

Notes on report of the Departmental Committee appointed to inquire into pleuro-pneumonia and tuberculosis in the United Kingdom / by Peel Ritchie.

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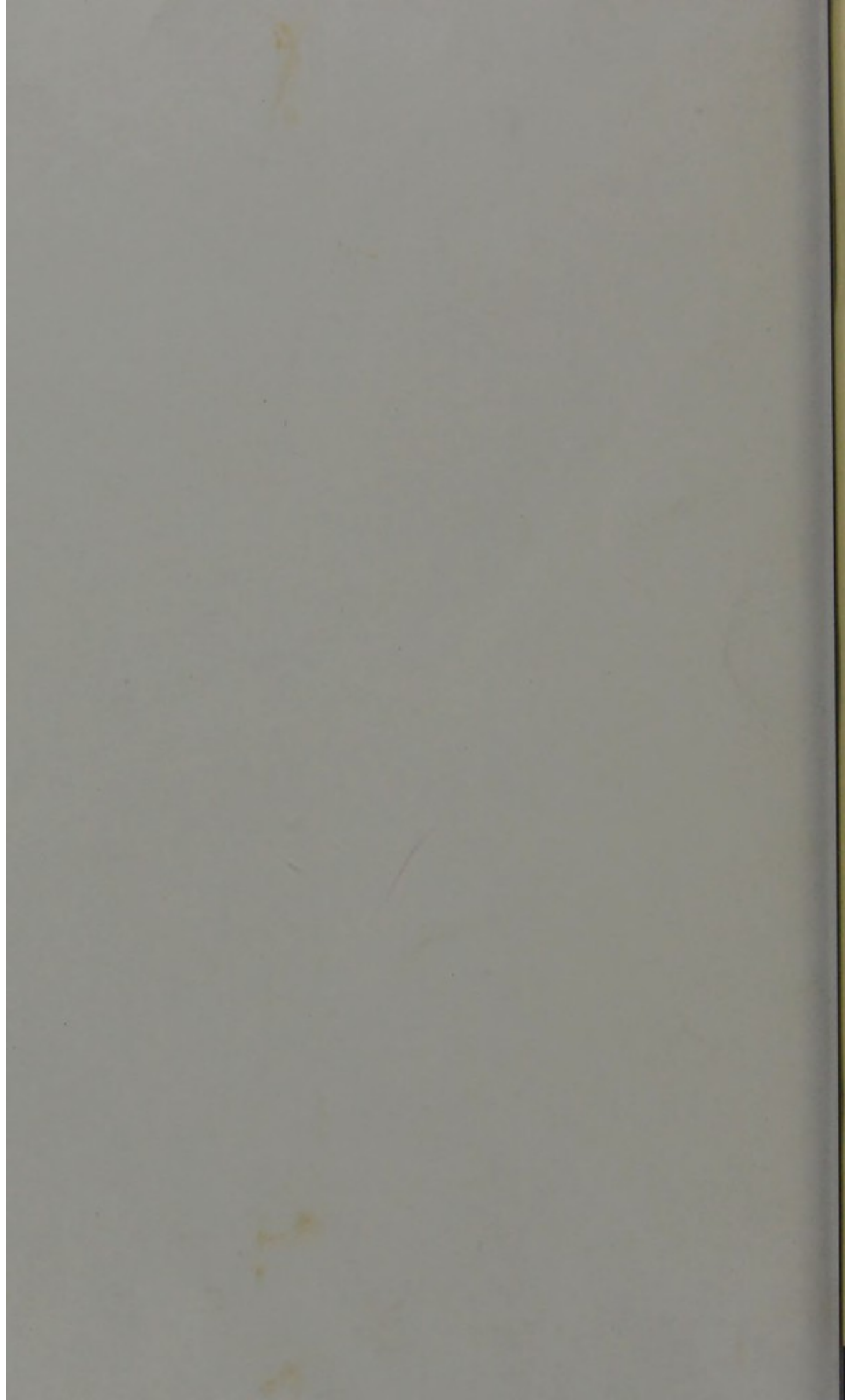
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NOTES
ON
REPORT OF THE DEPARTMENTAL COMMITTEE
APPOINTED TO INQUIRE INTO
PLEURO-PNEUMONIA AND TUBERCULOSIS
IN THE UNITED KINGDOM.

BY
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*(Read before the Medico-Chirurgical Society of Edinburgh, 7th November
1888.)*

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STATEMENT AND EVIDENCE.

IN submitting to your consideration the following notes on the Report of the Departmental Committee appointed to Inquire into Pleuro-Pneumonia and Tuberculosis, it may be well, first, to briefly recall the association of this Society with this most important inquiry, especially as no reference to the Society's action appears in published Transactions. On the 15th of February 1888, Principal Thomas Walley, M.R.C.V.S., in an elaborate paper on Animal Tuberculosis in relation to Consumption in Man, directed our attention to the relation existing between animal and human tuberculosis. After a very full discussion of the pathological and scientific aspects of the subject, I moved that, as a practical result, it be remitted to the Council to take steps to carry out some of the author's suggestions, by approaching by memorial, on the one hand the legislative authorities, and on the other the municipal, for improved and extended legal enactment was not only necessary, but the local enforcement of such powers as were already possessed called for more rigorous application. Accordingly, a memorial in the following terms was presented by the President in name of this Society to the Marquis of Lothian, Secretary for Scotland, on the 23rd of March 1888:—

“My Lord Marquis,—The Medico-Chirurgical Society of Edinburgh having had the subject of animal tuberculosis in its relation to man under consideration and discussion along with that of other bovine diseases alleged to be prejudicial to the safety of the community, would most respectfully approach your Lordship, in order to express their sense of the serious nature and momentous importance of these matters. The Medico-Chirurgical Society is composed of the medical practitioners of Edinburgh, as well as of other non-resident medical men, and numbers among its members many who are cognisant not only of the evil which has been clearly traced to these sources, but deeply impressed with the necessity for some active measures being adopted for their prevention. The Society would therefore earnestly pray your Lordship to use your influence and the powers with which you are invested to bring into operation the statutes and enactments of the Government towards the prevention of those evils, and, if necessary, for the introduction of additional means for the regulation and supervision of the whole traffic in milk and in butcher's meat supplied to the inhabitants. I have, with the authority of the Medico-Chirurgical Society, the honour to address you, my Lord, on the subject, and in its name to subscribe myself,—
Your Lordship's obedient, humble servant, JOHN SMITH, *President.*”

On receipt of his Lordship's reply of the 16th April, the Secretary, Mr Cathcart, again communicated with him on the 20th. The Departmental Committee of the Privy Council had commenced to take evidence on pleuro-pneumonia and tuberculosis on the 17th April.

"EDINBURGH, 20th April 1888.

"My Lord Marquis,—I have the honour to acknowledge, by instruction from the Council of the Medico-Chirurgical Society, the receipt of your Lordship's communication to the Society through their President, Dr John Smith, dated 16th April 1888. I am directed to inform your Lordship that the Council of the Medico-Chirurgical Society beg respectfully to urge, that the object of the inquiry on bovine tuberculosis will be best served by their sending two members to give evidence on the subject. One of them, Dr Henry Littlejohn, 24 Royal Circus, Medical Officer of Health for this city, will be prepared to refer specially to the etiology of the disease, and to its presence in cattle sent for slaughter and kept in dairies. The other, Dr R. Peel Ritchie, 1 Melville Crescent, President R.C.P., a man of wide clinical experience, will be able to give information as to the transmissibility of the disease to the human subject from the lower animals,—I have the honour, etc.,
CHAS. M. CATHCART."

To this a reply, of date 24th April, in the following terms was received:—

"Sir,—I am directed by the Marquis of Lothian to acknowledge the receipt of your letter of the 20th inst., proposing that two members of the Medico-Chirurgical Society of Edinburgh should be nominated to give evidence before the Committee now sitting to inquire into the subject of contagious pleuro-pneumonia of cattle, etc.; and I am to acquaint you that a copy of your communication has been laid before the Privy Council for the information of the Committee,—I am, etc.,
B. W. COCHRAN PATRICK."

In due course the following letter was received by Mr Cathcart from Mr Richard Dawson:—

AGRICULTURAL DEPARTMENT,
PRIVY COUNCIL OFFICE.

44 PARLIAMENT STREET, LONDON, S.W.
April 26th, 1888.

"Dear Sir,—Your letter of April 20th has been forwarded by the Secretary for Scotland to the Privy Council, and laid before the Departmental Committee on Pleuro-Pneumonia and Tuberculosis. I am desired by the Committee to thank you for this communication, and to say that they will have pleasure in hearing the evidence of Dr Henry Littlejohn and Dr R. Peel Ritchie. The Committee think it advisable to take this evidence towards the termination of the inquiry,—I am, etc. RICHARD DAWSON, *Secretary to the Committee.*"

After my perusal of the foregoing correspondence, it appeared to me to be necessary, as I had been nominated one of the representatives of the Society, seeing it was the views of the Society I was to state rather than my own as an individual, that the secretary should intimate to the Fellows—such Fellows as were thought suitable—that it was considered advisable, in the interests of the Society, that they should supply me with the facts, so far as they were at liberty to do so, which tended to support the view that bovine tuberculosis was capable of being transmitted to human beings, either by the milk of affected animals, or by the consumption of

their flesh, for the experience of one individual at this early stage of this inquiry was not yet sufficient; and, also, that the combined observation of many was therefore the more necessary, if due effect was to be given to the memorial of the Society. In reply to this appeal, I regret to say there was only the response, that those written to "have no evidence which they are in a position at present to have brought forward."

On 17th May Mr Cathcart intimated he had received a letter from Mr Dawson to the effect, that it had been decided to summon your representatives to give evidence on 29th May. Whilst informing Mr Cathcart that I had written Mr Dawson that I was ready to attend on that day, I requested that a meeting of the Council should be called in order that I might consult as to the evidence it desired to bring before the Departmental Committee. I submitted the views I proposed giving on behalf of the Society. They received the general approval of the Council, and I thereafter wrote Mr Dawson, that "the line of evidence I propose to submit to the Departmental Committee is, 1st, The reasons which led the Society to address the Secretary for Scotland upon the subject of bovine tuberculosis; 2nd, The evidence submitted to the Society; and, 3rd, The necessity for further experimental inquiry being made into the transmission of bovine tuberculosis to man."

At the meeting of Council it was approved that the points regarding—1st, the state of cow-houses, dairies, and milk shops, and the laws concerning them; 2nd, The exposure and seizure of diseased meat in slaughter-houses and markets; 3rd, The existing powers in dealing with diseased meat or milk; and, 4th, The further extension of these powers by enactment of Privy Council or legislation—should be left for the evidence of the other representative of the Society, Dr Littlejohn.

It is not necessary that I should further allude to the memorial to the municipal authorities.

Before considering the Committee's Report as a whole, it may interest you to learn the terms and nature of the evidence given by your representatives.

As my evidence expressed the views of the Society, it was taken first, but as explanatory of the absence of reference to the Contagious Diseases (Animals) Act, I desire to mention that my evidence was taken as that of a physician, and as approaching the subject from the public health side; and that, as expressed by one of the Committee, Prof. Brown, "an Order emanating from the Privy Council under the Contagious Diseases (Animals) Act, must not have any direct reference to the public health, but must refer to the prevention and spreading of the disease amongst the lower animals." It was left, therefore, to Dr Littlejohn to press this point.

My examination commenced by the Chairman asking as to the representations made by the Society to the Secretary of State for Scotland upon bovine tuberculosis and the reasons for doing so.

In reply, I stated the facts with which you are already familiar, the reading of the paper by Principal Walley, the discussion that ensued, in the course of which it was evident that his statements had made a profound impression, and a motion had been carried unanimously that the Government and the municipality of Edinburgh should be approached—the latter with regard to the stricter enforcement of legal enactments regarding byres and dairies; the Government, because the subject was one concerning which there was considerable doubt in the minds of many at present, and it could be better examined into if Government, rather than private investigators or individual members of the profession, were to take it up. I was then asked to give a brief summary of the evidence brought before the Society. In doing so I took the opportunity, first of all, on account of the very great difficulty of diagnosing tubercle in the early stages in cattle, to point out the necessity for skilled inspectors. I then spoke of the bacillus of tubercle as the cause of the disease, and showed that most competent authorities held the doctrine that the tuberculosis of bovines and the tuberculosis of the human subject were identical, that the apparent differences in the bacilli were accidental, and due to the differences in the media in which they were developed and the rapidity of their growth. We held that the identity of the bacilli being proved showed that, if there was not a probability of communication, we nearly all agreed there was a very great possibility; and I went on to say that the contagiousness of tubercle had already been declared by other societies, mentioning especially the meetings of the National Veterinary Association in London in 1883 and in Manchester in 1884, and that of the International Medical Congress at Copenhagen in the same year. I further showed that contagion was possible in three ways: first, by the ingestion of tuberculous meat, of which, however, we had as yet no proof; second, by the milk from tuberculous cows; and, third, by inoculation from sores to sores—that was to say, from sores upon the udders to sores upon the hands of those who handled them. In support of these two latter methods I gave particulars of the cases which Principal Walley laid before the Society, in which consumption, tabes mesenterica, and meningitis occurred in persons partaking of the milk of tuberculous cows, and one in which a boy with sores on his hands was infected from sores on the udder. I also spoke of the impression made on members by Dr Woodhead's observations on the phthisical death-rate in an establishment supplied by a dairy in which he and Professor M'Fadyean found evidence of tuberculosis in the udders of three cows. A question arises as to whether tubercle in the general system of an animal is sufficient to affect the milk, or is it only in cases of tubercular udders that the milk is dangerous? Observation points clearly at present to the latter condition only. I then narrated two cases which occurred in my own practice to support the view that tubercle might be conveyed

by cow's milk if a like condition occurred in the human subject. These were the cases of two mothers, previously healthy, who became affected during the suckling of their infants—the one with her first, the other with her third child. The infants, when respectively 4 months and 7 months, died of tubercular meningitis; and the mother in one instance died four and a half, and in the other four months afterwards of pulmonary phthisis. The grounds on which I supposed the infants were infected by the mothers' and not by the cow's milk on which they were latterly fed being the subsequent death of the mothers from tubercular disease. Both mothers, previous to the infants becoming apparently affected, suffered from irritation of the mammary glands; they never suppurated, but there was nodular inflammation of the glands. I was examined at length upon these cases. I next stated that we also felt, as a Society, that the frequency of tubercular disease in infancy requires explanation, and mentioned that in Edinburgh during the last ten years the average death-rate from tuberculosis under 5 years of age has been 6·8 per cent. of the deaths—that is to say, of 44,616 deaths at all ages, 3054 occurred under 5 years of age from tuberculosis. I also stated we have been in the habit in the past of putting these down to hereditary influences. I here gave in a table prepared for me by Dr Littlejohn, showing the number of deaths, and pointed out the frequency with which disease of the glands of the abdomen and inflammation of the brain occur in young children in Edinburgh. I handed in a table, prepared from a larger one of Dr James's, showing the total deaths in Scotland from *tabes mesenterica* and tubercular meningitis during ten years, 1876–1885, under 5 years of age, prepared from the Registrar-General of Scotland's returns. During that time 7415 deaths occurred from *tabes* and 13,216 deaths from tubercular meningitis; and “it was found that, with the exception of the first three months at the respective ages, inflammation of the head always caused the larger number of deaths.” I continued,—“Now, it occurs to myself that possibly the greater number of inflammations of the brain have been preceded by disease of the glands of the abdomen. One point is this, that in the first three months the *tabes* is in a larger proportion, but at all other periods between the three months and five years of age tubercular meningitis is the largest number. Tubercular meningitis, according to the return, may thus be regarded as one of infection from tuberculous glands. The glands, therefore, possibly may have become affected from the milk which the children have been fed on (I am merely speaking as a possibility); and the secondary disease, inflammation of the brain, may have thus often resulted.” In course of further questioning upon this head I observed,—“Meningitis being much more rapid in its fatal course, presents the more urgent and formidable symptoms, and to it is assigned the cause of death; whilst the *tabes*, being less evidently active, may be

overlooked, or not mentioned, in the certificate of death." I concluded this part of my evidence by stating that,—“So little is the subject known amongst medical men at present, that I interviewed, before coming up to this Committee, between forty and fifty of our leading medical men in Edinburgh, and, with the exception of Dr Woodhead, none of them had seen a case in a human subject which they could say resulted from bovine tuberculosis. They had in several instances had suspicions that such a thing might have occurred; they nearly all agreed as to the possibility of its occurring. Some of them doubted its possibility; but they were all unanimous in this, that the subject was one of such great importance that they thought an inquiry on the part of the Government was necessary to allay the popular mind and the doubts at present existing.” I gave it as my opinion that this inquiry should consist of experiments and investigation into the modes of communication of the disease, that it should be extensive in character, and conducted by a Board which should not confine its labours to one part of the country. As to the causes, I thought the conditions the cows are kept in lead to it, and referred to their insanitary state in Edinburgh. The want of exercise in stall-fed cows aided in producing a state of health favourable to development of tubercle. Artificial feeding had, I also thought, some influence, the cows being fed on milk-producing foods rather than upon blood and flesh improvers. In-and-in breeding might act by predisposing to hereditary constitution.

In answer to questions by Prof. Horsley, I said the Society had not considered the evidence of the communication of the disease from a husband to a wife; that though the disease might be introduced by inhalation, we thought it was not so in cattle. Possibly the cow got it in the stall or from the insanitary state of its surroundings. Cows were apt to lick what had passed from the mouth of another affected animal if it had dried up on the stall in which it was, and in that way the bacilli might be introduced into the cow's system. I had no figures to show the actual connexion between diseased milk or flesh and *tabes mesenterica* and *meningitis*, but that it was on these and such points that we were at present so much in need of enlightenment, and that it would be highly advisable for the general sanitary condition of the nation that an inquiry into them should be instituted; that we desired, if possible, to have a check put on the way in which diseased animals at present are exposed for sale, are slaughtered, and are treated, and so strengthen the hands of the veterinary inspectors in getting these animals properly looked after. I considered that a thorough and regular inspection by skilled men was necessary to prevent the spread of the disease among cattle and its transmission to the human individual, and that such inspectors would require special training in the use of the microscope and the detection of the bacilli.

The Chairman and Mr Stirling both put questions as to the phthisical and ordinary death-rates in Edinburgh of late years, to which I replied that the ordinary had diminished, and it was not found that the deaths from phthisis were increasing, but it was one of our difficulties that we did not know when or how long this condition that we were now wanting information about may have been continuing or going on. I stated further that the diminution in the death-rate was largely in consequence of the excellent sanitation of the Medical Officer of Health. I was also asked as to the destruction of the bacilli, and said that in milk properly boiled the bacilli were killed, but I could not speak with certainty as to the spores.

Professor Brown then took up the questioning with inquiry as to my views as to skilled inspectors, but I referred him for information regarding those now engaged at this work to Dr Littlejohn, repeating that they would require to be specially trained in the use of the microscope and the methods of demonstrating bacilli. My examination concluded with questions by the Chairman whether milk should not be supplied from country dairies under proper medical and sanitary conditions rather than from town dairies; but I held, as the introduction of the late epidemic of scarlet fever had been from the country, that I did not see why our town dairies should not be made perfectly capable of supplying good milk.

Dr Littlejohn was then called and examined. After preliminary questions he informed the Committee that in Edinburgh the carcase of an animal affected with tuberculosis was not allowed to be sold except the disease was limited, the glands unaffected, and the flesh on section sound; that the authorities had no data to prove that the use of flesh of animals so affected had any effect on the public health (but this was a matter for further investigation and experiment); that they had no power to seize tubercular animals in the markets or cowsheds, nor of preventing the milk from such animals being mixed with that from healthy animals. They had powers to seize diseased meat, but they wanted more than that—to take the live animal. He would like that they should have similar powers to those which he believed were enjoyed in England and Ireland, so that their inspectors might take any animals from the public markets which exhibit a suspicious appearance of emaciation, summoning the veterinary inspectors of the corporation, and craving powers from the magistrates to have that animal destroyed. He thought the Greenock people had such powers under a clause in their Act of 1877. He was also of opinion that tuberculosis should be included in the Contagious Diseases (Animals) Act, because this would give them power to prevent the milk of suspected animals being mixed with other milk or sold for human food, and would take from local authorities the excuse that they had no power in dealing with

this disease, and as public opinion was being so much directed to this point, it would compel these authorities to more stringently enforce the Dairies, Cowsheds, and Milk-shops Order than they do at present. He was under the impression that tuberculosis was on the increase, and gave figures showing that in Edinburgh in 1877, 51 carcasses out of 29,665 total cattle, and during the first five months of 1888, 46 carcasses out of 10,756 were condemned. Compensation he spoke of with diffidence, but would be inclined to grant it only where a mistake had been made. He considered the disease was more common among dairy than among ordinary farm stock, but could not say with certainty that tuberculosis could be communicated from the bovine animal to the human subject. That the disease was more common among dairy stock was due, he thought, to the manner in which their town dairies were managed. The ventilation was usually bad; everything was kept in a state of constant damp; the animals tied close up against the wall and close together, without provision for the proper cubic space, and never moved out from the one year's end to the other, until they were taken away for slaughter. He recommended notification, but thought that, having regard to the difficulty of diagnosis, a man should not be punished for not giving notice. He thought it desirable that milk should be examined by the microscope and other means, and would make the examination for the tubercle bacillus a part of the ordinary inspection of the dairy. He did not, however, suggest it as a remedy, unless it was proved to his satisfaction that in every case of tuberculosis they could detect the peculiar bacillus in the milk, which he strongly doubted, because, as far as his own experience had gone, he had only found it in cases where the udder had been markedly affected. Asked as to the proportionate distribution of the disease in the bodies of animals, he said he had chiefly observed it—first, in the pleura and peritoneum; second, the liver; and third, the glands generally. The lungs were rarely affected, the animal apparently being killed before they became so. He had never observed deposit of tubercle in the muscle of a bovine animal, but had in that of a pig, and had seen it also in the joints and bones, but usually the animals were killed before the disease had become so extensive. He had no evidence of the spread of the disease from one animal to another.

The remainder of Dr Littlejohn's examination had reference to the carrying out of the Milk-shops Order, the temperature necessary for the destruction of the bacillus of tubercle, the status and pay of the inspectors, the necessity for public abattoirs, the inspection of country dairies and the disposal of their milk to middlemen, the dairy companies in England and Edinburgh, and their special private sanitary arrangements. The water supply of Edinburgh dairies was then touched on, and the risk from its not being satisfactory or imperfect in country dairies, concluded his evidence.

NOTES ON THE REPORT.

The Departmental Committee was appointed to inquire into and report upon the nature and extent of Pleuro-Pneumonia in the United Kingdom, and the effects of Inoculation and other Preventive Measures on that Disease; also to inquire into the nature and extent of Tuberculosis in the United Kingdom, and the means to be adopted to arrest its progress. Of course, as regards the latter, it is from the animal rather than the human side it is considered.

The Committee consisted of seven members, and Mr Richard Dawson was appointed to act as secretary. Mr J. Naper was originally named a member, but being unable to attend, another member was nominated. The following were the members:—Jacob Wilson, Esq., was elected chairman; Sir G. Macpherson Grant, Bart.; J. Bowen Jones, Esq.; P. Stirling, Esq.; Victor Horsley, Esq., F.R.C.S.; Professor Brown, C.B., of the Brown Institute; Lord Cloncurry. They were appointed on 16th April 1888 by Lord Cranbrook.

The Committee commenced taking evidence on the 17th April, and continued its meetings from time to time up to the 4th of June. During that interval it sat on seventeen days, and examined 44 witnesses. Of these, 13 represented England, 16 were from Scotland, 6 from Ireland, 6 were Colonial—from the Cape Colony, New South Wales, Victoria, and Natal. One of these had, however, been previously resident in New Zealand. Two were officials connected with the Agricultural Department of the Privy Council; whilst one was foreign, a Government veterinary surgeon from the Hague, Holland. Arranged according to designation:—

1. Justice of Peace,	.	.	.	.	1
2. Representative of Local Authority,	.	.	.	.	1
3. Chief Constable,	.	.	.	.	1
4. Officers of Health,	.	.	.	.	2
5. Inspectors Agricultural Department P. C.,	.	.	.	.	2
6. Veterinary Inspectors,	.	.	.	.	4
7. „ Professors,	.	.	.	.	2
8. { „ Surgeons, British, 4 }	.	.	.	.	5
{ „ „ Foreign, 1 }	.	.	.	.
9. Medical Experimenter for Local Government Board,	.	.	.	.	1
10. Physician,	.	.	.	.	1
11. President Shorthorn Society,	.	.	.	.	1
12. Landowner,	.	.	.	.	1
13. Stockowners, Colonial,	.	.	.	.	6
14. { Stock-dealers, 2 }	.	.	.	.	3
{ Stock-dealer and farmer, 1 }	.	.	.	.
15. Farmers,	.	.	.	.	8
16. Dairymen and cowkeepers,	.	.	.	.	3
17. Superintendents, { Dairy Co., 1 }	.	.	.	.	2
{ Model Farm, 1 }	.	.	.	.

The Report consists of two parts: 1. The Report; 2. The Evidence.

The subjects remitted to the Committee were—Pleuro-Pneumonia: its Nature, Extent, Effects of Inoculation, and other Preventive Measures. This forms the first part of the Report, with which, as a medical society, we have nothing to do. Tuberculosis (Animal): its Nature and Extent in the United Kingdom, and the Means to be Adopted to Arrest its Progress, forms the second object of the Committee's inquiry, and it is with it we, as a Society, are interested. Of the 44 witnesses, 27 gave information of varying importance on tuberculosis, 17 upon pleuro-pneumonia alone.

The Report on Tuberculosis considers, first, the Nature of the Disease.

The nomenclature introduces the subject of the Report, and after an examination of the various tubercular diseases, it proceeds,—“We now know for certain that they are all forms of one and the same process, and caused by a microbe,” which “forms the poison or virus of the disease.”

The discovery that inoculation of the virus into the lower animals is capable of producing the malady is assigned to Klencke in 1843, but that Villemin in 1865 first placed it on a firm basis; “the nature of the poison itself remained unknown until it was discovered by Koch, in 1881, to be a rod-shaped microbe.” The microbe is then defined, the greater vitality of the spores is dwelt upon, and the importance of it and the viability of the rods are pointed out,—“Since, if the mucus, or saliva, or expectoration of an animal or human being suffering from tuberculosis be dropped upon the ground, flooring, or furniture of a room or shed, it is obvious that such secretions are, in proportion to the effect which exposure at the temperature of the air and drying may have in destroying the organisms and their spores, a source of danger to other animals or human beings who may accidentally take up the poison.”

The effect of temperature is next reviewed—that most favourable to the growth of the microbe being the ordinary heat of a warm-blooded animal, from about 98°·5 to 100°·5 Fahrenheit. At 82° Fahr. growth ceases, but this degree does not kill the microbe. If “kept at a temperature of about 107°·5 Fahr. for several weeks, the organism gradually becomes exhausted, and dies.” The effect of drying upon the microbes is mentioned; few resist desiccation; but from experiments made upon expectoration containing bacilli, it has been proved that such expectorations may be kept for several months successively dried and moistened, and then, when inoculated into animals, the bacilli are found not to have been killed, as “they have actively produced the disease.”

It is pointed out that tubercular discharges in this climate may remain virulent for a long time; and stalls and sheds, unless thoroughly cleansed, be a source of danger.

The order of liability of domesticated animals is given thus:—
 1. Man stands first; then 2, milch cows; 3, fowls; 4, rodents; 5, pigs; 6, goats; 7, sheep; 8, horses; 9, carnivora, *i.e.*, dogs, cats, etc. (very rarely). “From this,” the Report adds, “it appears that the organism grows most readily in those animals which are omnivorous and herbivorous,”—a summing up which, perhaps, requires a little modification. From the evidence, and also subsequently in the Report, a distinction as to frequency of tuberculosis is shown to exist between stall-fed cows and field cattle, but in the foregoing list this is not alluded to. The greater liability of the female sex and young animals to become affected is also mentioned.

Five predisposing conditions are next reviewed:—

1. *Starvation*, as causing degeneration of tissue and diminishing resistance to microbe growth.

2. *Deficiency of oxygen by bad ventilation*. This, whilst predisposing the one animal, also favours the transmission of the virus to another.

3. *Exhausting secretions*, *e.g.*, *prolonged lactation*. “The constant loss of the fat, *albumen*, and salts contained in the milk” produce “those degenerative changes which reduce the vital resistance of the animal.”

4. Possibly heredity (afterwards referred to), an influence “attributed by some to the transmission from parent to offspring, not of the actual virus, but of a condition of tissue which is peculiarly favourable to the development of that organism.”

5. *Certain foods (asserted, but very doubtful)*. “Some foods, *i.e.*, grains, etc., have been imagined to favour the occurrence of tuberculosis, but this is extremely problematical.” Although this is the deliverance of the Committee, I remain of the opinion I expressed, that, looking to the drain from the milch cow’s system, feeding the animal upon the kinds of food which favour the flow of milk, unless attention is paid to also supplying a compensating amount of blood and flesh producing food, cannot but aid in the production of such degenerative changes as to reduce the vital resistance of the animal.

The modes in which the virus or microbe enters the body have, it is stated, been proved to be the following:—

1. *Inhalation*, into the air passages and lungs.

2. *Swallowing*, into the alimentary or digestive system.

3. *Direct introduction*, into the subcutaneous or submucous tissue by means of a scratch or cut or sore in the skin or mucous membrane.

It is also supposed to be directly transmitted by 4. *Heredity*.

Inhalation.—From “the fact that the signs of disease are most commonly found in the lungs, inhalation would appear to be the commonest way in which the disease is contracted.” The result of comparative experiments has tested this; and the Report continues:—
 “The results of these experiments have been almost invariably

positive, the animals breathing such infected air rapidly succumbing to the disease." For my own part, I can readily believe the results of experiments so conducted; but, unless the infecting animal's lungs were in a very advanced stage of disease, I cannot say that I can quite accept this statement as altogether correct. The deduction is that "cohabitation of the diseased and healthy animals is a fertile source of spread of the malady."

Swallowing is also supported by numerous experiments. The virus in mucus, saliva, milk, portions of "diseased tissues and cultures of the bacilli, have been swallowed by calves, pigs, sheep, rodents, fowls, etc., with the effect that the disease has fatally followed the ingestion." It is added that "it is evident the digestive fluids do not necessarily exert an injurious influence upon the poisonous bacilli." I would here refer to the evidence (p. 256) of Mr A. Lingard for account of the case described by Dr Lamallerée in the *Gazette Médicale* of 15th Aug. 1883, in which tuberculosis was not only transmitted from man to fowls by their consuming the expectoration of a phthisical woman (who, it is presumed, had been infected by her phthisical husband), but also was transmitted from them to a previously healthy woman, who within a period of three months had eaten ten or twelve of the fowls which had died of tuberculosis.

Direct introduction.—The microbes make their way to the glands; these become diseased; the microbes pass by the lymphatics to the veins, and the virus is distributed through the body. "Undoubted instances have been laid before us of such inoculation occurring," "and one or two stated in the evidence in which a bull has given the disease to cows; and the converse has also occurred, namely, that a bull has contracted the disease from cows."

Heredity.—The predisposition through the "tissues of one particular breed or race" being "favourably disposed to nourish the tubercle bacillus" has been already referred to; but "whether the bacillus is actually contained in the ovum or spermatozoon" is considered. The statements by Baumgarten, that he has "observed the bacillus in the rabbit within the ovum," and that other observers have seen them mingled with active spermatozoa, are given. In support of the transmission theory, the case of Professor Johne of Dresden is referred to, in which the infected intrauterine 7 months' calf of a tubercular cow is mentioned, and it is remarked, "Similar intrauterine infection has been shown to have been more than probable in the human being;" but it is also added, "Against this view of the infection of the ovum and embryo it has been suggested that the disease-producing influence of the bacillus would prevent the ovum arriving at maturity." Stock breeders have discovered the risk "of breeding from tubercular stock." In-breeding, as giving rise to tuberculosis, is held, as was to be expected, to be erroneous; but as predisposing to infection, if the virus is introduced into the herd, is held as probable.

The Mode of Attack and Distribution of the Disease within the Body.—The disease may attack the body of an animal as *acute* or *general* or *miliary tuberculosis*, or more chronically, in the first instance, as *local tuberculosis*, becoming by means of the lymphatic glands subsequently distributed over the body. The local is held to be more common in man than in the lower animals; and the Report continues,—“The distribution of the disease in the body is difficult to connect with any special mode of introduction of the virus, save, perhaps, inhalation.” This is to me the more difficult to accept when the next paragraph states,—“Undoubtedly in cattle the lungs and pleuræ and the serous membranes generally are the favourite seats of the malady, any and each of the other organs being occasionally affected.” In pigs, the cervical glands; in rodents, the spleen, liver, lungs, and bones; in fowls, the nose, mouth, and spleen; in horses, the glands; and in man, the glands, the lungs, the joints, and the nervous system—are stated to be the commonly affected parts.

As the tubercle bacillus appears to grow best where the circulation is least vigorous, it is held that to this is due the predilection for the lungs, spleen, and joints. Mr Lingard in his evidence states that he found the bacilli at an early period of infection in the marrow of the bones (shown also by Professor M'Call), and before other sign of their presence was observed. This is mentioned in connexion with the question of the use of tubercular meat as food. Evidence was given that though rarely the flesh may be affected, and that ordinary cooking may not be sufficient to destroy the bacilli, for they may also be in the blood, and that, therefore, the chance of their presence “is too probable to ever allow the flesh of a tubercular animal being used for food under any circumstances, either for man or the lower animals.”

The appearance of tubercles, in the tissues, and according to rate of increase and the changes the nodules may undergo, are then described. The presence of bacilli in the secretions from diseased organs is next considered; and the Report continues,—“Of these it is obvious that the fact of milk being infected is of primary importance to the health of both animals and of men, since milk has been proved both to contain the bacilli and to infect the lower animals, *e.g.*, calves, pigs, etc.; while, unfortunately, it is becoming abundantly clear that by the same method of transmission of the virus the disease is communicated to the human being.” It will be observed that the question as to whether the udder is the part affected or not is not entertained. If the cow is tubercular in the view of the Committee, both its flesh and its milk are to be regarded as unfit for human or animal consumption. One of the points calling for further experimental observation, the infectivity or non-infectivity of milk from a cow without udder lesions, is thus set aside, but it is a question of much importance still unsettled. In my statement I took the view that it was only when

there was udder lesion that the Society had *evidence* of evil result.

The general symptoms of tuberculosis, and the want of them in local slow-growing cases, leading to difficulty of recognition, are touched on, and the characters of the symptoms ultimately, are described, and the evidence to be gained from physical examination of the chest; and this section concludes with the statement,—“The disease in the lower animals always terminates fatally.”

Frequency of Proportionate Occurrence among Animals and Men.—The calculated death-rate from the various processes set up by the tubercular bacillus is stated from the statistics of the registers of different countries to be “10 to 14 per cent. of all deaths among human beings.” In Paisley it is said the death-rate has been as high as 17·5. In Edinburgh the percentage of animals killed and found tubercular is very low; yet, according to the last report of the Registrar-General for Scotland, the deaths from phthisis alone in Edinburgh were 11·8 per cent. of the total deaths, and from all tubercular diseases 16·4. By the same returns for Scotland the deaths from phthisis number 10·75, and from tubercular diseases 14·55, which is above the maximum average given above. Could we obtain accurate returns of the tubercular cattle killed, it would be interesting to trace their relation to the human tubercular death-rate; and I hope to be able to follow up this subject, now that my attention has been called to it. Amongst animals the proportionate occurrence has not been so clearly made out.

In Dublin the animals slaughtered were at the rate of 4·9 per cent.; and from the evidence the rate varies from 50 per cent. near Glasgow (Q. 4262); 37·5 per cent. Liberton, near Edinburgh (Q. 7620); 30 per cent. in Paisley and Glasgow stock (Q. 5371); 25 per cent. Ayrshire dairy cows (Q. 835); 4·5 per cent. Victoria (Q. 5582); 3·5 per cent. Lanarkshire (Q. 5360); to ·2 per cent. of all animals, cows, oxen, etc., killed at Edinburgh (Q. 7684)—that is, 97 condemned carcasses in Edinburgh out of 40,421 animals killed. It would appear to me that the percentages are given upon results from too small numbers—the 50 per cent. statement being based on the deaths of 13 out of 25 milch cows.

In Germany the proportion among cattle slaughtered appears to vary, from the Report, from 1·5 to 20 per cent., according to district. These variations are explained by the Committee thus: The low percentages are those for open-air fed herds, the high death-rates among dairy cattle cohabiting in sheds.

The frequency of tuberculosis amongst fowls has also attention directed to it as not being generally known, and that both observation and experiment have shown that the fowl contracts the disease from man by swallowing the expectorated bacilli, and again forms a vehicle for its transmission to man and the lower animals.

Several authorities consider the disease amongst cattle is on the

increase, but the Committee consider this is doubtful; for probably the apparent increase may be due to better recognition, and that better hygiene has diminished the tubercular death-rate.

The Report next addresses itself to the question of

Remedial Measures.

It says two points are to be borne in mind in the consideration: 1. "That the disease can be transmitted *to* man from the lower animals, and *from* man to the lower animals, by one or other of the methods which we have already discussed, and especially by the ingestion of tubercular diseased meat or milk." The last clause has, of course, reference only to the transmission of the disease from animal to man, or from animal to animal. 2. "That it spreads from animal to animal."

After pointing out that the first of these is usually dealt with under the Public Health Act, the difficulty in dealing with tuberculosis is that "not only is the disease communicated from animals to man, but also from man to animals." Legislation, therefore, which protects cattle from tuberculosis must also prevent its communication to man.

As curative treatment is so unsatisfactory, the Report indicates "that legislation must follow the two lines of—

A. Prevention; B. Extirpation."

Under *Preventive Measures* are reviewed *the improved hygiene of cattle sheds, etc.*, as regards ventilation, water supply, disinfection of stalls, etc. It points out that although this has been partly met by the Dairy and Milk-shops Order, that its administration is imperfect, and "we would suggest that it should be much more stringently enforced, and that veterinary inspectors should be given more extended powers of entry into all places where animals are kept." The isolation of suspected animals, and prevention of the flesh or milk of diseased animals being given as food to others, and restriction as to fodder, litter, and water, are insisted on.

In England and Ireland, although the medical officer of health or inspector of nuisances has power to seize diseased animals in open market, "yet such seizure is rarely performed;" whilst the veterinary inspector has no power to prevent the sale or to order their slaughter, since tuberculosis is not included in the Contagious Diseases (Animals) Act, 1878. "The Committee are very strongly of opinion that power should be given to veterinary inspectors to seize 'wasters' and 'mincers' in fairs, markets, or in transit."

The risk of the disease being imported the Committee does not consider great whilst the regulations as to slaughtering and keeping in quarantine at port continue; but as there may be danger in importation from countries exempted from slaughtering, the present rules are incomplete. Another difficulty arises from

the failure of veterinary surgeons to detect the disease in the early stages; and the Committee conclude there could have been no proper veterinary examination in the case of animals found extensively diseased after death, but believed to be sound previously.

Whilst the Report is satisfied with stating that "it is highly desirable that breeders should, in their own as well as in the public interest, discontinue breeding from tuberculous stock," Professor Horsley, in a Supplementary Report, states that, in his opinion, "the act of wittingly breeding from animals so affected should be made 'an indictable offence.'" Prosecutions might arise from the "present state of want of knowledge" "of the early symptoms and physical signs" among cattle-owners, and even veterinary surgeons. He thinks that vexatious prosecutions would be few, and that as each would be tried "before district magistrates on its own merits," the objection would not be of much force.

This brings us to the climax of the Report, Extirpation.

Extirpation.—The Committee are of opinion that tuberculosis should be included in the Contagious Diseases (Animals) Acts, so as to provide:—"For the slaughter of diseased animals when found diseased on the owner's premises." "For the payment of compensation for the slaughter of such animals." "For the seizure and slaughter of diseased animals exposed in fairs, markets, etc., and during transit." "For the seizure and slaughter of diseased foreign animals at the place of landing in this country."

On the plea that tuberculosis may exist without "sufficient outward evidence to enable the owner to detect it," and its growth is so slow "that non-notification of its existence, even in a large number of cases, would do little to nullify the stamping-out effect of the Act of 1878," notification, the Report decides, should not be compulsory. Professor Horsley, again, differs from this conclusion, and says "that deliberate non-notification should be punished cannot be doubted by any one." He then refers to the objections, and continues,—“As, however, I consider that these objections have been already shown to have no weight, I recommend that both the forbiddal of the breeding from diseased animals and the notification of the disease should be included in any legislation for tuberculosis.”

After all the evidence laid before the Committee, the views it has taken of the spread of tuberculosis by the breath of affected animals, and the opinion expressed regarding the presence of tubercle in animals presumed to be healthy, that they had not been submitted to proper veterinary examination, it is somewhat surprising that notification should not be made compulsory. As Professor Horsley states, "Since it is clear that unless the veterinary inspectors or authorities receive information of occurrence of diseases, it is impossible to insure the thorough carrying out of the provisions of the Contagious Diseases (Animals) Act;" and with this I agree. And as we have taken so prominent a position

in this question, it seems to me that when the next stage is reached we ought again to step forward and petition in favour of the views expressed by Professor Horsley being made imperative. They both more strongly enforce the action to be taken for the extirpation of tuberculosis in cattle.

The Report considers that inspectors should have the same powers regarding animals suffering from tuberculosis as from pleuro-pneumonia. The Committee are of opinion that the slaughter of diseased animals would go far to stamp out tuberculosis; though, doubtless, owing to heredity, the process would be gradual. Another argument in favour of slaughter is the frequency with which pleuro-pneumonia and tuberculosis co-exist, and are mistaken the one for the other.

Some of the arguments, it must be confessed, seem to imply that veterinary education does not sufficiently progress; but probably what the Committee feel is, that often these animals are not submitted to veterinary inspection till they are exposed or after slaughter, and hence arises the difficulty. Seeing, however, if the Report is adopted and carried out by the Privy Council, the future of tuberculosis is reduced to a question of *diagnosis*, the improved instruction of veterinary surgeons and inspectors must follow, and more allowance in the recommendations should be made for the improvement of veterinary accuracy.

The last clauses of the Report consider the compensation to be given the owner for the compulsory slaughter of his animal, but that is not a question which concerns us professionally.

The Committee conclude by expressing their belief that, if their "recommendations be firmly carried out, pleuro-pneumonia may within a moderate period be exterminated in this country;" "and although we cannot dare to indulge in such sanguine expectations with regard to tuberculosis, we still venture to hope that much may be done to reduce its extent, and to minimize a disease so dangerous alike to animals and to mankind."

President and Gentlemen, I have concluded my review of this Report. You will doubtless agree with me in regarding it as a very able one, and, further, that its conclusion as to Remedial Measures could be no other than it is. You must remember that the Committee were appointed for practical rather than scientific ends, and that, as expressed by Professor Brown (7644, 5), "under our Acts (Contagious Diseases Animals) we have absolutely no power whatever to deal with the disease solely on the ground that we might take measures to prevent its extension to human beings." "We are bound to show that our measures have reference mainly to the prevention of the extension of the disease among the lower animals."

The evidence showed that tuberculosis was contagious, that it could be transmitted from one animal to another, from man to

animals, and, although seemingly of less importance to this Committee after the opinion I have quoted, from animals to man. You sent your two delegates to give evidence as to your views. I endeavoured to do my part, which was, if I may say so, to express the more scientific side of the Society's views. I supported the identity of the disease in animals and man, its transmissibility, and the scientific doubts existing in the minds of many, and the necessity for experiments conducted on a large or extended scale, such as only could be done by Imperial action. I viewed the question from the human side.

Your other representative viewed it from the animal or, in this case, the practical side. In order to deal with the diseased animals, he supported the other views the Society brought forward, that the animal suffering from tuberculosis was injurious to its fellows, as well as to humanity, and pleaded that the disease should, for various practical reasons, be classed among the contagious diseases of animals.

The scientific inquiry for the Committee's purpose had gone far enough. The further points we wanted to have cleared up by extended investigation, in their eyes, were unnecessary. If the milk was injurious, whether it came from a tuberculous udder or a tuberculous cow, was of no consequence from their point of view. Whether the flesh of an animal was capable of producing disease or not, if tubercle existed in other parts of the body, was of no consequence. To trace the effects of milk from a cow found to be tubercular did not come within their range of inquiry. If butter or cheese made from the milk of a tubercular Ayrshire cow was the means of disseminating tubercle was not the question of importance with them. That a bull with tubercular disease could directly convey disease to the cow, and that the cow, on the other hand, with a tubercular uterus could convey disease to the bull; that a cow with tubercular uterus was unfit for breeding; that cohabitation in an insanitary byre was injurious; that pigs fed on tubercular milk had the disease produced in them—were of chief importance. These things were held proved; and without going into the nicer questions I have hinted at as subjects for further experimental research, they put an end to all questions, for if tubercle exists in the animal, the bacilli are probably in the blood, and they therefore declare a tubercular animal, whether locally or generally affected, to be dangerous both in its living and its dead state, and stop further inquiry after the presence of tubercle is proved. For practical sanitary purposes we cannot but approve, but as scientific inquirers we may possibly regret that so many details are left still unsatisfied.



