

culated to "assist him in the operations which are beyond his own means," and tend to bring the land more rapidly to a perfect state of tillage. And the probable effects on the cottier tenants of Ireland, in thus affording them the inducement of such a home, are thus stated in page 571 of the Digest:—"A cottier tenant, holding an acre or two of land with a miserable cottage at a middleman's high rent, for example, would willingly move to a waste land lot of twenty-two acres, of which three or four may have been reclaimed, and where he finds a snug cottage ready to receive him at a fair rent."

In anticipating the effects which such a scheme as this would produce in our country, I cannot omit referring to the impetus which would thus be given to peaceful industry, and the vast increase to the agricultural produce of the land. The sister country would thus have an increased granary from whence to draw her supplies to meet the wants of an increasing manufacturing population. The example set by a comfortable and contented peasantry would disseminate its beneficial effects among the rest of the population; and if model agricultural schools were established in suitable remote localities, the extension of agricultural science could go hand in hand with the progressive improvement of the people.

III.—*On the Diminution of the National Wealth from Cattle Diseases.* By Thomas Baldwin, Esq.

[Read Tuesday, 15th February, 1870.]

THE agricultural live stock of Ireland is one of the great sources of our national wealth. In 1868 we exported 362,173 bulls, oxen, and cows; 45,707 calves; 781,558 sheep and lambs; and 242,423 pigs. The gross value of these was about £8,000,000. We got the market value for these animals; but we did not derive from a very large number of them the wealth which they were capable of producing. We sent away a vast number of half finished stall-fed beasts; and it is well known to experienced persons, that it is the last stage of the fattening process that pays best. I have seen Irish stock stall-feeding in England, where rent and labour are higher than in Ireland, and where the climate is greatly inferior for the production of roots and hay—two chief articles used for fattening beasts—to our climate. We are annually losing a quarter of a million sterling in this way.

In 1869 we had in Ireland 542,758 horses; 3,531,154 cattle; 4,141,280 sheep, and 1,157,734 pigs. The gross value of these was upwards of £50,000,000. The question I propose to submit for the consideration of the Society this evening is the proportion of this which was wasted by disease.

The subject is very comprehensive; so much so, that I find I cannot adequately discuss it in one paper. Up to the present no attempt has been made to put even an approximately correct estimate of the loss before the public. I have paid attention to the question

for several years through the medium of correspondence, and for the last six years I have had an opportunity of making personal observations in all parts of Ireland. The result of my inquiry is that we lose annually upwards of 5 per cent. by diseases of all sorts; which for 1869 gives a total loss of £2,500,000.

According to Dr. Hancock's recently published report, the whole of the local taxation of Ireland, averaged for the preceding three years (1866-7-8), was £2,632,977 14s. 5d., so that diseases of the agricultural live stock impose upon the gentry and farmers a sum very nearly equal in amount to county cess, poor rate, and all other local taxes put together. This statement will at first sound incredible; it is nevertheless true.

The horse is the best cared of farm animals, yet we all know how great is the loss arising from the preventible diseases from which he suffers. The sheep is naturally hardy and capable of withstanding the severest weather, and well endowed by nature with the means of fighting the battle for existence, but the mortality and loss from disease is very considerable. The mortality of lambs is generally high; liver-rot, which results principally from wetness in the soil, is very general, and foot-rot is almost universal. The pig, which in Ireland is the object of solicitude and care, suffers from sundry affections, some of which, like the hog cholera, occasionally decimate whole districts.

The greatest loss occurs in the bovine species; and I shall illustrate the importance of the subject by referring to three well known diseases of the contagious class which attack cattle; namely, cattle plague, pleura-pneumonia, and foot-and-mouth disease. The word infectious is now generally used in place of contagious. I use the latter, however, as being better understood, and as conveying the same idea.

Cattle Plague is the most infectious disease of bovine live stock, and when unchecked it is the most destructive. Of animals attacked, the death rate amounts to 80 per cent. I do not deem it necessary here to go into any historical account of the disease; it is enough to say that it has been conclusively proved that its original home is in the steppes of Russia, from which it has been extending westward in the course of cattle traffic, until it found its way into Great Britain. Several years before its appearance in this country, Professor Gamgee foretold its importation. He got up a strong agitation on the expediency of checking contagious diseases of all kinds by legislation. Chiefly through his instrumentality, bills were brought into the House of Commons on the subject in 1865, and were referred to a select committee, which collected a large mass of valuable information. Unfortunately, some of Mr. Gamgee's statements were unguarded and somewhat exaggerated—possibly not more so than those of many other enthusiasts who undertake to effect great reforms. His views were in the main sound; but the weak points in his case were seized upon by his opponents to lessen the force of his evidence before the committee, as well as of his advocacy of the question generally. Had his views, instead of being rejected, been modified and passed into law, England would have been saved from the cattle

plague, and other disease would have been banished or kept in check. An idea may be formed of the loss entailed by the cattle plague from the fact that it carried off about one-third of a million of beasts.

The agricultural classes are slow to accept new dogmas, and all classes are opposed to any legislation which would interfere with their freedom of action. The stock owners, who are not well informed on the nature of diseases, and who, being ignorant of infectious and contagious diseases and believing them to be of spontaneous origin, became horrified when it was proposed to pole-axe their beasts at less than their actual value ; and the men who happened to be their guides in the matter were as ignorant as themselves of the first principles of the subject. Between them, the cattle plague spread throughout the land, carrying disaster and dismay in its train.

- Its spread was so rapid and the ruin it threatened so imminent, that the agricultural intelligence of the country was at last aroused. The veterinary profession was wholly powerless to cure the disease. After it had decimated whole herds in numerous districts, people began to fall back on the advice previously tendered by Professor Gamgee and founded on continental experience. That advice was to kill not only every beast which became affected, but every beast which came within its influence. It was a violent remedy, and it was apparently as barbarous as it was violent. It was a rude interference with the rights of property. But it was inevitable, and the owners of property soon began to see that, in the present state of our knowledge, it was the only way to protect property in cattle from utter destruction. The government saw that it was hopeless to rely on curative treatment, and that it was necessary to destroy every beast that came into contact with it, on the same principle that a conflagration is prevented from destroying a terrace by gutting the houses on either side of the house on fire.

The proof of the soundness of the stamping-out principle was soon perceived after it was put into practice. Immediately after the introduction of the new act, the number of sick animals decreased from 18,000 to 11,000, 9,000, 7,000 per week, until the disease was stamped out altogether. Had the orders in council been carried out with firmness by a central authority, the disease would have been killed out in a month. Unfortunately too much was left to local authorities ; but even with this drawback the disease was gradually got under, and after a time the country was freed from its influence.

England thus gained experience which she can never forget. It was dearly bought experience, it is true ; but if she applies the principle to other contagious diseases, making due allowances for differences in their nature and mode of propagation, she will be amply compensated. The loss of industrial wealth is soon repaired, and if the Empire will use the light she has gained from cattle plague, she may save every year more than she lost by it altogether.

Our experience of the treatment of cattle plague in Ireland has been very limited, but it has been most instructive, and deserves to be brought prominently before the agricultural interests of the country. It so happens that I can speak on the subject from experience. By

the favour of the Lord Lieutenant of the day—the Earl of Kimberly, whose wisdom and firmness saved Ireland from this dreadful scourge—I had the privilege of serving on the Government Cattle Committee, which he convened for the purpose of considering the best means to be adopted for preventing the introduction of the disease into this country, and of dealing with it if it should appear. The committee deliberated most anxiously, and offered a series of most valuable suggestions. Ten persons were sent to England to study the disease. I was one of those persons. We made ten separate and independent reports, which were published by the government. Fortified by the views of the committee and by these reports, the government shaped its course, and saved the country from the calamity which threatened it.

Experience has shown that cattle are the great carriers of the contagion of cattle plague. It is also carried in a less degree by porous bodies. The restrictions imposed upon the importation of live stock into Ireland were most salutary and necessary. Notwithstanding these restrictions, the disease appeared at two places, namely, near Lisburn in the north, and near Enfield in Meath. As soon as I heard of the appearance of the outbreak at Lisburn, I visited the model farm near Belfast, which is only a few miles distant from Lisburn, to make arrangements for the isolation of the stock on that farm; and having done so, I went to the affected district; and I can safely say that it was the same disease which I saw in England.

The doubts thrown out by a committee of Irish stock owners and citizens who met at the Mansion House, as to the appearance of cattle plague in the north, induced the government to send over Professor Brown, an eminent veterinary surgeon attached to the veterinary department of the English Privy Council. While staying at my house, he was summoned to Enfield to inspect a case which two veterinary surgeons had declared to be cattle plague. He begged of me to accompany him. I did so, and am in a position to say again that it was the same disease of which I saw numerous cases in England. At Lisburn and Enfield the pole-axe was promptly applied and disinfectants freely used. Cordons were drawn round the affected district, and the movement of cattle stopped. The result was that the disease was stamped out at once. All this proves that cattle plague is easily subdued by the stamping-out process, and by strict police regulations. If it should appear again in the country, the same remedy should be applied with equal vigour. The landed gentry, the graziers, and farmers of Ireland should accept this as an established principle, and in every possible way aid and assist the executive for the time being in putting it into practice. They will thus save themselves from great loss, and the country from the ruin which would inevitably follow if cattle plague were allowed to spread through Ireland.

Pleura-pneumonia, commonly called the lung disease, was brought into Ireland by Dutch cattle imported into the dairy districts of the south some thirty years ago, when it decimated whole herds. Its original home has been traced to the mountain districts of central Europe, from which it spread westward until it found an acquired home in the congenial climate of the British islands.

The average loss all over Ireland cannot be determined with scientific precision; but we can make a sufficiently accurate estimate for all practical purposes.

Mr. Gamgee put in evidence before the committee of 1865 the statistics of nine Dublin dairies; from which it appears that for a period of twenty years the average number of cows kept was 315; of these the average number sold diseased was 161, or 51 per cent. per annum; the annual loss (that is the difference between the value of the animals and the amount realized by salvage) was £1158; estimating the value of the cows at £16 each, this gives a loss of 23 per cent. per annum.

We have more complete information in the returns collected for the veterinary department of the Privy Council, which have been placed at my disposal by Professor Ferguson.

Return of the number of cows kept by dairy proprietors within the Dublin Metropolitan Police District, during the respective years 1865 and 1867; also the number of cows which died of lung distemper, the number sold on account of lung disease, and the number sold on account of other disease than lung distemper.

	No of cows kept by Dairy proprietors.	No of cows which died of lung distemper	No of cows sold on account of having Lung distemper	No of cows which died on account of other disease than Lung distemper
First 12 months, terminating early in 1866	5,660	150	2,460	14
Second 12 months, terminating early in 1868	7,937	339	1,079	41

These statistics were collected in the end of January and the beginning of February. The difference in the statistics of the two years is owing to the restrictions imposed on the movement of diseased beasts in 1867.

In 1865 there was no restriction whatever; it will, therefore, be useful if I estimate the loss for that year:—

The total number of beasts kept in the dairies of the Dublin Metropolitan Police districts was	...	...	5,660
Of these, number died of disease	...	...	150
Number that had to be sold from lung distemper	...	...	2,460
Total diseased	...	...	2,610

This gives 46 per cent. of disease in the animals.

The actual loss to the dairy-man was of two kinds—direct and indirect. My estimate of either can only be regarded as an approximation.

The total value of the animals kept we will take at £90,560, (5,660 at £16),

Of these 150 died ; at £16	2,400
2,460 sold at £10 (value £16, less £6 salvage) ...	24,600
	£27,000

We thus get 30 per cent. of direct loss, or loss of fixed capital. Let us now consider what has hitherto escaped attention in the consideration of this matter, namely, the indirect loss, such as loss of income.

Of the total number of cows kept (5,660), 2,610 became diseased; the loss of milk on each of these must have been at least sixty gallons at one shilling per gallon, which gives £3 per cow. During sickness they did not consume as much food as healthy beasts; but this is more than counterbalanced by the loss of income arising from extra caution in buying in. At £3 per cow we get £7,830 or 8½ per cent on the capital. Adding the amount of direct and indirect losses, we get a total of £34,830, or 38½ per cent.

The loss in the grazing districts about Dublin is very large. The late Mr. Aungier, who was not likely to exaggerate the matter, admitted before the committee of 1865, that for two years in succession the number of losses among his grazing stock was 22 per cent.

The loss diminishes as we recede into remote districts, where cattle are not imported, and it is unknown in several breeding districts in the west and north-west. It is a standing disease on farms through which the great public roads run. I have known numerous instances of the ruin which it has brought to many a home along the great lines of cattle traffic in Leinster, Tipperary, Cork, Limerick, and elsewhere. It appears to me that the safest way to arrive at a fair average for the whole country is, to select an adequate number of representative districts, from the breeding districts in which there is none of the disease, to Dublin in which it reaches the maximum.

I have divided Ireland into nineteen such districts, and collected the statistics of 307 herds; and combining this with the government returns of the total number of cattle in each district, I arrive at the conclusion that on the whole the loss is a fraction over two per cent. of the total cattle in the country. My estimate of the value of the cattle in Ireland in 1869 is £34,000,000; 2 per cent. on this gives £680,000.

This, though formidable in amount, is very small compared with Mr. Gamgee's estimate. He stated at a public meeting in this city, and repeated the same statement before the committee of 1865, that Ireland loses annually by pleura-pneumonia 7 per cent of the value of her cattle. Mr. Gamgee's statement was founded on inadequate data. Mine is, I venture to say, a close approximation to the truth.

People may say, if there is so much pleura-pneumonia, what becomes of the carcasses? A few of them are allowed to die a natural death, and the bulk are sent to the shambles. Intelligent and experienced graziers and farmers send sick beasts to market very soon after disease appears. Mr. Aungier, in 1865, gave his experience as follows.—“A beast which separates himself from the other animals is not well. Sometimes I give a dose of salts, or a dose of oil, or some-

thing of that sort, and let it have a day or two's chance, because they are sometimes sick from other causes—sometimes from their bowels getting out of order, or from murrain; and by giving a dose of salts you do no injury to the meat, you only keep it a day or two longer, and if we find that it does not recover we then sell it."

Dairy farmers near large cities and towns, clinging to hope, retain the animals until their flesh is saturated with poison, their bodies emaciated, and all prospect of recovery hopeless. In this state the carcass sells for sums varying from £1 to £5 according to the locality. The meat is reduced to the condition of carrion. The tissues are relaxed and discoloured; and it is needless to add that the flesh must be unwholesome. I have more than once observed that labourers, who at their own request were permitted to use a quarter or sirloin of an animal that died of the disease in the advanced stage, suffered from it. If taken in the earlier stage of the disease, the preponderance of evidence goes to show that the flesh is not unwholesome. It must, however, suffer more or less in quality. Everything which relaxes the muscles lessens their value as human food. We know that the flesh of a heifer becomes reduced in quality and in market value by breeding; that it is less valuable after two calves than after one, and so on. And a blood poison, like the one generated in pleura-pneumonia, must injuriously affect the carcass. We may, however, assume that the flesh in the early stages of the disease may be used with impunity. The quantity of it sent to market is large enough to keep down the meat market. In the interest alike of producer and consumer, no restriction should be imposed on its sale. It is different, however, with a large quantity of diseased meat sent to Dublin and other cities and towns in a discreditable state. In the interests of the consumer this should be stopped, for he has no means of distinguishing what is poisonous from what is not. In the interests of the farmer and grazier, I would say that he should be compelled to send every beast to market as soon as the disease shall have unmistakably declared itself. In the first place, 80 per cent. of diseased animals would die a natural death, even under the treatment of the most skilful veterinary surgeon. Of the 20 per cent. that recover, the food, time, labour, and medicine consumed during their illness, and before they are restored to health, exceed their value. Again, the dairy farmer, hoping against hope, finds his property gradually melting away before an insidious disease like pleura-pneumonia.

In my own range of observation, I have known scores of cases like the following. A dairyman has a herd of 20 valuable cows, worth on an average £16 apiece. He sells two or three of them which run dry, and buys as many to replace them, in, say, Smithfield market. In a month or two, contagious lung disease breaks out; at first it is unheeded; they become worse, and after all hope of recovery is abandoned, they are sold at £4 or £5 apiece to a butcher. Others are bought to replace them; in a month or so a few more become affected, and they suffer the same fate as the first lot. Another purchase is made, and this thing goes on until the man becomes a bankrupt. In the mean time the public has consumed a large quantity of unwholesome meat and milk.

Is it not evident that it would be wise to adopt such measures as would enable him to realize the value of the animals when the disease declared itself, and while the flesh was sound. Of the means of accomplishing this, I may speak hereafter.* As to the circumstance that graziers are opposed to any legislative restrictions on the trade in cattle, it is important to bear in mind that pleura-pneumonia affects graziers and dairyfarmers differently. The grazer, as soon as the disease is suspected, sends his beasts to market, and realizes their full value. The dairyfarmer cannot do this. Disease in dairy stock is more easily detected, and the least suspicion of disease destroys the value of a cow for dairy purposes.

Pleura-pneumonia is more difficult to control than cattle plague, simply because it is more insidious, and takes a longer time to incubate or develop itself. Cattle plague runs its course in about seven days, and soon after the introduction of the contagion into the system, signs of disorder manifest themselves. The contagium of pleura-pneumonia may remain in the animal for two months, without showing any marked signs of disease, gradually saturating the system, undermining the constitution, and rendering a cure almost hopeless. Again, according to my observation, the contagion of pleura-pneumonia is capable of retaining its properties much longer than that of cattle plague. It is evident these differences should be duly borne in mind, in considering the means of checking the progress of the two diseases.

There is the widest possible difference of opinion among the most experienced stock owners and veterinary surgeons, as to the way in which pleura-pneumonia is produced. The late Professor Dick of Edinburgh, who had a large cattle practice, contended that it was not contagious, but arose from local or enzootic causes; Mr. Simonds, professor of cattle pathology at the Royal Veterinary College, London, in his evidence before the parliamentary committee of 1865, was asked by Mr. H. S. Thompson of Kirby Hall, Yorkshire, "Is it your opinion from experience, that pleura-pneumonia does originate in districts without communication or infection from other diseased animals?" And he answered, "Certainly" (Question 1833). On the other hand, Professor Gamgee declared that a case of it has never been produced in these countries except by contagion.

When he visited Ireland eight years ago, I mentioned several peculiarities I had observed from time to time in the symptoms in different herds and individual beasts, and suggested the possibility of two distinct types of disease of the respiratory organs being confounded under the one name. He appeared disinclined to accept this suggestion. Since then, I have paid much attention to the subject, and made experiments which go to establish the soundness of

* When the animals are sent to fairs or markets in the early stage of the disease, they realize a fair price. It occasionally happens that the disorder is not discovered. If the farmer allows the disease to progress, he is completely at the mercy of the butcher, who does not give for it more than often buys it at 1d. per lb., and sells it at the full price. It would be greatly in the interest of both farmer and consumer, if a dead meat market were opened in Dublin, and in the provincial cities, to receive carcasses. The competition of an open market would enable the farmer to get a fair price for his animals.

the suggestion made by me in 1862. Some time afterwards, I made the same suggestion to the Veterinary Surgeon to the Queen in this country, Professor Ferguson, who now accepts it as an established fact. He goes even further, and says there are several distinct types of the disease*.

It is well to briefly explain the steps taken to establish the distinction referred to above. In post mortems of animals that have died of pleura-pneumonia, the lungs and pleura are found to be the seats of diseased action. If from any cause or causes, such as constitutional derangement and cold, these two organs become diseased, we get symptoms similar to those of contagious pleura-pneumonia. It is needless to observe that ordinary lung disease is produced in cattle by a great variety of causes. If to lung disorder, disease of the pleura supervenes, we get a complication which has often been mistaken for contagious pleura-pneumonia. A severe attack of "foot-and-mouth disease" in dairy cattle is often followed, after the lapse of three or four months, by pleura-pneumonia of the non-contagious type. In "foot-and-mouth disease" the fourth stomach is invariably diseased; and very frequently the intestines are also involved. Leaving the elucidation of the connection between the two diseases to the medical profession, it is important for stock owners to know that the one disease begets the other, and as "foot and mouth disease" is now rife in Great Britain, they ought to be exceedingly vigilant in looking after their stock during next spring. The animals should be as generously treated as possible; and all beasts reduced much in condition should occasionally get tonics. For cattle, sulphate of iron is considered the best medicine of this class, but while strengthening the system it lessens the flow of milk. For milch cows the best tonic is strong table-beer.

When pleura-pneumonia follows foot-and-mouth disease, the loss to the farm is of course seriously increased, as I shall have occasion to shew by and by.

Here I would refer to a set of experiments I made in 1865 and 1866. In June, 1865, two milch cows were purchased in Smithfield for the Glasnevin Agricultural School. I was present at the purchase myself, and on arrival at the farm they were, contrary to a system in use there as to quarantine, put into a cowhouse with a large number of beasts. Within forty-eight hours, foot-and-mouth disease appeared in one of them, and like wildfire it spread through the herd. None of them died. In the winter following, the lung disease appeared among the same beasts. It did not present the true symptoms of the real pleura-pneumonia. To put the matter to a test, I cut up a number of small sponges, put the pieces into the nostrils of the diseased animals until they must have been saturated with the contagium, if it existed, and immediately introduced them into the nostrils of healthy animals elsewhere; and in no one case did the disease appear in any of those beasts. I have repeatedly produced the true contagion, pleura-pneumonia, in this way. I do not pretend to say I could invariably distinguish one from the other; that is a matter

* *Vide* his report to the Scottish Chamber of Agriculture.

requiring careful scientific research, which should be instituted forthwith. Such an investigation may be undertaken by the Council of the Zoological Society; the cost of it I have no doubt would be cheerfully borne by the public. The inquiry should aim at the following, among other, objects:—

1st. The determination of the period of inoculation in contagious pleura-pneumonia. At present our knowledge on this point is exceedingly loose and unsatisfactory; and until the period is defined, any legislation or police regulations on the subject must be of a purely empirical character.

2nd. To define or diagnose the two types of lung disease, now indiscriminately called pleura-pneumonia. At Glasnevin we have often had the two types at the same time. We know this from the history of the cases, from post mortem appearances, and from experiments. Last year several animals were affected, and in their treatment we had the assistance of Professor Ferguson. Two of them died on the same day; unfortunately he was unable to make the post-mortems, but it did not require a medical man to see the great difference in the pathological appearances. During the progress of the disorder it was apparent that the animals had not the same disease, and, on opening these animals after death, this was plain. The lung of one had the marked appearance so characteristic of pleura-pneumonia of long standing; the other was completely hepatized, showing the more rapid inflammation which takes place as the result of cold, or sudden constitutional derangement when the lungs become attacked. I must not intrude further on the domain of the medical profession, but I have observed several symptoms that enable me to distinguish the one type from the other, which come legitimately within my province, and one of which I will mention. In the case of acute diseases, or those which run their course rapidly, the flow of milk in dairy cows falls suddenly. In contagious pleura-pneumonia, on the other hand, there is a slow but steady diminution, until the acute symptoms appear, when it ceases altogether. At Glasnevin the milk of each cow is measured and noted morning and evening; and the record thus obtained often becomes as important in determining the character of disease, as a barometer in ascertaining the character of the weather. The keeping of such a record involves a little trouble, but the farmer is amply compensated for this trouble by the light it throws not only on the nature of diseases, but by enabling the stock owner who does not superintend his business, to judge of the skill and care bestowed on the feeding of his cows in his absence. The least neglect or irregularity in the hours of feeding tells directly on the yield of milk.

I have now to consider, as briefly as possible, the measures which farmers may adopt to protect themselves against loss from this fearful plague. It may be asked, why not establish or support Cattle Insurance Companies? The answer is that all the great companies hitherto established have become bankrupt. "The Norfolk Farmers and General Assurance Company" appears to be an exception. Its business is conducted with caution, and the premium is very high, as the following scale, taken from the prospectus of the company, shews:

Class of Cattle	Rate per £			
	Value per head not exceeding £12		£18	
	s.	d.	s.	d.
Farm Dairy Cows	1	0	1	3
Dairy-men's Cows (Country)	1	6	2	0
„ „ (Town)	2	6	—	—
Bulls	1	0	1	0
Feeding Stock	0	9	0	9
Working Oxen	0	9	0	9
Young Stock, from 1 to 2 years	1	3	—	—
All Stock up to 1 year old	1	6	—	—

Extra rates are charged if pleura-pneumonia is in the neighbourhood, or has been in the premises within three months.

The compensation is reduced to two-thirds of the amount insured, and one-third of the salvage.

There are a few small companies in existence, but their operation is on so limited a scale that they may be overlooked. Nor can insurance companies ever become so general as to save the nation from the great loss it suffers from this disease.

What then can farmers do for themselves?

They can put every newly purchased beast into quarantine for a period exceeding in duration the period of incubation of the disease. They can also separate from the herd an animal as soon as it shows signs of disease. By these means we have been able to reduce the loss very considerably at Glasnevin; and, in future, if we should be unfortunate enough to buy in animals having the disease in an incipient state, the loss shall be confined to them.

There is another piece of important advice I am anxious to give, and which should be inculcated as widely as possible among stockowners—more particularly dairy farmers—namely, that home-bred stock, well cared, is less liable to lung disease of all kinds than purchased animals. This remark applies more to the non-contagious than the contagious type of the disease. At Glasnevin it has repeatedly passed over our home-bred stock, and attacked purchased animals.

I have little faith in any mere treatment of the disease, and look solely for its extermination or diminution to proper restrictions on the transit of stock in affected districts. There is one remedy, however, which has gained so many adherents that I must refer to it; I mean inoculation. This system, which was first propounded by Dr. Wilhelm of Belgium, consists of introducing into an incision made in the tail, a little of the serum from a diseased lung. In this way it is said the percentage of death is reduced from 80, to 4 or 5 per cent. The system has found warm adherents on the continent. Professor Gamgee has most enthusiastically advocated it, and Mr. Olden, a well-known veterinary surgeon in Cork, has repeatedly stated before the Co. Cork Agricultural Society that he has practised it with great success. On the other hand, Professor Simonds, after having studied it under Dr. Wilhelm, and practised it in England, is wholly opposed to it. Professor Brown inclines to Professor Simonds' view, and my own experience runs in the same direc-

tion. Like Professor Simonds, I have failed to produce a real case of pleura-pneumonia by this so called inoculation. Irritation is produced in the tail, which occasionally falls off, but I cannot see how this could ward off infection. The advocates of the system appear to have such faith in it that they have put it in practice after disease appears in a herd. It is submitted that all the experiments made in this way possess little or no value. The presumption is that all the animals which resisted the disease after inoculation would have resisted it without inoculation. This system has been extensively practised in the great dairy district of which the town of Tipperary is the centre. I have visited the place twice specially for the purpose of inquiring into the subject. Every facility was afforded me, and the result of my inquiry is that there and elsewhere inoculation has done more harm than good. In no one instance was inoculation tried until after the appearance of the disease, and I met no person who is prepared to try inoculation on a sound herd as a means of prevention.

I have now to notice the well-known disorder called *foot-and-mouth disease*, which is not indigenous to these islands. The period of incubation, according to the most recent experiments, varies from 36 to 48 hours. The disease is most infectious, and spreads through an entire herd in a few days. In my own experience, I have not known it to cause the death of a single animal, but it occasionally develops itself in so malignant a form as to kill several beasts.

With ordinary care, and without any medical treatment, the animals affected with this disease recover in four or five days. Hence, it is thought slightly of by many persons. An intelligent and experienced veterinary surgeon writes to me to say that the loss from this disease is so small that it may be overlooked. He is quite right, so far as the loss by death is concerned, but every intelligent grazier, and still more every intelligent dairyman, knows that while he seldom loses a beast, yet his loss is very considerable. We are liable to three distinct sources of loss from this disease:—

1st. Loss of condition, which involves loss of food and interest of capital. In grazing stock the average loss under these heads rarely exceeds £1 10s. per beast. In dairy stock it often exceeds £5 per cow.

2nd. Loss of milk, which to dairy farmers is very considerable.

While the disorder lasts, the milk is wholly unfit for any use, and should go to waste; there is, therefore, no return from the food. Again, cattle low in condition suffer such loss of condition that they never regain the original flow of milk.

3rd. Lung disease and other affections are superinduced by this disorder.

Reference has been made (ante, p. 191) to the circumstance that in 1865 one of two cows purchased in Smithfield brought foot-and-mouth disease into the Glasnevin herd, which then contained thirty head of cattle worth, say, £600. It spread rapidly, affecting thirty-three beasts. Not a single animal died of the disease; the loss of capital and labour was, however, very great, as I shall now proceed to show.

1st. The disease attacked 30 animals, the loss of condition in which amounted to £5 per cow.

2nd. The loss of milk amounted to 4,000 gallons, which, after deducting expenses, would in the neighbourhood of Dublin realize at least £150.

3rd. Of the animals which got foot-and-mouth disease, eighteen took lung disease after, and, deducting salvages, the loss in this way was £8 a cow, or £144. The loss of capital was £294 out of £600, or 49 per. cent.; and loss of milk, £150 or 25 per cent. additional. All this occurred from a disease which is not fatal, and of which many people do not appear to think very seriously.

To check a disease of this kind, it is not necessary to resort to the pole-axe, or indeed to any violent measures. It is enough to adopt strict police regulations for restricting the movement of stock on any farm or farms where it appears. In other words, no horned cattle, sheep, or pigs should be removed from an affected farm until ten days after the last case of the disease. There should be no inter-communication of persons, dogs, or any medium through which the contagion is capable of being transmitted.

Sensational paragraphs about the appearance of the disease here and there should be avoided as much as possible, as they tend needlessly to temporarily lessen the value of agricultural live stock. I have read several recent statements to the effect that it had broken out on certain farms, and, on examining the animals, I found there was no foot-and-mouth disease at all, but common "foul" in the feet, with a little cow-pox.

The consideration of this disease leads to a subject of the deepest possible importance to the public, namely, the supply of pure and wholesome milk. The milk of cows affected with foot-and-mouth disease has a low specific gravity, arising from its apparent richness in cream, and, when examined under a microscope, it is found to contain large granular cells having the appearance of pus. These pus-like globules are in greatest abundance when the disease is at its height, and they become less as the animals become convalescent. Professor Brown states that he has observed these pus-globules three weeks after recovery. Milk in this condition can scarcely be wholesome for man.

That the public have taken no steps to prevent or check the sale of an article so disgusting is very strange. Its injurious effect on the lower animals has been repeatedly proved. A cat recently experimented on by Professor Brown soon sickened after drinking milk from an animal in the early stages of the disease. In my own experience, young calves and pigs have suddenly died from its effects.

I wish to add a remark as to the supply of new milk to cities and towns. Everybody appears to be aware that it is adulterated. In this city, fortunately, the great adulterating material comes from the "cow with the iron tail." The public are not altogether free from blame in this matter; they are too anxious to cut down the dairyman's prices, and thus encourage adulteration. Some of our Poor Law Boards of Guardians accept milk on terms below the cost of producing pure milk!