TUBERCULOSIS IN RELATION TO MILK-SUPPLY.*

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THE necessity for the "Model" Clause now being promoted in Parliament by the Brighton Corporation† is shown (a) by the amount of disease which is known to be caused by the milk from tuberculous cows, and (b) by the fact that the official action now practicable is not efficacious as a means of preventing this disease.

A.

That the milk from tuberculous cows causes tuberculosis in children is indicated by the following facts:

1. It is known that tuberculosis is due to infection, the cause of the infection being the tubercle bacillus. It is also well established that this tubercle bacillus escapes with the milk when the udder of the cow is affected with the disease. It is further known that the greater part of the milk which is consumed by children is consumed in an uncooked condition.

2. The statistics of the whole country show that while the registered death-rate from most forms of tubercular diseases has been steadily and progressively declining, that from *tabes mesenterica* has remained practically stationary.‡ *Tabes mesenterica* is the technical term used to indicate tubercular disease of the intestines or the glands in connection with them. The diagnosis of this disease is more difficult than that of other forms of tubercular disease, and it is possible that many deaths are still, and have been in the past, returned under this head which are not really due to tubercular disease of the alimentary canal. After, however, making the fullest allowance for this cause of error, the following remarkable and suggestive facts are to be noted:

(a) The death-rate from *tabes mesenterica* has remained stationary, while that from other forms of tubercular disease has greatly declined.

(b) The chief incidence of deaths from *tabes mesenterica* is among infants in the first two years of life, these being the years in which uncooked milk forms the chief item of the child's food. The same fact may be expressed in another form—thus: While only 3·6 per cent. of the deaths from consumption of the lungs occur in children under five years of age, 78·2 per cent. of the deaths from consumption of the bowels occur at these ages. It is impossible to dis sever these statistics from the firm belief that while consumption of the

* From Annual Report for 1900.

† See p. 649 of this issue.

‡ See paragraph 3 of Report of Second Royal Commission on Tuberculosis.

lungs is usually due to the direct inhalation of infective dust, consumption of the bowels is frequently caused by the drinking of the milk from tuberculous cows.

3. Cows brought into Brighton slaughter-houses from farms in neighbouring districts have frequently been found to be suffering from advanced tuberculosis of different organs, and sometimes from tuberculosis of the udder.

On March 4th, 1897, I showed at a meeting of the Brighton and Sussex Medical Chirurgical Society such an udder derived from a cow slaughtered in Brighton on the 22nd of the previous month. This cow had fresh milk in its udder at the time, and had been milked up to the time it was brought into Brighton, although suffering from extensive tubercular disease involving cervical, bronchial, mediastinal, mesenteric, inguinal and lumbar glands, as well as the peritoneum, pleuræ and both lungs. At that meeting a resolution was passed *nem. con.* that in recommending milk-supplies preference should be given to dairies supplying milk from cows which had been tested by tuberculin with a negative result.

The following table shows the number of tuberculous cows the entire carcasses of which have been condemned in Brighton during the past five years :

Year.	No. of Carcasses destroyed.	No. of Udders affected with Tubercle.	No. giving Milk at time of Slaughter.	Purchased direct from Farm.	Purchased at Market.	Remarks.
1896	11	6	—	4	7	4 of the 11 farms from which these cows were derived supply milk to Brighton.
1897	9	5	3	2	7	2 of the 9 farms from which these cows were derived supply milk to Brighton.
1898	9	—	—	—	9	
1899	11	4	1	2	9	1 of the 11 farms from which these cows were derived supplies milk to Brighton.
1900	15	9	5	6	9	6 of the 15 farms from which these cows were derived supply milk to Brighton.
Totals...	55	24	9	14	41	

Of the total of 55 farms, 13 supply milk to Brighton, and it is a fair assumption that a similar proportion of the farms in which there were cows with tuberculous udders supplied milk to Brighton. Thus of the 55 tubercular cows entirely condemned for tuberculosis during these five years, 24 showed tuberculosis of the udder.

The above table deals with animals which were completely destroyed. In addition to these, during the same five years, three tuberculous udders were destroyed in the slaughter-houses of the town, the remaining parts of the carcasses being passed for food. It will be noted that the 55 cows entirely destroyed for tuberculosis do not represent the total number of cows during the five years in which tuberculosis was found when they were slaughtered in the Brighton slaughter-houses. This number is probably twelve times as numerous. On this assumption, the proportion of tuberculous cows showing disease in the udder is from 3 to 4 per cent. of the total number of such cows.

4. Bacteriological examination and inoculation experiments on animals have proved that frequently cows' milk is capable of producing tuberculosis in other animals.

The following instances are taken from the experience of other towns :

	No. of Dairies examined.	No. producing Tuberculosis.	Percentage producing Tuberculosis.
Cambridge (mixed milk) ...	16	9	56.2
Liverpool :			
1st series { Town milk ...	144	4	2.8
{ Country milk ...	24	7	29.1
2nd series { Town milk ...	228	12	5.2
{ Country milk ...	67	9	13.4
Manchester (Country milk) ...	93	17	18.2
„ (2nd series)* ...	85	12	14.1

The preceding table shows that the mixed milk derived from country herds is more frequently infective than that derived from town herds, in which the supervision and sanitary conditions are more efficient, and emphasizes the importance of the Corporation being empowered to inspect and examine milk and cows without the Borough.

5. Feeding experiments on animals have repeatedly demonstrated the infectiveness of milk derived from tuberculous cows when the

* Given in Report of Medical Officer of Health of Manchester for fourth quarter, 1900.

udder is implicated in the disease. Numerous experimental observations in which calves have been fed with milk derived from tuberculous udders, and have become tuberculous in consequence, might be cited. Experiments have also been made by feeding calves on the same milk which had been previously boiled. The result uniformly was that a large proportion of the former calves became tuberculous, the latter never did.

The unanimous conclusion of the First Royal Commission on Tuberculosis, which reported in April, 1895, may be quoted (par. 22): "Any person who takes tuberculous matter into the body as food incurs some risk of acquiring tuberculous disease."

It appears probable that tuberculosis is conveyed by means of cows' milk only when the tuberculous disease affects the udder. The satisfaction that this statement might otherwise impart is minimized by the following remark of the Royal Commissioners: "It should be noted that this affection of the udder is not peculiar to tuberculosis in an advanced stage, but may be found also in mild cases" (par. 60). Furthermore, "The milk of cows with tuberculosis of the udder possesses a virulence which can only be described as extraordinary" (par. 61). It is also ominous that "the spread of tubercle in the udder goes on with most alarming rapidity." Thus Professor Sims Woodhouse remarks (par. 62): "I have noticed on several occasions during the interval between fortnightly inspections carried on along with a veterinary surgeon, that the disease had become distinctly developed. It may be, of course, that the early evidence has been overlooked at the previous inspection; but whether this is the case or not, the spread of the disease was so rapid as to afford very good ground for alarm. The very absence of any definite sign in the earlier stage is one of the greatest dangers of this condition."

On the strength of the experimental and other facts of which examples have been given above, the Second Royal Commission on Tuberculosis, in their report dated April 4th, 1898, recommended that the notification of every disease in the udder of the cow should be made compulsory on the owners of all cows. They also recommended (par. 8 of recommendations) that local authorities should be given powers somewhat similar to those of Sections 24 to 27 of the Glasgow Police Amendment Act, with power to slaughter cows suffering from tuberculosis of the udder, subject to compensation under the conditions named in the report. The powers of that Local Act are, I believe, more stringent than those asked for in the Corporation Bill. They also recommended that powers should be given to local authorities "to take samples and make analyses from

time to time of the milk produced and sold in their districts, and that milk-vendors should be required to supply sufficient information as to the source from which their milk was derived."

B.

The recommendation of the Royal Commission as to the compulsory notification of every disease of the udder has not been brought into operation except through local Acts of Parliament; but the following regulations were made by the Board of Agriculture, February 7th, 1899, being the "Dairies, Cowsheds, and Milkshops Order of 1899."

"Article 15 of the Order of 1885 shall be altered so that for the purposes of the provisions of paragraphs (a) and (b) thereof, the expressions in the said article which refer to disease shall include, in the case of a cow, such disease of the udder as shall be certified by a veterinary surgeon to be tubercular, and the Order and the Amending Order shall apply and be construed with the modifications necessary to give effect to this Article."

Article 15 of the Order of 1885 provides that if at any time disease exists among the cattle in a dairy or cowshed, or other building or place, the milk of a diseased cow therein (a) shall not be mixed with other milk, and (b) shall not be sold or used for human food.

The futility of this regulation without the necessary powers of inspection, in order that tubercular diseases of the udder may be detected, is obvious. It is further obvious that so far as large towns are concerned, this power of inspection outside their districts must be given to them. The Sanitary Authorities of the vast majority of Rural District Councils, and even of County Councils, embracing chiefly a congeries of rural districts, would not, in my opinion, enforce the powers of Section 50 of the Corporation Bill were they given to them. In the rare and exceptional instances in which such County Councils would be prepared to carry out these powers, it is clear that County Boroughs like Brighton would gain without having shared the necessary expenditure. The County Borough of Brighton is prepared, for its own welfare, to carry out and to bear the expense of carrying out these powers, and thus indirectly benefit the rural community.

TOWNS ALREADY POSSESSING THE POWERS ASKED FOR IN THE CORPORATION BILL.

The following towns, already possessing the powers now desired by the Brighton Corporation, have had addressed to them circular letters, to which the following answers have been received:

1. *Have the special powers respecting tuberculosis been put in force in your Borough?*

Halifax, Hastings, West Bromwich, Southport, and Scarborough have had, as yet, no experience of the operation of the clauses.

Stockport has only put the clauses in force so far as relates to clinical examination of cows by a veterinary inspector, and the exclusion of affected cows from the milk-supply.

At Derby routine work has been done for twelve months, and Liverpool, Blackpool, and Manchester have also put these clauses in operation.

2. *Has any Order been made by the Town Council under these powers?*

From Halifax, Stockport, Blackpool, and Liverpool negative answers have been received.

At Derby the answer is: "No Order has been made by the Corporation except to summon the dairyman, which has been a fairly frequent occurrence, to attend to show cause why an Order should not be made closing his dairy."

The Medical Officer of Health of Derby makes further remarks indicating his view that the making of this Order is a harsh measure, to be adopted only when milder means fail, for instance, when the dairyman has refused voluntarily to exclude the affected cow from the milk-supply, etc.

At Manchester only one Order has been made by the Corporation under Clauses 6 (b) and 6 (c) of their Local Act, which has been in force since February 4th, 1901.

3 and 4. *Has any such Order been appealed against, and what has been the result of the appeal?*

The answer is negative in all cases.

5. *Has any friction arisen between your Sanitary Authority on the one part, and either dairymen or the Sanitary Authorities of districts outside the Borough over which the powers extend on the other part?*

Derby, Blackpool, and Liverpool answer this question in the negative.

The Medical Officer of Health of Manchester says: "None whatever. The Cheshire Milk-Producers' Association do object to cows having undoubtedly tubercular udders being slaughtered under the inspection of the Manchester Corporation Veterinary Surgeon."

At Stockport it is stated: "Up to the present we have not put into force in outside districts any of the powers we possess on this point."

The statement from Blackpool is: "No friction whatever has arisen between the Blackpool Corporation and the Sanitary Authorities of outside districts. With the farmers there has been some slight friction, but it is of no moment. This slight friction is coupled with a number of cases of prosecutions for selling milk from which the fat was said to have been abstracted, but which the farmers maintained was exactly as it came from a cow, and has resulted in an association of dairymen, etc., being formed to protect their interests. I rather welcome this, as one of their rules is against adulteration."

6. *Do you consider the clauses of value to the public health of your Borough?*

The answers from Liverpool and Blackpool are: "Yes" and "Certainly."

The answer from Stockport is: "Yes, of the greatest possible value. There can be no two opinions on this point, I should imagine."

The answer from Manchester is: "Yes, undoubtedly. Over 40 cows having tuberculosis of the udder have been removed from dairies supplying milk to Manchester."

The answer from Derby is: "The value to the public has not been great. Suspicious cows are removed immediately after a sample has been taken. The tendency, I fear, is to create an objectionable trade in cows with doubtful udders, and in consequence other restrictions are very necessary."

7. *Has their operation resulted in any hardship to those engaged in the milk trade, particularly to those outside the Borough?*

Derby and Liverpool answer "No."

From Stockport the answer is: "To the small extent to which we have hitherto been able to employ them (since January 1st, 1900), I have not heard any suggestion of hardship."

The Medical Officer of Health of Blackpool states: "I am unaware of any circumstances up to the present which have caused any hardship. With regard to the tuberculin test, I have got the Sanitary Committee to agree to pay for the milk of the cow which cannot be used for human consumption during the period of the test."

The answer from Manchester is: "The only hardship is where the cows are slaughtered, and the carcasses are then found to be unfit for human food."

A SOURCE OF ERROR IN TESTING FOR SALICYLIC ACID IN PORTUGUESE WINES. A. J. FERREIRA DA SILVA (*Bull. Soc. Chim.*, 1900, xxiii, 795-796).—The Customs authorities of Brazil have recently condemned Portuguese wines on the ground of their containing traces of salicylic acid. The author, however, asserts that salicylic acid is not added to wine in Portugal, and attributes the error of the Brazilian chemists to their having used the method of Pellet-Grobert and Baudrimont (*Dict. des Altérations et Falsifications*, 1897, p. 253), in which 200 c.c. of the wine is extracted with ether. He found that certain Portuguese wines contain a small quantity of a substance having some resemblance to salicylic acid, and of which sufficient can be extracted with ether to give a rose colouration with ferric chloride.

By using the official German method, however, in which 50 c.c. (not more) of the wine are acidulated and shaken with a mixture of equal volumes of ether and petroleum spirit, he has never obtained this colouration.

An analogous phenomenon was observed in certain German and Austrian wines by Medicus (*Berichte, 9th Versammlung bayerischer Vertreter Angew. Chem.*, 1890, pp. 42-48), who concluded from direct experiment that the substance resembling salicylic acid was derived from the stalks of the grapes.—*Analyst*.