CONGRESS AT LEEDS.

CONFERENCE OF MEDICAL OFFICERS OF HEALTH.

The proceedings of the Conference commenced with an address by the President, E. C. SEATON, M.D., F.R.C.P., F.C.S., published in the *Journal*, Part III., Vol. XVIII.

"Poisoning by Canned Foods; Hints on its Prevention," by J. BROWN, M.D., Medical Officer of Health, Bacup.

From time to time the public is scared by reports in the daily papers of persons being poisoned by canned foods. Probably some of the reports are not true. Those largely interested in the trade believe that very few of these reports are true, and that a fatal case is very rare indeed, and when one has occurred it has been through gross carelessness in the person not using the senses of sight, taste and smell. The interests involved are so important, in regard to the extent of the business done and the enormous boon conferred to the working classes in having cheap foods and many fruits, which if home-grown would be luxuries for the rich only, that one should be most guarded in dealing with this question.

IMMENSE TRADE.

The canned food trade is an enormous one. Unfortunately the Board of Trade cannot furnish us with statistics. It has been stated that 581,000 lbs. of canned foods are consumed daily in this country; that tinned salmon is so popular that two million people eat it each day. One private firm in Liverpool has a turnover of over twenty million cans per year. The American Bureau of Statistics states that their exports of canned beef alone was 63,698,180 lbs. from June, 1895, to June 1896, and the following year was 54,019,722 lbs. In passing through the streets of our cities, towns and villages we see the windows literally decorated with canned goods. We are really living in what might be aptly termed the "Canned Food Age."

MEDICAL AND SCIENTIFIC EVIDENCE.

My enquiries are based not on newspaper reports got up to scare the public, but from medical and sanitary journals. In

these cases medical men have given reports, which prove to a demonstration that cases of poisoning do occur, and that some have proved fatal. As medical officers of health we are bound to take notice of this, and as custodians of public health to suggest such measures as shall safeguard the health and lives of the people.

I have collected, grouped, and epitomised reports of poisoning from canned foods that have appeared in the medical journals since 1879. Probably I have not observed all the cases reported.

Class A.—POISONING FROM CANNED MEAT.

This includes Beef, Mutton, Rabbits, and Tongues.

1.—1879. Twenty-one persons made ill from eating canned tongues, reported by Dr. Brown, Bacup. "British Medical Journal," 1879.

2.—1882. Family of five persons in Northampton. Canned meat. "British Medical Journal," 1882.

3.—1882. Family in Middlesborough. Tinned meat. "British Medical Journal," 1882.

4.—1885. Three persons in Edinburgh. Canned meat. "British Medical Journal," 1885.

5.—1885. Boy died from eating canned meat. "Lancet," 1885.

6.—1887. Father, Mother, and child aged 18 months; the latter died. Canned Mutton. "British Medical Journal," 1887.

7.—1887. Man, wife and child. Canned tongue. "British Medical Journal," 1887.

8.—1889. Child died from eating the scrapings from empty meat cans at West Bromwich. "British Medical Journal," 1889.

9.—1890. Man and wife died from eating canned meat. "British Medical Journal," 1890.

10.—1892. Family in Oldham. Tinned pigs' tongues. Reported by Dr. Sutton.

11.—1892. Family of eight persons. Canned Beef. "British Medical Journal," 1882.

12.—1892. Woman died from eating canned beef. "British Medical Journal," 1892.

13.—1892. Family poisoned by ox tongues. "British Medical Journal," 1892.

14.—1895. All the members of two families from eating tinned meat. One proved fatal. "British Medical Journal," 1895.

Class B.—POISONING FROM CANNED FISH.

- 1.—1884. Three persons made ill by eating tinned salmon at Great Bowden. "Lancet," 1884.
- 2.—Mother and son; the latter died. Tinned salmon. "British Medical Journal," 1884.
- 3.—1885. Professor Attfeld reported a case of death from eating canned salmon.
- 4.—1887. Death from eating canned salmon reported in "Sanitary Record," 1887.
- 5.—1888. Family made ill. Reported by Dr. Wear. "Lancet," 1888.
- 6.—1891. Six persons in London; one died. Canned salmon. "British Medical Journal," 1891.
- 7.—1892. Gentleman ate six sardines and died; his servant ate one and was ill. "British Medical Journal," 1892.
- 8.—1896. Four persons made ill; one died. Canned salmon. "British Medical Journal," 1896.

Class C.—POISONING FROM CANNED FRUITS.

- 1.—1884. Six persons made ill. Canned tomatoes.
- 2.—1890. Four persons poisoned by canned cherries. "British Medical Journal," 1890.
- 3.—1893. Family of six persons poisoned by canned tomatoes. "Public Health Epitome," 1893.

Salts of tin were found in the liquor of each can in Class C.

In Class A there were six deaths.

In Class B there were six deaths.

In Class C none were reported.

A. Canned Meats.—The poison is probably due to one of the ptomaines, which are of bacterial origin, and may have been produced (1) before the meat was canned; (2) after canning; and (3) after being opened. In the first the toxic properties are probably rendered inert by the steaming process, but the nutritive value of the meat is lessened. In the second case the can is usually in that condition technically known as "blown." The gases produced by putrefaction causing so great internal pressure that the ends are convex instead of concave. There is little danger of anyone consuming these, as the putrid condition and bad smell are so manifest. Thirdly, after being opened under certain conditions of the atmosphere, as humidity and temperature, foods are rapidly acted upon by bacteria, which form toxins, some of which are more dangerous than mineral poisons. This is particularly so in regard to fish, salmon being the worst. It is only just to say that the wholesale and retail

traders are most careful in examining cans and rejecting those which are blown or pierced. This is in all probability why the cases of poisoning are not more frequent.

B. Canned Fish.—In this ptomaines are the chief poisons, salmon being the kind of fish which in nearly all cases has been associated with poisoning. From what one has read in the daily press and from the physical conditions of some cans of salmon it is probable that a good deal of it undergoes putrefactive changes before being canned. We have seen salmon which has had a paleish, yellow colour, soft, and friable, in contrast with the firm, red, and flaky appearance of sound muscle. Canned salmon is not very popular with the public. The great canning firms will do well to take all necessary steps to ensure that all meats and fish are prepared and canned under the strictest hygienic conditions.

C. Canned Fruits.—In these the salts of tin and zinc have been the poisons. I am not aware of any case having ended fatally. The symptoms have been those usually associated with metallic poisons. From the analyses which I have made I find that cans in which lead is used in tinning or soldering that these are present in the fruit and syrup, due firstly to the action of natural acids, and secondly due to galvanic action. The amount of lead in some pears and apricots was such that in time it would produce plumbism with its manifold symptoms. The amount of metal in some cans was sufficient to give the fruit a metallic taste.

At least one case has proved fatal from lead poisoning in a child. Professor Lowry, of Baltimore, made a post mortem, and found lead in the viscera, also in the oil and sardines remaining in the tin. The verdict was "Death from lead poisoning from a sardine tin improperly soldered."

SOME CHEMICAL AND PHYSICAL OBSERVATIONS.

1. *Acid Reaction.*—There was an acid reaction in all the liquids of the cans of meat, fish, and fruits except one, a can of oysters, which was almost neutral or feebly acid. The acid was organic; no mineral acids.

2. *State of the Tins.*—More or less corrosion and discolouration present when metallic salts present in the liquid.

3. *Metallic Contamination.*—In meats the metal is chiefly found where it is in contact with the soldering and plating; in fruits it is present in the syrup; also throughout the substance of the fruit. In the syrups, with but one or two exceptions, a certain amount of tin and lead (whenterne plating has been used) have been present. Mr. Wynter Blyth examined over twenty cans of fruits, and found tin in every one, the amount

being 1·58 to 11·05 grains per lb. Dr. Sedgwick also found tin salts in every case of apricots, pine apples, peaches, and tomatoes, that he examined. Dr. Luff examined syrup from a can of cherries, which had caused metallic poisoning, and found the enormous amount of 1·9 grains of oxide of tin for each ounce of juice. Each person poisoned had taken from four to ten grains of malate of tin.

4. *Plating and Soldering*.—Being fortunate in having a number of canned foods for examination, I am able to compare the plating and soldering of over twenty years ago with that of to-day. The old cans, when opened, showed a bright, silvery appearance, and the soldering free from corrosion, and very narrow seams. No lead was to be detected in the plating. Two cans which were of recent date had double sealings, one was lobster and the other salmon. Both were suspicious in their physical appearances. None of this stamp were discovered among the old firms. It has been stated that some American firms rescal blown tins. The cans then have their former normal concave appearance again.

EFFECTS OF AGE.

All canned foods are better for being used soon after canning. How long foods hermetically sealed will keep is not definitely known. Fortunately, having had canned foods, including meats, soups, rabbits, giblets, oysters, etc., of from twenty to thirty years old, I found that the tins, though rusty outside, were perfectly good inside, none were blown. The meats were sound, though not as fresh and tempting to the eye as recently canned foods. One family, consisting of seven persons, consumed over 20 cans, and another lot of 13 canned rabbits was partaken of by a club. In no instance was anyone made ill. In canned fruits the effect of age is of greater importance, as the acids of the fruit dissolve by chemical and galvanic action the plating and solder. It has been shown by Professor Guteau, of Paris, that the amount of metal increases with age as follows: 1st year, 1·2 mil. grs. per kilogram; in two years, 2·1 mil. grs.; and after three years, 4·2 mil. grs. per kilogram.

HINTS ON ITS PREVENTION.

What the Trade should do.—All the canning stations for meats, fish, and fruit should be under the control of such by-laws of the sanitary authorities as will ensure that all the conditions necessary to the purity and soundness of the goods are enforced. In canned fruits it is very rarely that one can detect any decayed fruit, the fruit as a rule being exceptionally

fine. 2nd: If canned goods are to be continued it is necessary that the plating should be of pure tin, unless a satisfactory substitute can be discovered. In recent times the plating has seriously deteriorated, an alloy of tin and lead being used, containing two parts of tin to one of lead, and in some cases as much as two of lead to one of tin. This alloy is called "terne plate." I find this is most common in canned fruits. The severe competition has no doubt brought about this serious deterioration, since the plating tin costs £62 per ton, whilst lead costs only £14 per ton. (3) All canned goods should be kept in a cool and dry place. Shop windows should not be filled so that the tins are heated. In canned fruits this especially is harmful, as it promotes alcoholic fermentation. The syrup is very watery, being only about specific gravity 1140 to 1180. I believe that a well boiled syrup of 1250 spec. gravity would have less tendency to ferment. Fruits should be whole and unskinned, so that any metallic salt in the syrup would not saturate it. "Terne plated" cans should be forbidden for all goods, but especially for fruits. (4) Fruits preserved in jars or bottles are more desirable. Canned foods have three factors greatly in their favour: 1st, cheapness—about 10s. per gross for 1lb. tin; (2) lightness; (3) durability. Jars have three factors against their use: (1) cost—18s. gross for 1lb. jars; (2) weight; (3) fragility.

HINTS TO CONSUMERS.

Avoid cheap brands, there is 50 per cent. difference between the best and cheapest. Only purchase canned foods that have the name on them. Keep in a cool place. When opened empty the contents at once into a jar or glass vessel. Consume the same within one or two days, as some canned foods rapidly undergo chemical changes, especially fish, such as salmon. Blown cans of meat and fish should be thrown away. Blown fruit is really no worse in regard to colour, taste, and appearance, as the result of alcoholic fermentation. The only danger is that there may be metal in the syrup or fruit. In regard to canned fruits, pears and apricots have shown the largest amount of dissolved lead and tin, probably due to the large amount of acid in the juice of these fruits. Pine-apples have shown the least amounts, and in my opinion they are the safest fruit to buy under the present mode of canning. Avoid all fish, especially salmon, that has a yellowish soft and friable condition, showing that putrefactive changes have taken place before canning. Examine the plating of the inside of the can. This should have a silvery white appearance; if it is corroded,

reject it. If it has a blueish slate colour it will be risky, especially if it contains fruit. The plating has been done with an alloy of tin and lead. In some cases I have seen the soldering $1\frac{1}{2}$ in. wide. Cans doubly sealed with soldering are suspicious. I had two tins, one salmon, and the other lobster, both suspicious. In my opinion there should be a non-metallic coating for cans, which should be perfectly safe.

Suggested Substitutes for Canning.—Probably a light, cheap, and durable substitute may yet be found, and solve the problem. Aluminium is abundant in nature. The earth's crust only needs scratching to find it in all our clays and shales. An inventor with the genius of a Bessemer may do with aluminium what Bessemer and Siemens did in the production of steel from iron. Aluminium is tough, fibrous, light. Aluminium atomic weight is 27.3, iron 56. It is non-oxidisable, insoluble in organic acids. It would require no plating, Hydrochloric acid dissolves it, hence this acid should not be used as a flux. If aluminium should be dissolved, its salts are not so dangerous as those of tin and lead. The price of aluminium is at present too high.

WHAT THE GOVERNMENT SHOULD DO.

(1) Forbid the importation of canned foods in which the tin used for tin plating contains more than one per cent. of lead, or more than ten per cent. in the solder. This law has been in force in Germany since 1889. (2) That the soldering should be on the outside of the can. This regulation is enforced in France and Germany. (In one recent can I found over 40 grains of solder amongst the fruit.) (3) That the date of canning should be legibly stamped on each can. This is very important in regard to fruits. It has been proved by Professor Gautier, of Paris, that the amount of metal dissolved increases with keeping.

The following important resolution was passed:—

“In view of the evidence submitted to the Conference of Medical Officers of Health, held in connection with the Congress of the Sanitary Institute at Leeds, they recommended the Council of the Institute to urge the Government to inquire into the prevalence of cases of illness due to the use of canned foods, and to adopt such action as the evidence would justify.”

(For action taken by the Council see p. 132.)

A paper was read by Prof. S. DELEPINE, M.B., B.Sc., on
*“Bacteriological Diagnosis as applied to the Notification of
 Infectious Diseases.”*

“*The Furnishing and General Administration of Small Isolation Hospitals*,” by MEREDITH YOUNG, M.D., D.P.H., Medical Officer of Health, Borough of Crewe.

THIS question is one which I think of interest to Health Committees and Health Officials generally, and it is one on which it is extremely difficult to obtain detailed information. I have spent an immense amount of time in working out details from various sources, and I have now much pleasure in laying these before you. From the very nature of the subject such a paper as mine can only be scrappy, and I need not therefore apologise for that defect.

The *Administration Block* may be furnished pretty much as an ordinary private house, but in the wards there are several special articles of furniture to consider. The most important piece of furniture in the whole Hospital is undoubtedly the *bedstead*. If it be not comfortable the patient will suffer, and if it be not strong and well made, it will not stand against the constant wear and tear of hospital life—for a hospital bedstead, unlike a private one, gets no rest day or night, it may be for months together. The bedstead then should be all iron, with double or treble galvanised wire-wove mattresses, and with tubular and not angular sides. The castors should be of lignum vitæ preferably, and not china bowl, for the latter chips and is then liable to scratch the floor.

These castors should be supported on malleable iron horns—the horns being usually the weakest part of a castor.

The *Cots* should have both sides to slide down, not to fall outwards, and the sides are better to be the same height all round, or very nearly so, to prevent restless children climbing out. They are better without brass knobs, for children constantly screw these off for playthings. If they look sombre without these knobs, they can be enamelled in white or French grey.

Mattresses are best made of horsehair, and for a bed 6 ft. 3 ins. long by 3 ft. wide should contain 21 lbs. of good curled horse-hair.

You will raise a hornet's nest about your ears if you specify this, for the makers of these things think nothing of a mattress which is not thick and heavy. A thick mattress is not required where a woven wire mattress is placed beneath it, and thickness is a decided disadvantage when disinfection has to be

frequently done. The root of the objection raised by mattress-makers is obvious; it is that *good* horsehair weighs very light. Cloth tabs or tufts are better than leather ones, as they stand disinfection better. Cot mattresses of a fairly common size, 4 ft. 6 ins. by 2 ft. 6 ins., should contain about 12 lbs. of good curled horse-hair.

All mattresses should have covers of strong unbleached linen—they save a good deal of wear.

In the matter of pillows opinions differ, some preferring feathers and others wool. For myself I never wish anything softer, cooler, or more comfortable than one filled with clean white wool flocks. If feathers are used it should be seen that the inside of the pillow tick is bees-waxed, and not merely soaped.

The *patients' lockers* are perhaps the next most important item, and I have spent much time in designing one to meet the necessary requirements.

This is made of polished pine and is about 28 to 30 inches high, the height being such that the patient can easily reach the top of it when lying down in bed. The top is 16 inches wide by 14 inches deep, and has a thin brass rail with screw pillars to run round three sides of it—thus avoiding corners for dust which would be found if a wooden strip or rail had been used. The top should be made with a white glass plate $\frac{3}{16}$ to $\frac{1}{4}$ inch thick, firmly and evenly bedded and let into the wood; the bedding of this glass plate is extremely important, as if it be uneven the glass will be unsupported at some part and will probably break when some such thing as a soda water syphon is put down clumsily on it.

The locker has a drawer, 6 inches deep with plain wooden knob, for private valuables of the patient, and a cupboard 18 inches deep beneath this with a wooden knob and catch. The locker is mounted on four stout wooden legs on castors, and the legs should form part of the sides of the locker and not merely be screwed on to the bottom of it. These legs are 4 inches long and will allow a sweeping brush to pass under the locker. At the *back* of the locker is a towel-rail—these are usually put at the sides, and if the towel be at all soiled it does not look pretty in full view of the ward. These lockers should not cost more than from £1 to £1 2s. 6d. apiece.

A curious double locker with bed-table combined was designed, I believe, by my friend, Dr. C. K. Millard, of the Birmingham City Fever Hospital, to whom I am indebted for many valuable hints on the subject of furnishing. It consists of a double locker with a special removable top which does duty as a bed-table. I believe Dr. Millard admits its disadvantages, which are:—firstly, that it is only very little cheaper than the

three articles separately and that sometimes the two patients for whose use it is intended both want to use it at the same time.

I am aware that some people object to having lockers in an infectious ward at all because of the infection, and prefer to keep all the patients' clothing in a special store-room. But a patient always has a few things that he wishes to keep near him, and the ward usually develops a most untidy appearance if there be no special place for them. It is quite an easy matter to have a "locker morning" and to have them all turned out and all rubbish removed.

In the Birmingham Fever hospital, I observed with great pleasure that in the scarlet fever block a special low table 20 inches high, was provided for children. They can then sit to their meals and have their feet resting on the floor instead of swinging in mid-air. This table also did duty as a bench for 6 or 8 children on days when feet were to be examined; if they got restless while waiting for the doctor they had not far to tumble.

Easy chairs in a fever ward are generally of a bare and uneasy type, without any cushions and with many angles. I do not see why this need be so, for the cushions can be removable and tied on with tape; they can then readily be detached and disinfected, and the framework scrubbed with soap and water or sprayed with perchloride.

The ward screen should be of polished pine or birch, and should resemble as much as anything an ordinary clothes horse, with coloured washing cretonne tied on and hinged with brass hinges to open either way.

There is a craze at present against the use of cocoa fibre door mats for ward entrances, presumably on account of their power of retaining infection, and wire mats are recommended in consequence. But those who have tried wire door mats know that they are nothing more than scrapers which do not remove the wet off one's boot soles, but the surface dirt only, and I believe it is almost universally found that fibre mats are needed in addition to the wire mats. I see no difficulty in the disinfection of these fibre mats, for if it is not possible to put them through a steam disinfecter they can be soaked for hours in perchloride solution, and it will also do the fibre good.

There is sometimes a difficulty in the carrying of patients' food across from the administrative block kitchen to the wards, and in order that the food shall be warm when it reaches the patients, I think the best things to use are enamelled iron luncheon carriers similar to those made by Mr. E. Kirk, of the town of Leeds.

In connection with the *baths* of an isolation hospital, it is important to make provision in the scarlet fever block, in this

respect as well as in many others, for the special needs of children, and I strongly recommend a plan I saw at the Birmingham Fever Hospital, of having the baths in the first place small in size (and therefore economical of hot water), and in the second place raised on a concrete foundation some 6 or 8 inches from the floor. The latter plan is excellent inasmuch as it saves the nurse's back when she has half-a-dozen children to bath.

Another useful modification I saw at the same Institute, was a bath placed in the centre of a room, and with a wide board all the way round the top so that children could sit down, half a dozen at a time, and soak their feet when desquamating.

Some consideration should be given to the material of which baths are made. Putting copper ones aside as too expensive, we have three principal kinds left—enamelled iron (cast iron), zinc and porcelain.

1. The enamelled iron ones are inexpensive and usually good, but they take up a lot of heat from hot water, and they rust and discolour if the enamel gets chipped.

2. Zinc baths are not lasting—the bottoms bend out of shape, and they seldom look clean or inviting.

3. Porcelain baths last a long time, and have a very pleasant smooth surface. They are very heavy, and absorb a great deal of heat from hot water—though this is not a disadvantage, where many people have to be bathed quickly one after another.

Their smoothness may at times—though it is only rarely—prove a drawback, from old people or invalids slipping on them.

The outlet of the bath should be large— $1\frac{1}{2}$ ins. in diameter or more—as if it be small the bath will take a long time to empty, and patients and nurses will be kept waiting. The inlets and outlets, or supply and waste, should be entirely separate; if they are both at the same orifice, some of the dirty water from the previous bath will be washed back by the clean water entering. Waste of water too with this combined arrangement can go on unnoticed.

Bath thermometers of a very useful kind are made with a copper wire fastened to the top of the thermometer, and continued upwards for six or eight inches, then bent round in the shape of a hook so that they may be hung over the side of the bath, the bulb only being immersed.

The ward thermometers may very usefully be made with a contracted scale—from 50° F to 70° or 75° F—and with a lens front so that the indicating column will be magnified, and can be seen at a distance. It is useful to have temperature charts kept in the wards for recording *ward* temperatures; these should be marked at regular intervals of four hours or so by the nurse in charge of the ward, and the medical officer or matron

can then see at a glance if there be any great irregularity in temperature. This plan also serves as a means of drawing a nurse's attention to the temperature of the ward.

In the lavatories I do not think a more useful fitting can be found than Twyford's patent slop-sink; the bed-pans are emptied into this—held upside down—a tap turned, and a jet of water is sprayed upwards so as to wash out the pan without the necessity of the nurse using her hand for it.

If possible in the lavatory a draining rack or shelf should be provided for bed-pans, and I have an idea for this to be made in such a way that the water draining from them is conveyed along an inclined impervious shelf to the slop-sink direct, and the bed-pans are warmed by means of a coil or loop of hot water pipe from the lavatory adjoining which circulates under the shelf on which the bed-pans rest. I have not yet worked out the details of this but it appears a feasible scheme.

The provision of coals to the wards is often a troublesome detail to arrange, and so far as I can see it may be managed in one of three ways:—

1. By having four or five coal scuttles filled every morning and evening if necessary, by the porter, and stood in the verandah outside or passage inside the pavilion.

2. By having a large wooden cupboard close to the ward entrance outside, the porter to fill this as often as required. This is usually unsightly, and the nurses have after all to go outside for their coal.

3. By having a coal-bunker on wheels similar to that made by Messrs. T. Bradford & Co., of Manchester. This can be made in ornamental wood and with rubber tyres on the wheels so that it can stand in the entrance and be wheeled into the wards when required.

In connection with this subject, if the hospital is to be heated by means of steam pipes, it is advisable to have any steam radiators which may be erected protected by wire netting; otherwise the children will continually be burning their fingers.

There are many other matters of detail which mean comfort to patients and ease in administration, but time does not permit me to touch upon these. I pass now to a brief consideration of various plans of the *general management of an Isolation Hospital*.

Commencing with very small places, a common practice of hospital authorities is to engage a man and his wife as caretakers and general managers of the hospital, allowing them to live rent free in return for their looking after the place, and when it is occupied perhaps paying them a little extra.

This appears excellent on paper, but I have several objections

to it. The most serious is that the people are very often employed by the authority to act as nurses, and no one here will, I am sure, advocate anything else than that sick people should have the benefit of a properly trained nurse. It is, as we know, a question of life and death in typhoid fever. An ordinary caretaker and his wife, too, are very rarely trained in the measures necessary to prevent the spread of infection, and if this be so the utility of the Isolation Hospital becomes impaired.

The second objection is, that when the authority utilise the man and wife as caretakers simply, and get properly trained nurses when the hospital is occupied, there is often a dispute as to authority—the caretaker looking upon himself as lord of the place—and the nurses suffer from inattention to their wants.

In all such cases as these I think it is of the greatest importance to impress upon the caretaker and his wife that the wants of the nurse must be their first thought, and they must be made to understand that the nurse is the more responsible person and must be respected accordingly.

It must be remembered that when friction does arise in this manner the innocent patient is the principal sufferer.

Still another objection to the "man and wife" system is that one seldom finds the two people equal in working qualities, that is if you manage to secure an energetic woman you have often a good-for-nothing husband tied on to her apron-strings.

Where this system is inevitable, however, the Medical Officer of Health, before engaging the caretakers, will do well to pay them a surprise visit at their own home and see how that is kept.

The next system of administration for small places is to have the hospital staff to consist of a permanent nurse matron, with one general servant, one or more nurses, according to the number of patients in, and a porter to live off the premises—the latter to act as ambulance man, disinfecter, gardener, boots, and odd man generally.

This staff should suffice for a hospital accomodating up to about twelve patients, the matron to take a share of nursing and help with bad cases, and to engage laundry women from outside. It is important for the porter or odd man to live within easy call, for amongst his duties will be that of helping to remove dead bodies to the mortuary—a thing which may have to be done in the middle of the night, and of helping with delirious patients (and we all know how very rapidly a patient may become violently delirious).

Authorities constantly complain of the expense of maintaining a fever hospital, with perhaps only three or four cases in,

forgetting that separate diseases need separate nurses. This is a thing which cannot be helped by any means—it must be looked straight in the face.

Where the hospital is to accommodate over twelve and up to twenty or more patients the housekeeping duties of the matron will prevent her acting as a nurse except in the way of general supervision.

The nursing staff will, of course, have to be increased as the patients increase, and so will the servants or attendants, and taking these altogether the matron will have a fairly large party to organize. A word as to the matron's qualifications. She should, of course, be a fully trained nurse, or some difficulty will be found in getting trained nurses to act under her. She should, if possible, be of a higher social status than her subordinates, for though dignity in excess may be undesirable it is not so lamentable as to see a break down in discipline and organization resulting from the matron of a large establishment taking tea in the kitchen with her own cook! The matron should have the power of engagement and dismissal of nurses, servants and attendants, or if not this, certainly of all the female staff.

A Committee cannot judge so well as she of the qualifications of a nurse or of a servant, and this power of dismissal is a wonderful help to the smooth working of an establishment. Committees who have been badgered by nurses appearing before them to state their grievances will uphold the truth of my contention.

The next question to which I would direct your attention is one of great importance, especially in the case of hospitals just about to be opened. Shall the medical men of the town attend their own cases, or shall their responsibility cease when they have notified to the Medical Officer of Health that the case is one for removal?

My own opinion, after a great deal of consideration of the question is that it is not advisable in the large majority of cases for practitioners to attend their own patients at the Isolation Hospital. The only exception I would make is this—that where a patient after having it clearly explained to him that so far as medical attendance at least is concerned he will not be charged anything by the Hospital authorities, but that if he has his own doctor he must pay his own doctor's bill, if after clearly understanding this he makes it a condition of removal that he shall have his own medical man, then I would most certainly say let him have his own doctor, but the patient must be removed. Isolation of the patient must be our first consideration. If we have half a dozen doctors attending their own

scarlet fever cases it will to a very large extent undo the good effects of isolation, or, in other words, the daily visits of several medical men to a building in which infectious cases are congregated will be fraught with danger to the community. Medical men of the opposite view will say:—"I can take precautions by putting on a cloak, disinfecting my hands, &c., and I shall be no more likely to carry infection than the Hospital Medical Officer who will probably be the Medical Officer of Health, and will be in this capacity visiting the houses of the people." This is quite true, but it stands to reason that there is not so much risk, by a good way, of one medical man carrying infection as there is of half a dozen, and, it must be remembered the private practitioner may go straight from the Fever Hospital to the bedside of a sick person who is in a state to receive infection, whereas the Medical Officer of Health deals not with the sick person himself but with his surroundings. The private practitioner may say "I can arrange my visits so that I call at the Fever Hospital last, and therefore the objection that I may go straight from it to a sick person's bedside does not hold." My answer is that it needs a very strong mind to sacrifice convenience to conscience on a busy day, and even if the Hospital visit be carefully left to the last the practitioner may be called into a house urgently five minutes after he has left the Hospital.

As a rule, I believe, practitioners, though they may fight strongly at first for their right to attend their own cases, very soon give it up, finding it damaging to their practice.

I have in my mind one fairly large district in which this has been the case. There are other objections to this course of medical men attending the fever hospital and potent ones, but time compels me to omit their consideration.

Though I have thus argued against the regular attendance of private practitioners at the Isolation Hospital, it must clearly be understood that if the patient or his friends desired a consultation or if the case assumed a serious complexion, the hospital medical officer would in common professional courtesy communicate with them.

Should the question come up before any hospital committee I certainly think that nothing can be lost and much may be gained by a conference between the hospital committee with their medical officer and the local practitioners. And even if practitioners be allowed to attend their own cases it is always as well to leave the general superintendence of the hospital in the hands of the Medical Officer of Health, who should alone be responsible for the admission or discharge of patients.

Passing on to the general regulations of the hospital, there

are just two points of special importance, but which are not generally adopted :

1. The ambulance attendant should be instructed in no case to remove a patient unless he has a medical certificate of fitness for removal, or what is a better arrangement, he should take his instructions for removal of cases from the medical officer only, who in his turn should insist upon this medical certificate.

2. It is as well, considering the doubtful termination of the infectious period in scarlet fever, to send to the parents of each case, on its discharge, a written notice stating that although every precaution has been taken it is impossible to guarantee absolute freedom from infection and therefore the child should not, for a week, or two, be allowed to sleep with other children, or be sent to school, but should, if possible, have a couple of weeks in the country.

I may, perhaps, be permitted, in terminating this somewhat lengthy paper, to give briefly the average cost of the upkeep of isolation hospitals. Exclusive of interest on the construction of the hospital, and including all salaries and wages, the cost of upkeep should be about £25 per bed per annum.

The cost per patient will be about £10 or £12 per annum, for current expenses only—salaries, wages, &c., exclusive of interest on cost of construction. There is, however, a very wide difference in different institutions. The cost of furnishing will not I think in any case be less than £15 or £20 per bed.

“Tenemented Buildings, and Duties on Inhabited Houses,” by
JOHN F. J. SYKES, D.Sc., M.D., Medical Officer of Health,
St. Pancras.

(FELLOW.)

WHEN your Recording Secretary asked me if I would read a paper before this Conference, giving some account of the Customs and Inland Revenue Acts, so far as they affected Artizans' Dwellings, I cheerfully acceded to the request to lay before Medical Officers of Health such knowledge and experience of the subject as I had gained. Accordingly, I determined to make the subject as complete as possible, and to begin at the beginning, and then my troubles began also. I experienced many difficulties in obtaining historical information, but I hope that

the information which I am about to lay before you—and which has never before, to my knowledge, been collated—will prove acceptable.

It was not until the 3rd century that glass appears to have been used in windows in Europe.

It was not until the end of the 12th century that glass was used to any extent in the windows of private houses in England.

The glass had to be imported then, and it appears to have been regarded as a luxury.

In Britain a window-tax was first imposed in 1695, was several times increased, and in 1850 produced £1,832,684.

The effect of this window-tax must undoubtedly have been to exclude much light and air from dwellings, and knowing as we do the value of light and air, it is surprising how little notice is taken in most works upon public health of the imposition of this tax, and of its repeal. And yet its repeal must have largely contributed to the improvement of the public health.

For the purpose of more strictly assessing this window-tax, in the year 1808 the following provision became law:—

48 GEORGE III., c. 55.—SCHEDULE B.

Rules for charging Duties payable on Inhabited Dwelling Houses.

RULE VI.—Where any house shall be let in different storeys, tenements, lodgings, or landings, and shall be inhabited by two or more persons or families, the same shall nevertheless be subject to, and shall in like manner be charged to, the said duties as if such house or tenement was inhabited by one person or family only, and the landlord or owner shall be deemed the occupier of such dwelling house and shall be charged to the said duties; provided that where the landlord shall not reside within the limits of the collector, or the same shall remain unpaid by such landlord for the space of twenty days after the same is due, the duties so charged may be levied on the occupier or occupiers respectively, and such payments shall be deducted and allowed out of the next payment on account of rent.

Under this provision a very important case was decided in 1851, the case (No. 2207) of the Model Lodging House in Streatham Street, Bloomsbury Street, St. Giles, Middlesex. (As the cases quoted in this paper are very important they are quoted in full in the Appendix.) This case was an appeal by the owners, against an additional assessment made for 228 windows in the premises, the owner claiming that the building was not one dwelling-house, but consisted of many distinct tenements, and that the access to each story was by one staircase on the outside, and by external galleries open to the air used

as roadways to separate and distinct dwellings, each with its own outer door. Three of Her Majesty's Judges, who heard the appeal, decided in favour of the appellants who were successful, and the assessment was discharged.

In the same year the window tax was repealed and the following Act became law, but Rule VI., Schedule B of 48 Geo. III., c. 55, still governed the manner of assessment as it does to the present moment:—

14 & 15 VICTORIA, c. 36.

An Act to Repeal the Duties Payable on Dwelling Houses according to the number of windows or lights, and to grant in lieu thereof other Duties on Inhabited Houses according to their annual value. 1851.

* * * *

SCHEDULE.

The Duties by this Act made payable upon inhabited dwelling houses in and throughout Great Britain, according to the annual value thereof; that is to say—

For every inhabited dwelling house which, with the household and other offices, yards, and gardens therewith occupied and charged, is or shall be worth the rent of twenty pounds or upwards, by the year,

Where any such dwelling house shall be occupied by any person in trade who shall expose to sale and sell any goods, wares, or merchandise in any shop or warehouse, being part of the same dwelling house, and in the front and on the ground or basement storey thereof;

And also where any such dwelling house shall be occupied by any person who shall be duly licensed by the laws in force to sell by retail beer, ale, wine, or other liquors, although the room or rooms thereof in which any such liquors shall be exposed to sale, sold, drunk, or consumed shall not be such shop or warehouse as aforesaid;

And also where any such dwelling house shall be a farm-house occupied by a tenant or farm servant, and *bonâ fide* used for the purposes of husbandry only;

There shall be charged for every twenty shillings of such annual value of any such dwelling house, the sum of sixpence.

And where any such dwelling house shall not be occupied and used for any such purpose and in manner aforesaid, there shall be charged for every twenty shillings of such annual value thereof the sum of ninepence.

Under this Act, and Rule VI. of Schedule B of 48 Geo. III., c. 55, five leading cases were fought, of which the two first failed, and the three last were successful. These cases were those of—(No. 2262) the Albert Family Dwellings, in Underwood Street, in the Hamlet of Mile End New Town, Middle-

sex, 1852; (No. 2297) Pancras Square, Platt Street, Camden Town, Middlesex, 1853; (No. 2328) the Model Lodging House, Streatham Street, Bloomsbury Street, St. Giles, Middlesex, 1853; (No. 2349) Model Houses in King's Arms Gardens, St. George's-in-the-East, Middlesex, 1854; and (No. 2470) Model Dwellings in Flask Walk and Brewhouse Lane, St. John's, Hampstead, Middlesex, 1858.

It is worthy of note that the successful case as to the mode of assessment with regard to the window-tax in 1851 was—in respect of the same building—also the first successful case as to the mode of assessment of inhabited house duty in 1853, namely, the Model Lodging House, in Streatham Street, Bloomsbury Street, St. Giles.

The outcome of this was and is that in blocks of artisans' dwellings constructed with staircases open to the air at the sides, not necessarily above, the separate and self-contained dwellings were and are assessed separately, and not as those in one dwelling-house, all together—one dwelling-house meaning a building between four party walls. The effect of this peculiarity was and is to exempt separate and self-contained dwellings under £20 a year rental from inhabited house duty altogether, if the dwellings are approached by a staircase or gallery open to the air.

It must be admitted that in large blocks of dwellings it is particularly desirable that the separate dwellings (and families) should not be in aerial communication by means of internal and enclosed passages or staircases, and so far the effect of the decisions were and are beneficial.

It will be observed a little later that in some other respects the effect in relation to later Acts is anything but beneficial, as it enables otherwise badly constructed buildings to escape the influence of subsec. (2) sec. (26) of the Customs and Inland Revenue acts of 1890. And there are a number of such buildings, some constructed many years ago, some recently, some in course of construction.

No doubt many owners, whether philanthropic associations or private individuals, whose blocks of artisans' dwellings possessed inside staircases and corridors, whether properly lighted and ventilated or not, felt aggrieved that upon their buildings they were obliged to pay an inhabited house duty of ninepence in the pound.

Accordingly by letter dated the 8th February, 1884, the Board of Inland Revenue obtained from the Treasury a general authority to exempt from Inhabited House Duty Blocks of Artizans' or Labourers' Dwellings when they found upon inspection that the occupiers really belong to the working

classes, and that each tenement or set of rooms is under the annual value of £20, and would therefore have been exempt had it formed a separate house or cottage, duty however being paid prior to the grant of exemption for the rest of the block in respect of any holding in the block of which the value exceeds £20 per annum.

The Treasury Concession was limited to cases where each separate dwelling was *self-contained* and structurally severed from the rest of the building.

The effect of this was to put all blocks of separate and self-contained dwellings on a similar footing in reference to exemption from Inhabited House Duty, without any regard to their sanitary structure or condition.

This gave rise to further grievances inasmuch as, in those cases where it was held that the dwellings were not truly self-contained there was no exemption, and many of the more self-contained style of dwellings insanitarily constructed, obtained an exemption not granted to many of the less self-contained style of dwellings, although the latter might be sanitarily much more perfect than the former. These further grievances it was hoped to remedy by superseding the Treasury Minute of the 8th February, 1884, by the Customs Inland Revenue Act, 1890, section 26, sub-section 2, which it is desirable here to quote in full, as well as the amending section 4 of the Act of 1891 :—

Customs and Inland Revenue Act, 1890.

53 & 54 VIC. CH. S. SEC. (26), SUB-SEC. (2).

The assessment to inhabited house duty of any house originally built, or adapted, by additional alterations, and used for the sole purpose of providing separate dwellings for persons at rents not exceeding, for each dwelling, the rate of seven shillings and sixpence per week, and occupied only by persons paying such rents, shall be discharged by the said Commissioners, provided that a certificate of the Medical Officer of Health for the district in which the house is situate, or other Medical Practitioner appointed as hereinafter provided, shall be produced to them to the effect that the house is so constructed as to afford suitable accommodation for each of the families, or persons, inhabiting it, and that due provision is made for their sanitary requirements.

The Medical Officer of Health of a district, on request by the person who would be liable to pay the house duty on any house in the district if the duty were not discharged as aforesaid, shall examine the house for the purpose of ascertaining whether such a certificate can properly be given, and if the house be constructed so as to afford such accommodation, and due provision be made as aforesaid, shall certify the same accordingly; provided that the Authority, if they

are of opinion that the duties which would devolve on the Medical Officer of Health under this Section could not be performed by him without interference with the due performance of his ordinary duties, may appoint some other legally qualified medical practitioner, having the qualification required for office of Medical Officer of Health of the district, to make such examinations and give such certificates as aforesaid.

As respects Scotland, the expression "Medical Officer of Health" means a Medical Officer within the meaning of the Public Health (Scotland) Act, 1867.

Customs and Inland Revenue Act, 1891.

54 & 55 VIC. CH. 25. SEC. (4).

4. (1) Sub-section two of section twenty-six of the Customs and Inland Revenue Act, 1890, is hereby amended by the substitution of the words "where the annual value of each dwelling shall not amount to twenty pounds," for the words "for persons at rents not exceeding for each dwelling the rate of seven shillings and sixpence a week, and occupied only by persons paying such rents."

(2) In the case of any house originally built or adapted by additions or alterations, and used, so far as the same is used as a dwelling house, for the sole purpose of providing separate dwellings at an annual value not exceeding forty pounds for each dwelling, the Commissioners acting in the execution of the Acts relating to inhabited house duties shall, upon production of such a certificate as is mentioned in the said sub-section, grant relief by confining the assessment to the annual value of the house exclusive of every dwelling therein of an annual value below twenty pounds (if any) and by reducing the rate of duty to threepence.

(3) The provisions of the said sub-section in relation to a certificate shall apply to a certificate to be produced under this section.

The effect of these newer enactments with regard to inhabited house duty is (1) to exempt from duty all dwelling-houses containing separate dwellings (the words self-contained are omitted) under £20 a year rental value, and (2) to reduce the duty from ninepence to threepence upon dwelling-houses containing dwellings of £20 a year and over but under £40, the annual value of any dwellings under £20 a year having been first deducted—provided that the certificate of the Medical Officer of Health be produced to the Commissioners.

Two points strike one as requiring elucidation in the provisions of these acts of 1890 and 1891: the first is, can anybody demand that a Medical Officer of Health should examine any house, for the purpose of obtaining a certificate, without first supplying proper evidence from the Surveyor of Taxes of the district? and the second is, what standard do the provisions intend should be adopted in the certificate?

Upon the 4th of June, 1892, I addressed a very long letter

to the Local Government Board in reference to a number of questions as to the Customs and Inland Revenue Acts, some of which are now of no interest, but in the letter these two material points were raised, which will be best understood by quoting them in extracts :—

* * * * *

“I would beg furthermore to submit to your Honourable Board that in the provisions of the Statute it is left in doubt whether it is the duty of the Medical Officers of Health to ascertain values and other points in connection with liability to Inhabited House Duty, and whether the certificate is to precede or to follow upon the question of liability and the claim for exemption.

* * * * *

“It will be observed that I have taken the view that Her Majesty’s Commissioners of Inland Revenue are acquainted with the precedents and definitions of the class of houses intended to be included in the sections of the Act, and that until an owner has furnished the Medical Officer of Health with evidence that his house does, or will, come within the Act, or the Medical Officer has otherwise been furnished with such evidence, the Act does not contemplate that he shall examine and certify.

* * * * *

“Upon carefully reading the words of the section the requirements of the certificate appear more especially to relate to construction and fittings, and are couched in positive and not in negative terms, consequently every detail of a house under such a certificate receives the imprimatur of the Medical Officer of Health as being constructed and provided in a fit and proper manner, and as a desirable pattern for imitation. The experience of expert architects and surveyors tends to show that the effects of details in large buildings occasionally escape even their observation, and the ultimate effects upon health of many methods and forms of construction and fittings have not yet demonstrated themselves; in fact, sanitation is constantly advancing. Nevertheless, the Medical Officer of Health who grants a certificate may have quoted, possibly against him, every detail of construction to which he has certified; and how far my future opinions and recommendations might be paralysed by this course has given me cause for grave consideration.

“Your Honourable Board will recognise the wide margin between the minimum of sanitary construction enforceable under legislative enactments in old houses, whether occupied singly or by members of more than one family, and the maximum demanded by public opinion for new buildings, although not enforceable under existing enactments.

“I would beg to be directed by your Honourable Board as to the standard to be adopted in certifying, and to ask whether I am justified in declining to certify a house constructed or provided in whole or in detail, or in single instance, the reproduction of which in future new buildings I should repudiate.”

* * * * *

To this letter I received the following reply :—

COPY 59265 C.
1892.

LOCAL GOVERNMENT BOARD,
WHITEHALL, S.W.

15th August, 1892.

SIR,

I am directed by the Local Government Board to advert to your letter with reference to the certificate required to be given by a Medical Officer of Health under the provisions of Section 26 (2) of the Customs and Inland Revenue Act, 1890, as amended by Section 4 (1) of the Customs and Inland Revenue Act, 1891, to enable the District Commissioners to discharge the assessment to Inhabited House Duty in cases coming within the Section.

The Board direct me to state that they have no jurisdiction to determine the question raised in your letter, but it seems to them that it is not incumbent on you to examine a house, with a view to ascertain whether you can give a certificate, unless you have evidence that the house comes within the Section.

The Board have no authority to give any directions as to the standard to be adopted in certifying houses under the Section, and you must act upon your own judgment in determining whether a certificate can properly be given in any particular case. The Board do not however consider that a certificate that a "house" affords suitable accommodation for each of the families or persons inhabiting it, and that due provision is made for their sanitary requirements, should be construed as meaning that the sanitary arrangements are perfect in every detail, according to the latest developments of sanitary science.

I am, Sir,

Your obedient Servant,

J. F. J. SYKES, Esq.,

(Signed) S. B. PROVIS,

Medical Officer of Health to the

Assistant Secretary.

Parish of the St. Pancras.

After receiving this letter I came still more definitely to the conclusion that a house should not be examined under the Customs and Inland Revenue Acts, 1890 and 1891, unless and until evidence is produced that the house comes within Section 26 (2) of the 1890 Act, or Section 4 of the 1891 Act, and that as I could not give a certificate in the words of the Act because they were not defined, it would be necessary to state definitely to what the certificate applied. Accordingly I drafted and adopted the following form of certificate, which is sent to the owner of the house, or his agent, or to the Surveyor of Taxes, as thought best.

It is, of course, the duty of the Surveyor of Buildings to see that the building conforms to the Building Acts and other similar provisions relating to inhabited houses, but there is nothing to prevent the Medical Officer of Health from ascer-

taining for himself whether the building so conforms, but it would be exceeding his province, and unwise, for him to certify to that effect.

Customs and Inland Revenue Acts.

53 & 54 VIC., CAP. 8, SEC. 26 (2), AND 54 & 55 VIC., CAP. 25, SEC. 4,
INHABITED HOUSE DUTY.

Certificate of Medical Officer of Health.

Having been furnished with evidence that the assessment to Inhabited House Duty of the house described below will be wholly or partly discharged by the Commissioners acting in the execution of the Acts relating to Inhabited House Duties, provided that a Certificate of the Medical Officer of Health be produced, and having been requested to furnish the said Certificate. I HEREBY CERTIFY that I have examined the house described below, and am of opinion that the house is so constructed as to afford suitable accommodation for each of the persons inhabiting it and that due provision is made for their sanitary requirements, these words being interpreted to mean that the house is so constructed:—

- 1.—That each of the persons inhabiting it is provided with at least four hundred cubic feet of air space.
- 2.—That each of the living or sleeping rooms is at least eight feet in height, and at least ninety-six square feet in area.
- 3.—That there is at least one draw-tap and sink, with a sufficient supply of water thereto, for every twelve occupants or less, on each floor.
- 4.—That there is at least one water-closet, properly supplied with water, for every twelve occupants or less, on each floor.
- 5.—That the drainage of the premises is in accordance with the Regulations recognised by this Authority.
- 6.—That accommodation for clothes-washing is provided, sufficient for the number of persons inhabiting the house.

Name and Situation of House _____

Name of Owner or Agent _____

Date _____

*Medical Officer of Health for the
District of St. Pancras.*

As by the Customs and Inland Revenue Acts, 1890 and 1891, artizans' dwellings so well constructed and arranged as to be worthy of certificates may be exempted from the payment of inhabited house duty, in the case of future new artizans' dwellings, if the plans of drainage have not been previously submitted to and approved by the Medical Officer of Health, owners run the risk of not obtaining certificates.

A Medical Officer of Health may protect himself in the future against the attacks of the dissatisfied by officially requesting his Vestry or Board to add or attach such a paragraph as the preceding to the drainage or building form, in order to make it known before building.

In future new houses the following additional requirements may also be expected:—

That the house is provided, on each floor, with at least one sufficient space or lobby open to the air, accessible to and for the use of the occupants of the dwellings on each floor.

That the house is so constructed and arranged that perfilation of the dwelling rooms be not obstructed.

That accommodation for bathing is provided sufficient for the number of persons inhabiting the house.

That there is an outer door or gate locked at night, or a resident caretaker.

The constructors of this class of buildings have, therefore, to consider whether they shall build them in self-contained dwellings with balconies or stair-cases open to the air, and so escape both the inhabited house duty and the certificate of the Medical Officer of Health; or whether they shall build them, whether self-contained or not, with inside staircases and become liable to inhabited house duty, and to the requirements of the Medical Officer of Health in order to obtain his certificate. In any case, it is quite evident that it is very simple to avoid the Acts, and to defeat the very object for which they were passed.

Before concluding it must be pointed out that inhabited house duty may be made a tenant's tax, and not a landlord's, and that in case of non-payment by the landlord, distraint may be made upon the tenant's goods. If an owner refuse to pay the duty and a levy be made upon the tenant, the tenant will doubtless plead that the rental of his dwelling house being under £20 a year, and being a separate and self-contained dwelling in a compound house, it should be assessed as a separate house for imperial taxes, the same as it is for local rates, and that therefore he should be exempt. Such a case has not yet arisen, but when it does arise it will be interesting to see how our judges and legislators will act.

Again, what would happen if, in inspecting a house for which the owner desired a certificate, one or more occupiers of the separate dwellings refused admission to the Medical Officer of Health or to the Sanitary Inspector? These officers would have no reason to suspect a nuisance, and they have no power of entry under the Customs and Inland Revenue Acts.

"Infantile Mortality and its reduction, especially in regard to Measles and Diarrhœa," by JOSEPH PRIESTLEY, B.A., M.D., D.P.H., Medical Officer of Health, Lambeth.

(FELLOW.)

THE subject which the Council of the Sanitary Institute have asked me to bring before you to-day is one of an absorbing interest, and of the utmost importance to all Health Officers and others engaged in the study of practical Sanitary Science and Public Health; and whilst I cannot offer anything that is startlingly new, I trust that I may be able to put the matter briefly before you in such a way as to give rise to what, I hope, will prove a useful and profitable discussion.

The subject of Infantile Mortality is a wide one, but I am fortunately chiefly limited to its consideration in so far as it results from Measles and Diarrhœa. Taking the decennium 1881-90, there were registered in England and Wales 5,244,771 deaths at all ages from all causes, and of these deaths 1,259,860 (*i.e.* 24%) were amongst infants under one year of age. Analysing these 1,259,860 deaths more in detail, we find 25,366 were certified as due to measles and 120,943 to diarrhœal diseases (including diarrhœa, dysentery, gastro-intestinal catarrh, cholera, and choleraic diarrhœa), giving a total of 146,409 (*i.e.* 11·6%) due to the two diseases—measles and diarrhœa. Diarrhœal diseases caused more deaths amongst infants under one year of age than all the other zymotics together, whilst measles caused more deaths than any other one zymotic with the exception of whooping cough and diarrhœa. The total chief zymotics carried off 209,010 infants, respiratory and nervous diseases 456,461, phthisis, tubercular, and scrofulous diseases 79,055, violence 21,095, and other causes 494,239.

The waste of life, therefore, amongst infants under one year of age is enormous, and calls for serious consideration at our hands with a view to, if possible, lessening it.

It may be noted here in passing that infantile mortality from all causes (*i.e.* deaths of infants under one year of age) has on the whole *decreased* slightly during the decennium 1881-90, giving a rate of 142 per 1,000 births registered as compared with 149 during 1871-80, and 154 during 1861-70; in each decennium the male rate being slightly greater than the female. The infantile mortality from diarrhœal diseases has also *decreased* slightly during the three decennia 1861-70, 1871-80, 1881-90, whilst that from measles has *increased* slightly during the same

periods. The slight *decreases* in connection with infantile mortality as a whole, and that due to diarrhœal diseases, are satisfactory as far as they go, but are hardly *pari passu* with what one had hoped and expected from the concomitant sanitary improvements and improved methods of diagnosis that have taken place, not to mention the fact that the birth-rate has been decreasing since 1878, altering the age-constitution of the population and lessening the infantile mortality since then.

To impress upon you still further the enormity of the loss of life amongst infants from the two diseases—measles and diarrhœa, allow me to put the facts in another way, by treating each disease separately. Statistically considered (and expressing results in rates per million living at under one year of age), we find that in the case of measles:—

3,365 infants died during 1881-90, as compared with 2,767 and 2,737 during 1871-80 and 1861-7 respectively. At all ages the measles mortality, during 1881-90, was 440 per million living, consisting of 595 in Urban England (78 principal Towns), and 329 in Rural England, whilst the rates (under 5 years of age) varied in different Counties from a minimum 924 in Westmoreland, to a maximum 5,053 in Lancashire. Measles-deaths reach their *maximum* during the second year of life, and the disease is one which chiefly attacks children of tender years, and requires careful nursing and attention to prevent the after (dangerous) effects, though parents are apt to regard it as a trifling complaint, and one that it is necessary for their children to have, and that, therefore, the sooner they have it the better—an unfortunate line of argument as far as the children are concerned! In fact, this parental apathy with respect to the disease, together with the slightness of symptoms at times, is the cause of medical men, in a large percentage of cases, not even being called in or consulted, with the result that the patients are home-treated without proper and suitable precautions being taken to prevent the lung complications which are a source of great danger to life.

Measles, moreover, is highly infectious before the appearance of the typical rash, and its infectivity is certainly increased (or shall I rather say, the infection, which spreads so quickly under ordinary circumstances, does so much more rapidly) amongst persons in over-crowded, dirty, ill-ventilated, insanitary rooms or buildings, and as the disease is one of infancy or childhood, it soon becomes epidemic amongst the scholars of an over-crowded or ill-ventilated or insanitary school room or dormitory.

These few details in connection with the etiology of measles will be referred to later on, in dealing with suitable preventative measures.

In the case of diarrhœal diseases we find that 16,044 infants (per million living) died during 1881-90, as compared with 19,817 and 19,645 during 1871-80 and 1861-70 respectively. At all ages the diarrhœal mortality (excluding cholera) during 1881-90 was 659, consisting of 851 in Urban England and 520 in Rural England; whilst the rates varied in different Counties from *minima* 1,112 and 1,132 (under five years of age) in North Wales and Wiltshire (with birth-rates of 27·96 and 29·37), to *maxima* 6,461 and 7,281 in Lancashire and Leicestershire (with birth-rates of 34·45 and 33·78).

Diarrhœal deaths reach their maximum during the first year of life, and it is with this so-called infantile diarrhœa that we are dealing, but it must not be supposed that diarrhœa affects only, or principally, infants and children; on the contrary, it affects adults more than children, though it proves fatal chiefly in very young or very old people (where power of resistance or vitality is low). From a long series of observations taken in Leicester, it would appear to be proved that the diarrhœal incidence is greater amongst adults than amongst children or old people, although the mortality rate is practically restricted to the very old or the very young.

The Corporation of Leicester distributed gratuitously for a series of years (during the third quarters) diarrhœa medicine to all comers, with the result that of 36,925 persons reported to be suffering from diarrhœa,

1,778	were under 1 year of age.
3,196	were between 1 & 2 years.
1,844	„ „ 2 & 3 „
1,166	„ „ 3 & 4 „
769	„ „ 4 & 5 „
<i>i.e.</i> 8,753 or 23·7 % were under 5 years of age.	
2,418	were between 5 & 10 years.
4,404	„ „ 10 & 20 „
18,255	„ „ 20 & 60 „
<i>i.e.</i> 25,077 or 69·9 % were between 5 & 60 years,	
and 3,095 or 8·4 % were over 60 years of age.	

This fact in the etiology must be remembered in connection with the wider spread of this disease amongst all classes and at all ages than would appear from the registration of fatal cases (chiefly amongst infants), which come before all Health Officers in the ordinary course of their work.

Leicester is, as you are aware, notorious for (amongst other things) its infantile diarrhœa, and a valuable mine of information lies buried in the different Reports of Medical Officers and others extending as far back as 1847. A perusal of these

Reports, and reference to notes made by myself when Medical Officer of Health for Leicester, show that this diarrhœa is probably a zymotic disease due to the entrance into the body, through air or food, of germs or their products which grow and become active only under certain conditions. Thus, in the diarrhœa area (low-lying and crowded) of Leicester, during July and August months, 2,000 to 7,000 germs per cubic metre of air were noted as compared with 60 to 900 in the high and less crowded parts of the Town. Micrococci, bacilli, and moulds of different forms (the majority of micro-organisms liquefying gelatine) were separated, but nothing specific or distinctive discovered. These germs increase enormously in artificial cultivation under warmth, moisture, absence of light and fresh air, and in the presence of dead organic matter (vegetable and animal), and the cultivations were found to be capable of reproducing diarrhœa in those who ingested them. Similar germs were discovered in the kidneys, spleen, mesenteric glands, and the ulcerations to be found in the small and large intestines (mucous membranes), of patients who had died of the disease, and whose bodies were examined within a few hours of death.

The disease is practically *endemic*, shewing itself only during the third quarter of the year (*i.e.* the months of July, August, and September), when the 4-foot earth thermometer registers 56° F. and over, and disappearing when that temperature is reached as the thermometer falls. This so-called *critical* temperature 56° F. in its *causal* relation to the onset of epidemic diarrhœa is a fact about which there can be little difference of opinion amongst those who have studied the subject, or who will take the trouble to examine the many meteorological data at their disposal. I personally made a series of registrations and observations, and my results tally *in toto* with those of other observers. What the changes are that take place in the subsoil, I cannot definitely state, but it is probable that they are of a putrefactive and bacterial nature, giving rise to the subsequent and consequent development of the special diarrhœal poison. This 4-foot earth temperature is more trustworthy (because less liable to marked variations) than that of the atmosphere or that in the interior of sewers, and must affect any germs that may be present from defective sewers or drains, leaky cesspits, foul accumulations, "tips" of any sort, &c., whilst the level of the subsoil water may be a factor for good or evil in so far as it affects the ground air.

I would mention here that infantile diarrhœa during the third quarter of the year, was not a conspicuous feature of Leicester's death statistics fifty years ago, and the same may be said of the mortality tables of London. Since that date the disease

has shewn itself more definitely and distinctly, and is presumably more prevalent, as shewn by its greater fatality in urban than in rural districts, and in large, than in small, Towns, pointing to an excrement-sodden earth or polluted subsoil, as being a necessary ground-work upon which the germs develop their powers under the influence of the 4-foot earth temperature of 56° F. Although Leicester suffers severely, other Towns do also to a greater or lesser degree, from the ravages of this disease. The disease attacks all—rich and poor, strong and old, but proves fatal only in the very young and the very old (under five years and over sixty); though it must be remembered that, when the disease does not prove fatal in the young, its after-effects are to be seen in atrophy, debility, and general weakness and ill-health. Indeed, it takes months and months (nay, years and years) to rally completely from a genuine attack of epidemic diarrhœa—at least in young patients. The true disease once seen in a child will not be readily forgotten—the rapidity of onset, the fever followed by algidity, the offensiveness of the vomit and alvine discharges, the withered, pinched, little-old-man appearance and depressed fontanelles, the intense thirst, the peevishness and restlessness with sharp cries followed by moanings, the exhaustion, prostration and final collapse, together with the tendency to rally on the 7th or 8th day, followed by relapse and death (with or without fits) in twelve to twenty-four hours—form a picture to be lastingly imprinted on the minds of those who see it. The average duration of the disease (when fatal) is nine days, varying from five to twelve, and multiple cases occur in houses sometimes during an epidemic, giving rise in some observers to the belief in the contagiousness of this disease.

It is clear that the diarrhœal poison will act most severely upon those who have a low vitality (constitutionally and congenitally, or as the result of previous attacks of other debilitating diseases or of old age), so that the young and old suffer fatally. The young may be debilitated from improper or artificial feeding, though on the question as to the fatal incidence of the disease on breast-fed as compared with bottle—or hand-fed children, there is diversity of opinion and certainly non-agreement of statistics, *e.g.* those of Liverpool and Leicester. So too the young may be debilitated from maternal neglect (whether such neglect arises from the fact of the mothers working in factories or workshops, or otherwise); from inherited weakness of one or both parents, or from the parents' early and improvident marriages; from unhealthy and insanitary surroundings (darkness, dirt, overcrowding, want of air circulation round houses, in streets, or through courts and alleys, impure air inside

houses, filth accumulations, such as cesspits, pails, privies, neglected dung pits, or sewer gas generally, &c.) ; from impure water or food supplies, and from smoke nuisances. Some of these conditions affect persons of all ages. All these may act as contributory causes, whilst the bearing upon the subject of insurance amongst newly-born children, illegitimacy, uncertified deaths, the misuse (or rather use at all) of infants' cordials and soothing mixtures, etc., must not be forgotten.

The diarrhœa-rate is influenced too by the topographical position and geological formation of different Places, *e.g.* a low-lying and water-logged position as opposed to a high elevation and a dry and thoroughly drained subsoil, and clay *versus* sand or gravel—low-lying situations and sand or gravel appearing to favour the growth of the diarrhœa germs or poison.

Contributory causes or excitants of Diarrhœa (in order of importance).

1. Meteorological conditions, *e.g.*, 4 ft. earth temperature over 56° F., low rainfall, humid atmosphere ;
2. Topographical and geological conditions, *e.g.*, lowlying, flat and waterlogged positions, with a damp subsoil ;
3. Polluted condition of soil, arising from defective sewers and drains, leaky cesspits and privies, "tips" or made-grounds, &c. ;
4. Unhealthy, insanitary, and dirty surroundings with want of proper ventilation and light in and around houses, round courts and alleys, and streets, *e.g.*, emanations from foul and offensive accumulations such as middens, pig-styes, nightsoil pails and privies, cesspools, &c. ; back-to-back houses, and overcrowding on area or otherwise ; excessive smoke ; sewer gas ; &c. ;
5. Tainted food and impure water, *e.g.*, milk often kept in underground rooms or in badly-ventilated places where it is exposed to emanations from the earth, under- or over-ripe fruit, or water highly charged with vegetable matter ;
6. Improper or artificial feeding, maternal neglect arising from outdoor employment of mothers or otherwise, the use of cordials and soothing mixtures, early and improvident marriages, constitutional or acquired weakness of parents, and debility of children (congenital, or the result of previous illnesses, insanitation, &c.) ;
7. Illegitimacy, uncertified deaths, and infant life insurances.

So much for the etiology and the statistics of the two diseases, and now I come to deal with a most important branch

of the subject, viz.: preventive measures to be applied with a view to lessening, if possible, at least somewhat, this enormous mortality. And first let me state that, if there be any persons present who expect that I am going to offer them an easy and ready method of lessening this mortality, I am afraid that I shall have to disappoint them; for it must be admitted from the descriptions of the diseases that there are many factors that will have to be considered, and therefore many different lines of attacks tried, if we wish to be successful.

I propose to treat the two diseases separately.

First, as to Measles.—In connection with this disease, the *cruor* is certainly the notification, as to whether or not measles ought to be added to the list of notifiable diseases. Where notification would be followed by the other preventive measures well known to Medical Officers of health, viz.: isolation of patients in hospitals, the keeping away from schools of children from infected houses, disinfection, quarantining of suspects, &c., there can be but little doubt that such a line of attack would be highly successful, if adequate means were at hand for carrying out such isolation in properly equipped and ample hospital accommodation, and, if it were possible to hear of all the cases. This is, however, only *theoretically* true, for, in the Metropolis at least, and I suspect the same applies to most large towns, hospital accommodation is not adequate, whilst the large cost of supplying extra hospitals is a subject not to be lightly thought of. I have pointed out too, in describing the disease, various difficulties that present themselves, *e.g.*, the tender ages of the patients (to which may be added the natural dislike of mothers to part with their offsprings at such an early period of their existence); the difficulties of diagnosing the disease in its pre-eruptive (and also contagious) stages; the great rapidity with which the disease spreads, and becomes epidemic; the parental apathy in connection with measles, and the fact that medical men are not called in or consulted at all in a large majority of the slighter cases; and the careful nursing and attention required to prevent the after (dangerous) effects arising from lung complications. All these facts render it imperative that the Health Officer should pause before committing his Authority to a line of action and to an expense, the good to accrue from which might not be commensurate. *Theoretically*, nothing could be simpler, but *practically* nothing could be more difficult, than adding Measles to the list of notifiable diseases under the Act, with a view to benefit resulting from such a course. This I would call "full" notification, and I offer no objection to it in a small Community with suitable and sufficient isolation accommodation and a sanitary staff to follow up the

cases with disinfection, quarantining of suspects, &c. I have no doubt but that, under such circumstances, the expense involved would be more than justified by the good results obtained; but under other circumstances, viz.: in a large Community, without suitable and sufficient hospital accommodation and the necessary Sanitary Staff to follow up the cases, the matter is a very different one, and I think what is wanted is some sort of "partial" notification as between the Health Departments and the School Authorities. Measles affects chiefly infants and young children, and is undoubtedly spread *directly* through the agency of schools, so that if we find the inmates of any school becoming stricken down with this disease in such increasing numbers as to interfere with the attendance, the greatest good will be derived from the closure of that particular school or the particular class involved—more especially as we know that this disease spreads rapidly amongst scholars in an overcrowded, ill-ventilated, or insanitary school. The quickest and easiest way to obtain the necessary information preparatory to closing a school is by this system of notification between the Head Teachers or Attendance Officers, and the Health Departments. The cost would be slight and the information exactly in the form best suited for the purpose. I speak from a practical experience at Leicester, where I furnished the School Attendance Officers of the Leicester School Board with forms on which they were to report to me measles, all cases of infectious disease, and also doubtful cases coming to their knowledge, the nature of the disease (when known) being obtained from the mother or person in charge, or Medical Attendant (if any).

The question of sanitation (in its widest sense), and the importance of educating mothers in the proper treatment of children, and the rising generation in the elementary principles of hygiene and practical sanitary science, are matters to be remembered in connection with Measles, but perhaps not to such an extent as in the case of Diarrhœa, as I hope to shew presently.

Second, as to Diarrhœa.—Preventative measures have been again and again discussed at Meetings like the present, and I merely give my own ideas on the subject now and leave them to be discussed. Amongst principles that ought to guide Sanitary Authorities in dealing with infantile diarrhœa, first and foremost I place (1) *Cleanliness in its widest sense—municipal, domestic, and otherwise.* Pure air, pure water, pure food should be the Sanitarian's goal, and the various methods of obtaining such his daily consideration. Let sewers and drains be looked to, and the speedy and complete removal of all refuse matters

insisted upon. Give sunlight and pure air to your houses, streets, courts and alleys, and to the people inhabiting them. Away with back-to-back houses, insanitary areas, damp and dilapidated dwellings, town "tips," privies, cesspools and pails; see to your cowhouses, milkshops, dairies, pigstyes, slaughterhouses, bakehouses, &c.; and above all secure, if you can, Parks and Open Spaces in your Towns that are rapidly growing and becoming filled with builder's bricks and mortar, and give your people as pure air and water and as much of them as possible. Provide baths and washhouses, and counteract any natural deficiencies of sites in your Towns as far as possible by artificial means, *e.g.* lowering the level of subsoil water by efficient drainage, etc.

Next, I would suggest the all importance of the rising generation being taught the elementary principles of Hygiene and Domestic Sanitation, making such a subject compulsory in Schools, so that the next generation at least may be better prepared to bring up in a proper manner their children, and know how to tender the seedlings so that they may develop and grow into hardy plants and not dwindle and wither away.

Finally, in relation to diarrhœa, the subject of illegitimacy and the proper care of illegitimate children, the treatment of the question of uncertified deaths, and those of infant protection, and the infant insurance, call for attention by Parliament, who (at a not far distant date, I hope) will give us amended Infant Life Protection and Insurance Acts, a sensible Midwife's Registration Act, Medical Advisers to Coroners, and Special Investigators into all uncertified deaths, &c.

It will be seen that I do not lay too much stress upon outdoor employment amongst mothers, artificial or improper feeding, maternal neglect, the misuse of cordials and soothing syrups, early and improvident marriages, as causes of diarrhœa amongst infants. I am free to admit that they act as contributory causes or excitants, but the *vera causa* of diarrhœa is to be found in a microbial origin, the germs growing under the action of heat in a polluted subsoil, and the remedy for which is to be found in the words "national cleanliness." More light and air, less dirt and death. As insanitary conditions lessen, the health of the people at all ages will increase, whilst the infant population (being born of stronger and more robust parents) will have an extra advantage in the race of life. Debility, weakness, and illhealth may finally disappear, and the Hygienic Millennium arrive.