

Diseases caused by, but not usually  
attributed to, Sewer Gas and Deficient  
Ventilation.

Thesis for the Degree of M.D. by. —

John McPhail Dargall, M.B., Ch. M.  
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Thesis for the Degree of M.D. by —

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Only in recent years has much notice been taken of sewer gas, and impure atmospheric air, as causes of disease. Numerous cases of typhoid fever have been clearly traced to sewer gas, but some other diseases, I am satisfied, arise from the same cause. It appears to me that few writers have fully studied the effects of foul air, as a cause of disease, and that too much has been done trying to cure the patient, or in treating him, while the cause of the disease has been neglected.

From our now familiar knowledge of the deleterious effects of impure air, one is not astonished at disease in houses, with the most primitive drains, and these probably in disrepair, windows which cannot be opened, and many other

obvious unsanitary conditions. Even in modern houses the drain-pipes are usually under the floors, so deep that it is difficult to reach them when repairs are required, but at the same time easy for sewer emanations from a cracked pipe, or dislocated joint, to rise into the house, and though in many cases unperceived, yet poison the inmates with its baleful influence.

I do not, however, consider foul air as the original or exciting cause in every disease with which it is associated. It is certainly a predisposing cause, but whether exciting or predisposing, its removal, in most cases, would prevent the affections with which it is connected.

Disease increases and diminishes by variations of weather. During a hot summer typhoid fever, diarrhoea, &c., are more prevalent than during a cool summer, and during a continuance of dry weather a single shower of rain may make a decided increase in the amount of disease. The increase or decrease in the amount of disease from variations of weather, I hold to be due to changes in the drains, the quantity of sewer gas emitted being increased or decreased from the drain-traps being flush or the opposite. Perhaps the additional amount of water passing

through the drains in wet weather, stir up their contents, and the pressure forces the gas out of the pipes. Also, as a great diminution of pressure in the atmosphere is a recognised cause of the escape of fire-damp in mines, the same condition may be the cause of the escape of sewer gas into the atmosphere. Variations of weather may affect the prevalence of disease in another way — people stay indoors more during wet weather than in dry, hence they breathe fouler air, they have not the same amount of exercise, and, in addition, they are exposed to the effects of the weather acting on the drains outside, although the drains of the house may be perfect. In hot dry weather, again, the increased prevalence of disease may be accounted for, by the water in the drain-traps being dried up, thus allowing the escape of sewer gas, and the atmosphere being more rarefied by the heat, greater facility is offered for diffusion of the gases.

The climate and state of the weather being recognised as a cause of disease, how do we account for the gradual decline in the rate of mortality, which is steadily going on in this country? Has the climate improved? I think not; but a knowledge of the simple laws of health is being acquired by the public, and their principles enforced by

legislative enactments. Thus, I think, the conclusion inevitably follows, that the causes of many diseases spring from defective drainage and other insanitary conditions; and that the reduction in the death rate is due to improved sanitary precautions.

We have the changes in the weather influencing the amount of sickness, and the number of deaths by their effects on the drains, or otherwise as before stated; hence the weather may be both a predisposing and an exciting cause; as in cold wet weather, there is the "stirring up" of the sewage, and the poisoning of the system with the resulting foul air; also the usual effect of the same kind of weather, independent of its action on the drains, in the form of a "common cold", bronchitis, &c.

Since we have no power over the weather, and as it has so much influence on the drains, it only remains for us to do everything possible to make the drains proof against that influence. This is being attempted, but our sanitary arrangements are still incomplete, and far from perfect; yet, by perseverance, there is no reason why they should not, at least, be made very nearly so. Exertions in that direction have already given clear proofs

of success, in the reduced mortality over the country, notably in 1885, when the lowest death rates were recorded since registration was commenced. One week in the end of 1885 the death rate in London was 13 per 1000 from all causes; and about the same time the death rate in York was 7 per 1000.

I hold that this great reduction in the death rate of the metropolis, is largely due to improved drainage.

Then, York is well known as a badly-drained town, with numerous open ash-pits and common privies; built on a marsh, in the middle of the broad flat valley of the Ouse. In fact, the most favourable site for the spread of disease that one could imagine, and were it not that it is almost free from manufactories, its mortality would undoubtedly be greatly higher. Now, in York within the last twelve months much has been done to improve the sanitary conditions, and these improvements have already borne fruit in the low death rate stated above.

In a supplement to the annual report of the Registrar General issued in December 1885, it is stated, that the annual deaths per million from scarlatina within the last ten years, have fallen from 972 to 716. The decline under the head of measles is from 440 to 378. The deaths from fever, including

typhus, enteric fever, and ill-defined forms of continued fever, fell from an annual average of 885 per million to 484, a decline of 45 per cent. This last is the most satisfactory of all the declines, not only because it is greatest in amount, but because enteric fever is, of all diseases, most directly and largely affected by sanitary measures. The decline in the mortality under this heading, is the best test available of the efficacy of sanitary administration.

The following is from the "Sanitary Record".—  
 "Civil Registration was first established in 1838, and the mean annual death rate of England and Wales for the 38 years, — 1838 to 1875 inclusive — was 22.30 per 1000, the mean annual rate for the first 18 years being 22.42, and for the last 20 years, 22.19, an improvement of only .23. The mean annual rate for the eight years — 1876 to 1883 inclusive — was 20.26, the difference between the mean annual rate for the years 1856 to 1875, and 1876 to 1883 showing an improvement of 1.93 per 1000."

These results are extremely satisfactory, and another proof of the benefits derived from sanitary improvements, more energy being shown year by year in promoting the advance of sanitary science.

7

It should be noted that the above figures refer to deaths from all causes, and not, only from diseases generally regarded as depending on sanitary defects.

In a pamphlet issued by Dr. Russell, Medical Officer of Health for Glasgow, in February 1886, it is stated that, "Glasgow is still the unhealthiest city in Scotland". He considers unhealthy dwellings and overcrowding as the cause. According to the pamphlet, the deaths from diseases recognised as due to foul air, have not been more than the average, hence we are forced to conclude that other diseases, as phthisis, pneumonia, bronchitis, &c., are also due, directly or indirectly to foul air, and this conclusion is strengthened by the high percentage of deaths from such diseases, which we see in every report of Dr. Russell's.

For convenience, I shall divide those diseases which I consider as due to foul air, into two classes.

- 1<sup>st</sup>. Those depending wholly on foul air as their cause.
- 2<sup>nd</sup>. Those having foul air as their predisposing cause only.

In the first class I include simple febricula, tonsillitis, aphthous sore throat, phlegmasia dolens, pneumonia, general debility, &c.

In the second class, diarrhoea, bronchitis, "common cold", &c.

Simple Febricula. — This name seems to me to be one applied to any feverish state, where special symptoms are absent, or so obscure that we cannot class it with any particular disease; and, I think it likely that the symptoms I shall describe under this heading, will tally with those seen in the cases described in the above report of the Registrar General, as "ill-defined forms of continued fever".

I choose this disease first, as it seems to me most nearly allied to those generally considered as caused by sewer gas. It is usually stated to arise from errors in diet, fatigue, &c; however, having studied many cases, I believe it is really a mild form of typhoid fever. It is most prevalent in warm weather, when and where typhoid fever is prevalent. Moreover, all the symptoms of typhoid may not be present, there may be no rash and no diarrhoea, but there is the high temperature, quick pulse, thirst, sickness, coated tongue, and a general typhoid condition. In addition to these symptoms, in some cases, there is pain over the ilio-caecal valve more or less severe, and increased on pressure. In other cases there may be sore throat or cough, with or without pain in the region of the base of one of the lungs. In fact, the symptoms

vary so much in each case, that one is apt to think that he has different diseases to deal with, and it is possible, that such may be proved to be the case, though at the present time, I prefer to treat it as one disease, my object being to prove that in every case, it is caused by foul air.

The symptoms continue from 2 to 4 days, when there is complete recovery. The following is a case in point. - R. B., age 7 years, was on a visit to relations who lived in a back yard, where the sanitary conditions were indifferent, and where typhoid fever had prevailed about 12 months previously. The first symptoms were, loss of appetite and vomiting; and when I saw him he was suffering from pain over the ilio-caecal valve, increased on pressure. There was no diarrhoea, and the bowels were slightly confined. The temperature about 103°. He completely recovered at the end of 4 days. Other such cases which I have seen were similar to this, with the exception of having no pain in the abdomen, but with a cough or sore throat. In some instances the sanitary conditions were only suspicious, while in others, they were known to be exceedingly bad.

In the Glasgow Medical Journal for December 1885, Dr. Aitken, Professor of Pathology, Army Medical School,

in a paper on the "Coming into Being of Some Diseases", says that, "the recorded irregularities from the artificial types of diseases are now so numerous, that they form a very large class still standing alone - so large a class that, comparatively, the so-called <sup>typical</sup> cases become an insignificant minority". He speaks also of anomalous cases occurring when other typical diseases are prevalent, but which cannot be classed with these. The case which I have given above is, I think, an example of this, there being the symptoms of simple febricula in a locality, where the causes of typhoid fever were known to exist.

I had yet another case illustrative of the close alliance, if not identity, of typhoid fever and simple febricula. A boy about 6 years of age had all the appearances of typhoid fever, diarrhoea and pain over the ilio-caecal valve being present. On the day after first seeing him, I was asked to look at his brother, some years older, who had turned ill in the night. I found him in the same condition as his brother, except that he had no diarrhoea, pain in the abdomen, however, being present. He had also slight sore throat. I had little doubt at the time that both had typhoid

fever, knowing that there was a choked drain in the house, and that the inmates had been annoyed for some time by the smell of sewer gas. The first boy's illness ran the usual course of a typical case of typhoid fever, while that of the second lasted for about 4 days, and ended in complete recovery. There was no doubt that the first was typhoid fever, and in my opinion the second was the same, although it would, in the usual nomenclature of disease, have been put down as a case of simple febricula, or an anomalous case of fever.

The cough present in some of these cases is a symptom of bronchitis more or less severe, and I think it is closely allied to pneumonia, which seems similar to typhoid fever in various ways. Sore throat is another result of the same poison which has produced the other symptoms, and probably is caused in the same manner as diphtheria, or other throat disease generally ascribed to foul gas. Indeed, in this so-called simple febricula or continued fever, we have the combined prominent symptoms, more or less, of many diseases, and most, if not all, these diseases, are due directly or indirectly to foul air.

Tonsillitis. - In speaking of Simple Febricula, I mentioned sore throat as a prominent symptom; now, that I look upon as a mild form of tonsillitis, but have never found it assume the usual appearances of that disease viz. the great swelling of the tonsils with pain and difficulty in swallowing. In text books the predisposing causes of tonsillitis are said to be youth, debility, syphilis, and previous attacks. I underline "previous attacks", as on that I shall base my contention, that tonsillitis often originates from living in a foul atmosphere, resulting from bad ventilation, or from sewer gas; though I am inclined to the belief, that it is usually caused by the more deleterious sewer gas. Why should there be previous attacks? It appears to me that these are due to the same cause i.e. the patient continuing to live under the same unhealthy circumstances as during former attacks. I have seen many cases of quinsy, and almost invariably there were known defects in the house drains or a strong suspicion of such, and it was usual for me to be called at intervals of 3 or 4 months, to see the same patient suffering in the same manner. These repeated attacks of quinsy, I believe, are accounted for

in books thus. — "The tonsils have got into a morbid state, and a slight cause, as cold, is sufficient to begin a fresh attack". That is, no doubt, true, but what about the first attack when the tonsils were healthy? This probably arose from a leaking drain-pipe, and if it had been remedied after the first attack, I feel assured from observation, that, other conditions being the same, there would have been no further attacks. It is the continued neglect of the cause which often accounts for the repeated attacks, and not, as many believe, solely the morbid state of the tonsils.

The following case will partly illustrate this. — Miss C. aged 25, had ~~severe~~ attacks of acute tonsillitis at intervals of 3 or 4 months, sometimes longer. The attacks were of the severest kind, and little could be done to relieve her, the throat being so swollen that she could not open her mouth, and the attack was allowed to go on till nature relieved by the discharge of pus. I believe these attacks might have been mitigated by removing the tonsils, but the main cause, I think, was neglected. I did not know of any special defect in the drains, but the house was old, had low ceilings, and small rooms, with a stuffy smell, and a very strong suspicion of the presence of

sewer gas. In a case similar to above, I tried removal, and the result was satisfactory so far as the comfort of the patient was concerned, but the attacks were not averted, although the swelling was less extensive; the cause still remaining in this case as in the former. I have known whole families affected with chronic tonsillitis, periodic attacks of the acute form occurring, defects in the drainage being the undoubted cause.

Aphthous Sore Throat. — This disease of the throat is frequently met with in unhealthy localities. It is called diphtheria by many who are ignorant of its real nature. There are aphthae on the tonsils, of a grey or white colour, varying from the size of a pin head to that of a pea, and these may coalesce, forming an irregular patch. I cannot better describe it than as tonsillitis with diphtheritic patches. Many of the symptoms of diphtheria are absent; the membrane never overspreads the whole surface of the tonsils, the glands of the neck are not swollen, the constitutional disorder is not so severe, in fact, there may be little or none, and invariably the patient recovers. It is similar to diphtheria in being a disease of childhood, and having, in

my opinion, the same cause as diphtheria, and as the other diseases which I have been considering.

These diseases including diphtheria, croup, ulcerated throat, &c, are closely allied in many ways, and I believe, are really the same disease, but in different stages of development.

It is also probable that other forms of sore throat, as simple relaxed throat, generally ascribed to cold, are of the same nature.

Dr. Aitken, in his paper to which I alluded before, goes still further than I do, although much in the same strain, in quotations from other authors and in his own words, when he expresses the belief, that diphtheria is closely allied to scarlatina, if not the same disease in an imperfect state of evolution. From this statement it follows, that scarlatina is caused by sewer gas or other foul air, putting the specific poison out of the question, just as diphtheria is so caused; and if this is the case, since "things equal to the same are equal to each other," we conclude that these other forms of throat disease are the same disease as scarlatina, and all are due to the same cause. This opinion would seem to be supported by the marked reduction in the death rate, from

scarlatina, which is noted in the quotation which I give above from the Registrar General's report, on page 5.

Phlegmasia Dolens. - My views as to the cause of this disease, are similar to those expressed in speaking of other diseases. It appears after childbirth, at which period the system is in an unstable condition, which renders the patient specially liable to disease. I think a more illustrative case of phlegmasia dolens caused by sewer gas, could not be quoted, than that of the present Duchess of Cornwall. After her first accouchement, the drains of the house, Bushy Park, in which she was confined, were discovered to be in an extremely bad state, so that sewer gas had been escaping undetected into the house.

About four years ago I had a similar case in a farm house, which, to all appearance, was healthy, and above the average farm house as to its outward aspect. Phlegmasia dolens ensued about a fortnight after confinement, the second leg was attacked when the first was recovering, and the illness lasted four months. I enquired about "bad smells", remembering the case of the

Duchess of Comaught, and was at once informed that such had been noticed in the bath-room, issuing apparently from the waste pipe of the bath. The door of the bath-room was in close proximity to the door of the bed-room, in which my patient always slept, and was then lying. The cause of her illness was now clear, she had been inhaling this bad atmosphere all along, her system thus was weakened in the first place, and after her confinement, rendered still more liable to the effect of the gas. It may be that the sewer emanations were absorbed by the raw surface left by the placenta, and thus the disease localised in the leg, from the communication between the veins of the leg and those of the uterus.

Pneumonia. — I have not had sufficient experience of this disease, to add anything to what has been written about it lately. There is a growing impression that it is infectious, and some cases have been cited which seem to have been so. Pneumonia seems closely allied to typhoid fever, both as regards its cause and symptoms. We find, as in typhoid fever, that it frequently runs the

course of 21 days, although the "turn" may occur at the end of 7 days; and as an ordinary case of typhoid fever does not begin to recover at the end of that time, I cannot put my case better, than by comparing the slight "7 days" cases of pneumonia, to cases of so-called simple fever, which as stated, I consider as typhoid. In many cases of pneumonia, there is diarrhoea and a general typhoid state, while, as before remarked, in febricula cases, there is often pain in the region of the base of either lung, with more or less cough.

General Debility. — How often do we see cases of general debility amounting almost to insanity! Many a time have patients, male and female, expressed themselves to me as feeling inclined to commit suicide; the nervous system was so depressed, they felt "good for nothing", had no heart to work, could not sleep, read, and so on.

These conditions are common from overwork, irregular meals, and anxiety, but when the mind is relieved, the brain rested, and regular meals taken, the patient usually soon recovers. These symptoms are commoner

amongst females, and in addition there may be severe neuralgia, disorders of menstruation, dyspepsia, diarrhoea or constipation. Neuralgia of the 5<sup>th</sup> nerve is the most frequent symptom, but the intercostal nerves are often affected. In many cases menorrhagia appears to be the cause of the general debility, as the patient may have been menstruating every fortnight for six months or more. On closer inquiry, however, it is often elicited that she was previously far from well. In these cases the patient has almost invariably been in the habit of constantly staying indoors, usually in an insanitary house. These cases, unlike the others of which I spoke, do not get well so quickly under treatment, and for this reason:— the real cause is not found, or if so, not remedied; but tonics, sleeping draughts, &c., are given, yet the patient either remains in the same state or becomes worse. To insist on her going into the open air at this stage is useless, as she is too weak to walk about. What is to be done? Find the cause of the patient's illness. That, in most cases in my experience, was found in defective drainage, breathing vitiated air, or other insanitary condition in connection with the dwelling.

Few think of ascribing neuralgia, menorrhagia, dysmenorrhoea, dyspepsia, bronchitis, &c., to sewer gas or bad ventilation; the real cause is neglected, hence medicines can only give temporary relief until a "change of air" is tried, when there is rapid recovery. Sewer gas and bad ventilation are not, of course, the cause of every case of general debility, but I think they are so in many cases, and the medical attendant in such, may be at a loss to find the cause, the patient being in the habit of going out of doors often, and apparently observing the necessary laws of health; ~~But~~ but all these precautions are counteracted in the night, by exposure to the emanations from the sewers, and deficient ventilation.

In this class I might include other diseases, as probably directly due to the action of foul air, such as simple diarrhoea and meningitis; but, not having sufficient evidence to prove this, I place them in the second class — diseases due indirectly to foul air. At the same time, I think it most probable that the diseases which I place in the second class, will at some future time rank in the first class. In the second class I might include scarlatina, measles, &c.,

as being due indirectly to foul air, the infection being carried in many cases by drains. This might be said to be carrying my argument too far, as the poisons of these fevers are specific, the foul air acting only as a vehicle for the specific poison. From Dr. Aitken's paper already quoted, there is some reason to believe that scarlatina, diphtheria, and, I may add, tonsillitis and other forms of sore throat, are similar, if not the same diseases, and depending on the same cause, independent of any specific poison. This view receives support as follows:— The Medical Officer of health to the Marylebone Vestry, lately presented a report which is supposed to throw some light on the origin of a recent outbreak of scarlatina in Dorset Square. A minute examination leads to the inference, that every case in the outbreak was traceable to the drinking of milk, from a cow or cows on a model farm at Hendon. He states that, "There have been in the parish between 1<sup>st</sup> and 29<sup>th</sup> December 1885, sixty cases of illness, in all of which the patients had drunk milk from one of the three dairies supplied by the Hendon farm. Some of the sufferers have had simple sore throat, others a mild

attacks of scarlet fever, and a few have had a severe attack. Those who drank no milk save that which had been boiled, were not attacked, and most of those, who only took a little milk in tea or coffee, escaped. Children taking considerable quantities of luke-warm or unboiled milk, and adults drinking raw milk, form the bulk of the cases. Several instances of infection from the cream occurred, and I have reason to believe, that the disease influence was in a more concentrated form in the cream than in the milk. He says also that Dr. Klein is making experiments with the milk and secretions of one of the cows.

I am of opinion that, unless it is proved that the specific poison of scarlatina existed in the farm or dairies, or that the cases had their origin elsewhere, this outbreak was caused by the milk absorbing some poisonous matter, either in a gaseous form, or contained in water used for washing the milk tins, &c.; the same state of affairs having been proved in many cases, as the cause of an outbreak of typhoid fever. The fact of some of the cases being simply sore throat, while others were scarlatina in various degrees of severity, supports

the theory ~~that this~~ which I have ventured to advance, that the various forms of throat disease, diphtheria, tonsillitis, &c, are similar in character and cause; and also supports that of Dr. Aitken, that diphtheria and scarlatina are closely allied, if not the same disease in different stages of evolution.

Diarrhoea. — At the present time it is common to blame fruit, &c, for causing diarrhoea, and I do not contradict that statement in toto; as, no doubt, fruit and some other kinds of eatables will cause diarrhoea in certain cases. But why does diarrhoea prevail so much in warm weather of summer ~~of~~<sup>or</sup> autumn, while in cooler weather it is only seen as a symptom of some other disease, and even in the summer months, it often appears before the season's fruit is procurable? It is argued by some, that diarrhoea is not a disease per se, but only a symptom. I hold it to be a symptom in every ~~case~~ instance. It occurs in advanced phthisis as a symptom, in typhoid fever as a symptom, and so on; but that form of diarrhoea which seems to constitute a distinct disease, I still hold to be also a symptom, and of poisoning of the system

either by foul air, or by some offending matter in the alimentary canal. The main and most common cause seems foul air from sewers. This in warm dry weather escapes copiously into the atmosphere and is respired; but in many cases it is simultaneously assisted by the indiscreet modes of feeding infants and children. These may have been fed in the same way before, and no diarrhoea result, till the foul gas escapes plentifully, and, the child being already in an unstable condition from unsuitable food, poisons its system, and nature then endeavours to get rid of the poison, by a smart attack of diarrhoea. Here the bad feeding is the predisposing, while the sewer gas is the exciting cause. The question of feeding applies equally to adults, as it is well known, that an adult liable to attacks of dyspepsia is also liable to diarrhoea, and especially so in the summer and autumn.

The preceding remarks may be summed thus:—  
 1<sup>st</sup>. Diarrhoea, in every case, is a symptom of some disease known or unknown, and in no case is it a disease per se. 2<sup>nd</sup>. Unless traceable to some lesion in the intestine, as tubercle, it is due to absorption of foul gases by the system.

and accelerated by indiscreet feeding, or debility from previous illness. 3°. The influence of hot weather in increasing the disease is undoubted, and acts through the drainage.

In many cases of diarrhoea in children, it is common after the diarrhoea has continued for a long time, for symptoms of meningitis to appear, and in most cases of this nature death results, although I have seen recovery in many, simply on a change of weather from hot to cool. A remarkable change of this kind occurred about two years ago. I had six very severe cases of diarrhoea on hand, all children under two years. In all there was little hope of recovery, and two still less, both being almost in extremis. The weather was hot and had been long so, but at this time became cool. The whole six patients at once began to recover, and were soon well. The two severest cases had symptoms of meningitis, manifested by slight fits, and this leads me to suppose that what is called epidemic meningitis, is closely allied to typhoid fever, diarrhoea, &c., as to its cause and prevention.

Bronchitis. — Bronchitis and common colds are not considered as being caused by foul air, yet

I think that they may be caused by such, though not directly, and, that living almost constantly in an atmosphere more or less impregnated with sewer gas, or in a badly-ventilated house, may so far weaken the system, as to make the individual unable to resist the action of cold. Here we have the foul atmosphere as the predisposing cause, and the cold (it may be an almost imperceptible draught) the exciting cause. This may seem to many, at first sight, as nothing new. It may be said that simply living indoors, makes one liable to catch cold, by rendering the subject "tender", or like a greenhouse plant. I think it is more than this; it is that the air is foul, and that the nervous system of the subject is debilitated, not simply by a pure warm atmosphere, (as in the greenhouse) but by vitiated air with which the system has become saturated. When the system is out of order one is more liable to catch cold, and that, even from a slight draught; whereas, a person in sound health, will be unaffected by similar changes of temperature. Few persons are thoroughly healthy, and I think this is accounted for, in very many cases by the common custom of staying indoors,

and by imperfect sanitary arrangements both in and out of doors; and anyone, who has paid any attention to this subject, knows that, as in the vast majority of houses, ventilation is almost, if not wholly neglected, the air in such houses is extremely unhealthy, putting bad drains and sewer gas out of the question.

In this instance, again, the weather is a cause of the disease, but previous indifferent health, from the cause above stated, predisposes and is in reality the cause of the complaint. Remove the predisposing cause, and the exciting cause will have no effect.

It is interesting to note in support of this, that in the Registrar General's returns of the mortality in the eight principle towns in Scotland, for the week ending 6<sup>th</sup> February 1886, the death rate from all causes was 5.3 below that for the corresponding week of last year, and 1.1 below that for the previous week of the present year. Deaths from bronchitis, pneumonia, and pleurisy, were 21 below the number for the previous week of this year (1886). This, notwithstanding that the mean temperature was 4.3 degrees below that for the week immediately preceding, and 8.5 degrees below that for the

corresponding week of 1885.

Bronchitis frequently accompanies diarrhoea, beginning at the same time, and in houses where there is strong suspicion, if not certainty, of the prevalence of sewer gas. This leads one to infer that the two diseases are due to a common cause.

Some other diseases could be reasonably accounted for, in the manner I have endeavoured to account for those I have mentioned, but as it would simply be a repetition, or nearly so, of what has already been written, it is unnecessary to discuss the subject further. In the foregoing pages I may not have entered into the subject so fully as might have been done, but I have endeavoured to make my meaning apparent while avoiding details. I have intentionally abstained from speaking of the treatment of the diseases which I have been considering, but from what has been said of their cause, the method of treatment is apparent.

It may be said that several of the diseases which I have considered, seldom or never result in death, and what bearing can my quotations from the Registrar General's reports of the death rate, have on them? I have en-

deavoured to shew that these apparently simple diseases, which do not terminate fatally, arise from the same cause, and are similar to, if not identical with, more serious diseases, the death rate from which is extremely high. If this be the case, the fact of the simple forms of disease existing, should put us on our guard against the more severe forms.