

## THE REFORM OF THE MILK SUPPLY.\*

By G. F. McCLEARY, M.D. (Cantab), D.P.H.,  
Medical Officer of Health of the Metropolitan Borough of Battersea.

WITH the beginning of the twentieth century, preventive medicine is entering upon a new era. We are now confronted by a set of problems which are different in many respects from the problems so successfully attacked by the great masters of preventive medicine of the last century, and which call for the application of different preventive measures. The objects which Edwin Chadwick, John Simon, and our other great forerunners of the last century sought to attain, and which to a large extent they did attain, may, I think, not unfairly be described by the phrase "civic cleanliness." They sought to provide pure water supplies; to remove refuse and filth from the vicinity of human beings by establishing improved systems of drainage and sewerage, and better methods of dust collection; to provide open spaces and wider streets; to pave streets, yards, etc.; to raise the sanitary standard of building construction; to provide proper burial grounds; to regulate offensive trades; and to abate the smoke nuisance and the pollution of rivers. Of course we all know that they did very much more than this. Their work was too great and its effect too far-reaching to be described by any single phrase. Still, I think it not unfair to say that, broadly speaking, we may regard the attainment of civic cleanliness as the great object of our public health administration in the nineteenth century. It cannot be said that this object has been wholly attained. In a country whose capital is still supplied with something like filtered sewage as drinking water, it is obvious that there is much yet to be done to secure civic cleanliness. But the point is that any further progress in this direction must, or should, take place on the lines already laid down by our predecessors. Their methods of civic sanitation have stood the test of experience, and all that is wanted is a further development on existing lines. It is otherwise with the new problems that now press for solution. These are problems of a different nature, and demand new methods of treatment, although the principles underlying the methods will be found, probably, to be the same. Preventive medicine in the nineteenth century was chiefly occupied with problems of *civic cleanliness*; in the twentieth century we are confronted with the problems of *personal hygiene*, and the three problems of this kind which appear to me to

\* Read before the Incorporated Society of Medical Officers of Health, 10th February, 1905.

call most urgently for solution at the present time are : (1) The problem of infantile mortality ; (2) The problem of school hygiene ; (3) The problem of the milk supply.

The problem of the milk supply is pre-eminently a question of personal hygiene. The problem is to supply to the consumer, at a low price, pure milk from healthy cows. This is far from being merely a question of cowshed construction and sanitation. No doubt a clean, well-constructed cowshed is an aid to the production of clean milk, as a clean, well-constructed operating theatre is an aid to aseptic surgery. But in milking, as in surgery, the standard of cleanliness of the operator is the condition of paramount importance. The best thing that can happen to the cowshed is that it should be speedily abolished, and the cows allowed to live in the open air, as Nature intended that they should live. This alone would be a considerable reform, tending to improve the health of the cows and to conduce to cleanliness in milking. But much more than this is required. In order to supply the consumer with pure milk, at least four conditions must be fulfilled. First, the cows must be healthy ; secondly, the process of milking must be carried on with the most scrupulous cleanliness of cows, milker, and utensils ; thirdly, the milk, immediately after milking, must be cooled down to a temperature not higher than 40° F. ; and, fourthly, immediately after cooling the milk must be bottled, and the bottled milk kept at a low temperature until it is delivered to the consumer. By the precautions during milking the initial pollution is minimized, and if the milk is promptly bottled the subsequent contamination, especially the contamination within the home of the consumer, which Dr. Newsholme has shown to be the most important factor in the causation of summer diarrhoea, is also minimized. And we must never forget that all this must be done without raising the price of the milk. The problem of the milk supply is really a threefold problem. In the first place we must prevent initial pollution at the time of milking ; secondly, the milk must be protected from subsequent pollution, including pollution within the home of the consumer ; and, thirdly, the milk must be supplied at a price low enough to bring it within the reach of the poor. To prevent initial pollution, our attention must be directed to the farm in the country. Any methods having for their object the purification or quasi-purification in the city of milk already polluted in the country—such methods as sterilization, pasteurization, centrifugalization, or filtration—must be regarded merely as makeshifts, to be abandoned when better methods become practicable.

It is not intended in this paper to point out in what respects our

methods of milk production are defective. We all know that the present condition of the milk supply is a reproach to preventive medicine. There is ample evidence of this in the monumental book which embodies the results of Dr. Newman's valuable work on this subject—work which has conferred distinction upon the whole public health service. My object is to discuss the various remedies which have been proposed. I would only say that the epidemiology of milk is far from complete, and that fuller knowledge will most probably add to the dangers which we now know to exist in the present state of the milk supply.

It has been suggested that in the reform of the milk supply the initiative should be taken by the consumer: that the consumer, instead of regarding the cry for clean milk as something of a "doctor's fad," should realize the dangers that lurk in his milk jug, and make an effective demand for pure milk. This method would certainly lighten the labours of the Medical Officer of Health, but a little reflection will surely show that it is quite impracticable. By what means is the consumer to test the quality of the milk supplied to him? According to the leading English text-book, even a bacterial standard may be inadequate as a test for cleanliness. A milk may appear fairly clean to an ordinary observer, and yet contain pathogenic bacteria. It is true the consumer may visit the shop from which his milk is distributed, and satisfy himself that the china pans on the counter and the gilded cows in the shop-window are in a state of spotless cleanliness, but the initial pollution has occurred miles away in the country, and the cleanliness of the milk-shop is unfortunately no guide to the cleanliness of the cowshed and cows.

When we endeavour to stimulate the consumer to bestir himself and create an effective demand for pure milk, he may not unnaturally retort that that is more our business than his, since we are paid for it while he is not. As a ratepayer, he may point out that he regards his public health department as a specialized organization for the protection of his health, and that if we attach so much importance to a pure milk supply, it is our business to get it for him. This argument appears to me to be unanswerable.

The suggestion that the initiative in milk reform should come from the consumer seems to me to be a symptom of a tendency which is unfortunately very much in evidence at the present time—a tendency to look to education as the main, if not the only road to sanitary salvation. One cannot attend a meeting of sanitarians or open a sanitary journal, without being assailed on every side by prophecies of the glorious results which we may confidently expect from the teaching of hygiene in elementary schools. Questions of administration

seem to be taking a subordinate place, and work which should properly fall to the Medical Officer of Health seems in a fair way to be placed upon the shoulders of the schoolmaster. In the prevention of disease it appears—if I may be allowed to mutilate the famous line from *Locksley Hall*—that the Medical Officer of Health withers and the schoolmaster is more and more. I have no wish to minimize the value of education in sanitary reform, but I think there is just as much, if not more, need for strong and efficient administration. It is not because of education, but because of strong and efficient administration, that small-pox is now practically extinct in Germany. It is true we should be benefited by the German's education, but it is also true that we should be all the better for more firm administration of the German type, and it must be borne in mind that few educational methods are more effective than efficient administration. Every Medical Officer of Health knows the remarkable educational effect of a heavy penalty in an unsound meat prosecution.

It has been suggested that adequate reforms could be secured by transferring the administration of the law relating to milk from the Rural District Councils to the County Councils. I cannot understand upon what grounds the proposed change is deemed to be capable of achieving the object we desire. Wherein lies the difference between the personnel of the Rural District Council and the County Council, that is going to evolve order out of chaos and cleanliness out of unmitigated dirt? In the rural counties, that is to say in the milk-producing counties, both bodies are largely composed of, or at all events controlled by, persons directly or indirectly interested in the milk trade. And what have the rural County Councils done for sanitation in the past, that this confidence should be bestowed upon them? It is worth while to examine this question a little more closely. From a Local Government Board Return to the House of Commons, dated May 18th, 1904, it appears that there are 62 administrative counties in England and Wales. Since these counties came into existence in 1888, every county has had the power to appoint a Medical Officer of Health. In no less than thirty-five counties no Medical Officer of Health has been appointed by the County Council. These are nearly all great milk-producing counties, including such counties as Berkshire, Buckinghamshire, Dorset, Somerset, Norfolk, Suffolk, Kent, and West Sussex, and the three divisions of Lincolnshire. And in many of the remaining twenty-seven counties the Medical Officer of Health is merely a consulting officer, receiving a nominal retaining fee, and is in no sense an administrator. In only sixteen of the sixty-two counties in England and Wales is there a County Medical Officer of Health devoting his

whole time to the duties of his office; and some of these counties, *e.g.* London, Durham, Lancashire, the West Riding, Middlesex, and Glamorgan, are practically large Urban Districts. Taking the rural counties as a whole, it is not unfair to say that they are just as much defaulters as the Rural District Councils, and yet it is proposed to solve the problem of the milk supply by transferring administrative powers from one set of defaulting authorities to another set of defaulting authorities.

Let us consider briefly what is necessary for the efficient administration by a County Council of the Dairies, Cowsheds and Milkshops Order, and the regulations made thereunder. Much more than the appointment of a whole-time Medical Officer of Health is required. It would be necessary to appoint a large staff of veterinary and sanitary inspectors with ample allowances for travelling expenses, and a number of clerks, and perhaps some extra legal assistance. A bacteriological laboratory and a competent bacteriologist would also be necessary. In fact, it would be necessary to establish a highly-organized and well-equipped county public health department. Why the County Council should put the county ratepayers to this expense in order to supply the large towns with pure milk, is a question which the County Councillors would have considerable difficulty in explaining to their constituents at the next election. The ordinary cow-keeper may not have a highly developed sense of cleanliness, but he has a vote, and we must remember that the man with a vote has been made a ruler and master over us. The vote of the rural ratepayer is not likely to be cast in favour of a County Councillor who would seek to restrict and hamper the rural producer, in order that the urban consumer may drink pure milk. The idea that the rural county councils are going to solve the problem of the milk supply for us, seems to me to be based upon a confidence in the immediate possibilities of human altruism which I must sorrowfully confess I do not share. If the towns want pure milk, they must take steps to get it for themselves, and not look to outside bodies to get it for them.

One of the most striking characteristics of modern civic enterprise is the tendency of the city to extend its activity beyond its own borders, to put forth processes, so to speak, into the surrounding districts, in order to serve the needs of its citizens. To obtain pure water, Liverpool has gone into the heart of Wales. There, at an immense cost, she has converted a valley into a reservoir five miles long and over 1,000 acres in extent. Lake Vyrnwy, with its gathering grounds and its aqueduct 77 miles long, must be regarded as a process of the great social organism we call Liverpool. In the housing

question we are moving in a similar direction. By the Act of 1900 an authority can now build dwellings outside its own area, and at the present time London is putting forth huge processes of workmen's dwellings at Norbury and Tottenham. With increased facilities of locomotion, we may anticipate a considerable extension of this movement. In the provision of sewage-works, burial grounds, and isolation hospitals, there may be found other instances of this tendency. In the control of the milk supply the same movement may be observed. Section 4 of the Infectious Diseases (Prevention) Act, 1890, enables the Medical Officer of Health to take action outside his own district. We know of course that this section is unworkable in practice, but still it is an instance of the centrifugal tendencies of modern civic health administration. In the Manchester Milk Clauses, now adopted by many towns in the North of England, another step in the same direction has been taken on the initiative of one of our greatest administrators, Dr. Niven.

The tendency we are now considering is merely an expression of the increasing predominance of the city in modern life. The city is the great energizing centre of our time. Sanitary reform must proceed in the same direction as other tendencies of social development if it is to be effective, and it is, therefore, in the city that we must seek the organizers, administrators, and capital which we require to solve this difficult problem of the milk supply.

It is not, however, to a mere increase of the city's powers of outside inspection that we must look for a really effective reform. It would be impossible to frame a practicable scheme of inspection by which the large towns could adequately control the sources of their milk supply. It would be necessary for each large town to employ its own particular army of veterinary and sanitary inspectors. The cost would be great, it would be practically impossible to prevent much over-lapping, there would be continual friction and all the usual disadvantages of incoordinated administration. The only chance of obtaining genuine reforms by mere inspection lies in a transference of the law relating to milk from the local authorities to a central authority, such as the Local Government Board. This, however, is not in the least likely to take place. Although at the present time there may be a tendency towards increased central control, there is none, I think, towards an extension of direct central administration. In fact the tendency is rather in the opposite direction. In the last Factory Act there was an actual transference of duties from the Home Office to the local authorities. The instinct of local government is deeply rooted in our national character, and any considerable limitation of the powers of the

local authorities, such as is involved in this suggested transference, would be strongly opposed, not only in the rural but also in the urban districts. It is highly improbable that any Government will venture to suggest such an administrative revolution.

But the problem is too great to be solved by any scheme of mere inspection. There are limits to the function of inspection. As Dr. Leslie Mackenzie has pointed out, there are things inspection cannot do: "An inspector can advise, direct, forbid, threaten, prosecute. But at its best inspection is regulative, not productive. It cannot alter the habits of a people, the structure of a society, the economic condition of supply."\* In another and very much simpler branch of Public Health administration the limits of inspection have been demonstrated. No one now will contend that the inspection of private slaughterhouses can be made to yield satisfactory results. All sanitarians are agreed that a well-appointed public abattoir is absolutely necessary to protect us from the "ills that flesh is heir to." In milk control the limits of inspection are really still more obvious, for what we have to do is to inspect not an article but a process. By what system of inspection of surgeons uncleanly by nature could aseptic surgery have come into existence? To obtain pure milk we must change the personnel of the present employés in the milk trade. No amount of inspection will make a dirty man clean; we must displace the dirty man by a clean man. We must substitute for the present milk employé a person who may be depended upon to maintain a decent standard of cleanliness, and observe a reasonable moderation in the matter of expectoration in the absence of external compulsion. Such persons are to be had, but they will demand better pay, and unless economies can be effected in other ways the price of milk will rise and we shall be no better off than we were. Whatever else we do we must not raise the price of the people's milk. If our efforts result in raising the price of milk so as to take it beyond the reach of the poor we shall have done more harm than good. In order to avoid a rise in price it will be necessary to concentrate the milk industry into large producing and distributing units.

In a recent paper Dr. Edmund Cautley has suggested two ways out of this difficulty. His first suggestion is "That milk companies should amalgamate and obtain Parliamentary powers, somewhat similar to those which the old water companies possessed"; that Parliament should "grant to each milk company of a certain size, or, better still, to an amalgamation of several companies, an area of distribution, such as a parish or borough, with certain definite restrictions, *viz.* that the milk must be the undiluted product of the cow,

\* Mackenzie, "The Hygienics of Milk" (*Edinburgh Medical Journal*, 1898).

uncontaminated by preservatives, filtered and bottled at the farm or a local depot, cooled down to 40° F., containing 3·0 to 3·5 per cent of fat and not more than 100,000 micro-organisms per cubic centimetre, and at a price not exceeding 2d. a pint."

There is much to be said for this proposal. There would be a definite fixing of responsibility, the respectable dealers would be freed from the unfair competition of the adulterating scoundrels who now infest the milk trade, and the concentration of the industry into a comparatively small number of businesses would greatly cheapen the cost of production and distribution. The economies in delivery cartage alone would be enormous. But there are obvious disadvantages. We should be handing over our milk supply to a set of monopolist companies, and the history of monopolist companies in this country and in America is not such as should encourage us to add to their number.

Dr. Cautley prefers his second suggestion. He says: "The only plan for dealing with the matter thoroughly seems to me to be the municipalization of the milk supply. That the milk should be managed in a scientific manner, rather than according to the haphazard methods at present in vogue, will be generally admitted. Its management should pass as soon as possible directly into the hands of the municipal authorities, rather than through the intervention of milk companies, which will eventually have to be bought up in the same way as the water companies."

The same conclusion is reached by Dr. Lawson Dodd in his interesting little book, *The Problem of the Milk Supply*.

Both these writers, however, have been anticipated by Dr. Leslie Mackenzie, who was the first, so far as I am aware, to point to the municipalization of the milk supply as the solution of the problem. In the admirable paper from which I have already quoted he writes as follows:—

"As with water, with gas, with electricity, with sewage, with the slaughtering of cattle, with hospital isolation, so with milk; experience is slowly proving that municipal control will remain a feeble and ineffective compromise until the municipalities have a direct commercial interest in the purveying, or preparation, or distribution of milk. Already one observes signs of a tendency in this direction. . . . I do not urge the insane proposal that the municipalities should forthwith acquire the dairies, milk-shops and byres; what I urge as a possibility within the range of ordinary municipal practice is that, as with lodging-houses, working-men's houses, wash-houses, and the like, the municipalities might, by a piece of concrete practice, create the model for a vast industry. If, in the course of time the demand for



clean milk presses on the resources of the municipal installation, these may be extended by many methods."

With these remarks I entirely agree. The more I study this question the more firmly am I convinced that only by an extension of the principle of direct municipal ownership and supply can we bring about a really adequate reform of the milk supply.

#### DISCUSSION.

DR. BOOBYER (Nottingham) said that he was as strongly in favour of progress as any one there present, but in considering the suggestions which this very thoughtful, instructive, and suggestive paper contained, he was impressed with the necessity of looking very carefully indeed at the financial aspect of the matter before they committed themselves to even the most modified approval of it. He could not help feeling that they should bear in mind a quotation from a speech of Lord Rosebery, the gist of which was that they should go slow in municipal expenditure. He came from a town where there was a very strong and influential opposition to the growth of the public debt, which had been largely incurred for the sake of municipal and sanitary improvements, and a good lot of work had been done in the past which was not even now digested. One or two instances would give them an idea of what was passing in his mind. If they were to go on with hospital isolation they would have to spend a good deal more money than at present, or with abattoirs most suitable for the supply of butcher's meat to the consumer. At the present time his Town Council had purchased a piece of land for public abattoirs, but they dare not proceed with any further expenditure in this direction without due regard to what return would be likely to accrue to the ratepayer on the proposed expenditure. Three years ago he had stated at a public meeting that this project was on foot, but they dare not spend the £2,000 necessary for this piece of municipal sanitary furniture. With regard to the proposal before the meeting to municipalize the dairy farms of the country, until that evening he had never heard the suggestion made before. Many years ago he had taken up and had been very proud to support a project for providing clean milk for the infant population of the city he was connected with. A very well-known dairy farmer in the neighbourhood of Nottingham provided a sterilizing establishment at great cost in connection with his farm, and supplied the completely sterilized milk (boiled for 10 minutes) at the exceedingly reasonable charge of 10d. per gallon. This project has had to be abandoned as a commercial failure. They had not, however, given it up. Sterilization of milk must be carried into practice in the not distant future, unless they were to neglect the obvious duty of the governing body. They made two or three thousand pounds by the sale of the milk from the sewage farm, and they would find that the Sewage Commission had said some very nice things about the farm in the report. In conclusion, he thought that even if the milk-producing farms in country districts were under municipal control, unless the scheme was extremely well organized it would be impossible to guarantee the effective performance of proper sterilization.

MR. JAMES SADLER (Sec. of the Cheshire Milk Producers' Association) represented in an official capacity a very large number of dairy farmers and their landlords. The paper that had been read by Dr. McCleary, was as far as he could see, a plea for the municipalization of the milk supply in the same way as water, gas, and electricity. You could manufacture your

gas and your electricity within your own area, and so far as the water supply was concerned, if they attended to the proper filtration, it was very much a question of pipes. With regard to the milk supply it was a different thing. The cows should live in the country, although he could hardly agree with Dr. McCleary that they should be kept and milked in the open air. He was afraid that the proposal to municipalize the milk supply was not quite practical from a farmer's point of view, unless they could see their way to buy up the farms, and the stock in trade, and the cows. In Cheshire alone they had approximately 100,000 cows, which if valued at the low price of £20 each would amount to £2,000,000. He was quite prepared to admit that the ideal of what constitutes clean milk production was too low, but it was a process of education, and on the best managed farms the ideal already existed. They might at present be considered isolated farms, but he did not admit that they were few in number, and in fact they were growing more numerous every day. In his opinion this was the direction in which they, as representing the public health authorities, should develop. They could not do without the farmer, however unimportant he might appear from an outside point of view. They could not do without the dairy farmer, therefore they should approach him reasonably, encourage him, and carry him with them, and they would not find him half so black as he was painted. The dairy farmer, like every other farmer, moved slowly, like the processes of nature with which he was associated, but he was open to conviction, and once he was persuaded that the way they pointed was the right way—right also in the public interests,—then he would move with them, for if he was slow he was equally sure. They should not aim at displacing the present methods of milk production and distribution, but should aim rather at perfecting them. He would suggest that, so far as the country and the milk supply was concerned, efforts should be made on co-operative lines, if they chose, to establish local receiving depôts, where the milk could be taken from the farms to a convenient centre and there dealt with, whether in the direction of sterilizing or pasteurizing, or whatever way was thought best according to the dictates of modern science, with up-to-date appliances established for cooling the milk so there should not be the least risk in connection with it. One of the most important things, in his opinion, that Medical Officers of Health should aim at, was to see that the railway vans were put into something like a sanitary condition. The railway vans in which their milk was conveyed to town were in many cases a perfect disgrace to everybody concerned. He did not say that the railway companies knew of this, but they ought to, and it was the farmers' duty and the duty also of that Society to see that the vans were put into the sanitary condition of what were neither more nor less than travelling dairies. With regard to the distribution of milk, it might be very greatly economized, as it has been suggested by Dr. McCleary, by saving a great deal of over-lapping. With regard to the administration of the Dairies and Cowsheds Order in the County of Cheshire, they had both urban and rural representatives, and his experience was that they held the balance pretty evenly as between the parties. The Rural District Council was alive to its duties in this respect, and they had for some time past been administering the Dairies and Cowsheds Order. In his opinion there was one difficulty, and that was that the onus of putting premises in a proper state was on the tenant and not on the landlord. What did it mean when an order went to the tenant to repair the premises? He had either to persuade the landlord to do it, or do it himself, or give up his business. He was, however, pleased to say that some landlords in Cheshire had risen

to the occasion and done all that was needful. One estate was spending 50 per cent of its income in this direction. Unfortunately, not all landlords were doing it, and he thought that the putting of the premises of milk-producing farms in a proper state of sanitary repair was undoubtedly the duty of the landlords, and the Medical Officers of Health had every right to call upon the authorities to do their duty in the matter.

DR. RAYMENT was in the habit of inspecting a number of dairies in Wiltshire, and could not agree with Dr. McCleary that the milk would not be increased in price by his suggestions being adopted. In his opinion it would be absolutely impossible to supply the milk at the present price. There was no doubt that it was difficult to control the condition of the milk. Milking took place between four and five o'clock in the morning: the masters would not get up, and who was going to see to the men. Cowmen were not what they ought to be about their hands and clothes. If a man got up in an insanitary cottage, went out and put his dirty head against a cow's dirty flank, something must get into the milk pail, and he himself had seen things too filthy to mention in the milk. At the same time he found that there was a great deal of improvement in the condition of the cows themselves. In one instance there were 200 cows at one farm which were curried every day, but that of course meant extra labour, and unless a farmer was paid sufficient for his milk to enable him to employ men at better wages, he would have to give up cows altogether. He was glad that Mr. Sadler had mentioned the dirty vehicles in which milk was too often conveyed. At times they had a good van; at others a dirty fish van or one that had previously carried vegetables. No trains were ever made up twice alike, and they all knew how easily milk was contaminated. It was impossible for the Medical Officer of Health to be at the railway station before eight in the morning to inspect the milk van. He believed that the farmers were quite willing to improve. He did not agree with Dr. McCleary that the cows should be kept out all day. It depended a great deal on the soil. In the winter they would be very much dirtier than if kept in-doors, for if kept out of doors they would usually congregate at a boggy spot. There had been a very great improvement amongst the cows during the last year in his district, and he thought that most of the farmers were alive to the fact that improvement must be made. They did not, however, in his neighbourhood get 10d. per gallon for their milk delivered.

MR. NUGENT HARRIS (Sec. of the Agricultural Organization Society), said that Mr. Sadler had struck the keynote that he would have struck had he preceded him. It was to a large extent a question of education, and much could be done by it. He would give them a very striking illustration in Worcestershire. Three years ago such a thing as sterilized milk was unknown in that part of Worcestershire. He held a meeting in a certain district, a society was started, and last year that small society had £1,000 worth of sterilized milk. They had made a profit. It was sold in Kidderminster and throughout the Black Country, and there was an increasing demand for it. It had been of the greatest possible benefit to the small holders, and they looked upon his society as their best friend. It had also been of the greatest possible benefit to the Medical Officer of Health of Kidderminster, an epidemic of scarlet fever having broken out there, and he found that he could get a good supply of sterilized milk. Requests had been received from other districts to start societies on similar lines. At Bennington, in Lincolnshire, they had a similar society, the last place in the world one would imagine for sterilized milk. Yet the society had found an outlet. The societies got 8d. per gallon for

separated milk in pint bottles. In England the most difficult place in which to get milk was the village, and these societies had actually stepped in and filled the great want. There had been a meeting yesterday on the Duke of Sutherland's estate in Shropshire, and he had met there a farmer who had been making a large profit by the sale of sterilized milk. He also knew of a similar case near Framlingham, in Suffolk. He thought the line to take up was to start co-operative societies and organize dépôts and deal with the milk on the spot. To attempt to deal with it in large towns was a great mistake. In Denmark all the organization was complete for large towns. He had been to Finland and Sweden, and found that organization on the part of the farmers was solving the question of the milk supply there. There the manager of the co-operative dairy had a right to go and inspect any farm and investigate, when the milk arrives in a bad condition. On a repetition of the offence it is fined, and on the third occasion dismissed from the society.

DR. HERBERT JONES said the Medical Officers of Health did not consider that the supply of milk could be settled by sterilization, otherwise if that were the case the farmer would think that he would be able to keep his farm in as bad a state as he chose. He had been a Medical Officer of Health in Cheshire and member of the Agricultural and Farmers' Societies, and two years ago they had had the advantage of hearing a neighbour of Mr. Sadler, Mr. C. B. Davis. He spoke quite as strongly on the question of cleanliness of farmers, but nothing had been said by either of these gentlemen as to the necessity of sterilization. Those Medical Officers of Health who like himself were connected with the rural districts, said that if the farmer would pay the same attention to his cows as he did to his horses, there would be no necessity whatever for sterilization, and the farmer would get a good price for his milk. Dr. McCleary seemed to say that by inspection they could not get dairy farmers to keep their farms in proper condition. He, Dr. Jones, thought they would be much more likely to get it if they could obtain security of tenure for Medical Officers of Health. He would tell them what Mr. Sadler might have told them from his experience in Cheshire. In one part of Cheshire there was a very large factory belonging to the "Milkmaid" brand of milk, and if they were to drive from one farm to another they could tell at once by the condition of the farms and of the cowsheds, which were the farmers supplying the milk to the factory. The farms were kept in proper condition, and that had been done without any pressure by the authorities; merely by the influence of the dairy. This showed that it was quite possible to get what they wanted. As to sterilized milk in bottles, he absolutely approved of milk in bottles as suggested, but not sterilized. If the milk were drawn off in a cleanly manner by a clean milkman, and all the surroundings were clean, and then put into sterilized bottles, it could be supplied two or three times a week in two or three dozen bottles at a time. We should then have a proper supply, not in the dirty, filthy condition in which it is now. The amount of money that would be saved might well go towards the keeping of dairy farms in a cleanly condition. He protested against the notion that any Medical Officer of Health would be satisfied with sterilized milk.

DR. RAYMENT said that if milk were sterilized it lost a great part of its nutrient qualities, and therefore they would be cheating the public by supplying it as a substitute.

DR. J. TUBB-THOMAS said that the county of Wiltshire was alive to the necessity of having its milk sent out in proper condition, and with this end in view the Agricultural Committee of his Council had arranged for a

conference of the whole of the sanitary and rural officials during the present month, for the purpose of considering the proper administration of the Dairy and Cowsheds Order. He thought that when inspection was properly carried out the condition of dairies and cowsheds would be enormously improved. With regard to Dr. McCleary's paper, he was sorry that he felt bound to disagree with him on many points. The main point of a municipal milk supply he thought rather utopian. Was their experience of their municipal organizations quite satisfactory? Take the water supplies, were they all satisfactory? They had a very good illustration, he thought, in the typhoid epidemic at Lincoln. According to Dr. McCleary, if they did anything that would increase the price of milk they would be doing considerable harm. Could they say that if the dairies and cowsheds were in the hands of municipal authorities they would be able to supply milk at as cheap a rate? Was that their experience with other municipal institutions? Then again, did Dr. McCleary propose putting a ring fence round London to prevent milk coming from country districts? (Dr. McCleary disclaimed any suggestion of preventing supplies of country milk.) Then they would have the municipal milk competing with the dairy farmers in the country. Dr. McCleary said that the cost of milk should not exceed 2d. per pint. Had he considered the question of the cost of traffic of milk in bottles, and did he propose having a railway station at every farm? Could the farmer six or seven miles distant from London deliver his bottles of milk to the railway station at the same price as the large churns? Could the dairyman in London deliver milk in bottles at the same price as from the churn? He thought the increased cost had to be taken into consideration at once, and therefore the whole scheme was absolutely impossible. They might say that the milk could be brought to depôts close to the station to be bottled, but that meant further handling and a further increase of cost. With regard to the statement that Rural Councils in England had fallen short in their duties, he would point out that the County Councils in England had no power. When the Dairies and Cowsheds Orders were first introduced they were enforced by the police, and there was considerably more work done then than after they were transferred to the Rural Sanitary Authorities. He was compelled to admit that such Rural Sanitary Councils, composed of farmers, were not the proper persons to enforce the Dairies and Cowsheds Orders. Were the Orders enforced by the County Councils, the condition of affairs would be better than they were at present. Another great danger attendant upon the municipalization of the milk supply was the question of concentrating the milk. The bringing of the milk by large collecting companies and then sending it away had very great disadvantages from a sanitary point of view. If the individual farmer had to send his milk away, he was compelled to have an efficient water supply for the purpose of cleaning his implements and cooling his milk. The farmer who had no efficient water supply would still do what he does now; he would continue to supply it to the collecting companies. The farmer would prefer to supply direct, for the big companies pay a smaller price for it. Then again as to infection; when they received milk in London from the large collecting companies they might find some of it tuberculous. The difficulty of tracing the source of tuberculosis in milk was enormous. He had investigated a case for Dr. McCleary during the last few days. Directly he reached the place where the milk came from he was confronted with the fact that the company in question received its milk from 300 farms, and it was mixed in vans. Where was he to look for this source of contamination? It was impossible to trace the farmer. When they found an

infected milk the dairy company were prevented from sending the whole of their milk away. If the farmer had a proper water supply he would be able to send it away himself, and they would be able to trace any source of infection.

DR. LAWSON DODD, speaking as a consumer of milk, and one who daily felt in jeopardy after reading the admirable reports from the Local Government Board and from members of that Society, said that he had heard no stronger argument in favour of the municipalization of the milk supply than had been adduced by the last speaker. What stronger argument could they have than the fact of milk produced by a number of farms being mixed at one central dépôt, which might all be infected by one dairy farm? They might have inspected nine farms and got them into a fairly good condition, and the tenth might be in such a condition that an epidemic might break out within the jurisdiction of any member of this Society. He believed that at Nottingham, Reading, and other places, milk was already being municipalized, and was a large and profitable municipal industry. Municipal milk dépôts for infants were rising up on all sides. One of the evils resultant from the present system of milk supply was the fact that in the poorer districts of large towns milk was hardly consumed at all. The milk used was inferior tinned milk, exceedingly dirty and exceedingly unwholesome, sent over from abroad. Milk supplied to them from English sources was also in such a condition as to be practically undrinkable, and certainly very dangerous to the person who took it. In his opinion to produce a pure milk supply they must reduce the number of persons who handle it, as much as possible, and each one of those persons must be educated. Because Lord Rosebery said that the municipal debt was growing, was surely no reason why sanitary measures of the greatest importance should be neglected. No doubt that during the last hundred years this municipal debt of this country had been growing. Great administrators like Sir Shirley Murphy would no doubt tell them that the condition of London with its large municipal debt was better than it was with a small municipal debt. It seemed to him that the real question to be decided was whether the matter was serious and urgent. Could they afford to wait for education? A large proportion of the milk coming from the farms was dangerous, and if they were to wait until all those farmers were educated they would have to wait a long time. What they really needed was more disinterested control on the spot, and not merely the man who inspected from a distance. At present it was only when an epidemic had broken out that they were able to have the epidemic traced. As a question of public health reform the municipalization of the milk supply might well be brought forward. In this respect it was not so important to hold their gas and electricity supplies as the milk supply.

DR. WILLIAM BUTLER said they were all agreed that the milk supply in this country, and particularly in the towns, was of a most execrable character. They regarded the condition of their milk as responsible for the very great infantile mortality. Only by improving the conditions of the milk supply could they hope to combat infantile mortality, which hitherto they had failed to reduce. The milk supply from the beginning to the end of its source was subject to contamination. Not only is the cow itself commonly a source of danger, and the condition of the cowsheds, but the conditions of storage. In London they saw enormous risks in its storage in shops and the houses to which it goes, and he had not heard any positive suggestion by which they were to eliminate those risks. He ventured to say they were not concerned in municipal enterprises nor

private enterprises. They were primarily concerned in getting a pure milk supply, but he did not know that any there present were in a position to say that Dr. McCleary's suggestion would solve the difficulties. He was not even prepared to say that municipal control would improve matters. He thought that as to cost, the price would be increased much more by inspection. It would have to be inspected throughout the whole of its course, and even then it would fail. The cost of the inspection would raise the milk to quite a prohibitive price, and it did not seem to be practical. Dr. Tubb-Thomas referred to the mixing of milk in the country; all Medical Officers of Health in London were also well acquainted with the mixing that went on in the metropolis. These were circumstances, he considered, which should make them pause before they declared that the municipalization of the milk supply was a hare-brained scheme. If the farmers did not evolve a scheme to ensure a pure milk supply, then some municipal scheme would have to be considered.

DR. SIDNEY DAVIES thought that the Society was indebted to Dr. McCleary for the very bold way in which he had taken up the question of the milk supply. He could not help thinking that, although the numbers had been against him, the weight of argument was very much in his favour. He understood that it was agreed that everything which was necessary should be paid out of the rates; therefore if there was a general demand, that would be a very good reason why the municipal authorities should deal with the milk supply. Dr. McCleary had shown that it could not be done satisfactorily by private enterprise, and he also said that they would not have to pay more for it. In any case he (the speaker) would like to see the experiment tried, and it seemed the only way before them. It was one of the most important matters they had to consider, and they must at all events supply the milk cheaply. They must consider the poor. Could the people pay for it, or would it come from the rates? For his part he did not care whether it came from the rates so long as they succeeded in getting a pure milk supply.

MR. COX said that there seemed to be a general consensus of opinion that pure milk could not be supplied at the present ruling prices with success, therefore it followed that with the municipalization of the milk supply the ratepayer would have to contribute his quota.

DR. MCCLEARY said that his contention was that, by concentrating the milk industry into large units, such a saving would be effected as to enable milk to be sold without increase of price.

MR. COX replied that if pure milk could be supplied by any process of co-operation it became a question whether the municipality or the local authority should carry on the work, or some other body regulated by control. If the evidence showed that they could not get pure milk at ruling prices and make a commercial success of it at 2d. per pint, and they had had evidence in both directions, it seemed to him that by adopting Dr. McCleary's suggestions they would be making a shot at a solution which was very unscientific, and Dr. McCleary had acknowledged that his scheme was hypothetical. Personally, as one who was not a very large consumer of milk, he should prefer to see the whole cost borne by the consumer. He would certainly like to feel assured that nothing but pure milk was being sold, but he did not see that they would be justified in calling upon the whole body of ratepayers to bear the expense.

DR. WILLOUGHBY, speaking as an inspector of a large number of farms in the West of England, said that they had been told that one of the weak points was the want of inspection when the milking took place at five o'clock in the morning. Increased inspection would no doubt be a very useful

thing, but would the London County Council employ hundreds of inspectors in the country for the purpose? That he thought was impossible. As to the impossibility of tracing infection, he could say that the precautions taken by the company with which he was connected were very thorough. The milk was analysed every day, and no outbreaks of fever had taken place in connection with it during the whole time the company had been in existence. The farmers were as a matter of fact compelled to report any case that might occur under a bond of £200, and could gain absolutely nothing by concealment, and by periodical examination it was very easy to ascertain contamination. He doubted whether the County Councils could do any more, or even as much. He thought, however, that much good might be effected by sweeping away all the petty milk dealers. With regard to efficient water supply, his company refused to deal with farms unless the water supply was satisfactory both for cleansing the implements and cooling the milk. He had refused several farms in Wiltshire on those grounds. He considered that much benefit might result by the co-operation of the farmers with the local authorities in the inspection of the farms.

DR. W. A. BOND considered that one important point ought to be decided, and that was whether it was really dangerous to sterilize milk. A great deal of nonsense had been talked about sterilized milk. They sterilized their bread, their milk, their tea, and their coffee. In fact the greater part of their food was sterilized before it was eaten. In the case of the few articles eaten as non-sterilized food, such as oysters and water-cress, they all knew the result. It was a great pity that they did not emphasize the fact that there ought not to be any danger from the sterilization of milk; it would he thought assist a great deal in the economy of the milk supply. He agreed that all other measures should be taken to ensure cleanliness, but it would simplify matters very much if the milk could be taken to central depôts to be sterilized and put into bottles. A great deal of economy would be effected in this way. One might have a month's supply in this way. With regard to the vans of railway companies it would not matter very much whether they were clean or not, if the cans were properly sterilized and perfectly sealed. There were a few people who could not take cows' milk at all. If one or two people could not take sterilized milk, that was no reason why other people should be deprived of it, and the sooner the notion was overthrown the better.

DR. K. LUTOSLAWSKI (Warsaw), speaking as a medical man, a student of sanitary science, and the owner of a large dairy farm in Poland, as well as a consumer, said that it was not a medical question, but a social one. Therefore in dealing with it they should first inquire to whom was the milk supply of importance? The answer was the community at large. Nevertheless he considered that they could not ask for the municipalization of everything. Water, electricity, and gas were proper subjects for municipalization and payment out of the rates, because they were of use to everyone; but milk was not taken by all, and he thought they would have to leave it to those who took it to organize the supply themselves. He thought the correct solution of the matter was to organize the consumers, by means of co-operative societies, to take the supply of milk. It should always be the duty of the Medical Officer of Health to supervise the supply, and it was quite fair that the ratepayer should provide the inspection, and it ought to be forbidden to produce anything unwholesome. He agreed that education of the persons who handled the milk was necessary, but it was as well to realize that no university men would take to milking cows.



Nor would the Medical Officer of Health, although they would all be quite satisfied if he would undertake it. It was not everything to have a pure milk farm, for the main pollution of the milk was not at the farm but between the farm and the consumer. He thought that the Medical Officer of Health should reform the methods of carrying milk in England. It should always go from a clean cow into a clean bottle, and then to the consumer. Whether this was quite practicable he had his doubts, but what certainly ought to be attended to was the improvement of the methods of carrying milk.

THE PRESIDENT (Dr. J. F. J. SYKES), thought they ought all to feel very much indebted to Dr. McCleary for having the courage of his own opinions and for giving them such an interesting discussion. He would, however, ask Dr. McCleary to make one little correction in his paper. He did not think that Dr. Newsholme said that the contamination within the home of the consumer was the most important factor, but "an important factor." At all events it had not left that impression on his mind. Dr. McCleary made a very good point in saying that if municipal authorities and their advisers attach so much importance to a pure milk supply, it was their business to get it for the ratepayer. Dr. Lutoslawski put the other view of the question, the organization of the consumer by co-operation, but then a consumer becomes a ratepayer and it came back to the same thing, should they employ the municipal authorities to do it? Undoubtedly it was for the municipal authorities to protect themselves. Whether it would be by creating a municipal control over the whole of the district was quite another matter. He did, however, think that the municipal authority could make an object lesson, and as a rule the ratepayer's money was very well spent in showing them how they could spend their money satisfactorily in their own interests. In the building of houses the municipal authorities had already done a great deal of good. Mr. Sadler had fallen foul of the railway vans. There was no doubt that many of them were very bad, but the vessels they carried were ten times worse. If they went on the continent they would not find the abominable open milk pan that they found in England. He had been bold enough to say some time ago that the milk ought to be carried in a closed can, and he was jumped on by members of his authority, who said it was impossible. He had been round to the dépôts, however, and found that some of the large companies were actually sending milk in hermetically sealed cans. He had tried to reason out the peculiar shape of the can in use, and found that it was a survival of the churn, and that was how it used to be carried by the farmer in days gone by. Nowadays the churning of the train made the milk ferment, and the result was that they had to make holes in the top of the can in order to prevent the top being blown off. Then they finished it off with a rim round the top. If they went to the dépôts of a morning they would find the milk running over and being carried back again into the pan. He had opened one the other day, and the milk was actually the colour of the table at which he was now sitting. Another thing he found was that there appeared to be a tradition in the milk trade that when a man carried milk he was entitled to help himself to it. At any rate he had seen railway porters, van drivers with dirty hands, dipping their hands into it, simply because the churns were not sealed. That was the secret of the whole thing. As to the vexed question of sterilization. It was not a question as to whether sterilized milk was beneficial or injurious. It was that milk that required to be sterilized was not fit for food, and he thought that Dr. Bond had entirely missed the point. They wanted pure milk, not to be given sewage and to be told that

it was sterilized and fit to drink. He used that word sewage advisedly, because the bacteriologist in testing milk to-day adopted the same method as when testing sewage. Humanized milk is all bunkum. They could only humanize milk in one way, and that was by passing it through the woman. Therefore all those ideas were absurd, and they must go back to the original idea of getting a pure milk supply. A London authority should take its courage in both its hands and start a farm, get the best advice it could, and run it on the very best principles regardless of cost, and see if milk could be produced absolutely pure. When they had ascertained that, then they would be able to talk with some degree of certainty as to the best methods to be adopted.

DR. McCLEARY in reply to the point raised by Dr. Sykes said that Dr. Newsholme had made the statement referred to in the course of a discussion at the Epidemiological Society in 1903. He was very glad that his paper had been criticized. He wished to provoke a discussion and had succeeded. He had treated the matter as a preventive medicine question; it had other very important aspects no doubt, but he contended that it was not the business of the Medical Officer of Health to deal with those aspects. It was the business of the Medical Officer of Health to stick to his last and to deal with such a matter from the public health point of view. He could not, however, follow Dr. Boobyer in taking Lord Rosebery as an authority on public health. So far the epidemiology of milk had been mainly directed in pointing out that the present condition of the milk supply was a grave public danger. The Medical Officer of Health had demonstrated the existence of the danger, and the public naturally expected him to indicate a way to remove the danger. He had started from that postulate and had attempted to indicate a way. His point of view might be wrong, but at all events it was a fair and honest attempt to get at close quarters with the subject. As to the cost of milk at 4d. per quart being too dear to use in poor districts, large numbers of poor children were fed on cheap brands of condensed milk and worthless proprietary foods. A baby requires a quart of cow's milk every day, and 2s. 4d. per week meant more than the poor could pay. The problem, briefly stated, was they must not sterilize the milk, but sterilize the implements. They must bear in mind the analogy with aseptic surgery. They sterilized their instruments, their hands and clothing, and that is what they had to do in regard to milk. The problem was essentially one of personal hygiene, but the farmer at the present day had very great difficulty in finding milkers of any sort. How much more difficult would it be to find educated and cleanly milkers? The farmer already had sufficient burdens on his back. The problem was a very difficult one. He had proposed that the municipality should start a working model, and that was what their president had seized upon. A working model that should be an object lesson in the same way as with houses. They should say to the dairy farmer, this is the kind of milk you should supply. There would be very great economy in cartage if the milk were distributed from one centre. He suggested that they should start a working model, which would greatly help them in solving the great problem of improving their milk supply.

On the motion of the President a hearty vote of thanks to Dr. McCleary was carried by acclamation.