extremities become cold. The breath, as well as having increased in fetidity, has become cold. If there be emphysematous tumours, they become increased in size, and insensible to the touch. Sometimes the emphysema at this stage extends over the body. The back no longer winces from pressure. The eyes are still more sunken in their orbit. They are no longer bright on their surface, which often presents an appearance similar to that of a cold polished surface that has been dulled by being breathed upon. Occasionally, but by no means frequently, effusion is observed to have taken place into the anterior chambers of the eye. But this state of the organ is rarely seen, and generally results from a pre-existing ophthalmic delicacy. The discharge from the eyes, which are injected to the utmost, courses its way down the face, excoriating the cheeks in its passage. All the discharges, but particularly those from the mouth and nose, give off an intense and sickening stench. The discharge from the bowels is most offensive. The anus becomes tumified, as also does, in the female, the entrance and external sides of the genital organs.

The rectum, at its termination congested and swollen, sometimes protrudes a little from the relaxed anus, causing, while the animal has feeling, intense suffering and great straining. Swallowing is quite impossible, although there is often the sensation of thirst. The cough is still more difficult of accomplishment. The animal, instead of lying, throws itself down, and lies either with its head turned round to the side, as if pointing to the seat of suffering in the abdomen, or with neck extended, the head being advanced and supported by the chin on the ground. If the poor brute desires to rise, it does so with great difficulty, often being unable to do so without assistance. The beatings of the heart become at times tumultuous, but at others scarcely to be felt, the pulsations of the arteries corresponding in character; but generally, although greatly accelerated in number, the pulse is soft, small, and hardly to be felt; but if observed continuously or frequently, it will be found to undergo many remissions. The diarrhœal discharge, as well as that from the bladder, in many cases becomes mixed with streaks of discoloured blood and semi-blood clots. This is most observable shortly previous to death, which occurs from exhaustion, but not always in the same manner.

Sometimes the animal is convulsed, at others it lies extended, incapable of moving, its plaintive groans becoming more feeble with each expiration, until at last they cease, and often life departs with a deeply drawn sigh.

It is in the middle or last stages, principally the latter, of the disease, that pregnant cows abort. The fœtus seems in many instances to have died within the womb early in the malady, for often, when expelled, it is in a state of decomposition. Some calves are not born until the full time of gestation has been completed, and many of them live but to immediately develop the disease and die.

Recovery.

When the disease takes a favourable turn, and that its termination is to be recovery, it is observed that in the second stage there is an amendment in the symptoms instead of their getting worse. Sometimes, though rarely, the amelioration does not commence until the early part of the third stage.

It is unnecessary to enter into a more detailed description of the symptoms indicating the probability of recovery than to mention that the fever seems to abate, the diarrhœa diminishes, and what is voided from the bowels becomes thicker in consistency, browner in colour, and less fetid.

The discharge from the nose, mouth, and genital organs, also diminishes.

The urine becomes more natural, the breath less stinking. The breathing and the arterial pulsations steadier and less frequent. There is a disposition to nibble at enticing food.

The temperature of the surface is more uniform. The attitude of standing more natural. The eyes are less anxious looking, and, in short, the animal has evidently had a change for the better.

If the case has been a severe one, it takes the animal a long time to accomplish a

thorough recovery, but when it does not terminate fatally, the recovery is more perfect than in cases of typhoid fever in the human being, but not more so than those of typhus.

Although when commencing to treat of the symptomology of the disease, I had determined to be as brief as possible in my description, I find, notwithstanding its manifest incompleteness, it has extended itself so very far beyond my original intention that, in order to have this report finished at the required time, I shall be obliged to leave many of the most important parts of the subject untouched. They have, however, all, with the exception of curative measures, been already so extensively and ably treated by other investigators, that their being entirely dispensed with on this occasion, will not be of much practical consequence, particularly as the deficiency can be so easily supplied by a reference to any of the numerous authors, principally French and German, so justly considered as high authorities on the subject. The particular symptoms by which the Cattle Disease could be recognised, should it visit Ireland, is the most important description of information that could be afforded under existing circumstances. I therefore prefer forwarding to your Excellency, *in extenso*, all I have classified on that particular branch of the subject, to rendering it more imperfect by condensation merely that there might be sufficient space left for the insertion of pathological anatomy and curative treatment in this report, more particularly as I have been advised, I trust not unwisely, that it would be more desirable, in your Excellency's estimation, to have only a single portion of the subject thoroughly expounded, than to have all its many important points only so imperfectly alluded to, that practical utility would be sacrificed to mere extension, much of which would necessarily be but compilation.

I have the honour to be,

May it please your Excellency,

Your Excellency's obedient and

Very humble servant,

EDWARD BARRON, V.S.,

Of the Edinburgh Veterinary College, in connexion with the West Highland Society of Scotland.

21st February, 1866.

Kill, Naas,
February 5, 1866.

Sir,

I have the honour to lay before you, for the information of His Excellency the Lord Lieutenant, a report of my experience of the Cattle Plague during my visit to London and Cheshire.

Agreeable to your instructions, on my arrival in London, I waited on Mr. Helps, and was introduced by him to Professor Simonds, who, in turn, introduced me to Professor Browne, who I understand is the gentleman who has the chief conduct of the Cattle Plague department. By these gentlemen I was received with every courtesy and kindness, and was daily accompanied in my inspections by Doctor Browne, who took every pains and trouble to make me as far as possible acquainted with the nature and symptoms of the disease.

While in London I had several opportunities of seeing the disease in all its stages, and witnessed several post-mortem examinations conducted by Doctor Browne, who pointed out to me and explained the different appearances of the parts affected.

The symptoms of Cattle Plague are so marked, and so different from anything we are accustomed to see in this country, that when once seen by any one at all experienced in cattle can hardly be mistaken for any other disease.

The suddenness of the attack is itself almost sufficient to convince any one that the poor animal is plague-stricken. It feeds, and, in the case of milch cows, milks as usual to-night; in the morning it rejects all food, the flow of milk is sadly diminished, or altogether stopped, the breathing is accelerated, the head protruded, the ears pricked back in a most peculiar manner, the eye sunken, and sometimes tearful, with a heavy and swollen eyelid, a faint blush overspreads, or partially so, the inside of the mouth, and in the female this appearance is also present in the vagina. In a very few hours all these symptoms are much aggravated. The coat has a hollow staring appearance, the breathing becomes laborious, the blush in the mouth and vagina of a deeper colour, and the delicate membrane covering the internal surface of the mouth and gums peels off. The animal, from the first, presents a most dejected appearance; looks what it really is—struck by the hand of death, and to which it generally succumbs in from three to seven days.

On examination after death, the parts found to be chiefly affected are the air passages, the lungs, and the third and fourth stomachs. The appearance of these parts is then very peculiar indeed, and cannot be mistaken. The lungs are generally larger than natural, and are distended with fixed air. This appearance is sometimes present on parts of the body during life, chiefly the back and loins.

I had an opportunity of seeing some interesting cases at the Royal Veterinary College, and also at Professor Gamgee's; these chiefly related to inoculation after vaccination, but, sad to say, the result in almost every case was death. Three animals at Mr. Gamgee's had recovered after inoculation. These had not been vaccinated.

While in Cheshire, on one farm I visited, the owner had lost twenty dairy cows, and at that time had two others in a hopeless condition. This man had tried every supposed remedy without avail. When I called he was in the act of burying three magnificent animals, one of which had died on the third day after the first symptoms of the disease.

Upon another farm the whole herd (54) had been vaccinated, all of which "took well," except three; seven were already dead, five in a hopeless state, and sixteen fresh cases had been reported that morning, all of which I saw.

The plague is known to be highly contagious and infectious, and it is my firm conviction, that should it unfortunately visit this country, no human power could arrest its progress.

This country is so thickly inhabited, and so heavily stocked, that isolation would be hopeless.

Our hope—our only hope—is to keep this fatal malady from our shores, and to this end Government would be justified in having recourse to *any measures, no matter how extreme;* not alone as a proof of love and affection for this country, but that by saving this country England may in some degree supply her loss from its resources.

Should this country unfortunately become afflicted with this terrible pestilence, I recommend the immediate slaughter of every animal on every farm where the disease had once appeared, not indeed with the hope of "stamping out" (which I fear nothing

but the sacrifice of the last animal could effect), but that the most might be made of the flesh while in a healthy state, and to guard against the direful effects to ourselves of the fumes that must arise from a number of putrid carcases buried even at a depth of six feet.

Should we indeed be obliged to bury, I would recommend the pits being made at least six feet deep, and the same distance asunder, and not more than two animals (previously having their legs broken above the knees and hocks) buried in each pit.

This would in some measure weaken the strength and volume of the fumes that must arise in warm weather from a mass of dead and putrid flesh buried even at a depth of six feet.

I have the honour to be, sir,

Your obedient servant,

AUGUSTUS WARBURTON.

Major-General Sir Thomas Larcom, K.C.B.

Moyglare House, County Meath,
Maynooth,
26th February, 1866.

SIR,

Referring to your letter of 16th January last, stating I had been selected by the Lord Lieutenant to proceed to England for the purpose of making myself acquainted with the symptoms, and to observe and consider the best mode of treatment of the Cattle Plague, as also to that of the 30th of January, requesting that I should furnish you, for His Excellency's information, with a report of my observations upon the subject, and with all particulars which would, in my opinion, be likely to be of future use in the matter, I beg to inform you that pursuant to your letter of 16th January last, I left Ireland on the evening of the 19th instant, and proceeded to London, where I waited on Mr. Helps, at the Treasury, on Monday, the 22nd instant. He was kind enough to accord me an immediate interview, and to forward the object of my mission with his advice and a letter of introduction to Professors Simonds and Browne. Thence I proceeded to the Veterinary Department of the Privy Council Office, where I met Professor Simonds, who appointed to meet me at the Royal Veterinary College on the following morning.

I have the pleasure to report that every opportunity was constantly afforded by Mr. Helps and Professors Simonds and Browne to promote the object of my visit, particularly by Professor Browne, who gave the members of the Commission who accompanied me and myself the daily benefit of his presence and experience. I am further indebted to Professor Gamgee for the information afforded me at the Albert Veterinary College.

I append to this Report notes taken from my diary.

I do not deem the origin of Rinderpest a subject for my observation, except to express my belief, founded upon inquiry, that it is one, not of spontaniety, but of contagion, seriously located in England, where it now appears securely and fearfully established, defying all curative and defeating most precautionary means; so much so as to make it a subject of universal and pressing gravity—the more, that the cases reported are not exaggerated as to number, information of disease to a great extent reaching the Inspectors by accident or report. The disease is obscure, rapid, fatal, and intractable to treatment; remedy seems powerless; science at fault; vaccination, inoculation, allopathic, and homœopathic remedy, each alike unattended with success; while experience has proved for our admonition that the contagion is swift, subtle, and destructive; that it may be conveyed by the wind, by the excrement, and the more so if fetid, by the breath, by exhalations from the body, by substances impregnated with contagion, which may be carried to any distance; that it adheres to utensils, to clothes, particularly to woollen materials, as well as to wood and walls; consequently the means of arresting its volatile flights may be calculated as beyond our reach, when those employed for obstructing its generation are of the usual sanitary description, ordinary precaution appears incompetent to check its progress while the stealthy virus never slumbers. In the incubative stage of Cattle Plague external symptoms are entirely absent. I have been unable to ascertain satisfactorily the time it lasts, or the particular period when danger commences. It is, I believe, still occult, though vanity has not failed to give it a duration. Better far ignorance on this matter, all important, than that idle speculation should tend to deceive, and security be asserted where no assured safety exists.

While to the instructed the symptoms, particularly internally, of Cattle Plague are unmistakeable, yet to the uninitiated its early external appearances are not unlike those of pleuro-pneumonia—loss of appetite, cessation of rumination, glazed eye, occasionally red, twitching of the head and muscles near the kidneys, running of water from the eyes and nose, protrusion of the head, and motion denoting irritation of the throat, quick breathing, accompanied with a grunt, cranching of the teeth, stiffened standing, distressed look, and in dairy cattle accompanied with loss of milk. These are symptoms common to both, and tend, therefore, to deceive the owner of cattle for some twelve or twenty-four hours, all important to himself and others, every neglected moment disarming precaution and wafting contagion far and near.

I thus prominently notice the similarity of early appearances of Cattle Plague and pleuro-pneumonia, and I advisedly allude to them, in consequence of the first clause of

"suggested regulations," emanating from the Cattle Plague Committee in their first Report, by which the owner of cattle might innocently or evasively conceal a case of Cattle Plague, in the former instance believing, and in the latter pretending it was pleuro-pneumonia. Keeping in view that time is invaluable upon the first outbreak of Rinderpest, I may be permitted to suggest the advisability of inserting the words "any disease" in place of the words "the disorder" therein contained, making the existence of disease the subject of immediate inquiry to a properly qualified person, and the fact of "disorder" (Cattle Plague) to result from inspection, all due precaution enjoined being in the meantime strictly observed. It occurs to me further, that this forms a strong reason to conceive the propriety of compensation in a liberal spirit, to induce the very earliest disclosure of the existence of disease by an immediate application for inspection, leading to immediate action being taken, the presence of "disorder" being thus correctly and opportunely ascertained.

In reference to clause 3 of said "suggested regulations," a competent Inspector, having had the animal slaughtered, it appears desirable, he having satisfied himself after a post mortem examination of the existence of the "disorder," should be forthwith empowered to have all the cattle exposed to contagion in the same house or yard, or of the same lot, also slaughtered—the carcases of those disordered to be buried, with their hides slashed, together with their horns, hoofs, &c., in pits at least six feet deep, quick lime in such quantity as may be expedient for disinfection being put over them, with four feet of earth on top; the uninfected carcases, if fit, to be disposed of for human food, and the hides, first subjected to disinfection, to be sold.

With respect to clause 4 of said "suggested regulations," I am of opinion the Constable, being *pro-tempore* an Inspector, and whether the words "any disease" be inserted in place of the words "the disorder" or not, shall in the first instance, and upon his own responsibility, be empowered to order the isolation of the suspected animal to be in operation for three days, or until such time as the Inspector has reported thereon, or as may be hereafter excepted, communicating immediately to the nearest Magistrate, the fact of such isolation, and his reasons for so doing, as well as the report he has transmitted to the Under Secretary; and if such Magistrate shall satisfy himself that there are good reasons for supposing the animal so isolated is not "disordered" (or diseased, as it may be), he may annul such isolation by his written order, which written order the said Constable with all due despatch shall hand to the owner of such isolated animal. I am impressed with the force of this alteration from the fact that delay of isolation may be dangerous, and it should therefore be instantly enforced through precaution, no detriment being possible from its practice. Convinced, by my experience in Cheshire, of the absolute necessity of providing strict sanitary protection for the inhabitants of infected districts, having there witnessed the neglect of the use of lime or any other disinfectants, and the noxious effluvia produced by the want of due provision for the disposal and proper burial of carcases, I beg to observe upon the absence of terms in clause 12 of said "suggested regulations" sufficiently defining the duties of owners and Inspectors with respect to burials of disordered carcases.

While "the disorder" in England, now deeply rooted, is sought to be extirpated by the suspension of cattle traffic, and by the slaughter of infected and suspected animals, an outcry against the threatened inroad on the freedom of business transactions—the moving of manure, the prevention of the sale of fodder or manure, or the use of the latter on infected farms; the incarceration of dogs, as well as the tyranny of extermination—is loudly raised, the pressure of local zeal initiating district proscription. The apprehended closing of markets, the prevention of sale of live stock, the closing of roads, the establishment of dead meat marts, the erection of local slaughter-houses, the violation of vested rights, the interference with customs grown requisite through usage, the losses entailed by those restrictions, become inevitable through precaution, are all so many superadded trials to the visitation of disease, and are so many germs of discontent and dissatisfaction which accompany the seeds and poison of Cattle Plague, and are, moreover, dire ills we should earnestly seek and are bound to endeavour to exclude from the category of our own evils, and are, under Divine mercy, effects we may, I sincerely believe, avoid by prevention, destruction, and compensation.

Prohibition of imported cattle and sheep into Ireland, that first of moves—directed, doubtless, by God's providence—that inception of wisdom saved and comforted this land; yet every little likelihood must still be regarded exaggeratedly, when the stake is great; prevention must become so enamoured of possibility, that ever watchful, we shall be enabled to resist every subtle approach of Cattle Plague. Once arrived, I would advocate indiscriminate, unreserved, and immediate slaughter, not only of all infected animals, duly certified as such, but of all in the same herd accessible to contagion, first through the inducement of full compensation, provided the owner or his servant gave

information of the existence of disease within twelve hours after its earliest appearance, to the properly constituted authority; and secondly, by fear of a penalty of not more than £20, nor less than £5, for each case not duly reported, with forfeiture of claim for indemnity; such indemnity to be further withheld in case of his neglecting to fulfil all the requirements imposed upon him for the sanitary protection of the inhabitants, as well as for the prevention of the spread of the disease. This, doubtless, may be interpreted as a strong measure, but the necessity is created by the emergency. I believe the public weal requires that the Executive, through their officer, should be put in possession of this common enemy, and pay for its capture from the individual for the community, to secure it with a view to its merciless destruction, always upholding that the rescue of cattle from contagion, by stamping out, proves not only the salvation of property, but of food too. Divested of full compensation this alternative would become impracticable and evaded. Thus, a desire for disclosure would be influenced, the motive for secrecy removed, the possibility of diagnosis or practice prevented, to treat being but to trifle with disease, recusants made, through inducement of indemnity, their own inspectors. Cattle Plague once arrived in Ireland, liberal indemnity is the lever by which the attempt to eradicate it economically can be effectually made; it would almost entirely transfer the arbitrary or vacillating duty of the Constable or Inspector to the voluntary and timely information of the owner of infected herds; it would tend to destroy the opportunity for escape of contagion, to annihilate each centre of disease ere it radiated further poison, to instil hope into the heart bowed down under affliction, to strengthen the timid for the discharge of those new duties of energy which new wants will invite him to supply. The sister country, with cattle decimated, with offices denuded, and pastures bared, with countless tons of untasted fodder, needs supply, not alone with imported meat home or foreign, but with living stores too. Shall we not by every precaution before, and every means after appearance of disease, increase our exertions to become her larder for fatted, and her nursery for store cattle. Is it not palpably the interest of every Irishman, of every grade and every trade, to join cordially and uncomplainingly to strengthen the hands of the Executive, to be prepared to meet the approach of this unprecedented affliction, which, if here stamped out effectually, promises prosperity universally.

I believe the avowed object of compensation would be obstructed by reduction, the principle once affirmed should predicate the amount, stamping out should be placed beyond the risk involved by timidly halting before full indemnity, apprehensive of either economy or fraud. Is it economy to risk an outlay of two-thirds a sum for obtaining an end so prayerfully sought by all, which the remainder, if wisely added, would surely effect. Feeling that a life of description of English Cattle Plague would fail to realize my painful experience of a month, the means I regard as nothing compared to the end. I do not apprehend fraud to any extent, nor can I anticipate its reason, but granted, better far every tenth sufferer should glose over his illgotten indemnity, while integrity ruled the remnant nine, so that ten infected centres were obliterated from the score. But the suspension of the owner's business, the delay necessary to disinfect his premises and lands, the difficulty to supply fresh stock after the requisite interval, the probability that time, when such could be advantageously procured, had passed away, the possibility of fresh attack and renewed inconvenience oppose the idea, he could become influenced to convert the healthy into sick, through fraudulent purpose. Practice of every day life disproves the difficulty of affixing value, but the want of sufficient inducement to disclose his sick while others are in health, the whisperings of hope, and the thought to cure them under that concealment, which the compassion of his equals and the sympathy of his inferiors render secure, would be but adding momentarily the deadly fuel, which gives life and mobility to the unquenchable flame.

This calamity resolves itself into a question of food. Sophism cannot cheat truth that statutable enactment intervenes to recoup individual loss; this would properly be the province of voluntary aid. The giganticism makes it national, for it endangers the nutriment of the people. The meat markets forebode an advancing decrease in quantity, as they have already through panic deteriorated in quality. The exhibition of first class meat is the exception not the rule, holders are anxious to get rid of stocks, for the loss is damnifying beyond belief, and the apprehension is fearful beyond expression. How will the reduced stock of England be renewed is an important consideration for both sides of the Channel, in a monetary and sanitary point of view. Can her bared pastures, her emptied dairies, meet the liabilities on land through foreign importation? Are the thews and sinews of the working classes, hitherto well fed, because well employed, to wax feeble, curtailed if not denied that sustaining food requisite for those whose laboured livelihood is inseparable from the sweat of their brow? Shall we, a great food depot, through inaction or through fear, be prevented to assist them while their

supply must become so unequal to their demand that price must reach prohibition—prohibition, perhaps, enlarging into disaffection? A vast amount of meat food, and material for its manufacture, exist in Ireland. It is indisputable that to her must England look for some time to come for store stock, but if the crisis here is allowed to grow to panic, when enterprise already winces at the approach of danger, Ireland, to her own incalculable loss, will fail England.

The time now approaches when the action taken by Government and endorsed by Parliament will, in effect, either stimulate or depress the energy of this country. The period is at hand when the trade and transfer of cattle will commence for fatting purposes out of doors, and either confidence or distrust will rule the transactions, upon which will materially depend our own prospects, and our capacity to aid the sister country. Warned by her painful condition, the prevailing alarm, if not allayed by reassuring preparations to meet the calamity, will induce an amount of fear which will paralyze that energy so requisite to meet the emergency in England and here; while in Ireland it will induce a want of confidence, and an amount of caution likely to delay or defer every purposed improvement and outlay. Meantime, the tide of project thus stayed will doubtless exercise its baneful influence upon all classes, but most fearfully on that now more than ever advisedly commending itself to our fostering care—the lower and labouring population.

It further appears to me that ample compensation will not only prove an effectual means to discover and stamp out Cattle Plague, to allay alarm and cherish industry, to suggest project and support improvement, to create food by protecting cattle, but it will have an important effect upon the meat markets, by preventing unfinished cattle, all through the approaching summer, being, from apprehension of loss, pressed for sale, by which a material gain will accrue to both producer and consumer, it being impossible to improve the quality of meat without, at the same time, adding considerably to its quantity and weight. I am sure that by extending protection from panic or loss to the producer, every consumer will be best consulting his own interests ultimately, by promoting a perseverance in its production which will place it considerably within his own reach. It is admittedly true that under ordinary circumstances supply has lagged behind demand; it is consequently the more incumbent to prevent a further falling away, the fact being that to save stock is to realize food.

Thus advocating the free use of the poleaxe for the future benefit and advantage, not of a class, but of the mass, and pleading the desirableness of ample compensation, I am led to the consideration of the mode by which the requisite funds should be raised. I at once discard any voluntary system; its finality alone would be its fatality. I believe the basis cannot be too broad, or the liability too diffused. Considering that agriculture is the staple of Ireland, originating her income, that her wealth is invested in her flocks and herds, that their destruction would be an enormous evil, involving income and wealth, I incline to think it becomes the duty of income to move to its own rescue.

Unprepared for and caught by this threatened calamity, I see no escape for the owner or occupier of land, the professional or merchant, the trader or shopkeeper, the annuitant or incumbrancer, debtor and creditor, peer and peasant, all would be involved in this national insolvency, the hapless results ramifying themselves into the very labyrinths of society. It is objectionable that a Union should be called upon to rate itself, even to a limited extent, the object being not only to extirpate the Cattle Plague from the Union rated, but to pay for strong measures to prevent the spread of infection into the adjacent country, precautionary restrictions being further imposed. Charging indemnity on the poor rate would, in many instances, press upon a class of persons unable to bear it. Keeping in mind that the compensation rate, and that, too, required for the support of the poor, should, in the first instance, be advanced by them, machinery being at hand for both an income and poor rate basis, I incline to the former, as affording a more extended area for dispersing the liability, as well as exempting a tottering class of occupiers of lands and houses chargeable under Poor Law rating, and a struggling community excepted by the provisions of the Income Tax Act.

I believe a Central Board in Dublin is essential to the occasion, which requires what is necessary to be done shortly, sharply, and decisively. It would be uniform, cognizant of its duties, and equal to their prompt and vigorous discharge when time is so all-important. The great responsibility of details resting upon its members would make them amenable to local suggestion, while the absence of local pressure would be wanting to divert their attention and energy from the paramount object of their constitution—the prevention of the spread of the disease. Sitting daily, they would be in a position to advise, direct, and control, to receive reports and seasonably amend abuses. Conscious of their powers and used to their exercise time would be economized, not stayed for the general interests and for infected districts in particular, thus protected by unity,

promptness, and action. Owing to the sudden appearance of disease in the infected counties of England, and its fearfully rapid progress, local authority and local inspection, appear to have been insufficient for the requirement, by no means, I assume, owing either to apathy or indifference, it would rather seem as though the rapid spread and flight of disease had thoroughly distanced the growth of experience in its management, and authority was only able to cope with plague when through its fatality the Inspector's occupation was well-nigh gone. Energy and decision may actuate authority in one locality, while its neighbour hesitating and vacillating apprehensive of consequence and unacquainted with the extent of its powers, halts but to undo what promised mutual advantage. Adjacent local authorities, ever differing in opinion as divided in interests, must in action conflict too.

Although the infected herds of England during the winter months, housed and yarded, are thus submitted to partial isolation, yet disease escapes each injured farm steading, forming a new centre whence it radiates to another; in Cheshire, increasing westward, journeying into Lancashire and Wales, which closer approach to where our channel is narrow and communication frequent causes fear, the more to be apprehended, that by the end of next month will commence the purchase of cattle for the Irish pastures, and April will see her green fields plentifully dotted with their grazing stock. Apprehending a disease disastrously contagious, which there no barrier appears to stay where cattle are thus partially isolated, is it impossible to contemplate without anxiety vast herds of cattle spread over countless acres, separated but by hedge or ditch, exposed to infection, not to its possibility but its probability, hares and rabbits, dogs and birds, with flies too, passing and repassing, without let or hindrance.

I, therefore, very respectfully urge that the most vigorous precautions may still be used for the prevention of this dread disease, and that such immediate preparations may be made and measures adopted for arresting its progress on arrival as may, with Divine assistance, appear most advisable.

I am, sir, your obedient servant,

CHARLES CANNON.

To

Major-General Sir Thomas Larcom, K.C.B.

EXTRACTS from NOTES OF RINDERPEST CASES in London and Cheshire, January and February, 1866.

Monday, 22nd January.—Visited Mr. Helps at Treasury; called upon Professor Simonds; arranged to meet following morning at Royal Veterinary College, Camden Town.

Tuesday, 23rd January.—Met Professor Simonds; introduced to Professor Browne; with him and Mr. Priestman, Veterinary Surgeon and District Inspector, proceeded to a temporary hospital near the Metropolitan Cattle Market, where two yearlings, a bullock and a heifer were kept, Rinderpested. The bullock had the external symptoms which are to be observed in pleuro-pneumonia—dulness, drooped head, arched back, legs gathered under him, short husky cough when moved, the grunt denoting laboured breathing, twitches in the head and at the kidneys, cranching of the teeth, running from the eyes, loss of appetite and rumination, emaciation and constipation, without inflation on the back or crepitation. His mouth, when first opened, appeared like foot and mouth disease; a welt lay across the upper gum; the gums were red and inflamed, particularly about the teeth, and one or two red spots were visible; the papillæ, or little pillars on the inside of the mouth, were tinged with red, and by the use of the finger or a knife the entire coating where inflammation existed peeled off without apparent inconvenience to the animal; no blisters, as in foot and mouth disease, were there, and whereas in the latter the skin of the entire tongue has occasionally come away, it rather appears here as though a slight or mucous covering only stripped. This indication of the mouth was found in every case I had opened for examination, and is thus easy to be distinguished from foot and mouth disease. He was pronounced by Professor Browne to be a bad case of Rinderpest. I did not attempt auscultation in this or any other case. The heifer was not very ill, her eye looked full and well, her coat was not stared, she had scarcely one of the above external symptoms, drank freely of water, as did the bullock. She gave no reasons for apprehension until the mouth was opened, when the symptoms already described in the bullock appeared in a very mitigated form, added to spots which were to be seen on the inside of the vagina or shape. After a lengthened examination of both cases, I was convinced the latter was as likely to live as the former was to die. The two animals were not treated by either Professor Browne or Mr. Priestman; they were left to nature—hay, mangolds, and water being supplied.

Returned to Royal Veterinary College, where models in wax of different parts of a Rinderpested cow were shown us, and lectured upon by Professor Simonds most instructively. They represented a very severe case. The gums were red and abraded, spotted too; the papillæ red; the skin peeled off the palate of the mouth, and it looking raw; the throat and root of the tongue covered with ulcers; the passages lined with yellow matter; the fourth stomach, almost invariably attacked, instead of presenting a pale surface, was variegated with red and purple spots and lines, ulcers, and perforations, with patches or hems tinged with crimson.

The appearance presented by the wax models formed a most useful introduction to the four *post-mortem* examinations I afterwards witnessed, as well as permitting the opportunity of more prolonged observation and inquiry.

Repaired to a Mr. Davis, cow-keeper at Long Acre, where two cows were diseased in a stable, well kept and ventilated. One was ill twelve days, the other five. The latter was much worse than the other, continually getting up and lying down; breathing very laboured, with cough and grunt; her sides heaving, her appetite quite gone, rumination ceased, purging set in. The other was more prostrate but easier, with a grunt and cough, respiration difficult; both had yellow matter running from the eyes, and the latter from the nose. The owner stated he had formerly suffered from lung disease; but in this the cows lost their milk, and failed at once either to feed or ruminate.

He gave these two cows linseed and oatmeal gruel, with brandy and pepper to support them. As the shed was some distance from his residence and the evening dark, no light was at hand to enable me to get their mouths opened for examination.

Wednesday, 24th January.—Found yearling bullock dead, after five days' illness; yearling heifer lying in a corner, unable to stand, breathing much oppressed, dysentery set in, appetite gone, much drawn up and emaciated, coat stared, back arched when put up, mouth more inflamed, also vagina; skin of mouth easily peeled off, gums red and spotted, great prostration and apparent pain, refuses to drink; no hope of recovery. The bullock, being disinfected, was sent on a cart to the adjoining slaughter-house, about forty yards away. This, my first *post-mortem* examination, was made in the presence of Professor Browne and Mr. Priestman. The appearances were nearly such as those referred to from the wax models at the Veterinary College, except denoting a milder type, the roof of the mouth not being exfoliated; the right lobe of the lung was diseased, the kidneys sound. The Professor stated Rinderpest was sometimes preceded by pleuro-pneumonia, or foot and mouth disease, and *vice versa*. The plague was described to me as a highly diseased state of the mucous membrane, in virulent cases extending from head to tail. Called on Mr. Davis of Long Acre, who informed me his two cows were dead.

Thursday, 25th January.—Met Professor Browne at the temporary hospital; found the yearling heifer dead; the carcase was sent to the slaughter-house, where also Mr. Davis's two dead cows were awaiting *post-mortem* examination; Mr. Priestman was in attendance. The heifer first opened, symptoms not so severe as those of the bullock, but well and sufficiently marked to establish the relation of disease between the two; the lungs were sound, and also the kidneys. Mr. Davis's cow, ill for five days, was next examined; the inside presented the nearest approach to the wax models I saw; there was emphysema or inflation of the lungs present, which would I presume account for her laboured breathing before death; very much inflammation was present in the mouth and vagina; the kidneys were sound. Mr. Davis's cow, ill for twelve days, was then inspected. She too showed the symptoms present in the last case, but less severely. The mouth, tongue, throat, and fourth stomach, all with the vagina sufficiently denoting the similarity of appearance with the other cases, there being in this one in addition adhesion of the lung, which would show that Rinderpest, of which she died, succeeded pleuro-pneumonia. However incompetent I feel to form an opinion upon the internal evidence of disease, I must observe that medical treatment must do strong battle to oppose the progress of an ailment so quickly fatal, and so apparently located from mouth to tail. It was satisfactory to have seen each animal alive, though exhibiting a different type of Rinderpest, yet each resulting in death, and showing a similarity internally in a more or less disordered state of the mucous membrane. This concluded my *post-mortem* inquiry. It was a gratification to be assured by Professor Browne that the four cases were as well developed instances of Rinderpest as he had seen. Visited Metropolitan Market—large preponderance of foreign cattle offered for sale; foot and mouth disease very prevalent.

Friday, 26th January.—Visited Royal Albert College—introduced to Professor Gamgee and Mr. Doogan, one of his assistants, who conducted me through the establishment, and kindly afforded me every information; saw first a well-bred weanling heifer inoculated with Rinderpest virus, exhibiting almost identical symptoms as others I had seen, also a very fine fat cow, brought in the day before from an infected dairy, neither inoculated nor vaccinated; not much distressed, but with impaired breathing; mouth and vagina moderately affected; feeding a little; eye full. In next stalls were two yearlings, a bullock and heifer, both previously inoculated; had disease slightly, and recovered; were now feeding and ruminating, and looking healthy. At the other side was a yearling well-bred heifer, vaccinated successfully; inoculated on 22nd January; apparently ill, but mouth and vagina clean.

Saturday, 27th January.—No cases reported at Veterinary College or Veterinary Department at Princess-street. Proceeded to Albert College; arrived to see the inoculated weanling heifer die after five days' illness; her death was violent, accompanied with convulsive struggles nearly approaching to delirium; all the other internal symptoms were present after death. The good cow much worse, her breathing quickened, and fallen away; ceased to ruminate and to feed; mouth and vagina considerably more inflamed; indisposed to get up; dysentery set in. Two recovered inoculated yearlings looking healthy. The vaccinated yearling heifer inoculated on 22nd January slightly Rinderpested; coat stared, cold looking, and dull; eye changed; also external appearances of mouth and vagina more inflamed; feeding impaired. The glass thermometer is here always at hand, and much used to test the internal temperature of the animals. It is introduced into the rectum, and is said to indicate the existence of fever; admitting that excitement can be caused by external force or accident, it might become a question how far it is to be depended on, and for what practical purpose.

Monday, 29th January.—Visited the Metropolitan Cattle Market with Professor Browne; saw no cases of Rinderpest, and less of foot and mouth disease than upon a former occasion; returned to Veterinary College, and as two cows under vaccination experiment were reported Rinderpested, we were permitted to see them. Both had been vaccinated on 7th January; came to Royal Veterinary College on 17th; Professor Simonds highly approving of the vaccination. On the 20th January one was exposed to infection, the other was inoculated with Rinderpest virus, both showed symptoms of Rinderpest on 27th January. The good cow at the Albert College reported dead, after three days' illness.

Tuesday, 30th January.—Visited the vaccinated cows at the Royal Veterinary College; found that inoculated more severely attacked with Rinderpest than the cow exposed to infection. She was lying down prostrated, breathing painfully loud, so as to be heard outside the door of her stall; eyes running thick corruption; the latter, housed in another part of the college premises, I found standing, clothed; her hair was not so stared, her breathing was easy, and though dull, and with drooped head, she did not appear to suffer pain; the internal symptoms were all visible. Neither cows showed inflation on the back nor crepitation. Further on was a black coloured cross-bred cow, located there since last November, exposed to infection every day, and inoculated more than once with Rinderpest virus, but never could be induced to become sick. She had been subjected to the contagion of a dead diseased calf in the same stall all night, as well as left in a stall from which a Rinderpested cow was removed, and with the same result.

Visited with Professor Browne a cow-keeper at Westminster, who had four cows reported diseased out of thirty-five; they were perceptible on our entry; their heavy look and protruded hanging heads with stared coats, and stiffened standing, inviting observation; they were in a row; the fifth appearing ill too. This man had previously lost ninety cows, and after the expiration of some time again purchased those thirty-five fresh cows. I could scarcely convey a remote idea of the filth of the sheds; the feeding trough had a bottom of old bricks, pointed with dirt, welled by time; one side was the wall, the other wood, encrusted with foulness; soured grains filled the interstices, while the animals held their heads over water, converted into slop, by refuse food and unloosed nastiness. Others lying in their own droppings, while their tails were saturated with their own urine; at the end of the shed was a large heap of manure, which evidently did not owe its accumulation to the excrement of the cows alone.

Wednesday, 31st January.—Called at the Westminster cow-keeper's. Three cows died; two were sent to be slaughtered; some amongst the remaining looked very suspicious. Visited the Veterinary College, Camden Town. Found the vaccinated cow that had been inoculated dead and awaiting a *post-mortem* examination in the dissecting-room. Saw the cow exposed to infection; a decided alteration for the worse, lying down, very indisposed to move, with mouth and vagina symptoms exaggerated from previous day.

Thursday, 1st February.—As I purposed this to be my last day for Cattle Plague visits in London, I called early to see the survivor of vaccination at the Veterinary College, desirous to see the experiment, if possible, to the close; found her sinking gradually, but with considerably less pain than the inoculated cow; breathing accelerated, prostrated looking, ceased to feed. I did not see her ruminate. She appeared more stiff on her limbs, and was lying down, immediately on being stirred. The case was too confirmed to ask for any further internal examination. It was generally considered she could not last two days. Visited the immaculate cow for the last time; looking healthy and ruminating, regardless of the pestilence around her, as if to show the vast evil had a limit. Called at the Albert College to see the issue of vaccination there. The yearling vaccinated and inoculated I found much worse, gradually sinking, emaciation greatly increased, and she, apparently, in every way failing; no inflation on the back; internal symptoms more inflamed.

Friday, 2nd February.—Waited on Mr. Helps. He and Mr. Harrison advised my proceeding to Cheshire, where for some days I should be aided by the experience of Professor Browne, who was about to leave London. Called on Professor Simonds, who kindly gave me letters of introduction to Mr. Humblesden and the Inspector at Crewe, lest I should remain after Mr. Browne's return to London; Professor Browne having communicated to me his intention to leave London the following Monday for Chester, I made my arrangements to do so too.

Monday, 5th February.—Left London for Chester. On my arrival waited on Professor Browne at his hotel, appointed to meet him the following morning at ten o'clock. The Rinderpested cow vaccinated and exposed to infection at Royal Veterinary College reported dead.

Tuesday, 6th February.—Met Professor Browne at the office of the County Inspector for Cheshire, proceeded thence to Eaton Park, near Chester. Found the shippings (sheds and stalls) faultlessly kept, ventilation and cleanliness valued and duly maintained by the steward; every appliance liberally afforded to meet the requisites of the patients. Fifty animals reported under homœopathic treatment, prostrate cases being aided with arrowroot, brandy, and mulled porter. About twenty were vaccinated; lost twenty-six. The disease appeared here of a very mild type, some under treatment scarcely indicating Rinderpest. The preparations for burials seem to be conducted with all proper regard to superior authority, as well as care for the health of the inhabitants. The sheep in the park appeared healthy. Proceeded to a farm at Poulton, the occupier of which had seventy-two animals (cattle); fifty died, seven were slaughtered, three recovered, the remainder under treatment. Sheep sound. The shippings here in fair order; a very large amount of fodder remaining unconsumed. On an adjacent farm, loss of cattle reported eighty-six; cured seven; vaccinated some, but none recovered. One resisted the disease. Some were treated, others not. Exhumed an ewe, said to be Rinderpested. *Post-mortem* examination; Professor Browne saw no traces. Visited some three or four farms where sheep disease was reported; found none, report having taken liberties with the past as well as the present.

Wednesday, 7th February.—Presented my letter of introduction from Professor Simonds to Mr. Humbleden, residing near Chester, who very kindly showed me interesting cases in his locality. Visited a farm, where, out of a lot of seventy-four head of cattle, eleven were sold, one never infected, one still under disease, eight recovering, and the remainder died. I was by no means assured that the eight were all recovering; some looked very dull, and internal symptoms were very inflammatory. Visited an adjoining farm, where a very fine cow was shut up in a house sick, about twenty equally fine cows were walking round the house, and to the door, which had apertures for ventilation, the manure was thrown from the hospital on the dung pit, over which the healthy animals walked. She had been vaccinated, the farmer said; the fact appearing that she had been setoned with some irritating compound after a most barbarous fashion; inflammation ran very high, and the shoulder was as though a natural collar had been present on one side; she appeared very ill, with forced

respiration and fever, but the mouth and vagina were perfectly free. The isolation here was quite a farce. Saw two cows and one two-year-old heifer in Chester, reported to be well vaccinated, all three badly Rinderpested; mouth and vagina well marked. One cow never lost her milk, but continued as usual. She appeared a great sufferer, moaning continually, and oppressed in her breathing, much inflation was present along her back. They had been five days ill; not treated; the following morning I heard they were dead.

Thursday, 8th February.—Favoured by the County Constable of Cheshire with the following account of Cattle Plague in that county, up to the 7th instant:—

Number of cases reported to 7th February:—

Died,	22,345
Killed,	715
Under treatment,	7,873
Recovered,	1,840
(During about three months.)	32,773

Number attacked during past week, 7,771, or 1,110 per day.
Dead, and killed, „ 4,986, or 712 per day.

Visited Nantwich, containing 80,126 acres, valued at £161,427.

Attacked up to 7th February:—

Died,	8,473
Killed,	49
Under treatment,	1,450
Recovered,	840
	10,812

Accompanied by Professor Browne and the County Inspector, I found in a field adjoining the town twenty-two diseased carcases had been buried in a space 15 yards by 4, and within five yards of a running stream, the soil being sandy; the stench was intolerable, and only to be resisted by getting the right side of the wind, which was then blowing towards the town. It was impossible lime to any sufficient amount was used, or that the pits could have been properly constructed, or that any inspection had taken place. Further removed from the town, we found a ridge in a field, next an orchard, about one hundred yards from the farmer's dwelling, containing forty-six carcases, buried without any lime or other disinfectant, and a high ridge of clay raised over the surface of the field denoting the shallow depths of the pits. This ridge adjoined the public road, and here too inspection seemed blind. Two miles further on, I found six cows buried within three yards of an inhabited dwelling-house, within six yards of the public road, and six yards of a grazing field, in which cattle were feeding. Returning late, called on Mr. Tollemache, saw seven of his vaccinated cows, never sick; lost three out of the lot, originally containing ten; they were also vaccinated; but he further stated that when disease appeared, he had the sick immediately removed from the healthy.

Friday, 9th February.—Professor Browne having discovered, on the evening of the 5th instant, after *post-mortem* examination, the symptoms of Rinderpest in two sheep, one having died and the other being slaughtered, proceeded this day to inspect the remainder of the flock. I accompanied him. There were some lean as well as scabby sheep amongst the lot of seventy-three. They were purchased at Liverpool, and were supposed to come from Scotland. No additional case had occurred before I left Chester, though one looked suspicious. The farmer had these sheep on the pasture off which his cattle had previously died. He lost seventy cows; has now seven remaining. Visited an adjoining farm, the occupier of which had forty-eight cows; twenty-four alive; twenty-four died; found also four calves; had disease on his premises, but isolated none, the sick standing beside the healthy, the animal that ceased to ruminate being left beside that I saw ruminating. Lastly, visited the famed lime-water well, which overflowed the yard; saw three calves apparently well, and also a heifer dying within fifty yards of the same well, unable to rise, which the master stated was walking about an hour before. In the stable was a cow mildly attacked. The owner of the well stated he had saved seven out of twenty-two attacked.

Saturday, 10th February.—Left Chester for Shrewsbury; returned the following evening to Liverpool to visit the cattle market there before my return to Ireland.

Monday, 12th February.—Visited Liverpool market; saw no case of disease, or of foot and mouth distemper. Some excitement prevailed at the recommendation of Royal Agricultural Society of Ireland to stop the export of cattle from Ireland to Liverpool, and opinions were expressed that the butcher going to the ox would be a more likely means of propagating infection than the drover or dealer, who was not necessarily so closely in contact with disease.

Tuesday morning, 13th February.—Left Liverpool, and arrived in Dublin on that evening from Holyhead, after an absence of twenty-five days.

CHARLES CANNON.

Albert National Agricultural Training
Institution, Glasnevin,

February 5, 1866.

Sir,

His Excellency the Lord Lieutenant was pleased to appoint me as a member of the Cattle Plague Committee, which he convened at Dublin Castle, for the purpose of considering the measures which should be taken in the event of the Plague unfortunately reaching Ireland; and, more recently, he directed that I should proceed to England, with a number of medical, veterinary, and other gentlemen, to inquire into the symptoms, mode of treatment, &c., of the Plague.

In obedience to the instructions contained in your communication of the 30th, I have now the honour of submitting to you, for the information of His Excellency, the following report of my observations on the subject.

I propose to state the results of my experience under the following heads:—

I. Symptoms.
II. *Post-mortem* appearances.
III. The modes of treatment adopted in England.
IV. Suggestions as to the way the Disease should be dealt with, should it unfortunately break out in Ireland.

I. *Symptoms.*

The symptoms of Cattle Plague are very variable. I shall endeavour to give a popular description of those which I believe to be the most characteristic of the disease, and to explain, as I proceed, the points in which the disease differs from other maladies likely to be mistaken for it.

It is necessary to premise that several of the symptoms usually ascribed to Cattle Plague are common to other diseases. Thus, in most of the descriptions of the early stages of the Plague, it is stated that the animal is dull and off its food. But every man who has had the least opportunity of observing the habits of cattle, knows that they exhibit these symptoms when affected with the generality of diseases involving any of the principal organs of vitality.

I have seen beasts in the early stages of Cattle Plague that presented many of the symptoms of animals suffering from ordinary indigestion, which is frequently mistaken for Plague, in the present excited state of the agricultural mind. There are, however, signs which materially aid us in distinguishing the Plague from other diseases, even in its earliest stage.

In the first stage I am inclined to think that one of the safest tests in doubtful cases is to insert a thermometer, specially constructed for the purpose, into the vagina of the cow, or rectum of the ox, to ascertain the temperature of the blood. Cattle Plague being a species of fever which runs its course rapidly, the temperature soon rises from two to four degrees above its natural standard, which is 102 degrees, whereas in indigestion, or diseases not of an acute inflammatory character, there is not necessarily any sensible change in the heat of the blood; secondly, there is usually a running from the eyes, and a discharge of mucus from the mouth of cattle affected with the Plague, which do not occur in indigestion; thirdly, soon after the poison of Cattle Plague enters and circulates through the system, indications of the disease soon present themselves in the mouth and in the vagina of the female. These indications consist of spots of a pink or reddish colour in the vagina, and the buccal membrane of the mouth, which acquires a pinkish blue colour.

When these symptoms become well marked, we have what may be called the second stage of the disease, in which the malady generally declares its true character very clearly. Yet I am inclined to think that even an intelligent farmer is likely to mistake one disease or other for some cases of Rinderpest.

The disease which is most likely to be confounded with it, in the second stage (which we have now arrived at), is "foot and mouth disease" (called eczema epizootica by some veterinarians, and epizootic aphthæ by others). Foot and mouth disease, like Cattle Plague, is produced by a specific poison. In foot and mouth disease the action of the poison is at first local, while in Cattle Plague the system is evidently affected before any local symptoms make their appearance. Again, the time occupied in developing the disease is much shorter in foot and mouth disease than in the Plague.

In the former it is seldom less than twenty-four hours, or longer than four days. The average of twenty-nine cows affected last year at the agricultural institution, over which I preside, was about two days.

In Plague "the period of incubation during which there are signs of disorder" varies from four to eight days according to some veterinary professors, while, if dependence is to be placed on the observations of the medical section of the Cattle Plague Association of Norfolk, it varies from seven to twenty-one days when produced by infection, and from four to eight days when produced by inoculation.

Eczema epizootica, or foot and mouth distemper, as the more familiar designation indicates, attacks the mouth and feet. Vesicles quickly appear on the inner surface of the lips and cheeks, on the tongue, and occasionally on the nose, and on the skin between the clefts of the feet. These vesicles, sometimes small, frequently acquire the size of grapes, and often collect in patches. They run their course rapidly, and, as the animal usually sucks or smacks with its lips, the vesicles within the mouth soon burst, causing intense pain. The feet also suffer acutely, a fact rendered painfully evident by the crippled appearance of the animal, and the difficulty with which it moves.

In Rinderpest, when buccal vesicles form, they make their appearance on the inner surface of the lips and mouth. A similar eruption sometimes forms on the nose. All these are so like those seen in foot and mouth disease as to betray inexperienced persons; but, as a rule, the appearance of the mouth in the two diseases is quite different.

We are generally enabled to distinguish the two diseases in the vesicular stage, without opening the mouth, by carefully observing the animal. Thus, in foot and mouth disease, there is, as already stated, a movement of the jaws, accompanied with a smacking or sucking of the lips, whereas in Plague, the animal grinds its teeth, which it seldom does in mouth and foot distemper. In the vesicular stage, too, the feet are tender in foot and mouth disease, while, in none of the cases of Rinderpest which I examined was there an appearance of vesicular eruptions of the feet.*

In foot and mouth disease I have observed that the eruptions usually occur in the gums of the upper jaw, and across the lower gum, but not so often in the concavity of the lower lip, which, in Rinderpest, is one of the most constant seats of eruptive appearance.

The appearance of the vagina in the cow, and occasionally of the rectum in the ox, is often of great use in enabling us to distinguish Cattle Plague from other diseases. In Plague, a slight redness of the mucous membrane of the vagina, or "bearing," is one of the early symptoms of approaching danger. In a short time red patches appear on this membrane, usually presenting themselves first about the part commonly called the clitoris, and soon after its surface is covered with semi-purulent matter, which has been compared to the spawn of salmon.

In Rinderpest the nose and eyes generally present very characteristic symptoms. Indeed, from the first appearance of the disorder, and throughout its entire course, the eyes generally exhibit a most unhealthy appearance.

First of all, tears roll freely from the eyes, coursing their way down the cheeks, which become marked with the lachrymal discharge; the conjunctiva becomes red, injected, and its colour gradually changes to a dull brownish red.

As the disease advances, the eyelids swell, which, with absorption of the fatty matter of the orbit, causes the eye to have a sunken and most dejected appearance.

The lining membrane of the nose acquires a light purplish shade of red, evidently partly caused by the blood in its capillary vessels not being sufficiently decarbonized—perhaps as a partial result of congested circulation. This is followed by red patches, and soon after the surface becomes abraded.

There is a discharge from the nostrils, which is at first watery, but gradually becomes thicker, and ultimately purulent.

Several cases occur as the disease develops itself still further in the system, which are likely to be mistaken for pleuro-pneumonia.

The leading variations in the symptoms of this disease, as it affects different animals at this stage, depend on the parts principally affected. In the majority of cases the fourth stomach and small intestines are the parts most invariably and intensely affected, but the air passages of the respiratory organs are so frequently involved (I believe as the result of complication) that the symptoms become so complex, and some of them apparently so like those of pleuro-pneumonia, as to deceive the casual and inexperienced observer. Thus, in some cases the mouth, larynx, and windpipe, or trachea, are very severely affected; while in other cases these parts are but slightly, or not at all, attacked, and the chief seats of disease are the fourth stomach and intestinal canal. When the trachea is affected, the animal has a peculiar cough, which is often mistaken for the cough of lung disease, and so much is this the case, that I have known even veterinary surgeons to mistake the one for the other.

* I saw two animals with tender feet; and it is said that vesicles often form between the digits in Rinderpest.

In lung disease there is invariably a short hacking cough, and a characteristic grunt which it is difficult to describe, but once heard not likely to be forgotten.

In Rinderpest there is no symptomatic cough unless the respiratory passages are affected. In severe cases, rather than a cough there is a deep moan, indicating severe internal suffering, and truly characteristic of the disease, and not at all similar to the decisive grunt of lung distemper.

I have heard many describe what they call the constant characters of this moan, but the danger of attaching importance to such descriptions was rendered plain to my mind in one case which a medical gentleman was describing to me, and in which what he regarded as characteristic in the respiration arose from the circumstance that the animal was in calf, and that the womb and other contents of the abdomen forced the diaphragm so forward into the thoracic cavity that the lungs were compressed.

Often towards the later stages of Cattle Plague, and sometimes even in the middle stages, there is observed a very striking peculiarity in the breathing, particularly in expiration which has a sort of double action ; for instance, when the animal inspires or takes the air into its lungs it does not send the breath out again in one continuous uninterrupted wave. The flanks are seen to contract at the latter part of the act of expiration, as if the abdominal muscles were called into action to assist in finishing the emptying of the chest of the air that had been inspired ; and such is really the case.

In all these instances the lungs, on examination after death, will be found emphysematous. Broken-winded horses have the same kind of "draw" or double action in expiration, and from the same cause—emphysema of the lungs.

In doubtful cases auscultation and percussion are, in my opinion, the safest means of distinguishing lung disease from Rinderpest.

In pleuro-pneumonia one or both lungs, or a portion of them, are affected, and of course the healthy respiratory murmur of the affected portion of lung is suspended. In advanced stages the lung becomes hepatized or solidified. In Rinderpest the lung is not necessarily diseased at all. It frequently happens that there is emphysema of the lung, that is, air is thrown into the tissue of the lung, giving the part an inflated appearance. The phenomena of pulmonary emphysema rather helps in distinguishing Cattle Plague from lung distemper. A dull solid-like sound is emitted on striking the ribs over a lung solidified from pleuro-pneumonia, while the sound emitted on percussion over a healthy lung is resonant, and indicates that the light healthy pulmonary tissue is filled with air. In Rinderpest, when the lungs are emphysematous, the sound from percussion is still more resonant and hollow-like than even from healthy lungs.

In many cases of Cattle Plague the skin appears inflated in several parts of the body especially along the spine, this is caused by emphysema or gas being eliminated in the cells of the tissue beneath the skin. I saw several sick animals in which the inflation was considerable ; but it is not a constant symptom, nor is it confined to this disease, for a similar emphysema occurs in Black Leg. If there be much emphysema of the surface the lungs are very likely to be similarly affected.

II. *Post-mortem Appearances.*

In the course of my inquiry into the Cattle Plague I had the advantage of assisting at several post-mortem examinations, some of which were specially made for the instruction of my colleagues and me, under the direction of that accomplished veterinarian, Mr. Browne, of the veterinary department of the Privy Council, and lately professor of veterinary surgery at Cirencester Agricultural College. Others were made at the two veterinary colleges, under the directions of the respective demonstrators of anatomy. The post-mortem appearances in all these cases clearly showed that the chief seat of the disease is, as already stated, the digestive organs. As a rule, the heart, liver, spleen, and kidneys are healthy, and the lungs do not exhibit any marks of diseased action, except the emphysematous appearance sometimes met with, and to which reference has been already made.

The post-mortem appearance of the eyes, nose, and mouth, need not be described here, as they can be well understood from the description I have given of disease in these organs under the head of symptoms.

The parts in which lesions are most marked in Cattle Plague are :—

1. The stomachs, particularly the abomasum, or fourth stomach.
2. The intestines.
3. The larynx and trachea.

1. *Lesions of the Stomachs.*

I saw no indications of disease in the first, second, or third stomachs that I had not seen before in animals I dissected myself, and which died of other diseases. The first stomach or rumen is generally full, sometimes much distended with food, but so it is,

when in other diseases rumination is suddenly suspended. When the rumen is surcharged in this way, and unable to discharge its contents, I am inclined to think that food or medicine administered through the mouth can do little good; and if there is any hope from curative treatment, food or medicine given to the animal should be such as goes not into and remains in any of the first three stomachs; and in case of extreme distension of the rumen, some of its contents should be removed by hand, as is done occasionally in impaction of this organ.

Many persons urge that the third stomach or omasum, is invariably involved in this disease, but I believe this view is advocated by persons who have not witnessed the post-mortem appearances which are often present in other diseases.

One professional gentleman assured me that a characteristic post-mortem appearance of the third stomach in Rinderpest was that the epithelium peeled off easily; but the fact is, the epithelial covering of this organ sometimes peels off readily in post-mortem examinations of even healthy animals; and in some cases of Cattle Plague it adheres pretty firmly to the folds.

There is a well-executed cast of the lesions of the omasum in the Museum of the Royal Veterinary College, showing one of the folds perforated; that is not, however, a characteristic lesion of Plague, for on the morning of Sunday, the 15th of October last, I discovered a lesion identical in every respect in an animal which had eczema epizootic the previous summer, and which died of what I call non-contagious lung disease, in contradiction to the contagious form on the 14th October.

I am aware that some authors state that the third stomach is the seat of Rinderpest, but I believe that all well-informed veterinarians of the present day discard that opinion.

The fourth, or true digestive stomach, is invariably affected, its appearance depending on the stage of the disease at which the animal dies, as well as on its constitution.

The appearances which I witnessed may be classed as follow:—

a. When the animal dies in the earlier stages of the disease, the mucous membrane appears slightly thickened, and of a dirty, dark colour, especially towards the pyloric end. Red patches appear here and there on its surface, which on examination are found to surround the glands.

b. Sometimes the whole of the inner surface of the mucous membrane is of a dull red, or plum-colour, and presents well-marked patches, more intensely coloured than the rest.

c. In a more advanced stage there is often very considerable abrasion of epithelium, and patches of yellow exudation are seen towards the pyloric end; and at a later stage these exudations slough, leaving well-marked abrasions behind.

2. *Lesions of the Intestines.*

The small intestine (consisting of the duodenum, jejunum, and ilium) very frequently show the same dark, dirty appearance as the fourth stomach, with patches of a deeper red than the rest about the glands. The irregular patches, called Peyer's glands, do not appear to be ulcerated, but I saw them covered or surrounded with exudations of yellow or brown matter.

The large intestine (consisting of the cæcum, colon, and rectum), do not appear to be diseased to the same extent as the small one. Only in two or three cases did I see the rectum affected, and then it presented the appearance of the small intestines, and partly that observed in the cæcum. Portions of the inner surface of the mucous membrane of the cæcum and colon appeared of a dull red colour, and in the cæcum more especially there are red stripes or bands, giving an appearance which may be compared to the marking of a zebra.

In the colon, again, we find stripes of a blackish green colour, crossed by broad transverse lines, of a similar character, giving it a chequered appearance.

3. *Lesions of the Larynx and Trachea.*

As already stated, these parts are not so often the seats of the disease as the fourth stomach and small intestine; but when the respiratory organs are attacked, the lesions in the larynx and trachea are well marked, and forcibly illustrate the terrific virulence of the disease. There is a wax model in the Museum of the Royal Veterinary College which represents an extreme case of this kind. In one of the cases I saw the whole of the mucous membrane lining the trachea was congested, and at its upper end there was an exudation of dense matter; and the membrane of the larynx showed greatly increased vascularity. I cannot but come to the conclusion that all attempts at curing an animal thus severely affected are, in the present state of our knowledge, not only futile, but

eminently calculated to disseminate the virus of one of the direst diseases that has ever affected the herds of Great Britain ; for if this Plague be communicable by the atmosphere, as is generally supposed, there must have been dispersed through the air, during the progress of the disease in this poor brute, poison enough to smite, it may be, a thousand sound beasts.

The more common appearances seen in the larynx, trachea, and bronchial tubes, are thus described in the following extract from the Norfolk Report :—

"Sometimes almost healthy and free from mucus, sometimes presenting only a dull reddish discolouration of the mucous membrane between the rings of the trachea ; at other times showing either a few scattered spots of redness, or a more general pinkish colour, or reddening of the surface ; or a vivid claret red infection of the mucous membrane in large patches, or in sprinkled spots, mixed with stripes. When so congested the tubes are free from mucus, or contain some reddish frothy fluid, chiefly in bronchi."

In concluding this part of my observations, I have merely to say that post-mortem appearances have not, in my opinion, received due attention in cattle diseases. It is by the study of these appearances, and by careful observation of the sick animals during life, that we can hope to gain a full knowledge of the laws by which mysterious diseases like Rinderpest are governed.

III. *The different Systems of Treatment adopted in Great Britain.*

It is with deep regret that I feel myself called upon to report that every attempt hitherto made at curing this dreadful murrain has utterly failed.

Everywhere I went I inquired most carefully and anxiously into the experience of the most intelligent and skilful men, who had tried curative agents ; and during my stay in England and since my return, I have been in communication with several agriculturists, veterinary surgeons, and others of well-known ability, in the expectation of gleaning some information that would afford even the germ of a well-founded hope.

I was sanguine enough to think that the united knowledge and wisdom of the many accomplished men now engaged in human and veterinary medical science, would be able to grapple with a great calamity like this, but I grieve to say I have been disappointed. I do not presume to state that either branch of the profession is deserving of blame in the matter. The human physician or surgeon knows little of the diseases of live-stock, and it is unfair to censure the veterinary profession for having failed to cure Rinderpest, while human medicine fails to cure hydrophobia, glanders, and in the majority of cases cholera morbus, and several other diseases of man.

I shall classify, and briefly review, the several attempts made to cure Rinderpest. The first of these which I shall notice is homœopathy. I do not intend to enter into a discussion of the merits or demerits of this system, but I will say that it cannot have the least *positive* effect in curing this malady. It is to my mind inexplicable, that intelligent men who have had any knowledge or experience of contagious diseases, could expect that the *infinitesimal* doses given in homœopathy, would counteract the virulent poison on which the very existence of Cattle Plague depends. Homœopathy has, by what I will venture to call *negative* merits, gained numerous advocates, and so have many of the most flagrant nostrums of quacks and charlatans.

What I mean by the negative merits of homœopathy is, that it does not necessarily do harm, while the animal is usually well nursed. My views of the negative merits of this system will be the better understood when I make a very brief reference to the let-alone system, which I have tried myself in pleuro-pneumonia, and which when coupled with good nursing, and especially when attention is paid to the state of the bowels, will be found to give a higher per-centage of cures than any of the vaunted systems of physicking.

I saved two of the most valuable cows on the Glasnevin Farm, last year, which were reported to be suffering from attacks of pleuro-pneumonia, by placing them in a large well-ventilated room, depriving them of all solid food, and putting them under lock and key.

Had these animals, while so housed, received homœopathic treatment, they would have recovered just as they did without it, and homœopathy would have got credit for cures which it never effected.

Homœopathy has not by its own inherent merits cured a single case of pleuro-pneumonia, and it never can be more effectual in the cure of Rinderpest.

2. Several specifics have been tried for Rinderpest, but without success. It is not unreasonable to suppose that a specific might be discovered, which if administered in time would destroy or counteract the poison of this Cattle Plague ; but when the disease has made progress in the system, and caused abrasion of the membrane of the alimentary canal, the action of no vaunted specific could be reasonably relied on.

Arsenic is a medicine which I found very commonly used in England as a specific in

the treatment of Rinderpest, but I confess that while I know it possesses tonic properties, yet from its well known action on the stomach and intestines, it is the last medicine I should recommend in such a disease; and I can have no hesitation in saying that I collected no authentic evidence favourable to its use; on the contrary, I am convinced it in many cases but added fuel to the fire.

3. I look more hopefully to prophylactic, or preventive, than curative treatment; and I am fortified in this opinion, by the experience of all veterinary surgeons of eminence, not alone of England, but on the European continent.

Should the Plague unfortunately appear in Ireland, I would strongly recommend the following simple measures for the consideration of every cow owner in the land:—

a. To carry out as far as possible the principles of isolation.

My own experience tells me that we must look to isolation, in its widest and most complete form, as the great means of checking the ravages of the Plague and other contagious diseases. All trustworthy experience shows that the Plague is eminently contagious. Probably there is no fact more clearly established in connexion with the propagation of the disease, than that it has followed the great public thoroughfares; and if a herd has escaped here and there, we invariably find it is owing to the circumstance that the farmer has kept his farm free from all sources of infection. And so it is of other contagious diseases. The great cattle marts are the centres for propagating pleuro-pneumonia and foot and mouth disease, as well as the Plague; and the metropolitan markets are the head centres whence contagion is spread to the provinces, and towards which it again gravitates with accumulated virulence.

I submit that Rinderpest can never be stamped out of Great Britain by any Act of Parliament which does not take cognizance of this simple but well established law, no matter how wisely conceived it may be in other respects.

It is, then, manifestly the interest and duty of every farmer, whether he owns one cow or one hundred, to use every possible precaution to isolate his farm and premises from all contagious agents.

There is another species of isolation—separation of sick from healthy animals—which is also important. Of the value of this sort of isolation I have witnessed a great many illustrations. Here I will merely mention one of the most recent cases that has occurred in my own experience. During the summer of 1865 a contagious fever carried off a vast number of Irish pigs. In July one of the most valuable sows on the Albert Model Farm showed marked symptoms of the disease; and as soon as I suspected the nature of her affection I had her isolated and given in charge to a steady young fellow, who was prohibited from going among the other pigs; and as many of the latter as possible were put under lock and key, and given in charge to another steady fellow. I then called in Professor Ferguson, who pronounced it to be a clear case of the disease. The sick animal recovered under his treatment; and we had not a second case of the disease, which Professor Ferguson ascribed to the system of isolation adopted.

b. To watch carefully the state of the fæces, and to regulate the food so that they shall be of normal consistency. If the bowels be confined when the poison enters the system, I should say the chances of its elimination become most doubtful, while, if the bowels be too lax, they become liable to inflammatory action.

c. Hot or stimulating food is to be avoided for milch cows as much as possible, for although it increases the secretion of milk, it either thereby lowers the system, or renders it more inflammatory.

d. The farmer should provide as good food and shelter for his cattle as his circumstances will permit.

e. I would recommend a semi-tonic, semi-alterative, to be given occasionally.

Mr. Priestman, Veterinary Inspector of one of the London districts, under the Order in Council, and a gentleman to whom my colleagues and I feel much indebted, gives a prophylactic, consisting of ½ oz. nitre, and ½ oz. carbonate of ammonia, in a pint of water, twice a day; and he is said to have been more successful than any other practitioner in London.

The medical section of the Edinburgh Cattle Plague Committee recommend sulphite of soda as a prophylactic, in oz. doses, three times a day. Mr. Priestman uses the same medicines as curative agents, and is said to have been equally successful; but he candidly assured me that he ascribed his success more to good nursing than the power of drugs.

The Edinburgh Committee also recommend as a curative, carbonate of ammonia, which they say should be given alone in half oz. doses three times a day, combined with three drachms of nitre dissolved in water. But I consider good hygienic measures, respecting food, ventilation, temperature, and cleanliness, as more to be relied on than all the medicines in the Pharmacopœia.

4. The attention of the public has recently been prominently directed to two means of preventing or mitigating the effects of Rinderpest, which demand a passing notice in this report, viz., inoculation and vaccination.

I had an opportunity of witnessing several experiments made on cattle which had been inoculated with the virus of Rinderpest, the results of which are not encouraging. In one instance a lot of 61 young animals were inoculated on the ribs, and at the time of my visit, 43 of these had died, and four appeared hopeless, leaving fourteen, or about 23 per cent., in a fair way of recovery. Reports of inoculation are, as might be expected, conflicting, but the per-centage lost in all the cases which I had an opportunity of inquiring into was very high.

The suggestions I have to offer as the result of my observations on inoculation with Rinderpest matter are these :—

a. That it is a suicidal practice to inoculate full-grown cattle, particularly fattening animals. It is surely infinitely better to slaughter them at once, or sell them for whatever they will realize in the market, than to run the risk of losing the greater number of them.*

b. As the sale of young stock, more especially of calves and yearlings, cannot be well forced, I would respectfully suggest that a rigid set of experiments should be instituted with a view of more fully testing the efficacy of inoculation.

5. The public have been led to expect more success from vaccination than from any other mode proposed for preventing or curing Cattle Plague.

I believe Mr. Ceely, of Aylesbury, one of the highest authorities in these countries on variolous affections, and a member of the Royal Cattle Plague Commission, was the first to suggest that Rinderpest might be a malignant form of small-pox. This suggestion was followed up by several medical men, foremost among whom was Doctor Murchison of London, who communicated several papers on the subject to the *Lancet*. Vaccination was at once suggested, not only as a means of testing the soundness of their views, but in the hope that it might save what remains of the herds of the United Kingdom from Rinderpest.

These experiments have failed to realize the hopes that were entertained. It is known to those with whom I have been associated in this matter, that I never believed in the identity of small-pox with Rinderpest, and the grounds on which this belief rests are these :—

a. The eruptions in Rinderpest on which its supposed identity with small-pox was based do not as a rule appear.

b. The eruptions which do appear occasionally are not at all identical with small-pox.

c. The eruptions sometimes seen in Rinderpest are not always the result of that disease. I will here mention a case which illustrates this, and shows the danger of trusting to the statements of men whose opportunities of making observations are limited. A medical gentleman was explaining to me and others certain eruptions on the udder of a cow which was suffering from Rinderpest, and which he believed was a symptom of the disease in that animal ; but these eruptions were identical with the milder form of cow-pox so commonly met with on cattle, and existed in the animal before she contracted the Plague.

d. On examining skins on which eruptions are fully developed in Rinderpest, there is no loss of substance, the same as occurs in small-pox.

e. Experiments have been made in America, Russia, France, and more recently in England, which completely prove that Rinderpest is not a form of small-pox. Cows have been inoculated with small-pox, or true variolus matter, but without producing Rinderpest.

IV. *Suggestions as to the Means of dealing with Cattle Plague.*

When I commenced this report I intended to enter very fully into this part of the subject ; but Professor Ferguson having since furnished me with a proof copy of a separate report, which, as a member of the Dublin Cattle Plague Committee, he proposes to submit to His Excellency, and that report having anticipated many of my suggestions, and discussed them more fully and forcibly than I could hope to do, little remains for me to say on the matter. It is impossible to discuss this part of the subject without touching on some of the points treated of, both in the report submitted to His Excellency by Lord Naas, on behalf of the Cattle Plague Committee, as well as by Professor Ferguson. Having

* Inoculation might prove more successful hereafter. It is well known that a disease of this kind is most virulent when it first appears in a country, and that it becomes less malignant as it progresses.

been a member of the Committee which discussed the several paragraphs of the recommendations contained in Lord Naas' report, I approach the subject now under circumstances which preclude me from going fully into the details of the measures proposed, many of which have since been made law by an Order in Council. I shall therefore merely refer to a few of the points still open for discussion, and to which I have given attention since his Lordship's report was prepared. The point which most immediately concerns the agricultural interests of Ireland is the means of keeping the dreaded enemy out of the country.

The measures taken by the Government have so far saved Ireland from this calamity. Everybody admits, however, that there is still great danger that the disease will be imported in the clothes or boots of drovers, &c. I think the landed interest of Ireland cannot sound too loudly the tocsin of alarm when the enemy is within a few hours' sail of our shores. I must at the same time say I am not so great an alarmist on this subject as most people. Ovine small-pox, a highly contagious disease, raged in the flocks of England a few years ago, yet it did not reach Ireland except in one case, and then it was imported by sheep. Again, I know from my own observation that a person who had examined Rinderpest cattle in England, was a few days afterwards among healthy cattle in Ireland, and he does not appear to have brought infection with him in his clothes. It was mentioned to me in England as rather curious and interesting that a herd who had been attending cattle under experiment did not carry disease from affected to healthy animals; and there is not a shadow of doubt that cattle themselves have been the great carriers of infection in Great Britain.

On the other hand, numerous instances have been furnished to me by English agriculturists, in answer to a circular which I issued, in which the disease broke out in places to which no diseased cattle could be traced, and in which the infection was supposed to be conveyed by drovers. I think careful experiments should be instituted for the purpose of throwing light on this point. In the meantime, and while there is strong ground for supposing that drovers carry infection, it is wise to deal with them as men who are unconsciously likely to bring destruction to our herds.

Several suggestions have been offered for dealing with these men. The Cattle Plague Committee recommend:—

"That no person be permitted to quit Ireland in charge of cattle or sheep without a passport or return ticket, to be obtained from the police authorities at the port of embarkation. . . . . .

"That upon receiving such passport or return ticket, he shall be provided with clothes, on payment of a deposit of £5, with which he may proceed to Great Britain; and upon his return he shall receive in exchange his own clothes, and deliver up the clothes provided by the police.

"That on his return, when he claims his own clothes, he is to receive his deposit of £5, on returning the suit lent him."

I not only share Professor Ferguson's objection to this plan (*vide* separate report, p. 3), but believe that if it were free from the objection he urges against it, still it would be ineffectual.

At the first meeting of the Cattle Plague Committee, I suggested (*vide* Appendix to Lord Naas' report) that Irish drovers should not be permitted to leave the Irish ports, or even go on board the export ships; and that arrangements should be made for providing another set of men to take charge of the animals on board. I believed, and still believe, that we could thereby confine the disease within the smallest limits, and that, too, in the most practical and effective way. Since I first offered this suggestion, I have spoken on the subject to several persons largely interested in the export of cattle, and they have all concurred in my views.

The next, and most vital point of interest to the tenant farmers and gentry of Ireland is, whether cattle are to be slaughtered without giving suitable compensation to their owners.

The opinion of the most enlightened agriculturists of England (if I have rightly interpreted it) is, that in the present state of our knowledge the only effectual way of combating or destroying Cattle Plague is to adopt a most rigid system of isolation, and to use the pole-axe promptly, not only with animals which have been affected, but with those which have come into contact with diseased beasts, unless the number of the latter be alarmingly great.

It may be said that it is opposed to the spirit of our institutions to enter any man's premises, and destroy his property. But it is equally in accordance with the spirit of enlightened legislation, that the Government should enact laws which protect the lives and property of the mass, rather than of a class or an individual. It is one of the glorious principles of British law, that it consults as far as possible the liberty of the subject; but there is another principle which imposes taxes and restraints on the individual, in opposition to his views and self-interest.

If it be the duty of a Government to interfere with the freedom of action of the subject at all, surely if I have a cow which is likely to spread destruction among the herds of my neighbours, and to reduce them to bankruptcy and ruin, the Government ought to be empowered to step in and save them. But I hold that if my private property, of which there is some chance of recovery, is by the urgent wants of society sacrificed for the public good, I ought to get compensation.

In the code of regulations prepared by the Cattle Plague Committee, it recommended that certain well qualified persons, to be called Inspectors, should be empowered to slaughter, under certain conditions, animals affected with Cattle Plague, and that the owner should get two-thirds of the value of every animal so slaughtered.

An Order in Council has been passed fully adopting the first part of this regulation, and I may be permitted respectfully to express my sincere hope that the Executive shall be immediately empowered to give effect to the part relating to compensation.

Some persons may ask why give compensation to Irish which is not given to English farmers?

I answer this question thus:—

1. The Order in Council relating to Cattle Plague, as carried out in England, is not as stringent as the order based on Lord Naas' report.

In England the slaughtering of animals is not enforced at all, and the result is that the disease is spreading with fearful rapidity. It could not be otherwise than distasteful to the English people to see their cattle slaughtered without compensation; and it would cause equal dissatisfaction in Ireland.

2. The circumstances of the two countries are very different. English farmers are affluent, and can bear losses much better than the farmers of Ireland. As a rule, too, English farmers are not so dependent on one species of farm produce as the Irish. In Ireland there are upwards of 400,000 farmers, not one of whom holds over 30 acres of land, and the vast majority of these are largely dependent upon horned cattle. They own about one-third of all the cattle in Ireland.

The farmers holding each farm 30 to 100 acres in extent, own more than another third, leaving less than one-third in the hands of the large farmers and gentry.

These few figures appear to me to indicate the ruin which the ravages of the Cattle Plague would bring upon this country. It would go far to undo our recent healthy progress, and would weigh heavily upon a class of farmers who not only stood their ground during the famine, but have actually increased in numbers since.

It is not I believe generally known that while there has been a great decrease in the total number of holdings in Ireland of late years, there has been an actual increase of what may be called the upper class of small farmers.

a. Thus in 1851 the number of holdings varying in size from 3 to 50 acres was 70,093, in 1863 we had 72,050 of them.

b. In 1851 we had only 49,940 farmers whose holdings varied from 50 to 100 acres, while in 1863 we had 54,840 of them.

If unfortunately the Rinderpest should virulently attack the cattle of Ireland, and a system of slaughtering without compensation be adopted, a vast number of this industrious, deserving, and useful class of farmers would be swept away.

Assuming then that compensation ought to be given for every animal slaughtered for the public good, the next question for consideration is, how we are to raise the fund for liquidating such payment? The majority of the Cattle Plague Committee recommended that there should be a Union rating, but that when the rate exceeds sixpence in the pound in any one Union, the surplus should be met by a rate-in-aid, to be charged equally on all the Unions in Ireland.

Professor Ferguson (*vide* separate report, p. 7) has urged several valid objections against this plan. The result of my own independent consideration of the subject may be briefly stated thus:—

1st. Believing that the brunt of the tax should be borne by the class immediately interested, I proposed a national poll-tax on all the cattle of the country. In this way we would establish a Compulsory Insurance Company under Government auspices, which I regard as the true way of stamping out a deadly contagion of this kind.

2nd. The destruction of a large number of cattle would affect the ordinary citizen in the increased price of beef; and it is to my mind clear that his rateable property should not be taxed, at all events not to the same extent as that of the man who gets compensation.

3rd. A Union rating would too heavily tax the *tillage* farmer.

4th. As society at large is, however, interested more or less in stemming a great calamity like this, I think that in addition to a poll-tax, there should be a supplemental fund, raised by imposing a moderate tax, say on all property now subject to income tax.

5th. A scale of compensation should be adopted which would not only afford reasonable relief to farmers, but so act on their self-interests as to stimulate them to lend their aid in killing out the disease. I would suggest—

a. That if in any case it could be clearly proved that a farmer knowingly kept the existence of disease in his stock from the authorities, he should not get compensation for any animal or animals so discovered and slaughtered.

b. All diseased animals slaughtered, and of which the owners gave prompt notice, the compensation should not be less than two-thirds of the value of the animals.

c. For all animals destroyed on suspicion, such as for having been subject to the influence of infection, the owner should be permitted to dispose of the carcases, and be paid either the difference between the amount so realized and the full value of the animals, or a high proportion thereof.

The "Aberdeenshire Association" gave, in every case, three-fourths of the difference between the salvage and the full value of the beasts; and to this circumstance must be mainly ascribed the success of that Association in stamping out the disease.

If the owners of cattle be not compensated in accordance with some such liberal scale as this, they will use every exertion to conceal the existence of disease, and otherwise endeavour to evade the law.

Efforts are now being made in this country to establish a National Mutual Cattle Insurance Company on voluntary principles. I believe such an Association would not only utterly fail to check the progress of the disease, but be the means of giving it a permanent footing in the land.

The only moderately successful attempts at dealing with the disease by mutual co-operation are those made by the Cattle Plague Association of Norfolk, and by the Aberdeenshire Rinderpest Association.

I visited Norfolk, inquired into the working of the Association, and had an interview with its Sub-committee; and while I can say that too much praise cannot be bestowed on its members for the example they have set to others, I must at the same time state, as the result of my inquiry, that the voluntary principle on which it is based would utterly fail to meet our requirements in Ireland, and that any scheme which does not possess the power of governmental action will not effectually stamp out the disease.

In Norfolk numbers of farmers have not joined the Association at all, and the consequence is that its efforts have had only partial success.

I have procured a copy of the rules of the Aberdeenshire Association, the principal object of which is (to use the words of the last report), "prevention—to protect farmers from the ravages of the disease, rather than to indemnify them after their herds have been attacked; but with this is united indemnification of members in case of loss, and non-members are treated with, to induce them to slaughter off their whole herd when attacked. The assessment levied is equal to only about four shillings per cent. on the value of the cattle, of which tenants pay one-half, and proprietors another, and this is the whole liability. Less than two-thirds of this assessment has been found sufficient to meet all claims for the last six months, during which time disease has been in the country."

Speaking of the principles of a Mutual Assurance Company, the Aberdeen Association remarks, such a "company could only deal with the stock of its own members, and although assurers might be indemnified for part of their loss, the company could practically do little to stop the progress of the Plague. Indeed the tendency might be in the other direction, for an Assurance Company, supported by the local authorities, might be disposed to permit proceedings on the part of its members to save the company from loss (such as attempting to cure animals, or sending them off alive after disease had appeared in the herd), which would have the effect of spreading the disease."

Trusting that the numerous and arduous duties of my office will be some apology for the imperfections of this report,

I have the honour to remain, Sir,

Your obedient servant,

THOMAS BALDWIN,
(Superintendent of the Agricultural Department of National Education).

To
Major-General Sir Thomas Larcom, K.C.B.

Cattle Plague Report of Mr. Pallin, who was sent under the Government's auspices to England to Study the Disease, by the Carlow Agricultural Society and Athy Farmers' Club.

To Professor Ferguson.

Sir,

As you requested me to supply you with a summary of my report on the Cattle Plague, after my return from Scotland and England, where I have been sent by two agricultural societies to investigate it, I beg to do so in as abbreviated a form as possible.

After a careful study of the disease, I have concluded that there is no bovine malady which is analogous or identical with it, therefore it must be classed as one of the *special diseases* of that tribe; and further, I do not feel warranted in changing the name which has been adopted by more ancient writers, that of "Malignant Contagious or Infectious Bovine Typhus, or Rinderpest."

The disease itself is an exanthematous fever, of a very low form, affecting principally the mucous membranes in particular parts, in which some of the pathological conditions are constant and characteristic, while in others they are variable, like other epizootic and epidemic diseases. It seems to vary in the intensity of its attack in different phases of its visitation in a locality. These phases may be divided into three periods.

First—At its outbreak, where but few animals are attacked, but yet with a severe form of the disease.

Secondly—Where its rapidity extends and becomes much more intense in the symptoms of each individual case.

Thirdly—When, after the second phase, or when the disease takes its most malignant form, it commences to abate and gradually becomes milder in its character, and seemingly more amenable to treatment, until it eventually disappears.

From the complicated nature of the disease, its pathology is very variable, so that I consider it judicious to divide it into simple and complicated. In both forms the period of incubation is much the same, and which I consider is from five to fourteen days, and sometimes three weeks, from exposure to contagion. In the simple form the premonitary fever is generally the first symptom, while in the second form of the disease the animal is often treated merely for the complication, while the Plague is being developed. In the complicated form we find the disease in all its stages, in connexion with affections principally of the mucous and serous membranes; death is the result sooner when such is the case, while, in the simple form, it is generally produced by exhaustion or debility.

The Symptoms of the disease, like its other peculiarities, vary according to climate, situation, age, sex, and constitution. The study of the premonitary ones is most essential to the veterinary surgeon. In this way it often happens that the milkmaid is the first who detects the indisposition of the animal. There is a peculiar appearance which is at once observed by the practised eye. It is these symptoms I have tried to make myself acquainted with; for, in the second stage, or as is generally supposed, the first symptom—that of the animal refusing food—the premonitary fever is at that time over, and the animal probably past hope. The first symptoms I have observed is a peculiar bright appearance of the eye; it looks clear and glassy, and, on a careful examination, I have found a dark margin surrounding the thinned white edge of the sclerotic, where it joins the cornea; this I consider arises from congestion of the venous layer of the choroid coat, which lies immediately beneath. The brightness of the eye arises probably from some derangement of the brain. The animal has rather a wild appearance, looks round, and is uneasy. The ears are drawn back, and their temperature is unequal. The mouth will be sensibly hot, while the finger, if introduced into the vagina, can detect the temperature increased. There is also an occasional spasmodic twitching of the muscles of the neck or shoulder. The pulse, too, begins to rise. This stage does not last long. The excitement is followed by a corresponding depression, and then the second stage sets in.

In the primary stage of the disease the animal eats as usual; but rumination, although she is pronounced as "cudding," is performed imperfectly, which accounts for the rumen being always distended with food after death.

The temperature of the body now begins to decrease, the ears are thrown further back; there is an evident diminution in the milk; the dulness increases; the animal now refuses food, stands listlessly, yawns, and grinds the teeth; moves from one leg to the other, or knuckles over on one or both hind fetlocks; the eyes in some instances get

dull and depressed, while in others they remain prominent and glassy; but in every case, as the disease advances, the congested margin of the sclerotic increases. From this time there is commencing constipation. Some times the malady is ushered in by diarrhœa, with a progressive diminution of milk. The ears, horns, and other extremities are now sensibly under the natural temperature; the breathing is but slightly accelerated, but the expirations may be noticed perceptibly prolonged, while the pulse rises a few beats in frequency. It is at this stage that the orifice of the vagina markedly reddens, and the colour deepens as the disease advances. Although this is given by many as an unerring symptom, I have found it in many cases absent, and the mucous membrane of the vagina quite normal.

The mouth shows indications of the disease by an increased vascularity of the gums around the roots of the teeth, forming a kind of reddish band round the membrane. During this time the internal organs have been undergoing changes; the stomach, intestines, and respiratory apparatus have been suffering, and cows that are in calf they generally abort at this period. By some it is looked on as the turning point of the disease. Sometimes the animal begins to improve after the abortion, but in most cases the remaining train of symptoms develop themselves with more rapidity, and sooner ends fatally. The other symptoms gradually become more aggravated, as the internal organs get more affected. In one case the animals will stand persistingly, while in others they will constantly lie, with the head doubled back to the flank. In this posture the breathing soon becomes stertorous and difficult, the nose begins to discharge, and a thick frothy saliva comes from the mouth, while it has its superficial membranes roughened.

The pulse increases up to 70 or 100 per minute, becomes hard and wiry. The muscles of the shoulders, back, and quarters have a spasmodic twitch; the respirations number from 36 to 70 per minute; a viscid discharge appears at the vagina, the lining membrane of which is studded with small papillæ of a darker hue than the surrounding parts, accompanied by venous congestion of the lining membrane; the milk is scanty or altogether gone; the urine is voided in small quantities, and high coloured in some cases; the eyes discharge watery tears, which gradually become purulent. As the disease advances the sclerotic conjunctiva becomes swollen and injected.

At this stage animals will occasionally live for some time, the disease appearing, as it were, to take on a chronic form; and I have found, if the animal does continue for twenty-four or forty-eight hours in this state without getting worse, and the temperature of the body and extremities remaining equal, there is a chance of recovery. I have seen a few beasts live for ten days in this way, and after recover; but it generally happens that diarrhœa sets in, and the last stage of the disease develops itself immediately.

An animal in the last stage of this disease is a painful sight. The breathing is short, oppressed, and difficult, the expired air appearing at the nostrils like steam; the eyes are either sunken or wild and prominent. The animal lies with her head stretched out, or resting it on the manger; some have it bent back to the loins when lying, and generally emit a groan at every expiration. There is a fœtid smell from the body; the discharge from the mouth is very offensive. The poor animal shivers, moans, grinds her teeth, stretches out her head and gasps for breath; the fæces are quite liquid, fœtid, lightly clay-coloured, and passed frequently, while in a very few cases obstinate constipation is present. The pulse is small and weak, and the extremities deathly cold. All these symptoms gradually increase in intensity, and the poor beast dies without a struggle, apparently from exhaustion.

In the complicated form it is found in many cases associated with epizootic apthæ; such cases were very common in Edinburgh during its prevalence there. I have myself seen animals suffering from both diseases together, while exposed for sale in the Glasgow market. In such cases the eyes run from the commencement. A large quantity of saliva froths from the mouth. The nose becomes ulcerated. There is great depression from the first. The pulse is quick and weak; death commonly ends in diarrhœa or dysentery.

Pleuro-pneumonia is a very common accompaniment of Cattle Plague. When such is the case, the breathing is affected from the beginning. The back is arched and the coat stares; there is a short husky cough with the line of demarcation along the ribs; the pulse is high from the first, but gradually gets weaker as the disease increases, until death, which is the result in most cases.

Dysentery is another complication occurring in animals of a weak constitution; it is also invariably fatal in its termination.

Emphysema is a very common concomitant. It occurs in two forms, general and local. I have seen one animal suffering from general emphysema of the whole body, which though, to all appearance, thin before, then resembled a beast for exhibition. On tapping the skin in any part it resounded like a drum. The breathing, in cases of this kind,

is very difficult. Local emphysema is very often present, and I consider it not an unfavourable symptom. In a few cases abscesses have formed in the cellular tissue, and in them the disease passed over in a lighter form. Perhaps inoculation from the matter of those abscesses might be found to produce the mild form of the disease. I would recommend it to the notice of the experimentalist.

The morbid lesions after death are both interesting and important. It is only through their careful study a satisfactory result can be arrived at, or a gleam of light thrown on a disease still so enveloped in comparative mystery.

In a report such as the present one I only introduce the more important post-mortem appearances, and in as short a manner as possible. In simple cases we find the fourth stomach the principal seat of disease; the natural yellow or brown colour of it is changed to a dark or mulberry shade, the lining membrane is thickened and corrugated, and in cases which have been long suffering there are often patches resembling ulceration.

A careful examination of this stomach proves the morbid condition not to be the result of inflammation, but depending entirely on an intense capillary congestion of the mucous coat which is found raised and separated from the muscular one beneath. The increase in thickness arises from a morbid development of the epithelium which, in some instances, is desqumated giving to the membrane an ulcerated appearance, a true form of which is only occasionally seen. The fourth stomach is generally found to contain nothing more than a quantity of fluid of a similar colour to the mucous membrane itself, and is probably a morbid secretion of gastric juice filled with a quantity of the desqumated epithelium; the peritoneal covering of the stomach is generally healthy, proving the non-existence of inflammation.

The intensity of those appearances of the fourth stomach seem to increase from before backwards, as the pyloric end is found generally in a more advanced stage of disease. The pyloris itself is thickened. Passing to the ilium, it is found similarly affected, but the symptoms decrease as we proceed backwards. It generally loses its intensity till reaching the cæcum. Here again the red patches are visible, varying in intensity along the course of the large intestines, until we reach the rectum, which is evidently another favourite abode of the disease. In it we find the whole membrane again thickened, discoloured and changed, and ulcerated in the advanced stages of the disease.

In the third stomach I have failed in finding any characteristic lesions peculiar to the disease. In some instances the purple circles so much spoken of can be observed, but it is a state which, I believe, exists also in other diseases. The membrane of the leaves is generally dry, the epithelium peels off attached to the ingesta, which is found generally hardened between the folds, which themselves are injected, while the papillæ stand erect and prominent. In one instance I saw the edge of the fold ulcerated.

The first and second stomachs are generally normal, excepting, as I have observed before, the rumen, is full or impacted with food, to a great extent.

It not unfrequently happens that the conical papillæ in the mouth, at the base, or on the body of the tongue, will show the epithelium broken up by a peculiar abnormal process. The root of the tongue, fauces, and velum palate are implicated to a greater or less extent. Their follicules are filled with effused lymph, giving to the parts an appearance as if dotted over with some yellow pigment. Some of the follicules are ulcerated, but the greater portion are found only distended with lymph. The buccal membrane around the teeth is ulcerated looking, and stretching between each tooth is a kind of white secretion, which is easily removed and very fœtid.

The respiratory organs, in simple cases of the disease, have the change principally confined to their upper part. The septum narium is found injected and discoloured. The top of the trachea seems most affected; but traces of the disease are manifest throughout its whole extent. Its lining membrane is covered with scarlet patches, decreasing in size and number as you descend downwards, while the venous congestion is well marked. The trachea is filled with frothy mucus; in some cases with a kind of sizey coagulum, and in a third, with a thick, creamy fluid, which I believe to be true pus. The lungs, unless when complicated with pleuro-pneumonia, are healthy. Emphysema has been found in many instances.

The heart is pale, softened, and generally filled with blood in a fluid state. Spots of ecchymosis are occasionally found on its surface and in its chambers.

The liver, spleen, and kidneys are generally normal, excepting being congested. The generative organs show marked traces of the disease. The vagina evidently suffers most. Its membrane is covered with a thick putrid discharge, which, when removed, shows the papillary eruption of an apthous nature. The labia superiorly are dry and corrugated; inferiorly coated with discharge.

The brain and spinal cord is more seriously involved than is generally imagined, and I feel confident a careful examination is only necessary to find many interesting

peculiarities. I have watched an animal suffering from the Plague rest her head on the manger, or in other instances keep it pressed against it; evidently proving the presence of pain in it.

In many cases symptoms of the wildest delirium end the poor animal's sufferings, proving to what an extent the brain is involved. After death it is generally found congested, and deposits of lymph at its base are not unfrequently present.

The Blood of animals affected with Cattle Plague is both physically and chemically altered. Under the microscope the cell walls are found corrugated, broken down, or assuming a stellate form. The generality of the white corpuscles are increased in size and quantity, while some are ruptured and their contents have escaped. The chemical condition of the blood is changed. There is an excess of fibrine and salts.

The Milk microscopically examined is found changed, particularly as the disease advances and gradually diminishes. After it is taken from the cow it soon separates into a thick creamy part and a thin watery portion. When examined under the instrument it is seen to be almost exclusively made up of fat cells, which crowd together and overlap one another. The taste of the milk is altered, which is probably due to the excess of saccharineous principles.

Concluding my report with the treatment and preventive means, two parts which I fear up to the present is little more than blank, I beg to add that the most simple treatment possible seems to be attended with the most success. In most parts of Cheshire the plan of giving large quantities of medicine is abandoned. Medical treatment to have any effect should be applied in the very first stage of the disease; all food should be at once taken away, and a gentle laxative of oil combined with a stimulant should be administered. The animal should be put into a warm house, with pure air to breathe, clothed and well rubbed to equalize the temperature. No food of any kind should be given except some well boiled gruel, and that only in small quantities. If a milch cow she should be often milked. In case of constipation being present the laxative may be repeated, but it is much safer to risk a little constipation than produce an opposite effect; in any case the stimulating treatment should be continued.

Good nursing is, I think, the most important item. A watchful eye and a kind soothing hand do more than many are aware of. I have traced some of the best recoveries in Cheshire to good attendance and simple treatment.

The preventive means are most important, and I would urge on every Irish stockmaster to lose no time in adopting them. The cow sheds should be kept scrupulously clean, the walls should be washed with lime every month at least, while the floor ought to be occasionally sprinkled with chloride of lime; the animals should have plenty of pure air, which must prove a safeguard against the evil effects of contagious miasma.

Vaccination has proved ineffectual in preventing the disease; but I feel strongly inclined to recommend its general adoption in Ireland. In many histories of plagues we find the virulence of the disease gradually become less as it increases in age. If unfortunately the Plague does visit our shores, it may have its virulence spent before it arrives amongst us.

The poison of vaccine is not capable of counteracting that of the Rinderpest which is now raging, but by having the systems of our animals which are at present pure and free, charged with vaccine, it may yet prove of benefit against the disease in its milder form. Vaccination can do no harm, and a fair trial is due to it in a country free and uncontaminated with disease.

In conclusion, I believe the disease will ultimately be found to surrender to remedial agents, and I would recommend a careful experimental inquiry into the results of inoculation.

I am, sir, your obedient servant,

WILLIAM PALLIN,

(Member of the Royal College of Veterinary Surgeons, London and Edinburgh).

Carlow, February 15, 1866.

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