REPORT

OF THE

TWELFTH ANNUAL MEETING

OF THE

ASSOCIATION OF

EXECUTIVE HEALTH OFFICERS

OF ONTARIO

HELD AT

TORONTO, ONTARIO,

16TH AND 17TH AUGUST,

1897.

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OF ONTARIO.

The Twelfth Annual Meeting of the Association of Executive Health Officers of the Province of Ontario, was held in the theatre of the Normal School, Toronto, on Monday and Tuesday, August 16th and 17th, 1897.

First Session—Monday Afternoon.

When the hour for opening the meeting arrived on Monday afternoon, the President, Dr. Sheard, of Toronto, called the gathering to order and requested the Secretary to read the minutes of the last meeting. Upon motion, the minutes as read were adopted.

Mayor Shaw then gave an address of welcome to the Association. He stated that among the many duties devolving upon the Mayor of a city, none were more pleasing than welcoming visitors. Toronto was a fine city, and its citizens were delighted to have conventions held in it. He was particularly pleased to greet the members of such an Association. The healthfulness of a city contributed to its popularity. "We have," said the Mayor, "in the person of your President a most energetic and efficient Health Officer. As a

city we owe much to the Medical Health Act and the efforts of the Executive Health Association for the benefits which have resulted to us through the enforcement of the Act." After some humorous references of a local nature His Worship proceeded : " We are also to have with us, this week, the members of the British Association for the Advancement of Science, among whom are some of the most distinguished sanitarians of the mother land. I know that you gentlemen, who are so familiar with scientific terms, will remain over for the rich treat that they will lay before you. I trust that I shall have an hour or two to-morrow to show some of you around the city. We trust that you will have an enjoyable time while here, and that you will go away with pleasant recollections of your visit to our city."

Ald. SCOTT, as Chairman of the Reception Committee, said that he agreed with every word of welcome uttered by the Mayor. He then proceeded : " I think it is especially appropriate that your Convention should be held in Toronto, not only on account of its being a very important commercial centre, but as it may be regarded as a centre of medical science. The people of Toronto take a very great interest in the question of sanitation. The fact that the city is so healthy a one, is largely due to the administration of the law relating to that science on whose behalf you have met here to-day. We regard the Health Act as an important one, and one that comes home to each individual one of us. Its administration in Toronto has been very effective. I trust that each member of this Association will see to it in his own district that every effort is made to prevent the spread of contagious disease by those who are suffering from it, or on the part of those who are with them. I welcome you, in the hope that your deliberations will result in the development of ideas which will tend to further strengthen the administration of the Health Act, if that be possible, and also to bring out such amendments to the Act as will commend themselves to the Government for adoption. We in the city of Toronto have had great reason of late to be pleased with the way the law in regard to the spread of contagious diseases has been administered. You are aware of the recent importation of smallpox by

a passenger on a steamboat. With the stringent and prompt measures adopted by Dr. Sheard we are in hope that the disease will not spread amongst us. We feel that we have in him a Medical Health Officer who is able te cope with anything in that respect, and we feel that you of this Association are also desirous of doing all you can to restrict the spread of disease in your own districts and throughout the Province at large. Our City Council is a unit to do everything that can be done to prevent the spread of any contagious disease. I wish you all a pleasant stay and a safe return."

The CHAIRMAN, on behalf of the Association, returned thanks to the Mayor and Aldermen for their very cordial greetings.

The PRESIDENT delivered his annual address, and was loudly applauded at the close.

A Committee consisting of Drs. Hutchinson, Kitchen and Bryce was appointed to draft resolutions in regard to the demise of Dr Griffin, of Brantford, and Mr. Alan McDougall, of Toronto late members of the Association.

Dr. BRYCE then read a paper on "How far should Mandatory Measures go in dealing with Measles, Whooping Cough, Tuberculosis and Leprosy?" The doctor prefaced his paper with the following statement: I have prepared this paper with the object of getting the ideas of the members of this Association, as to what ought to be done in the Province in the carrying out of the Act in regard to the diseases treated of in the paper, and also that I might be able to state your views at the British Medical Association meeting, to be held at Montreal next Month.

At the conclusion of the paper, the following discussion took place:

Dr. HUTCHINSON: Would you close the school room?

Dr. BRYCE: Yes; if the child goes home from the school, ill, it should be done.

Dr. CASSIDY: We have the difficult question to meet as to whether we will deal with measles and whooping cough, somewhat after the fashion of those diseases which now demand notification. It seems to me, that, while it would be desirable to accomplish as

much for the diseases named as for those others which have been counted more serious, it is a question if it is practicable to do so, should we attempt it. We know that measles is a peculiar disease. We are often called to visit persons who have many of the symptoms, and a first-class diagnostician would be in doubt whether to pronounce it an actual case or not. The doctor may not be able to state readily that it is a case of measles. Yet that patient may in the meantime have inoculated a number of others. If you were to know that such an individual had been exposed, and you could get a history of the exposure, then the practitioner would be justified in isolating that person. And if that applies to the physician, it applies with greater force to the householder, who cannot be expected to readily recognize the symptoms, which are rather difficult to define. Sometimes young children will run about for a few days and cannot be kept in bed. And if it be in the spring some may call it croup, or bronchitis or something of that kind. In scarlet fever the outbreak follows rapidly after the first attack; perhaps in eighteen hours you have an outbreak. It does not show itself so soon in smallpox, but it is somewhat shorter than in measles. I do not, however, wish to infer that I am opposed to taking all means to accomplish what the doctor has so well described in his paper. With regard to whooping cough it is really important to know that disease is so infectious at the very earliest stage. It is not wise to wait until you have pertussis, for all the time the patient may be liable to infect others. Of course there are some who still think that this disease is of a very trifling nature, but in some cases it has proved fatal indeed. I remember many times passing houses in Toronto and hearing the familiar sound of whooping cough in the spring and summer, and even in the fall. In many instances the disease lingers very long

Dr. SHEARD: Personally I would like to have some definite power given me to quarantine people who have not been infected with disease but who have been exposed to it. We have tried to keep in quarantine people who have been exposed to scarlet fever and diphtheria, but I have not succeeded in doing so in some cases. I have had legal opinion on this very point, and the law appears to

be clear, that, while we can keep in people infected with the disease we have no power whatever over persons who may have been exposed. Clause 78 of the Public Health Act says no householder shall permit any person suffering from these diseases to be removed from his house, but the Act does not speak of restraining persons who may have been exposed to such disease, except as in Clause 84 ; but in the latter case it distinctly refers to persons coming from "abroad" We have tested some cases, and have found that the law governing persons exposed refers to those coming from other countries or other municipalities. But according to another section of the Act such person is to be removed to the place of isolation, after having two medical men examine him and pronounced him to be suffering from a contagious disease.

Dr. BRYCE : No.

Dr. SHEARD : Yes. But what is the use of trying to procure isolation when a medical practitioner will say to the householder "I will give you a certificate, and your child can go out." The case at present is like this. There is a case of whooping cough, scarlet fever or measles in a family. They call in Dr. Thompson and he says the children must stay in ; then Dr. Smith is sent for, and he says the children can go out. What is the result? Dr. Thompson is dismissed and Dr. Smith gets the family practice. In cities where the Health Officer is always available he should have power to say whether people should stay in or not. We have tried to placard in Toronto, and we are going to try again. We placard a house, and the occupants say : "You have put that infernal placard on our door. We will defy you." And often the family physician will say, "Why do you placard that house? The patient is in a back room, and the rest of the family are kept out." Then he tells the inmates they may go out if they please, and out they go, and there is not a health officer in Ontario who can stop them. I have tried under various City Councils to prevent that, but I have not been successful. I would like to see the words "or other physician" struck out. I have no confidence whatever in the placard as a means of isolation. I have seen smallpox placarded in Mott Street, New York, and have

seen Italians by the score go in and out of the house. And even in this city you will see many persons enter and leave a placarded house. They say, "I am neither a coward nor a fanatic, I will go in and risk it." We have recently had a case of smallpox isolated, and we had two ladies come and say to the policeman that they wanted to see the patient and give him a bouquet. (Laughter.) What do you think of that, in the case of women who prize personal charms Now if that be so in the matter of smallpox, how much more would it be in a case of measles? We had a good deal of scarlet fever lately, and we placarded houses, but in a short time there were 300 cases among children attending two schools. We would have from forty to fifty cases a day reported from these two schools. It would be difficult to get after all these cases. We have 30,000 children attending our city schools. There are 1,500 in Landsdowne School. If it was noised about that there was scarlet fever among the pupils soon 1,000 scholars would be kept away from the school, and perhaps not more than twenty would be infected with the disease. Then extra officers would have to go running around, and even though there were only twenty cases nervous mothers would keep all their children at home. And we all know that in the case of Sunday Schools it is even more difficult to deal with this matter. Many of the Sunday Schools have not a proper record of attendance and residence. It would require the efforts of the whole staff of the Health Office, for two days for the purpose only of sending notification to all the parents of children attending the Sunday Schools. We can in the day schools communicate by telephone and other ways more easily than we can with Sunday Schools, and the latter are as likely to communicate contagious disease as the former. I want to be practical. When you come to the municipal authorities for a grant for public health work, they are very careful to ask what it all means. They sometimes say, "This is getting irksome; you are annoying us. We don't want it." But suppose you do lock up a whole household. Nowadays there are many people who are glad to be locked up in their own homes, if you will keep them in provisions and fuel. You can easily see where this would lead to among the poor of the city,

if you took up all these cases, especially whooping cough, which sometimes covers a period of five months. With such a style of quarantining there would not be enough left in the corporation funds to run the town. I would like to have two separate classes of contagious diseases. First, such cases as Asiatic cholera and smallpox. In these cases let the health officer have full power, so that he will be able to take either by the collar, if necessary.

Support the officer in all such cases, so that he will not be hindered, so that none will be able to say, "He tried it in that case and failed, and so we will also defy him." Placard the house in the case of whooping cough and measles if you like. It has been suggested that some of these cases can be reached by by-law. We have had that matter thrashed out in the courts, and find that no by-law can over-ride the Act. The Act has such words as these: "Whenever any householder knows," and "Whenever any physician knows. The householder does not know; he does not want to know. You may tell him, but he will not believe you. When I know by bacteriological examination that the bacillus is there, he cannot deny that a case of diphtheria exists, but in scarlet fever there may be doubtful cases, and physicians may not agree, and you cannot make one "know." If you attack people and fail you had better never have touched them. The moral influence of the community is at once averted from you. I would like to ask, how many health officers here have entered action against attending physicians for not reporting cases of contagious disease.

Dr. HALL. I was very much interested in the paper read by Dr. Bryce. The question of limiting the risk of infection from whooping cough and measles, I consider a most important one. The health officer now feels that he has public opinion against him whenever he makes any attempt in the direction of enforcing these provisions of the Act. The opinion of the public at the present time is rather that "the children have to" contract these diseases and go through them some time during their life. Some mothers will even expose their children to the contagion so as to get the difficulty over while the weather is favorable. I have known some parents to

expose their children to whooping cough in the spring, so that they might have an easy time of it. It is a question how much the health officer will be able to combat that idea. Dr. Bryce's paper has referred to a number of expedients which might be taken towards limiting or preventing infection from these diseases. In a town or city about the size of Chatham I imagine that the means he has pointed out might be practicable, but after hearing the President's remarks it would appear very much as though it would be impracticable in a city the size of Toronto. My experience with school teachers has been that as a class they are very willing and even anxious to co-operate with the health officer in every way they can. I have never seen measles sweep down on a community in the manner that has been indicated by Dr. Bryce's paper. Our experience with measles this summer was that the outbreak was very gradual, and at no time had we a large number of cases. The importance of limiting whooping cough and measles is, I think, not solely on account of the death rate from the disease but largely on account of the very disastrous effects that frequently follow an attack of either of these diseases. It is almost as bad to be left with sore eyes the remainder of a person's life as it is to be taken away by death. But as physicians we know that there are more deaths ultimately resulting from whooping cough and measles than the mortuary statistics ordinarily show. I think it should be incumbent on the householder to report to the health officer all cases of disease in children which they cannot clearly understand.

Dr. HUTCHINSON: We have met with the same difficulties in London that Dr. Sheard has met with in Toronto. I would suggest that the Provincial Board of Health take the proper means of having Sec. 78 amended by striking out the words "or attending physician," which occur in two places; and in Sec. 80 "whenever any physician knows that any person." That words "knows" governs the whole thing. The physician never "knows." (Laughter). He may know in his heart, but he never "knows." I would put in another clause to the effect that "whenever any physician has reason to suspect."

Dr. WARDLAW: We are now suffering from an epidemic of whooping cough in Galt. If you had to quarantine every house in which there is whooping cough you would have to watch nearly half of some towns. They whoop in the spring and they whoop in the summer. Many of these local cases are not reported to me. We have had cases of diphtheria in town, and I have had difficulty in having some of the cases reported. In many instances the doctor's practice is at stake. The length of time of quarantine should also be stated in the Act. Some physicians say that the time should be only a week, while others say it should be eighteen days; but there is nothing in the Act, and the attending physician is left to do as he pleases. You could not quarantine every case of scarlet fever and measles without ruining the town financially. In quarantining in some cases we had to maintain the men, besides paying for clothing, etc., and it cost a good deal more than the ratepayers were willing to pay We have never proceeded against any person for not reporting. In one instance I asked a certain doctor, "was that a case of scarlet fever?" He replied, "I said that it resembled scarlet fever." The disease broke out next door, and the attending physician there declared it to be scarlet fever. Dr. No. 1 then got that case and the other doctor lost a family's practice for his frankness.

Dr. MCCRIMMON: In townships the monetary part of the question would be difficult to deal with. I have received as high as $15 a year as salary for acting as health officer. Our local board of health costs at the highest $80 a year, and the ratepayers kicked at that figure. If we were to increase that we would be run into the lake. It is hard to deal with contagious diseases in townships like ours. There is only one telephone in the entire township, and if we were notified by mail, before we could reach the patient, he might be dead and buried, and all the neighborhood might be infected. In regard to measles, the cases often do not come to our knowledge until the old ladies of the section have got through with their visits and consultations.

Dr. HUTCHISON: There is often trouble in placarding. No one but the health officer has authority to take off a placard.

Dr. SHEARD: We had to put up a new placard every day on Simcoe Street. Unless you are prepared to pay men to stand day and night to prevent removal, the placards will be taken down in many cases.

Dr. McCRIMMON: I have had placards taken down in our township also.

Dr. SEWARD: In several cases of diphtheria in our town I have found the placards removed before the next morning. The only effective way in some cases would be to barricade the house, but that would cost a good deal of money. We had seventeen cases of diphtheria during the past year. Some doctors are willing to attend cases and not report them. As a comparatively new practitioner in our town I do not feel like taking active legal measures. But if things do not improve I shall have to proceed against some persons.

DR. STURGEON: We had some cases of diphtheria in Petrolia and a number of them were not reported. One case had not even been attended by a physician. The child at last was brought to me suffering from paralysis of the throat. The parent said the child had been troubled with "sore throat," but it was diphtheria.

Dr. KITCHEN: Some two years ago we had an epidemic of measles imported into St. George from the neighboring town of Paris. A child from our town had visited Paris, and within a few days we had 100 cases of measles. I was called upon to report four or five cases, but many of the cases were not attended to by physicians at all. As Dr. Hall has pointed out, many mothers conclude that it is absolutely necessary for children to have measles at some time, and they will take their children into houses where the disease exists, in order that they may get the disease at a suitable time of the year. In the matter of whooping cough we do not see very much of the disease at first, but when the children get weak and low, the physician is called in. The doctor then gave some personal experience as to his refusal to allow his own family to visit friends where whooping cough had been, but stated further that he had known a case where the children of an intelligent medical practitioner had visited friends, while yet

suffering from whooping cough; and that being the case, what could be expected from others?

Dr. Bryce: The discussion has brought before us the practical difficulties we have to deal with as health officers. The points brought out in the discussion however, have not exactly taken up the recommendations in the paper. The speakers have plainly pointed out the many difficulties which are found in practice, when dealing with these diseases. In regard to the legal phase of the subject, I have never been able to agree that some of these clauses are as weak as the police magistrate and other legal officers of Toronto hold. The police magistrate of Toronto has never been willing to sustain the provisions of the Act regarding the matter of quarantine and notification. Sec. 94, which is made to deal with cases in schools more especially, is very clear as to the duty of householders. It says:

"Sec. 94. Whenever a case of smallpox, cholera, scarlatina, diphtheria, whooping cough, measles, mumps, glanders, or other contagious disease exists in any house or household belonging to which are persons attending school, the householder shall within eighteen hours of the time such disease is known to exist, notify the head teacher of such school or schools, and also the secretary of the local board of health, of the existence of such disease; and no member of such household shall attend school until a certificate has been obtained from the medical health officer, or legally qualified medical practitioner, that infection no longer exists in the house, and that the sick person, house, clothing and other effects have been disinfected to his satisfaction; and until such certificate shall have been obtained, it shall be the duty of every member of the household, and of the teacher, to use all reasonable efforts to prevent the association of members of the said household with other children."

We intended by that clause clearly that the householder must notify in the case of every one of these diseases. So far as measles are concerned, the householder should be the first party to make a notification regarding the disease. Regarding quarantining, Sec. 84 has been our sheet anchor for fifteen years in writing to medical health officers in the country as to what they should do in grappling with such diseases as smallpox. The smallpox regulations were made in 1885, and in all these years we have never had a single case

in which the legal aspect of that clause as we generally interpret it, has not been sustained—that is, so far as the ability to hold a smallpox patient or a suspected patient is concerned. Now, if it is efficient in dealing with smallpox and those who have been exposed to it, then I take it that the clause is exactly the same in regard to the other contagious diseases. If this clause does not permit that, then clearly there is nothing in the Act that will do it. In quarantining persons affected with or exposed to contagious diseases, they should be kept in at their own cost; and only when they cannot at all pay for it, should the municipality do so. I have had an instance where a householder was visited by a medical man and instructed to disinfect his premises; and finally the doctor had to get the place disinfected. The doctor sent in a bill for $5 for this, but the householder refused to pay it. No doctor can collect for disinfection under such circumstances. The question arises in connection with measles; "Can you remove?" Among the better class of people it is not necessary to remove in measles; and perhaps it is not yet practicable to remove in the case of measles generally. What, then, is left for us to do?

The very first case that occurs in a family or is reported in a school, is the one that we can deal with most effectively. Take the household connected with that case, and deal thoroughly with the members. Follow these children for ten days, and you will not have the difficulty of dealing with 3,000 cases of measles. In a somewhat lesser degree we must adopt the same methods in dealing with measles that Dr. Sheard is using to-day in stamping out smallpox in Toronto. Take the case of Montreal in 1885. It was said that there were 20,000 cases of smallpox then in that city, and the local authorities said that it was not possible to deal successfully with the question. But when it was found that in one month $1,000,000 worth of orders from the wholesale houses, were cancelled they soon found that it was possible. When they were told "We will deal with you if you will put in a disinfecting apparatus and vaccinate all your employees" it was found that it could easily be done. We need to try and get at the first cases at home, and at the first room in the school, where an outbreak has occurred. If we keep on educating the public, we

will be able to deal with whooping cough and measles in something the same manner that we have done with smallpox, diphtheria and other diseases that have been looked upon as being more serious. I may say that the Provincial Board of Health will take it as a kindness that they can hardly express if this Convention will draw up a few proposed amendments to go before the Government and be put into the Statutes now being consolidated.

You know that Legislatures are so constantly amending Acts that when they get an Act that has worked well, they are very slow to touch it. We have had a few amendments made in fifteen years, but we can work in some further amendments by showing the Attorney General that they are clearly practicable, and have public sentiment behind them. Yet we know that public opinion is changeable, as has been proven in the matter of dealing with tuberculosis in cattle.

On motion of Dr. HUTCHINSON, seconded by Dr. MCCRIMMON, it was resolved "That as a result of the discussion on the working of the Ontario Health Act, a committee be hereby appointed to consider the necessary revision of certain clauses in the Act, to report at the meeting to-morrow afternoon, the said committee to consist of Dr. Sheard, Dr. Bryce, Dr. Hall, Prof. Shuttleworth, Dr. Hutchinson and Dr. McCrimmon."

Dr. SMUCK, of Toronto, read a paper on "Heredity in Marriage."

The meeting then adjourned until the following morning.

SECOND DAY—TUESDAY MORNING.

A paper on "Scarlet Fever and Milk Supply" was read by Prof. E. B. Shuttleworth, of Toronto, which envoked an interesting discussion.

Dr. MACDONALD: This question of milk supply has been agitating our Board of Health for some time. There is frequently a good deal of difference of opinion, and sometimes even a collision, between some medical health officers as to the evils and dangers, arising from the sale of milk. There is doubtless very much danger of infection through the medium of milk, but it is difficult to get Boards of

Health to see this. In our city the Board of Health had a meeting with the milkmen, to see if all could agree upon some mode by which the milk could be delivered fit for use, and free from risk of infection, and such an angry multitude I never saw. These milkmen seemed to think that the health officers were anxious to hinder them, in their work of supplying milk to the people. If the Boards are convinced of the necessity of watching the milk supply, I think much good might arise from reasonable and active measures. We have had no epidemic lately in which we could trace the source to our milk supply; yet we have been doing the best we could to enable the citizens to obtain their supply of milk from pure sources. Our health officers will be a good deal helped, by the publication of this paper, and its influence upon the public generally must be beneficial. People are more inclined to see the business side of a question, to the neglect of how the matter may affect the general health of the community.

Dr. HALL: Is bottled milk distributed in Hamilton?

Dr. MACDONALD: Yes, by some; but it is not universal.

Dr. BRYCE: I am quite sure that we owe Prof. Shuttleworth thanks for this address. The question in connection with the disease being spread through cows, was dealt with quite as much as its importance deserves. Investigations since 1885 have settled the question that cows do not have scarlatina. There is danger, however, from the ulceration of the teats of the cow. I have looked over the report of the health officer of London referring to this source of the disease. There were three or four outbreaks in the four years referred to, but in every case, and also in the Hendon outbreak, while they could not trace the outbreak to contact of children, the influence of contact with school children was very marked. It is very difficult to say whether the disease can be traced to the cows or to the children. Cruiksbank has well worked out that an eruptive form of disease may be got readily through inoculation from cows suffering from cow pox or any other disease of that kind. The pathological conditions are never present in certain cases of scarlet fever, but in the severer form of scarlet fever they are. Setting that aside we come to the one question of the danger of milk distributed by bottles. Of course

we grant at once that there is danger of infection by the distribution of bottles. Regarding the particular dairy that Prof. Shuttleworth referred to—and one that I was instrumental in having started to supply Toronto with better milk—I was particularly interested in its history during the month of May. The cows, according to a veterinarian, were in as good condition as cows could be, and the dairy houses were also in as good condition as could be. No men having scarlet fever were in connection with the dairy, as Prof. Shuttleworth has pointed out. None of their families were affected. Therefore there is nothing left but the bottles from the houses to the dairy. It was never contended that the bottles were sterilized. There is no attempt made by Prof. Shuttleworth to show that the bottles coming back from the dairy had distributed the disease. As to whether the bottles were contaminated, I tried as far as possible to find out. Before the drivers delivered in Toronto they went on Yonge street to thirteen families, and none of these have had scarlet fever. None of the people working around the dairy, nor their children had scarlet fever. In cases in Rosedale, where some patrons had scarlet fever, it was in every case school children, and not little children, who were infected. It was likely that the bottle came from the home infected, that the driver took it in his hand, and that from the hand of the driver the contagion was spread. Is the danger in bottled milk *per se*, or is the danger in the method of handling the bottles by the driver? If it be in the latter, and it appears to be so, how then are we going to prevent that particular danger, for the manifest advantages of bottled milk have been already confessed? Milk properly put in bottles is in such a condition that it keeps so that only one delivery a day is needed, even in summer. That proves that the milk has certain manifest advantages. How, then, can we eliminate the danger by handling milk from bottles? Take a case. Scarlet fever is in the house. The bottle comes in; it is left there and comes out to-morrow. It have been, perhaps, in the sick room, and has been put under the kitchen tap and washed in cold water. How can that be helped? There are three ways of stamping out scarlet fever. First, by placarding, if thought necessary. Secondly, by taking the patient out

of the house; and thirdly, by having the inspector of the Board of Health constantly on the premises. But this last would be absurd. Will it do to say that milk must not be put in bottles, but must be taken in the old way, necessitating the use of ice, and have the milk remaining over night in the city stables? Let the driver know there is scarlet fever in the house, and that he will have to put the milk for the time being into another vessel. We can never deal effectually with this matter, until we adopt one of these methods. I have traced the cases of scarlet fever in houses where this milk has been distributed, and there were twenty per cent. school children. The school children in Mr. A's house take scarlet fever. They also drink milk. Was it the school that caused the infection or was it the milk? Taking the broad fact that seventy per cent. went to school, and that there was no disease along the line of the country portion of the route supplied by the dairy referred to, and no disease on the premises except where children went to school, we must come to the conclusion, that it was the school and not the milk that was the source of infection. And while the city officers are to be commended for doing all they could in trying to prevent the spread of the disease, I think they should have followed up the matter of likelihood of contagion from the school a little more closely, and not have laid too much stress upon the likelihood of infection from the milk. I looked into the matter of those cases, where the patients had been in attendance at the Model school. Some eleven or twelve per cent. of the total number of school children affected, attended that school. Of seventeen cases occurring in the Model school in May, only three belonged to families that took milk from this particular dairy. I again assert that the school factor should have been followed up a little more closely, before condemning the milk. The cases were increasing so rapidly, in that particular school, that it was absolutely necessary to close it. Now, what are we to do in practice? Are we to take the position that the bottled milk is dangerous? Or are we to take the more reasonable position, that bottled milk is dangerous only under certain conditions? I am convinced of the soundness of the latter claim. Bottled milk may be dangerous, when used in houses

where the bottles are used by persons, suffering from contagious diseases. We must not be too ready to condemn or try to do away with this plan of distributing milk. We must remember, too, that there are thousands of dollars invested in this mode of delivery, and we must be very sure of our ground before we attempt to prohibit or hinder it. I certainly could not say that we should go back to the old mode of delivery. If we take a stand, inimical to the use of milk delivered in bottles, we will not only injure a legitimate business, but will manifestly lose ground so far as the public health is concerned.

Dr. STURGEON: Would it not be possible to have one driver to leave the bottles, and another to collect them?

Dr. ROE: Why not have new bottles until the case is convalescent?

Dr. SHEARD: First of all, we start out with the idea that the placard on the house would prevent the driver of a milk waggon from taking the bottles from a house where such diseases exist. But the driver of a milk waggon is not usually an educated man, and often he is one not impressed with sanitary ideas. We know, that if we did put a placard on the door, it would be gone in the morning, and unless we can get a man to stand by and see that the placard is kept on, there would be none when the milkman came on his rounds. I have seen, where a bottle was taken out by one man and filled with milk for another man. It has not gone back to the dairy, and has not been cleaned. I admit that that is not the ideal system, but here you have a system, that can give opportunity to such a thing as I have described. If you get an infected vessel from an infected house, there will be danger, and the larger number of those infected vessels you gather up, the more you increase the danger. But if you are going to deliver the milk in each one's own receptacle, so that a household will be responsible for its own vessel, then the careless or the diseased only will be the sufferers, and not their neighbors. If you have a can of milk containing eight gallons, you have less danger of infection than if you have it divided into bottles of pints and quarts. Of course, a dirty can will do more damage than a dirty bottle.

These bottles are often only imperfectly cleaned. If you will take some of them that are supposed to have been cleansed, you can pick the casein easily out of them, and what substance will make a better culture for disease germs than casein? It looks very well to have the milk on your table in a nice bottle. But there are many cases in families where there is scarlet fever, which is never observed, and the children take the milk from the bottle, and that bottle is refilled and goes into some other house. Now as to the cause of the disease. Is it milk, or is it the school? Of course there is a risk in schools, but I will not recognize that as the cause of the disease in the particular cases referred to in the paper and by the previous speaker. If you have thirteen cases reported to you, and you have twelve of these cases from one milk supply and from one man's dairy, what must you conclude? There is only one conclusion possible. Here is a dairy which has only two per cent. of the city milk supply, and yet has among its patrons twenty-six per cent. of the cases of scarlet fever. Of course, I do not mean to say that a school is powerless to disseminate disease. We have means of thoroughly knowing how disease prevails in schools. We have many bottled milk dairies in Toronto, and they handle probably as much milk as this particular dairy; yet these dairies have had only two cases of scarlet fever among their patrons, while the other one has had eighty cases. If we are going to deliver milk advertised as sterilized milk, we must sterilize that milk, or else admit that we are obtaining money under false pretences. You cannot sterilize milk in water that the hand of a man will bear. The bottles now used cannot stand the sterilizing process. They are worth seven cents apiece, and they would be sure to break in water capable of sterilizing. Bottles that are to bear the process of sterilizing would need to be annealed. As to the old can, the chances are in the proportion of eight gallons to one quart, or of one to thirty-two. The milk is now cooled by ice, and not much danger is likely to be realized from churning in the carrying.

If we are to have bottles, it must be only where the milk is actually sterilized. Till then, the bottled milk must be held to be specially liable to infection.

Dr. HOLMES: I would like more information in reference to one part of the paper, where it states that the medical health officer had no jurisdiction in dealing with certain dairies visited by him. I was under the impression that the Health Act gave the health authorities full power over the milk distributed within the municipality, no matter where it came from.

Prof. SHUTTLEWORTH: I do not think there is any point at which any of the speakers have been at variance with my paper. It is very true, as Dr. Bryce has stated, that school influence is very great. But all the dairies were concerned in the school attendance. With regard to the placarding of houses, I find that the milkmen are pretty well aware of the existence of any contagious diseases among their patrons. If the bottles were of better quality, sterilized milk could be distributed in them with advantage; but milk cannot be sterilized with the bottles now in use. As to the handling of bottles, they might be wrapped in paper, or better still, the bottles should not be left in houses where cases of contagious disease exist, but the milk should be poured into some vessel provided by the members of the household. I think arrangements should be made by which no bottles should be left with infected families.

Dr. J. J. CASSIDY read a paper on "The Propagation and Prevention of Rabies."

Mr. J. J. MACKENZIE: I think the matter dealt with in the paper is an important one, for we are every year having some cases of rabies in this Province. Our first case was in 1891, in which one man and a number of animals were affected. We had no further cases until 1894. In 1895 there were some cases, and in 1896 there were several different outbreaks. There seems to be evidence to prove that these outbreaks were, in some way, connected. Three occurred in the county of Middlesex and the remainder in the county of Brant, in the vicinity of Paris. It would look as if it were a recrudescence from year to year. Two other cases were sent to New York from Canada to be treated for rabies, and we heard of them through the Pasteur Institute, and not from the health authorities of the municipality in which they occurred. The brain tissues

of the suspected animals were not sent to the laboratory, and that is the only way that a case can be decided.

Dr. HUTCHINSON: Last winter and spring in our vicinity there was an epidemic of mad dogs. A big dog, owned by a butcher, went out and bit a number of other dogs, some twenty in all. He sprang at a man and lacerated his arm, the wound was cauterized as soon as possible. After biting the man, the animal attacked a young woman and bit her through the fingers. One month after that she was sent to the New York Pasteur Institute and was treated there, and is now well. The dog had all the symptoms of rabies, and was undoubtedly mad. We made a culture from the medulla of this animal and inoculated two rabbits, One developed rabies and died with all the symptoms of that disease. The other was a little tougher animal, and did not die although quite sick. Another case was a great Dane bitch which ran amuck one morning and tore the whole cheek out of a girl, killed two goats and tore two skye terriers. We isolated the terriers and watched them. One of them died. The other was not so badly bitten and survived. The child was sent to the Pasteur Institute, came back after treatment, and is well to-day. Another dog had rabies and his head and medulla were sent to Mr. Mackenzie, but being too old, a proper culture could not be got. I have noticed, that all the dogs having rabies were large animals.

Dr. ROE: Is it not a fact that a mad dog will not stop and fight, but will snap and go on?

Mr. MACKENZIE: Yes.

Dr. BRYCE: In Dorchester and London townships, a number of animals had been bitten by a farmer's dog—a collie, I think—and the farmer was also bitten. The dog followed the farmer, who was visiting a neighbor. The man entered the house and turned to shut the door to keep the dog out, when the animal sprang at him. The farmer kicked at the dog, when the latter seized him. The dog there appeared to have the definite purpose of resisting his master. At first I was skeptical as to the real nature of the outbreak. They had destroyed every animal that was bitten. However, a pig

went mad a few weeks after being bitten. I said to the local authorities, "if any more cases occur let me know early." In a couple of weeks, I got a telegram, that a pig had been bitten. I saw this animal in the last stage of disease. It was lying down, short of breath, had lost all power over its limbs, and died next morning. I heard then that two cows had been bitten. They became rabid, and horned each other, and finally they had to be killed. Several other pigs had been bitten. The farmer was sent to New York thirty days after been bitten, at my suggestion. I think that those who have been bitten and have not suffered by rabies should be grateful. It may be that no person will get smallpox through this Belleville case, but he may thank the Lord and not himself for it. Let us, as far as possible, protect the people who have been bitten by rabid or suspected dogs, even if the dogs live, months after an outbreak. We should lay before the Government certains regulations, with a view to hindering the progress of this frightful disease. I am of the opinion that Sec. 84 of the Health Act empowers a Board of Health to send bitten persons to an Institute to be treated for hydrophobia.

Dr. HALL: We have many setter dogs in our section, where considerable hunting is done. We have three men who train dogs, coming from the United States. We have had no cases of rabies, and I have been wondering if setters are as susceptible to rabies as other breeds. I beg to move the following resolution:

"That this Association ask the Provincial Board of Health to construct a Model By-law regulating this matter, along the lines indicated in the paper."

The resolution was seconded by Dr. Roe, and adopted.

SECOND DAY—TUESDAY AFTERNOON.

Resolutions or regret and condolence were passed regarding the deaths of Drs. Griffin and Oliver and Alan McDougal, C. E.

Dr. SHEARD presented the report of the committee appointed to bring in certain amendments to the Health Laws, giving fuller powers to health officers in dealing with cases of contagious disease. The following are the proposed amendments:

Section 74 : In the third line, insert after " local board of health," *or medical health officer.*

Section 77 : In the first line, insert after "knows," *or has reason to suspect.*

Section 78 : In the third line, insert after " suffering from," *or recently exposed to.* In the fifth line, insert after " medical health officer or," *if there be no medical health officer, then of the*

Section 79 : In the first line, insert after "specified," *or recently exposed thereto.* In the third line, insert after " medical health officer," *except where there is no medical health officer, then of the.* In the eighth line, after " attending physician," insert, *as above.*

Section 80 : In the first line, insert after "knows," *or has reason to suspect.*

Section 82 : In the last line, strike out " or attending physician."

Section 83 : In the eighth line, after "disinfected " insert, *to the satisfaction of the medical health officer or local board of health.*

Section 85 : In the fourth line, strike out, "attending physician or." In the fifth line, insert atter "medical health officer," *or in case no such officer exists then from the attending physician.*

Section 86 : In the sixth line, insert after "medical health officer or," *in case there is no medical health officer then.*

Section 87 : In the fifth line, after "charge," insert, *or any member of his household who has been exposed to or.*

Section 89 : In the third line, insert after " precautions as," *the medical health officer or.*

Section 91 : In the first line, insert after " board of health," *or medical health officer.*

Section 94 : In the third line, insert after " exists," *or is suspected.* In the sixth line, insert after " also," *the medical health officer.* In the tenth line, strike out " or legally qualified medical practitioner," and insert, *or in case there is no medical health officer then by a legally qualified medical practitioner.*

In subsection 2, line 7, insert after " evident," *to the medical health officer or the local board of health.*

In subsection 3, line 8, strike out "medical," and insert after "evidence," *satisfactory to the medical health officer or local board of health.*

The following discussion took place before the proposed amendments were finally accepted by the meeting:

Dr. HOLMES: It seems rather strange to me, that in this clause (79) we should strike out the words "attending physician" and leave in the words "board of health." It would be well to strengthen the hands of the medical health officer, particularly in rural municipalities, by having the words "board of health" also struck out.

Dr. BRYCE: I think if we leave the amendment as at first proposed, viz., "the board of health, or medical health officer," and put in the proviso "and where there is none, then the attending physician," we shall have a practical plan. If the health officer is absent, the board could then act.

Dr. SHEARD: The object in striking out the words "the attending physician" is largely because it is often found that the attending physician is the one, who is most anxious to relieve the quarantine.

Dr. HOLMES: I am fully in accord with these recommendations. I think it is well, that there should be no conflict between the health officer and the attending physician.

Dr. HUTCHINSON: Health officers in every city are being bothered at all hours of the night, by doctors wanting placards taken off in order to please their clients.

Dr. SHEARD: Regarding section 80 it is pretty hard to say whether a doctor "knows" or not. Some doctors are, occasionally, very anxious to prove that they do not know whether or not it is a case of contagious disease.

Dr. BRYCE: If a medical health officer is made responsible for dealing with suspected cases of smallpox, then he alone, and not the board of health, should be the judge as to whether any particular case is one requiring isolation or not. The point has been raised again and again, that the health officer might not be a skilled diagnostician. It seems to me, that if that was conceded for a moment, the work of the medical health officer would practically be abolished. It

appears plain, to me, that the Act gives him ample power in the matter of acting and disciplining in actual or suspected contagious disease cases. I think that the public should be given to understand, that if they expect officers to do work, after being put into positions of responsibility, it is important that these officers should have the fullest possible powers. It would never do that other physicians should be called in except by the medical health officer, who may have the option of asking in others to strengthen his own diagnosis.

Dr. BAKER: Supposing a patient is stricken with a contagious disease such as smallpox, that patient should have the right of calling in his own regular physician, or any other doctor he chooses if he is willing to pay for them. The health officer is not always the strongest man in a community.

Dr. BRYCE: If the family physician reports he has already tied himself up. Regarding the case now in Toronto, there was a physician who not only reported the case as a suspicious one while the man was in Belleville, but he also reported the case to the authorities here after the man left for Toronto. But some in this city, who never saw the patient, declared that it was not smallpox at all.

Dr. SHEARD: Section 82 already provides, that the attending physician shall have access to the patient. But the attending physician shall not have the authority to state when the patient or the members of the family shall go out and mix with the public. The medical health officer alone should say who of the family may go out, and when. In smallpox the family physician generally does not want to take the case, but in the simpler cases, and sometimes even in diphtheria, doctors will often too easily endeavor to get over the Act by granting certificates, etc. Sometimes the law seems to bear a little hard. For instance, on one occasion our action led to the postponement of a wedding. That was a serious matter indeed. (Laughter.) The object of the amendment in section 83, is to fix the authority, as to who shall say when the disinfection has been completed. The Act at present does not say who shall be the judge in the matter. It is possible that a case might arise where the board of health and the health officer would differ. Speaking for myself, I

would say in that case, "Get another health officer." But it is a good thing to strengthen the hands of the health officer. But there are local boards of health, that have no regular health officer.

Dr. Roe: There are cases where the medical health officer cannot get on with the local board of health. The board of health in our town, once claimed that I was their servant, and that I had to do as they said. I replied, that I was an adviser, and that they should as far as possible carry out my suggestions. It was a case of smallpox, and they demanded that because I was the medical health officer, I should go and attend the case personally. I refused to be the attending physician, and insisted upon the board providing a doctor. They actually expected that I should attend to that case without extra pay, and I was then getting a paltry $50 a year. They appealed to the Provincial Board of Health, and the Secretary gave an opinion in my favor.

Dr. Holmes: Personally, I have never known a board of health to refuse to do, what a medical health officer has suggested. I think, that power should be given to medical health officers to have full control of slaughter houses and dairies, though situated outside the limits of the municipality.

Prof. Shuttleworth: The Toronto board of health took the advice of the City Solicitor in that matter, and he said that the jurisdiction of the City Medical Health Officer did not extend beyond the bounds of the municipality.

Dr. Sheard: Legislation passed in 1896 gives the health officer power to go all over the country and test if necessary. We, in Toronto took advantage of the Act, and went about testing. The Government said, "Who in the world gave the medical health officer of Toronto power to go skylarking all around the country?" and they abolished that section of the Act. In the face of the recent action of the Government, the health officer would not be sustained in acting, as though he had such power as is spoken of. It is, however, contended that the health officer, through the council, has the power, to issue a permit for the sale of milk. In the city of Toronto, we have a large number of milkmen. They get their milk wherever

they can, and some of them are constantly changing. One man may get his milk from various sources, or get a portion of his supply from another milkman, and there is a good deal of difficulty in tracing and keeping track of the sources of supply. This question of license and control has been brought before the Privy Council, and it has been decided that we have no authority to prevent a license being granted.

Dr. BRYCE: It is quite clear that section 113 does enable the council of the city of Toronto, or of any other city, to alter section 10, of Schedule A, in such a way as to make it specific. It has never occurred to me, that under the power of the municipality to amend that section, they cannot say to the applicant for a milk license, "We will grant you a permit under certain conditions." And one of these conditions should be, that the vendor of milk will allow a city officer to inspect his premises, and that the city health officer be notified of any cases of scarlet fever or other contagious diseases occurring amongst the employees of the dairy or their families or patrons. It is clear, that if you grant a permit, you should grant it on certain conditions, and in the case of milk vendors, one of these conditions should be the power of inspection. It was a rather clever thing in introducing section 113, to enable the municipalities to alter and amend as they think best.

Dr. HUTCHINSON: We got the city solicitor's opinion in London, and he said we could not prevent any man selling milk; that we were bound to give him a license. It said, that it interfered with commercial interests.

Dr. BRYCE: He was looking only at the Municipal Act. Municipalities should take advantage of the provisions of section 113, which will give them power, under special agreement that they have not yet availed themselves of.

Dr. SHEARD: Then the Government will say, "If that is in the statute book, we will wipe it off."

Dr. HALL: In Chatham, we require an application to be made by the milk vendor on a printed form. When that is in, we send an inspector who looks over the premises, and makes a report to the

medical health officer. If the latter recommends that a certificate be granted, the City Clerk makes one out, and the applicant becomes a licensed vendor. One of the conditions of our milk license is, that the vendor shall purchase milk only from persons having a like permit. So that if he buys from a neighboring farmer, that farmer must also have a permit. Last year the inspector of cattle and dairies found five or six cases that he thought were not up to the standard of health. Our recommendation in this case, accomplished everything we desired. I also sent a veterinary surgeon out, and he condemned three cows. One of them had lump jaw, and two others were in very poor condition, and not fit for the dairy. He told the dairyman that he would have to slaughter these animals, before he could get a license to sell milk, and the animals were killed accordingly. I recommended in another case that the tuberculin test should be made, and the dairymen agreed with it. So far it has worked very satisfactorily with us.

The PRESIDENT: You appear to have most accommodating people, around Chatham. (Laughter.)

Dr. HOLMES: If people do not know any better than in the cases just cited from Chatham, it is all very well. I am very sorry there is any doubt in the matter of control. The Ontario Legislature should have the power to give municipalities the right to restrict the sale of improper milk or meat within their own limits. I cannot for a moment conceive that it is not in the power of the Province of Ontario to restrict trade, as far as possible in the interests of the health of the Province. Our local boards of health have within the last year investigated the condition of the slaughter houses, and they are determined that a better condition of affairs must exist. The whole surroundings of the slaughter house are such that it must produce a bad condition of meat. What is the use of listening to and discussing such able papers as that read by Prof. Shuttleworth, if we have no restriction whatever over these vendors of bad milk?

Dr. SHEARD: You could seize and destroy such milk.

Dr. HOLMES: But you would have to furnish proof.

Dr. SHEARD: Of course you could not seize it merely because you fancied it was unfit or dangerous. You would have to show cause.

Dr. HOLMES: In the matter of lump jaw, you could prove that the cow was in a bad state, but it is a question whether you could prohibit the sale of the milk. And it would be very difficult in other instances.

Dr. SHEARD: We get milk from almost all the way east of Berlin. If we were to inspect all these dairies, it would mean an immense expense, and the municipality of Toronto would be doing the sanitary work of a good deal of the Province.

Dr. HOLMES: My position is this: You can easily prove that the slaughter house is in a bad condition, but you cannot easily prove that the meat is unfit for food.

Dr. SHEARD: Exactly. The slaughter house man may say: "If you think the meat is bad, prove it."

Dr. BRYCE: According to Sec. 54 you have the right to go out and inspect slaughter houses.

Dr. SHEARD: But what is the good of such inspection where you have no power to act? Any medical health officer may seize unsound meat, but he cannot say "You must improve your slaughter house or we will not let you sell."

Dr. BRYCE: You may say, "If you have putrescent meat around your slaughter house your meat must be bad."

Dr. SHEARD: No. The conditions may be bad, yet the meat may be good.

Dr. BRYCE: The amendments of 1896 remove anything weak in the Act.

Dr. SHEARD: But the recent action of the Government knocks that galley west.

Dr. BRYCE: No. That referred only to the tuberculin test. It is within the power of every municipality to control its own meat traffic. The law is as strong as it can be.

Dr. HUTCHINSON: We have not a slaughter house in the whole city of London. If we were to go outside the city limits, to inspect

the slaughter houses, they would defy us. They bring in meat from some of these slaughter houses, the stench from which, from the hogs offal, would knock you down. We have destroyed some meat, but what can we do in the way of general protection?

The PRESIDENT: The Committee will submit these proposed amendments, which have been unanimously carried by this meeting, to the Provincial Board of Health, and the Committee will co-operate with that Board in endeavoring to secure the adoption of the amendments at the next session of the Legislature.

Mr. W. F. VANBUSKIRK, City Engineer of Stratford, read a paper on "Sewage Disposal," and supplemented it by the following remarks: In dealing with this question I have had to consider that it is not in most cases, what is the best way, but what is the most available way. Therefore I have advocated the straining through coke as the cheapest. Where one can get the money, it would be best to have sewage treated by chemical precipitation.

Dr. HALL, of Chatham, lead in a discussion on "Water Filtration" In Chatham we use sulphate of alumina as a coagulent, and the amount varies from two to eight grains, according to the turbidity of the water. It is estimated that with a basin as proposed we will get along with half a grain to the gallon.

Mr. VANBUSKIRK: Are there any villages in the vicinity; say within five miles above stream?

Dr. HALL: Louisville is sixteen miles above us and Thamesville about twenty miles. London, the chief source of the pollution of the stream is eighty miles up the river.

Mr. VANBUSKIRK: According to experiments in Massachusetts there would be great danger if there were any cases of typhoid fever in the villages and towns up the stream. The filters will be all right if they are properly attended to, but it is difficult to get a man who will give them proper attention and put enough of the coagulent in. One thing is to be guarded against in the use of filters, and that is the great tendency to try and save on the coal bill, and pump only through one filter where two are used.

Mr. MACKENZIE: I had some experience with the St. Thomas water supply, and also with the Chatham supply before the sedimentation basin was put in. In the latter case the filter was being overloaded, the water was rather turbid, and it had to be cleaned out twice a day instead of every twenty-four hours. In the case of all these mechanical filters, we find that the manufacturers claim more for them than they can carry. The filters decrease in benefit, as the load put into them goes beyond what they are calculated to bear. It is stated that at Louisville they have a sediment that cannot be purified by mechanical means. At St. Thomas they used three filters for about 400,000 gallons per diem, while each filter is supposed to take 500,000 gallons. The result is that at St. Thomas, where the filter gets less than the manufacturer claims for it, the filtration is kept at about 97 per cent. removal of bacteria. In Massachusetts they have got as high as 99 per cent. of removal of all the bacteria present; but I think no sand filter can remove more than 99 per cent. At St. Thomas it varies from 94 to 97 per cent. removal. At Chatham, with the sedimentation basin and the double filtration, they should be able to obtain similar results.

The other papers on the programme, upon motion, were taken as read by title.

Moved by Dr. Cassidy, and seconded by Dr. Bryce, that a committee consisting of Dr. Cassidy, Prof. Shuttleworth and J. J. Mackenzie be appointed to make practical experiments to determine the value of formaldehyde as a disinfectant using the funds of this Association for the purpose, and that the said committee report upon the result of their work, at the next meeting of the Association.

Dr. ROE: Our reservoir at Georgetown is three miles out of the municipality. Have I any authority, as health officer, to go out there and look after the source of water coming into the basin and see that its purity is protected?

Dr. SHEARD: It is town property; and you would be justified in doing so.

Dr. ROE: A stream which flows through a certain man's farm enters the reservoir, this man has a claim against the corporation,

and threatens to put a lot of cattle in the field through which that stream runs. If he does so, it will pollute the stream and also the reservoir. As health officer I have forbidden him to do it.

Dr. SHEARD: Serve him with a notice that he must not so pollute the stream, and that if he does so, in the event of any lives being lost he will be prosecuted for manslaughter, and he will desist.

Dr. BRYCE: There is a provision in the general waterworks Statute to protect public water supplies from contamination from animal matters, and power is likewise given to local authorities in any municipality to inspect in their district any nuisances threatening to affect that water supply.

The election of officers was then proceeded with, and resulted as follows:

President—Dr. McCrimmon, of Palermo.
1st Vice-President—Dr. J. J. Cassidy, Toronto.
2nd Vice President—Dr. Hutchinson, London.
Secretary-Treasurer—J. J. McKenzie, Toronto.
Council—W. F. VanBuskirk, C. E., Stratford; Dr. Holmes, Goderich; Prof. Shuttleworth, Toronto; Dr. McLay, Watford; Dr. Wardlaw, Galt.

Votes of thanks were passed to the Mayor and corporation of the city of Toronto, to the Press, and to the retiring President, after which the Convention adjourned.

In the evening the members of the Association were entertained at dinner by the president.

PRESIDENT'S ANNUAL ADDRESS.

BY CHAS SHEARD, M.D., L.R.G.P.S., MED. HEALTH OFFICER, TORONTO.

To the Executive Health Officers of Ontario:

GENTLEMEN,—My first duty is to extend to you my heartiest appreciation for the high honor which you paid me at your meeting at Niagara Falls, in choosing me to preside at the twelfth annual meeting of the Association of Executive Health Officers of Ontario.

When I look upon those who in past years have occupied this position, I accede to the discharge of my duty with some degree of

trepidation. I am however, inspired by the confidence, that those who have preceded me, have also known of the difficulties of the office, and I know that I can be assured that any short comings which may be manifest in me will, in the fullest measure, be allowed.

We meet together as fellow workers in the same field to exchange our sympathies in our difficult positions, and by our mutual counsel to assist in the advancement and welfare of everything, which may pertain to the more thorough carrying out of such duties as relate to the active work of improving and maintaining the general health of the Province of Ontario.

We each of us have individual experiences, may be upon varied lines, converging to the one focal point, and we would not be doing our duty towards each other, were we not free to extend ideas as to where improvements may be made in the carrying out of the great work of general sanitation.

We are all working under the public health laws, and I take it conscientiously endeavoring to carry out, as far as we can the ordinances therein established. Our duties are always onerous, and sometimes exceedingly trying and irksome. We are brought into daily conflict with this and that vested interest, and I can readily understand how a health officer receiving little more than the nominal appointment without remuneration or reward, save in the conscientiousness of a duty properly performed, should manifest under certain circumstances some degree of dilatoriness, in the carrying out of the work.

As a health officer told me not long ago he had resigned because he found that the duties of the health officer were going to bring him into conflict with the proprietor of a large tanning establishment, whose family were his patients, and his returns from those patients were vastly more than the remuneration of his office, and it is not to be wondered at if the health officers receiving as many do, a small pittance for their work, having to assume serious responsibilities, should sometimes be slow to act in emergencies, and this same slowness of movement at some critical moment astonish, if not alarm the public of the Province; and it ever will be thus, until there can be

provision made to give fair remuneration to those who assume these responsibilities, to make it worth their while to carry out sanitary laws, in the fullest and most perfect manner.

I can scarcely believe it possible for a health officer in any populous district to long hold his office and rightly discharge his duties, without it sooner or later bringing him into conflict with some of his brother practitioners.

We are all of us medical practitioners, having that same special feeling (I was going to say jealous feeling) which possesses us, when after we have had the charge of members of a family for a decade or longer, we feel annoyed when some other physician is called in to receive their confidences, after we have borne the heat and burden of the day, and we can reasonably sympathize with the doctor's feeling when he does all in his power to protect the family, to shelter them in their trouble, even though he should go so far as to violate one of the sections of chapter 205, of the R. S. O., and indeed in the formation of that Act know as the Consolidated Health Laws of this Province, full provision was made for the attending physician to exercise his rights and to share equally with the custodian of public health, in determining what measures were to be adopted in any case of contagious disease.

Section 85 provides, "That persons recovering from any of the said diseases, that is (smallpox, diphtheria, scarlet fever, cholera, or typhoid), or any person suffering from any such disease, shall not leave the premises until they have received, *from the attending physician* or the medical health officer, a certificate that in his opinion they have taken such precautions as are necessary to insure the immunity from infection with other person, with whom they come in contact.

We know it is a fact that some physicians are more careful than others, and some are more fearful of the communication of contagion than others. There are to-day to be found qualified medical men who do not believe to any extent in disinfective measures. I am happy to say they are few, but still they exist, and we have some of them in Toronto. I have lately had an instance under my own

observation, where a reputable physician gave a certificate to a family, that although one of their family had scarlet fever, the remaining members of that family might go in and out as they pleased, and that inasmuch as he had treated the body with carbolised vaseline, there was practically no danger of infection. Our department ventured to differ from this gentleman. We ordered the occupants of the house either to remain indoors or to remove the patient to the Isolation Hospital. They defied us. They said while the placard could stay upon their door, they proposed under the advice of the attending physician to go in and out as they pleased, and they did so. They were promptly summoned as the Health Act provides, with the result that the physician in question entered the box and stated on oath that he believed there was no danger of infection, and that the health officers were altogether too officious, with the result that inasmuch as section 85 gave him an equal right with the health officer, the health department was out of court.

Now this was a simple case of scarlet fever, but it might have been a case of smallpox, and I could provide you with a score of men who would say the same thing regarding the latter disease, while the health officer is saddled with the responsibility of taking all necessary precautions. There are some who would say why doesn't he exercise his right and step in and remove the patient per force, to the Isolation Hospital, but the only section in the whole range of the Health Act which gives him such authority to remove the patient is section 68, which provides, "That the medical health officers of a municipality or a majority of them may by warrant under their hands, authorize any two medical practitioners to enter in and upon any house, out-house or premises in the day time for the purpose of making inquiry and examination with respect to the state of health of any person therein; and may also, upon the report of such medical practitioners in writing recommend the same, cause any person found therein infected with a dangerously contagious or infectious disease to be removed to some hospital or other proper place; but no such removal shall take place unless the said medical practitioners state in their said report that *such person can be removed without*

danger to life, and that such removal is necessary in order to guard against the spread of such disease to the adjoining house or houses."

You will readily see this proviso, to say the least, is somewhat cumbersome, and if you have had the misfortune to have in your municipality eight or ten cases of scarlet fever in a day, you will find the working of the section somewhat slow and tedious. Then again, we know perfectly well that the minor quarantinable diseases are subject to very great variation in character and intensity. Take for example scarlet fever. Many cases occur where the services of a physician are not considered by the parents to be necessary, and in diphtheria many cases occur in which only a bacteriological examination of the throat shows the existence of diphtheria, but in a case of scarlet fever we have no such positive means of identification, and therefore we have to admit many cases as puzzling. I have known where repeated swabs taken from a child's throat showed the presence of Klebs Loeffler Bacillus, and yet the parents of that child obtained from a legally qualified medical practitioner in attendance, a certificate that it might attend school without danger of infection, and the excuse he gave when questioned about the matter was that he could diagnose diphtheria before bacteriology was ever known, and he could diagnose it after, and if that case had been tested he would have been able to have defied any health department in the Province of Ontario, for under sec ion 94 is provided, "That whenever a case of smallpox, cholera, scarlatina, diphtheria, whooping cough, measles, mumps, glanders, or other contagious diseases exists in any house or household belonging to which are persons attending school, the householder shall within eighteen hours of the time such disease is known to exist notify the head teacher of such school or schools, and also the secretary of the local board of health, of the existence of such disease; and no member of *such household shall attend school until a certificate had been obtained from the medical health officer or legally qualified medical practitioner, that infection no longer exists in the house.*"

If, then, such certificate can be obtained in the case of a disease where bacteriology positively defines and demonstrates infection,

what could be said of a certificate in the case of scarlet fever, where the eruption had been extremely slight and the desquamation possibly unnoticeable.

Fortunately in the City of Toronto we have a School Board and School Officials who have backbone enough to look solely to the Health Office for authority when to admit or reject the children from school, and the Health Office is strong enough to promise them the fullest protection in such work.

I do not wish to critise the Public Health Act, unfavorably or unfairly. I am well aware that when it was framed it was comparatively new in the Province of Ontario, and little by little changes have been made in it, which have resulted in signal improvement to the protection of the public health, but I think the time has come when in those municipalities where public medical health officers have been appointed, and where an active and scientific health department exists that such department should have the sole authority for saying when the occupants or inmates of a house, whether contagious disease, shall frequent the public streets or parks, or public thoroughfares, or mingle with the general public, or when such children shall be premitted to attend at the public school, and further should have authority to exercise the right to take possession of any individual affected with any of the graver contagious diseases. Until this is done it is a gross unfairness to charge the health officer with the responsibility of maintaining the public health, or diminishing the ravages of an epidemic.

The science of Sanitation, I affirm, is just as much of a specialty in medicine as is Ophthalmology, Gynæcology, Orthopoedic Surgery or Laryngology.

The science of Sanitation like other sciences must depend upon the correlation of facts, upon the comparison of cases, alike in many respects but differing somewhat in their phenomena.

The great obstacle to the development of our science is the difficulty in ascertaining what cases are sufficiently similar to become comparable, which difficulty is in its turn apparently due to insufficient and erroneous records of the phenomena observed. Very, very

few are the men who can for, and by themselves see and describe the things that are before them.

Just as it took thousands of years to produce a man who could see that the star Alpha in Capricorn is really two separate stars, so we had to wait longer before the man came who could see the difference between measles and scarlatina, and still longer for the one who could distinguish between typhus and typhoid. Said Plato, he shall be as a God to me who can rightly divide and define. Men who have this faculty we cannot produce by any system of education, they come we know not when or why.

Living matter differs from other matter in degree and not in kind; the macrocosm repeats the microcosm and one chain of causation connects the nebulous origin of suns and planetary systems with the protoplasmic foundation of life and organization. From this point of view pathology is the analogue of the theory of perturbations in astronomy; and therapeutics resolves itself into the discovery of the means by which a system of forces competent to eliminate any given perturbation may be introduced into the economy.

But whilst true science in its proper application and realm of usefulness does its material work in forming the basis upon which are wrought revelations in practical medicine, it and the scientist does an equally great though unspecified labor in permeating the whole result with that dignity which belongs to learning. It is science which seams and scars the detested face of hypocrisy and lies, adds beauty to beauty, grace to grace, truth to truth. It decks the flower of the field with loveliness till all the universe beats with one heart, pants with one breath. Science and art are the obverse and reverse of nature's model. The one expressing the idea in thought, the other expressing the idea in reason.

The discoveries in chemistry and their applications to the arts in the earlier portions of the reign of George the Third were principally derived from the experiments of Black, Cavendish and Priestly. To these philosophers at the beginning of the present century succeeded the most original of inquirers and the most popular of teachers, Sir Humphrey Davy. His lectures at the Royal Institution diffused a

love of science amongst the general community. His invention of the safety lamp in 1815 showed how the profoundest investigations might result in an apparently simple contrivance of the highest utility, like most of the great inventions that have changed the face of the world. But of all those, who by science diminished the amount of domestic sorrow, and enlarged the average term of human life, was the physician who for half a century had been striving in vain to make the medical world feel confidence in his discovery of vaccination. For thirty years after this antidote to the smallpox was first practiced in 1800, the whole ignorant and imperfectly educated, still stood in the way of the general diffusion of this the greatest blessing of our era.

Now the law prescribes that every child born in the kingdom must be vaccinated. We look back upon the time when many who had escaped with life from the terrible disease that killed 92 in every 1000 of the population, bore into our public places the indelible marks of the scourge, and we rejoice now to behold the unscarred faces of the young as the best tribute to the memory of Edward Jenner.

Among the numberless marvels, at which nobody marvels few are more marvellous than the recklessness with which priceless gifts, intellectual and moral, are squandered and thrown away. But who among the sons and daughters of men, gifted with thoughts which wander through eternity and with the powers which have the God-like privilege of working good and giving happiness, who does not daily let thousands of those thoughts drop to the ground and rot. Who does not continually leave his powers to draggle in the mould of their own leaves. The imagination can hardly conceive the heights of greatness and glory to which mankind would be raised, if all their thoughts and energies were to be animated with a living purpose.

But as in a forest of oaks, among the millions of acorns that fall every autumn, there may perhaps be one in a million that will grow up into a tree, somewhat in like manner it fares with the thoughts and feelings of man. The growth of physical science is now so prodigously rapid, that those who are actively engaged in keeping up

with the present, have much to do to find time to look at the past, and even grow into the habit of neglecting it. But natural as this result may be, it is none the less detrimental. The intellect loses for there is assuredly no more effectual method of clearing up ones own mind on any subject than by talking it over with men of real power and grasp, who have considered it from a totally different point of view. The parallax of time helps us to the true conception, as the parallax of space helps us to that of a star. It is well to turn aside from the fretful stir of the present, and to dwell with gratitude and respect upon the services of those mighty men of old, who have gone down to the grave with their weapons of war, but who while they lived won splendid victories over ignorance.

We have missed from our ranks the honored names of Dr. Egerton Griffin, health officer of Brantford, who seldom, if ever, missed a meeting of this Association. His kindly disposition, his energy and his ability as a sanitarian did much for the cause of public health in this province.

Mr. Alan Macdougal, C. E., who contributed so frequently valuable papers, whose reputation as an engineer made him one of the ablest men of the country, and gave a strength and character to this Association which will long be felt.

It is said by Thackeray that one of the greatest blessings of old age is its memories, and the good and noble names with whom we have been associated in years gone by, must indeed be pleasant for us to recall. When the heart is withered, do the old love to remember how it once was young and beat with warm emotion. The sympathies how ready, the enjoyment of life how keen and eager, so they fall the buds of promise, the roses of beauty, the florid harvests of summer.

To this great work we may all do something. Labor as we may our task will never be finished, for every day and all day long is constantly bringing a death of error, a development of truth.

HOW FAR MANDATORY MEASURES ARE OF VALUE AND PRACTICAL IN MEASLES AND WHOOPING COUGH.

Mr. President and Gentlemen of the Association:

While it is true that as officials appointed to carry out the laws of the country, whether provincial or municipal, it is our plain duty to give to them such effect as the powers and duties at our command render practicable, nevertheless it is evident to all physicians to-day, as the causation, methods of communication, and progress of the different contagious diseases are becoming better known, that a differentiation must be made in the several classes of diseases as regards our methods of dealing with them, this differentiation being based upon several important considerations, amongst these the chief being:

1st. The rate of mortality.

2nd. The methods of communication and the contagiousness of the disease under ordinary local conditions.

3rd. The duration of the disease and its contagiousness.

4th. The public opinion which exists with regard to any particular disease.

Dr. Clifford Albutt Regius, Professor of Physic in the University of Cambridge, in the 1897 edition of his System of Medicine very well illustrates several of these points in his classification of infectious diseases. He has:

1st. Infectious diseases of chronic course, including tuberculosis, leprosy, actinomycosis.

2nd. Diseases of uncertain bacteriology (not endemic) including measles, rubella, scarlet fever, chickenpox, smallpox, mumps, whooping cough.

3rd. Infective diseases communicable from animals to man—(*a*) of certain bacteriology—glanders, anthrax. (*b*) Of uncertain bacteriology—rabies, vaccinia, foot and mouth disease, glandular fever.

From this classification as well as from the practical experience of every medical health officer it is apparent that no hard and fast line can be laid down for practically dealing with these several diseases, and it has been found in practice both in Ontario and else-

where, as in England, that even in class 2, including most of the so-called eruptive diseases, we must again draw distinctions as to our methods of dealing with the several diseases. Thus in Ontario, and indeed in Canada, there is no divergence of views as to the thoroughness with which vaccination and isolation should be carried out in dealing with smallpox. To a large degree this may be said with regard to diphtheria and scarlet fever; but the case is different with regard to measles, whooping cough and chickenpox. While it is true that both measles and whooping cough require notification under the Ontario Health Act, I think I am stating a fact of common experience, when I say that in practice the law is a dead letter. There are two principal reasons for this:

1st. The generally mild character of the disease *per se*.

2nd. The inadequacy of the means ordinarily at the disposal of the health officers for obtaining such practical success as shall commend itself to the public and to their representatives who supply the funds for carrying on public health work. Judging from experience in England, where practical sanitation has reached its highest evolution, the fact that both measles and whooping cough cause there annually many more deaths than any other of the diseases of the class has not had such an influence as to make health authorities generally recommend or the public submit to the measures in general operation regarding smallpox and scarlet fever. Thus in the table given by Dr. Henry Kenwood, Medical Officer of Health, Stoke Newington, in a paper before the Sanitary Institute, Apail 7th, 1897, the following morality per 1000 population is given:

—	1851-60.	1861-70.	1871-80.	1881-90.	1891-95.
Smallpox	0.22	0.16	0.23	0.04	0.02
Scarlet fever	0.88	9.97	0.72	0.33	0.18
Whooping cough	0.50	0.53	0.51	0.45	0.39
Diphtheria	0.11	0.18	0.12	0.16	0.25
Measles	0.41	0.44	0.38	0.44	0.41

A glance at the table makes the point at once plain that while smallpox and scarlatina have shown an enormous and steady decrease comprising the five decades, whooping cough has shown but ten per cent. of a decrease, and measles has stood practically constant, and has a total mortality equal to fifty per cent. of all the other diseases put together.

Wherein then lies the explanation of the inability in practice of health authorities in England or here to deal with measles?

Primarily it would seem to be due to the early stage of the contagiousness of measles. Albutt states, "The mode of contagion is generally personal intercourse. The infection is perhaps greatest in the earliest stage. It is present at the onset of the prodromal symptoms, possibly a little earlier, and persists down to the time the rash fades. Thereafter it declines rapidly. It is rare that infection can be traced to a convalescent later than three weeks from the commencement of the attack." It seems quite apparent therefore that if a child has been inoculated, the inoculation of every susceptible member of his family is inevitable, and to a less extent those school children or others with whom he mingles. The point is illustrated by Dr. Kenwood in referring to those urban districts where notification exists, wherein it is shown "that a population which is very free from measles sickness in one week or one month furnishes a very large number of cases in the next." Thus "In Edinburgh during 1884 to 1893 there were instances where the number of cases notified in one month rose to the extent of 800 in the next, and where one-half and one-third of the total notifications in one year came to hand in one month." While without vaccination it is probable that smallpox infection would show the same incidence, it is quite plain that given a single case of measles of school age a localized epidemic of some extent is almost inevitable.

The question therefore arises with us, which is discussed by Dr. Kenwood, viz.: "Is the notification of measles of any practical value and if so under what circumstances?"

In answer to this question for ourselves several other points

must be remembered, (1) the low mortality of measles amongst the better classes, (2) the very general practice among the poorer classes of treating the disease, during at any rate the earlier stages until some complication supervenes, with "home remedies." With the first fact of its low mortality in mind it is at once apparent that public sentiment is not prepared to submit to quarantine of the family from three to six weeks, and notification would not result if such were attempted. Regarding the second point, the mischief is generally done before any official can be aware of the outbreak. Assuming that a municipality is, however, prepared to supply the hospital facilities for isolation as the complement of notification it would mean, taking Kenwood's calculation of cases for London from an assumed mortality of five per cent, there would be 53,600 cases as in 1892, and even if but thirty per cent. were isolated in hospital, as much accommodation would be required in a year as for all other contagious diseases together; and since in many instances the cases run up to over 3,000 in a week the hospital accommodation would have to be proportionate. In the article of Dr. Kenwood the various recommendations of the medical officer of the Local Government Board are mentioned to be taken by the local authorities and are as follows:

A. Sources where information may be obtained as regards occurrences of measles.

1. Compulsory notification by physician and householder.
2. Careful inquiry in every case as to source of infection and house to house visitation in vicinity of cases.
3. Notification by school authorities of cases and absentees.
4. Information from public officers and institutions.
5. Prompt registration of all deaths from measles.

B. Preventive measures in all invaded dwellings.

6. Every case promptly visited by health officer to advise measures of isolation with verbal and printed instructions. Those who cannot be isolated at home to be removed to hospitals.
7. House and articles to be thoroughly disinfected.
8. Continued observation of inmates till fourteen days after disinfection.

C. Preventive measures to be taken in the invaded district.

9. Notification of health authorities by school authorities.

10. Exclusion of all members of infected families from schools.

11. Exclusion of children from infected houses.

12. Early closure of public, elementary, Sunday and private schools.

13. Precautions regarding library books.

14. Preventing members of infected households from carrying on their occupation, where such appears necessary.

15. Instruction of the public concerning gravity of measles.

16. Temporary addition to sanitary staff in epidemics.

In these recommendations, called by Dr. Kenwood a "Counsel of Perfection," the whole ground is covered applicable to almost any communicable disease, but it appears to me for the reasons stated that the task to be performed is greater than the means ordinarily at command makes possible. Recognizing, however, the gravity of the disease in its totality, judged from mortality statistics in extended epidemics, the following measures are of practical utility, and are arranged in their order of practical importance.

1. Notification daily by the school authorities by messenger or telephone to the health officer of every absentee.

2. Immediate investigation by a competent medical health official during the day of every absentee reported sick by the inspector or truant officer. By such measures the great majority of first centres of an outbreak of any contagious disease would be known at the earliest possible moment.

3. Notification by the teacher of any further cases of disease where a pupil develops any of the symptoms and his immediate removal from the school.

4. The compulsory notification by the householder, under severe penalty for neglect, of every case occurring in the house. While it may further be useful to have notification by the physician, yet from the nature of the disease, (measles, whooping cough, and even scarlatina) and the absence of a physician in many cases, the compulsory notification by the householder is of primest importance. We are

aware that in practice in Ontario notification by the householder is not carried out or greatly insisted upon. By this measure, developed by very general distribution of leaflets, the disease would become *corralled* in a comparatively small number of houses at the beginning of the outbreak.

5. In view of what has already been stated with regard to the possibly great cost of isolation hospitals for measles, the most practical measure of isolation would seem to be in the home, the public being warned by placard. By this means the health officers are assisted by the neighbors, who will commonly give information, if the children from an infected house are seen on the street. If in a poor district, hospital isolation would alone prove probably an adequate measure of isolation.

6. The disinfection of house, articles, books, etc., after the disease in a house is ended, is a natural and routine method, wholly within the powers of the health authorities to carry out.

7. The closure of schools is a measure of some importance, as a last resort, but it need not in practice be early resorted to, except in the room whence the sick child has been removed.

If, during the period of the incubation of the disease, the teachers, where the schools are closed, were utilized as inspectors to visit the homes of their pupils I can imagine no better or as practical a means of assisting the health department in ferreting out cases of the disease. In Ontario municipalities the teachers are the employees of the municipality, receive pay during the closure of the schools, and might fairly have this missionary duty laid upon them. Their visits to many homes might in other ways exert a most salutary influence.

Whooping Cough. What has been said with regard to measles might be repeated almost word for word concerning whooping cough. It is certainly communicable from the beginning of the earliest symptoms, and indeed it is most so during the non-spasmodic stage. Afterwards the power to communicate the disease declines, but is still present for at least six weeks from the beginning of the attack. These facts make the danger of an outbreak spreading

rapidly in schools very great indeed, especially as the spasmodic cough, which appears commonly at first at night, does not occur for several days, often for several weeks, from the onset of the disease. With regard to the duty of the teachers in such circumstances, the most that can be said is that they should be kept very well informed by literature as to these facts, and be required when the disease has appeared in any municipality to send any child from school which has developed a cough, until the true nature of the disease has been ascertained. Of course, notification of the health authorities of the action taken, would naturally follow The isolation by a placard, of the children of a household for six weeks would appear to many a hardship and would prove difficult in practice, but it must be apparent, that unless this be carried out, the spread of the disease in a district is inevitable. It cannot be expected, except under surroundings especially bad, that isolation facilities in hospitals will be provided in this disease, under our present social methods. I am, however, firmly convinced that just as we have seen isolation hospitals developing in London—where the highest number of admissions in 1872 was 20 in a single month, while this was increased to 1850 in 1892, or over 60 per cent of all the notified cases during the year were treated in the Metropolitan Hospitals—that public opinion will gradually support the authorities even in extending hospital facilities to these diseases.

While it may fairly be said, that the low mortality from these diseases, as indicated in the mortality statistics, may not seem to indicate the same necessity for such measures in Ontario, as would seem to be demanded in England, yet it may well be, that these statistics do not give by any means an accurate idea of the mortality dependent upon these two diseases, since in many instances, doubtless, the deaths registered as due to pneumonia and bronchitis in children, might more properly be set down as due, either to measles or whooping cough. Further, as illustrated by the fact that the deaths from measles in 1895 occurred almost wholly in Toronto and Ottawa, it is apparent that all that is demanded is to make conditions in this

Province similar to those of the densely populated centres of England in order to have the mortality from those two diseases increased to a similar degree.

The question of how far mandatory measures should be adopted for dealing with tuberculosis would very properly form a subject for further consideration, but inasmuch as this Association has already expressed itself in regard to the necessity for inspection of cattle as regards tuberculosis, and has urged the necessity of "Homes for Consumptives" as the first steps required for dealing effectively with the disease in man, I do not deem it necessary to occupy more time in the discussion of this extended problem.

As regards leprosy, it need only be said that the disease does not exist in Ontario, and should cases at any time occur, provision exists under Dominion Statutes for the removal of such cases to the lazaretto at Tracadie.

I have thus dealt with these subjects with a view to obtain the views of this Association in order that the attitude of the Medical Officers of Health of Ontario may be fully obtained, and that I may be enabled to present them in the discussion on this subject which I am asked to take part in, at the coming meeting of the Public Health Section of the British Medical Association, which is to meet very shortly in Montreal.

THE RELATION BETWEEN SCARLET FEVER AND MILK.

By Professor Shuttleworth, Bacteriologist to the Toronto Board of Health.

The communicability of scarlet fever, through the medium of cows' milk, may be regarded as established beyond the shadow of a doubt. Much attention has been given to the subject during the past fifteen years, and a large number of instances have been brought forward, in which the connection between milk and disease has been positively demonstrated.

The most notable of these cases is the Hendon outbreak, which occurred in 1885, not only at Hendon, where the implicated dairy

farm was located, but in three districts in North London where milk from this dairy was distributed. This outbreak is particularly prominent from the fact that it was made a special subject of investigation and study by Mr. W. H. Power, F. R. S., in which he was assisted by Dr. Klein, both of whom reported to the Local Government Board. The precise number of cases of scarlet fever directly traceable to the milk supply is not given, but in general terms is stated as "a strikingly large proportion."

Another outbreak occured at Wimbleton and Merton, in the winter of 1886. This was also investigated by Mr. Power, and out of 545 cases of scarlet fever, in the districts named, 493, 90.5 per cent., were consumers of the suspected milk. An attack at Glasgow, in the summer of 1892, gave a proportion even greater than this, as of 236 cases all were traced to the milk of one dairy.

In a recent series of articles in the British Medical Journal, on the influence of milk in spreading zymotic disease, Dr. Ernest Hart gives an abstract of thirty-two similar instances, of which authentic records exist, thus affording proof, if such indeed is required, that there is an intimate relation between scarlet fever and milk.

The nature of this relationship is by no means as definitely made out. In the historical Hendon outbreak, the researches of Mr. Power go to show that the milk had not become infected in any commonly accepted way, such as unwholesome conditions of water or drainage, or by careless handling of milk, or milk utensils, by infected persons, but through the cows themselves. About a fortnight before the outbreak of scarlet fever occurred three newly-calved cows were purchased and added to the herd, which numbered about one hundred. Subsequent investigation revealed the fact that at least one of these additions was suffering from vesicles and ulcers on the teats and udder, and that the affection had spread to other animals in the shed from which the infected milk was obtained. The withdrawal of this milk from distribution was followed by a cessation of scarlet fever, but a small quantity, which was surreptitiously entered into consumption, gave rise to the disease in a large proportion of the families to whom the milk had been delivered.

Dr. Klein's examination of the affected animals showed that on the teats, and sometimes on the udders, there were flat irregular ulcers, from one-quarter to three-quarters of an inch in diameter, first appearing as small vesicles, on a greatly swollen and red surface, and later covered with a brownish crust, which, when scraped away, left a granulating, slightly indurated base, not elevated, nor surrounded with any redness of the skin. Patches, denuded of hair, were noticed on some animals, and the epidermis was rough and scaly, as in desquamation. Two animals were removed for special observation, and were subsequently killed. The lungs exhibited numerous lobules, and great congestion; there were also pleural adhesions, and, in one case, the cortex of the kidney was congested, but its medulla was pale.

Inoculations in calves, with the matter from the ulcers, produced similar lesions, and sometimes death. A streptococcus was isolated from the original contents of the ulcers; from those produced by inoculation, and also from the blood of the inoculated animals. This micro-organism was claimed by Dr. Klein to be identical with the streptococcus found in human scarlet fever, and by its biological characters to be capable of differentiation from streptococcus pyogenes.

The streptococcus was not satisfactorily demonstrated in the milk, as flowing from the udder, but such implantation would likely take place by the manipulation of the ulcerated teat during the act of milking.

I have no desire to raise the question as to the identity of the so-called Hendon disease in cattle, and scarlatina in the human subject, or the micro-organism, or micro-organisms, in which they originate. Suffice it to say that there is much difference of opinion in regard to these matters, and some eminent authorities, including Professor Crookshank, are not inclined to cede the position assumed by Dr. Klein. My object in alluding to these points is simply that of showing the possibilities of the case.

Though the precise character of the *materies morbi* is still a matter of uncertainty, the transmissibility through milk is unde-

niable. On analyzing the records of the thirty-two outbreaks collected by Dr. Hart the exciting causes are shown to be as follows:

1. Existence of scarlet fever infection on the premises or in the families of dairymen or attendants (seventeen cases).
2. Ulcerated teats—possible Hendon disease (eight cases).
3. Milk from newly calved and unclean cows (two cases).
4. Polluted water used for washing containers (two cases).
5. Not ascertained (two cases).
6. Unsanitary byres or dairy (one case).

To this I would add:

7. Use of unsterilized bottles for distributing milk.

Of late years the practise of serving milk in quart wide-mouthed bottles, closed by a card disc, or other stopper, has become exceeding popular in Toronto, and doubtless elsewhere. Were it not for the possibility of the conveyance of disease, it seems to be the most cleanly and convenient mode of distribution and temporary storage. Filled bottles are, however, taken directly into the rooms of patients suffering from contagious diseases, and are there kept and used as containers until empty. The bottles may then be possibly rinsed out, or are returned unwashed to the milkman, who puts them with others, and conveys them back to the dairy.

There is a possibility, if not a strong probability, that a bottle so used may become infected, not only by the hands of the nurse, on its smeared exterior surface, but by the air-borne particles by which the disease is admittedly conveyed; and also that the remains of the milk in the vessel may form a suitable medium for the multiplication of the specific microorganism. The infected bottle may by contact with others contaminate them, and the manipulations of the milkman would also tend to this result.

I can speak from experience in regard to the treatment which dirty bottles receive in the average dairy. They are placed in water as hot as can be borne by the hands—about 45 C. (113 F.); a little sal soda, pearline, or ordinary soap is added, and the bottle cleaned by a revolving brush. It is then rinsed with water, drained, aired, filled with milk, and sent forth on its mission for weal or woe.

The water used for washing, and the ordinary time of immersion, is not sufficient for sterilization. According to Sternberg the thermal death point for streptococcus pyogenes is between 52 and 54 C., with ten minutes exposure, and it is probable that other infecting cocci would require the same treatment. This temperature would be higher than the operator could stand, and the loss, by fracture of the badly annealed bottles, which is now much complained of, would likely be increased so as to interfere materially with the profits of the dairyman.

That scarlet fever infection may be transmitted by bottles seems likely from the outbreak last spring in Toronto, to which extended reference was made in the late report of the Secretary of the Provincial Board of Health, and of which the circumstances may be briefly recounted.

Before doing so it may be well for me to state the position which Toronto occupies with regard to the disease. The records of eleven years, 1886-96, embroce 3,280 reported cases, sometimes falling as low as one case per month, and giving an average of twenty-four cases per month over the whole period. In the winters of 1891 and 1892, the disease assumed an epidemic character, the average per month for six months being seventy-eight cases. Since January last, and up to July, a more serious outbreak occurred, showing an average of 187 cases per month.

The type of disease may be learned from the records of the Isolation Hospital, but as the cases sent to that institution are usually more severe than those in private practice, the results will probably be higher than if the whole city were included. In 1895 the mortality was 19.25%, declining in 1894 to 16.27%, and 8.19% in 1895, while of the fifty-five cases admitted last year there was not a single death. It remains to be seen whether the recent outbreak, with its partly different origin, will not bring about a revival of virulence. The indications so far point in this direction.

It may be further explained that, at the beginning of the year, the milk supply of houses in which scarlet fever occurred was closely watched, and since February 1st a regular record has been

kept of particulars relating thereto. The total milk consumption of Toronto amounts to about 12,000 gallons per day, so that, by ascertaining the quantity supplied by each dairyman, his place as a possible carrier of infection can be determined readily.

Nothing unusual occurred until May 17th, when from the customers of one dairy there were reported five cases of scarlet fever. For the first four months of the year this large establishment had an enviable record, only three cases being reported. From May 4th to 16th, inclusive, there were four cases, followed by the large increase mentioned. On the 18th another case occurred, three on the 19th and two on the 20th, until, by the end of the month, the total for May was thirty-six. The largest number in any one day was reached on June 3rd, when thirteen cases were reported. The last case from this dairy was recorded on June 17th, making forty-five for that month, or eighty-one for the period of forty-five days. The persons affected were residents of various parts of the city and as a rule belonged to the better class.

The milk supplied by this dairy amounted to about 2% of that used in the city, and the liability to infection should have followed the same proportion. In April the cases had not reached this limit, being only 0.4% of the whole number affected, but in May the percentage was 16.9, and, in June, 25.5% of all the cases in the city were consumers of this milk. During the first nine days of this month the percentages was 42.4, while the normal proportion should have been less than 2%.

In view of these facts it is difficult to arrive at any conclusion other than that implicating the milk supply, but an attempt to trace the origin of the infection has not been attended with such definite results.

As the dairy was situated in the country, outside the limits of the jurisdiction of the Health Officer of Toronto, there was some delay in bringing the matter under control. Action was taken on May 20th, and, later on, the Secretary of the Provincial Board, whose aid had been invoked, reported having visited the dairy, and

found all the operatives free from scarlet fever, He recommended the sterilization of the rinsing water used for bottles, by heating it to the boiling point.

On May 28th the Health Officer of Toronto, accompanied by the writer, were permitted to inspect the premises, and found that some eighty cows were lodged in a byre of which the sanitary arrangements were in all respects satisfactory. One of the cows was emaciated, and apparently sick, but her milk was said not to have been used for a week previous. None of the animals had ulcerated teats, though many were warty. With the exception specified the cattle were seemingly in prime condition. This had been previously asserted by a competent veterinary inspector, as also subsequently. No scarlatina could be traced among the employees or their families. The milk from all the cows was mixed, cooled, and bottled in a house set apart for the purpose, but the drainage and condition of this shed were not very satisfactory. The bottles received from customers were collected without special precautions, and washed in the usual manner. This operation was sometimes not sufficient to remove all traces of previous use.

A thorough renovation of the milk house and wash-house was proposed, and assented to by the proprietor, who at all times was exceedingly willing and anxious to do everything in his power to comply with the suggestions of the health authorities. The improvements required were, however, somewhat extensive, and did not progress as rapidly as desirable. Temporary expedients were resorted to, but as the efforts made seemed to have no effect in lessening the occurrence of the disease, the health officer of Toronto was compelled to call the attention of the proprietor to the only legal remedy, which is specified in Section 99 of the Health Act. This was not resorted to as the milk was voluntarily withheld from distribution, and I believe destroyed, until arrangements were perfected. Since July 6th, when the milk was again sold, there has only been one case (July 21st) of scarlet fever occurring among the customers of this dairy.

Setting aside the emaciated cow, and the imperfect sanitary condition of the milk and wash houses, there is nothing left to account for the dissemination of the disease except the bottles, which appear to be the most likely cause.

A feature worthy of notice is that relating to the incubative stage of scarlatina communicated through milk. No customer from the dairy received any milk after June 3rd, but there were twenty-three subsequent cases, two of the last of these showed incubative periods of seven and eight days, respectively, after consumption of the milk and up to the commencement of recognizable illness.

THE PROPAGATION AND PREVENTION OF RABIES.

By J. J. Cassidy, M.D., Member of the Provincial Board of Health.

At the last quarterly meeting of the Provincial Board of Health a report on "Rabies in Ontario" was presented by J. J. Mackenzie, B.A., bacteriologist of the Board. The report showed, among other things, that rabies existed in this Province, eight different outbreaks having been recorded since 1891. Twelve persons, bitten by rabid dogs, during these outbreaks had received treatment at the New York Pasteur Institute; mortality, nil. One person, a boy thirteen years of age, had died of rabies at Dundas, after an illness of three days. Twenty days before the outbreak of the disease on him, he had been bitten by a rabid dog. The wound was not cauterized and he was not sent to the New York Pasteur Institute. A post mortem examination of the body of the deceased was made and a pathological examination made of the medulla. Subsequently rabbits were inoculated with small portions of this medulla and in 14 to 21 days developed rabies.

This is a very interesting fact in connection with the propagation of rabies, showing that this disease, communicated to man through the saliva of a rabid dog, after the death of its human host, may be reconveyed to another animal, the rabbit for instance, and so

be propagated from animal to animal, as long as scientific curiosity or the requirements of a biological laboratory may demand. The death of the boy after an illness of three days, and the appearance of the phenomena of rabies, twenty days after being bitten, showed, even before death had occurred, that the disease in question was not an attack of hysteria in a frightened child. The propagation of true rabies from the medulla of the dead child to the rabbit removed all doubt as to the cause of the lad's death and showed that the *contagium vivum* was present in the medulla of the dead boy, as well as in the saliva of the dog, which had bitten him. I deem this all the more important, because before proposing preventive measures for the restriction of a disease, one must be prepared to prove without the shadow of a doubt, that the disease really exists in the country. The dog is the chief propagator of rabies, the disease being transmitted from the diseased to the healthy animal by a bite or inoculation. In this respect it operates like other contagious diseases; its presence in a given case always being significative of a preceding case. Other animals such as cats, wolves, foxes, etc., may contract the disease; but the dog is most frequently attacked and perpetuates the malady.

In man death usually takes place in two or three days after the disease has become developed. Fortunately, however, a person bitten by a rabid animal is not always inoculated, even if no preventive measures are adopted. The chances of escape are a little more than three to one. Some authorities state that only fifteen per cent. of those bitten by rabid animals develop the disease. Bites on parts of the body, unprotected by clothing, are likely to be followed by inoculation and vice versa if the bite be inflicted through clothing, the virus will probably be wiped away from the teeth of the animal before they penetrate the skin of the person attacked and inoculation does not follow. Bites inflicted on the head and face by a rabid animal are frequently followed by rabies, and at an early date because, (1) the network of nerves in the skin of the face and head is so close that a bite is certain to lacerate some nerve branches. (2) the contagium of rabies travels readily along from the wounded peri-

pheral nerves to the nerve centres, and (3) speedy inoculation of the medulla is more likely to occur, when the distance from the wound to the nerve centre is short.

Some experiments made by Professor V. Babes, of Bucharest, Roumania, which were detailed in a paper read by him at the Seventh International Congress of Hygiene, London (Eng.), show very clearly that the virus of canine rabies exists in its most intense form in the medulla of the diseased animal, and that, when inoculation from the diseased medulla is practised, as in the laboratory, for instance, absorption of the virus is rapid and defensive measures to be successful have to be used promptly. He says, "At first we tried to destroy the virus by disinfectants and heat, and we found that the medulla of a rabid animal is particularly resistent to the action of these agents, a fact due principally to the fatty material, in which the virus is contained. It is necessary to use a solution of corrosive sublimate $\frac{1}{1000}$ or carbolic acid $\frac{1}{100}$ to render the poison harmless. Strong acids and even alcohol have a more energetic action; a temperature of 136$\frac{2}{5}$° F. kills the virus in an hour; a temperature of 140° F. in four minutes. To prevent the outbreak of rabies after infection, we find it necessary to excise or amputate the infected part in about fifteen minutes after the infection. Excision of the nerve of the infected region, even after infection in the nerve itself, does not prevent the development of the disease. Cauterizing the wound with a red hot iron five minutes after the bite stops the action of the poison; when done in from ten to fifteen minutes after the bite the outbreak of the disease is retarded. Caustics and antiseptics (strong acids, carbolic acid, full strength or diluted) do no prevent the progress of the disease, if applied to a wound later than five minutes after infection." Professor V. Babes concludes from these experiments that the poison of rabies itself was the proper means by which practical results could be obtained in the treatment of this disease. Certainly if the poison of rabies were introduced into a wound in a patient, bitten by a rabid dog, with the same certainty with which it was introduced in the laboratory of Prof. V. Babes, ordinary surgical treatment would seem to be of little avail. Unless under the most fortunate circumstances

a patient could not expect to receive adequate treatment with the red hot iron, strong nitric acid, carbolic acid, pure alcohol or water heated up to 140° F. in five minutes after the receipt of the rabid dog's bite. Excision of the wounded part in fifteen minutes, with or without the subsequent use of the above mentioned caustics or heat, could not be performed except in rare instances. If the experiments of Prof. V. Babes had been made with the saliva of a rabid dog, instead of an emulsion, made from the medulla of a rabid animal, his results would be more instructive to the surgeon.

How long a time should there be allowed to supervene before cauterization or excision or amputation is done? The reply to this question would seem to show that something depends on the site of the injury and its extent, depth, etc. If situated on the head, face or hands, and deep, excision or cauterization should be done in fifteen minutes; if done later it will probably be useless. If the wound is situated on a part of the body usually covered with clothing, perhaps a longer time may be allowed to elapse. As the rapidity with which the treatment is applied is the most important feature, any competent person should be prepared to cauterize a suspicious bite if provided with courage so much the better. If the wound is superficial it might be cauterized even if fifteen minutes have elapsed.

From the fact that the lad, who died at Dundas, received no preventive treatment, the public should be warned, that any wound inflicted by a rabid or suspected dog is of importance. It has recently transpired that the saliva of a rabid dog is capable of inoculating a bitten person for three days before active symptons of hydrophobia appears in the dog. The animal is ill, though not so as to cause special remarks, and yet is capable of inoculating a bitten person with this terrible disease.

As illustrative of the necessity of prompt cauterization the following report of a case of hydrophobia, which occurred recently at Bourdeaux (France), may be quoted. A. B., aged 13 years, on the night of Feb. 21, 1896, was bitten by a rabid dog on the thumb and left temple. Two hours after the receipt of the injury, the wounds were burned with the red hot iron and sutured. He went

to Paris, and four days after the bites, the intense form of anti-rabic treatment was begun at the Pasteur Institute. The treatment lasted three weeks. He returned to Bourdeaux, and May 20th developed rabies and died in three days on May 22nd. The reporter Dr. Salrares attributes the fatal result to three causes.—(1) The extent of the wounds and their situation on the thumb and temple; (2) because the bites had not been cauterized till two hours had elapsed; (3) The late application of the anti-rabic treatment, four days after the injury.

A second case is reported in the New York Therapeutic Review, "E. G. Valintine aged 47, was treated at the New York Pasteur Institute, treatment was begun on June 6th 1895, the fourth day following a bite inflicted on the right wrist, by his own dog, which presented the usual symptoms of rabies. The patient had two deep cuts, which, bled abundantly, and were cauterized only 20 minutes after. He died of hydrophobia, on Feb. 23rd 1896.

Both these cases illustrate the necessity of prompt cauterization. This also shows the necessity of beginning the Pasteur treatment very soon.

There can be no doubt in spite of occasional failures, such as these, that the preventive treatment of Pasteur for persons bitten by rabid dogs is of the greatest value. This discovery should always be remembered as inaugurating a new departure in the treatment of zymotic disease and as a demonstration of an effective means, by which thousands of human beings may be saved from suffering and an awful death.

In 1888 the number of persons bitten by dogs proved to be rabid, who were inoculated at Paris, was 1,371. Among these the total mortality, including those who came late and died during treatment was 1.31 per cent. The mortality among all persons inoculated was 1.16 per cent. Up to 1891 the rate had been reduced below 1 per cent. Among these cases there were 280 cases of face bites. Among persons bitten in the face and not inoculated, the mortality is 80 per cent, and among all persons bitten and not inoculated the mortality is 15 per cent.

Anti rabic Institutes are now in operation in many countries.

At. Warsaw, in 1889, 145 patients were inoculated, and one died At St. Petersburg, among 484 patients inoculated, the mortality was 2.68 per cent. At Odessa, when the simple method was used, 3.39 ; In 1887 , with the intensive method, among 345 persons, 0.58 per cent ; in 1888, among 364 persons, 0.64 per cent. At Moscow, in 1887, 1.27 per cent. At Turin, 1.88 per cent. At Constantinople, 34 persons up to November, 1888 ; mortality, nil. At Havana, 0.60. At Bucharest, 244 persons ; mortality, nil. 39 persons bitten by the same animals refused treatment : of these four at least died of the disease. In Hungary, in nearly three years, 552 were bitten ; 62 were inoculated and not one died ; 470 were not inoculated, and at least 44 died. In Italy, by Luigi de Blasi, 343 were inoculated ; mortality 1.17. By Celli, 109 ; mortality, nil. By Baratier, 335 ; mortality, 0.59. At the New York Pasteur Institute 686 persons were inoculated in five years up to Jan. 1st 1897 ; mortality 0.58. Several of these patients were from Canada ; mortality among Canadian patients, nil.

Rabies, which used to be very common in Berlin, has been completly stamped out by a law, extending to the whole of Prussia, which provides that all dogs suspected of rabies shall be immediately killed, also all animals which have been bitten by rabid animals ; and that all dogs in a district which has been infected by an outbreak of rabies shall be confined, or, when abroad, both muzzled and led. No case had occurred in Berlin from 1883 to 1891. In Vienna rabies was entirely put an end to by rigid muzzling ; but in 1886 the order was rescinded, and within a year the disease reappeared. Thereupon the muzzling order was put in force again and is still maintained (1891) so that the disease has been banished. In Sweden, rabies was common, and from eight to ten persons died annually of hydrophobia ; after the enforcement of muzzling and prevention of importation of dogs, rabies declined, and no death from hydrophobia has occurred since 1870. The immunity of Mauritius has a similar history.

In England, the mortality from rabies rapidly increased during thirty-eight years up to 1891. The mortality during that period reached the terrible total of 939.

In the opinion of Professor Flemming, who read a paper on the propagation and prevention of rabies at the International Congress of Hygiene at London in 1891, the "United Kingdom can quickly and easily free itself from the disease, and keep itself free if it cares to do so; and a heavy responsibility for the loss of human life rests upon those who oppose, or, do not choose to adopt the measures indicated. Continental nations, with coterminous frontiers should combine in a simultaneous effort to abolish a scourge which causes so much suffering to man and beast. Such a consummation can be realized; it only needs the will to effect it."

In Professor Flemming's opinion the suppressive sanitary police measures are, in the order of their importance: 1st—Destruction of all dogs which are rabid, or which are suspected of being or becoming rabid; 2nd—The seizure and if need be, destruction of all ownerless and wandering dogs; 3rd—All other dogs to wear a properly constructed and well fitted muzzle while rabies prevails, and also for a period equal to the longest interval of latency after the malady has been suppressed; 4th—A dog tax.

The by-law to provide for the licensing and regulation of dogs in force in Toronto has the following salient features: An annual tax on dogs, and registration of all dogs over six months old; each dog to have a collar, to which is attached a metallic plate showing the letters C. L. P. (city license paid), the figures indicating the year of issue, and a number corresponding with the number under which the dog is registered. This by-law would be improved, if as Professor Flemming suggests, it were further provided that suspected dogs should be destroyed, as well as rabid ones. A suspected dog is one that presents symptoms resembling rabies or which has been in conditions that have rendered infection probable or possible. Again, if a rabid dog were discovered in Toronto, all other dogs should be obliged to wear a well-fitting muzzle during the prevalence of rabies, and also for a period equal to the longest interval of latency after the malady has been suppressed—three months.

In reference to Ontario, as I have already mentioned in this paper, twelve persons from this Province bitten by rabid dogs have

received treatment at the New York Pasteur Institute, during the past seven years. It is quite likely that many others bitten by rabid dogs have escaped inoculation. The lad who died at Dundas was not unfortunately in that category.

It would be in order therefore for the members of this Association to use their influence in their respective municipal councils so as to secure the passage of a model by-law which would tend to reduce or eradicate canine rabies.

The *London Times* observed in 1886 :—"One thing at least is certain, and it is, that no one who has once seen a human creature die from hydrophobia in torments too horrible to describe, would hesitate to muzzle every dog in the kingdom, if by so doing the extinction of the disease could be secured."

As the Canadian and American frontiers are coterminous for the width of this continent it is obvious that the suppressive measures quoted above, to be effective, should be applied equally in the United States as well as Canada.

It has been observed by the members of the Provincial Board of Health that all cases of hydrophobia reported in Ontario occur in the western part of the Province, in the direct line of travel from the United States. This would seem to indicate an importation of rabies through dogs brought into Ontario from the United States. It may be that some dogs brought from Europe have introduced the disease, but the length of the ocean voyage would be against this view. An effective measure against this danger would be to impose a long quarantine at the expense of the owners, against all dogs brought from any country to Canada, or rather to go a step further, as Sweden has done, and directly prohibit the importation of dogs.

THE TYPHOID SERUM REACTION AND ITS RELATION TO MUNICIPAL HEALTH WORK.

J. J. MACKENZIE, B.A., BACTERIOLOGIST TO THE PROVINCIAL BOARD OF HEALTH.

MR. PRESIDENT AND GENTLEMEN,—Those members of this Association who attended the meeting at Niagara on the Lake last year and afterwards went to Buffalo to attend the Public Health Association, will remember the paper by Dr. Wyatt Johnston upon the reaction in blood serum obtained from typhoid patients.

The method, although first elaborated by Widal was first introduced into public health work by Dr. Wyatt Johnston, of the Quebec Board. It is as follows :

The blood of a patient suffering from typhoid fever is found to have the peculiar property of causing the bacilli of typhoid to become motionless, and undergo a process of what is called agglutination. The method of applying the test is as follows :—

Dried blood method ; Capillary tube method. In the first method the blood is allowed to dry upon a piece of clean paper and then sent to the laboratory ; in the second the liquid blood or blister fluid is drawn into a sterile capillary tube, which is sealed and sent to the laboratory.

Within the past year I have had many opportunities of applying the test and in the Journals a great deal of work has been published on the subject.

The result of this work is as follows : The test is usually sucessful from the sixth to the ninth day of the illness. Have not had sucessful results before the sixth day and sometimes not then. It remains for a varying period after the disappearance of the fever, in some instances for months. In applying it, certain facts must be taken into consideration. A blood serum even in a healthy person sometimes presents evidence of agglutinative power if used in too concentrated a form. For this reason it is necessary to dilute, and it is found that a blood serum diluted $\frac{1}{10}$ of its strength with sterile water will not give the reaction if the patient is not suffering from

typhoid or has not had typhoid. In using the capillary tube this is easy to do and one can determine with considerable accuracy, the limits of dilution which bring about the reaction, in some instances this is as high as $\frac{1}{5000}$ or even $\frac{1}{10000}$.

When using the dried blood method on the other hand this is more difficult and in practice I have found it well to dilute with water until one just finds a faint yellow reaction in the diluted blood. This corresponds to a dilution of about $\frac{1}{30}$.

One can however, if the sample is properly taken, determine more accurately the limits of dilution necessary. This is by allowing a drop of blood to fall on the paper, and allow it to dry without smearing it. One, then is able to determine from the size and density of colors in the dried drop, to decide how much water to add to bring it up to the normal quantity and then by lifting a loopful of this and mixing with varying numbers of loops of distilled water, form dilutions which will allow one to approximate to the dilution necessary to produce the reaction.

From a clinical standpoint, however, once that the reaction is definitely obtained, the degree of intensity does not seem to be of importance in the matter of prognosis. Mild cases sometimes show slight agglutinative action and severe ones very great power of agglutination, but the reverse is also found.

Widal also discovered that the power of agglutination varied considerably from day to day of the disease and during convalescence it sometimes disappears very rapidly and at other times persists for a long time.

The theory of the causation of this agglutination is not well understood, but it has been definitely proved that oxygen of the air plays a part in the process as it does not occur if typhoid blood serum is passed into a typhoid culture from which the air is excluded. There is no doubt, however, that it depends for its appearance upon the breaking up of the bacilli in the tissues, and the consequent liberation of toxine into the system. It is obtained quite easily in men and animals by inoculating them with the dead bacilli of typhoid.

The question whether *Bacillus coli* also reacts with typhoid serum has been discussed, as of special interest in bearing upon the relationship of the two germs. I have not found a reaction with *Bacill coli* with any of the typhoid blood samples which I have tried, and I have tried a number, but other observers have described the occurrence of reaction with this germ. This has been partly due to the appearance of partial or pseudo reactions which one can soon with practice, differentiate from the true reaction, partly also to the use of too concentrated blood, but partially also, no doubt, to a distinct agglutinative action of blood serum upon *Bacillus coli*.

Johnston and McTaggart have noted this in some instances which are of marked interest. There were cases in which they obtained a reaction with *Bacillus coli* and not with *Bacillus typhosus*, the natural conclusion being that the cases were not true typhoid but due to a coli infection. In some of these cases, subsequent events proved the correctness of this view. It is well consequently to try the reaction with the coli bacillus in those cases in which it fails with the typhoid germ.

The importance of this reaction in municipal health work is that it tends to place typhoid in the same well marked class of diseases in which diphtheria is now.

We have not the same liability to dispute the diagnosis in diphtheria, since the introduction of the bacteriological examination of exudates. The bacteriological laboratory is now the final court of appeal and assists health officers materially in enabling them to discover just those doubtful mild cases, which have the greatest significance in the course of an epidemic.

By the use of the typhoid serum reaction, I believe we may obtain the same results in typhoid. We know that in every typhoid epidemic that occurs, there are a large number of cases of febriculæ which undoubtedly are related to the epidemic, but which, on account of their mild character are not reported or are not considered typhoid. These mild cases are, as in diphtheria, important factors in the spread of an epidemic and in the elucidation of the course of this spread.

I believe that by classing as typhoid all these fevers which give the typhoid reaction, no matter what the length and character of the fever may be and no matter whether such clinical symptoms as rash are present or not, we will be able to consider typhoid as a definite disease, and such fevers as the vast majority of the so called malarial fevers in this province, typho-malarial, etc., etc., will be included, and the work of the health officer lightened in dealing with their cause and prevention.

CHATHAM'S EXPERIENCE WITH WATER FILTRATION.

W. H. HALL, M.D., MEDICAL HEALTH OFFICER, CHATHAM.

The President and Gentlemen of the Association:

GENTLEMEN,—Last Friday I received from the Secretary of the Association the first intimation that my name was on the programme for a paper on the subject of Chatham's experience in water filtration. I regret that the time at my disposal was too limited to permit my making even a superficial investigation of many collateral but important matters connected with our water supply and bearing on the subject matter of my paper.

Owing to the geological formation of the district, Chatham is in a peculiarly difficult position as regards the obtaining of good potable water. There are no springs nor high level head waters available, and no lake in the immediate vicinity. The resource of artesian wells is denied and deep rock boring brings brine, oily matter or nothing. The Chatham Waterworks Company, established in 1892, after sinking a large number of trial wells within the municipal limits, without result, operated some flowing wells in the adjoining township of Raleigh, piping the water to Chatham, but this supply proved inadequate and they installed a filtration system, utilizing the water of the river Thames, which flows through Chatham.

This system, known as the Hyatt or New York Filter, combines the use of sand, gravel and coke with the injection (by an automatic arrangement, before the water reaches the filters), of sulphate of

alumina to coagulate impurities, in the proportion of from half a grain to eight grains per imperial gallon, the proportion depending on the state of the river as to turbidity and the speed of filtration. With slow and leisurely filtration, it would be theoretically possible to proportion the amount of sulphate of alumina added, so as on the one hand to ensure the precipitation of all the aluminum sulphate added, and on the other hand, that all previously suspended matter should be precipitated—in other words that all the added aluminum sulphate and all the matter previously held in suspension should be precipitated and left in the filter, and that no aluminum sulphate and no sediment should go through the filters. This would require repeated daily analyses, as the amount of sediment in the water is constantly changing, and thus such a scheme of meting out the exact theoretical amount of aluminum sulphate is quite impracticable.

The amount of aluminum sulphate added, varies from half a grain to eight grains per imperial gallon, average being two grains, and the maximum being required in spring flood and curiously enough not at the maximum level of the latter, but when the increase about the normal level of the river has reached a third of its total. The explanation is that at this particular stage the freshet has sufficient velocity to disturb and sweep down the accumulated organic and other loose deposit of the past year lying on the top of the river bed. Afterwards, when this particular sediment and slime has floated away to the lake, the river, still rising, has become less turbid and less coagulant is required.

When the sedimentation basin, of which more anon, is in working order, it will contain twenty-two days' ordinary supply, and being largely cleared of suspended matter which will sink by gravity to the bottom, it will be feasible to use a considerably smaller percentage of aluminum sulphate than at present—say half a grain to the imperial gallon.

In connection with the status of the filtered water for washing and cooking, its relative hardness must be taken into account, and this too, as I am informed, varies with the season and state of the movement of the river; the hardness being least in midsummer and

midwinter and greatest in freshets. It is believed that its hardness will be much reduced after it has been allowed to settle in the sedimentation basin. However this may be, it is considered at present fair laundry water and gives great satisfaction to the Grand Trunk and other users of machinery, the boiler scales (of lime) being slight and easily removable.

It was thought by the citizens of Chatham that so important a matter as the filtering of the water of the Thames should not be left in the hands of a private company, and acting on this sentiment the city purchased the works from the company at a cost of $135,000. After assuming civic control, the water commissioners installed, in 1896, another mechanical filter identical in capacity with that already in use. The combined capacity of these two filters is 1,000,000 imperial gallons in twenty-four hours.

This year a sedimentation basin has been excavated; extreme length over embankments from outside to outside 900 feet, and extreme width 180 feet. Depth below datum, south end, 12 feet 10 inches; north end, 10 feet 2 inches. Width at datum level, 112 feet; width of basin at bottom, south end, 73 feet 6 inches; north end, 81 feet 6 inches. Length of excavation at datum level, 832 feet; length of basin at bottom, 797 feet 6 inches; width of basin at top of embankment, 130 feet; length of basin at top of embankment, 850 feet. Width of embankment at datum level, 34 feet; at top, 16 feet. Height of embankment above datum level, 6 feet. The entire inner face is rammed with clay to a depth of about two feet, coated with six inches of blue clay and faced at top to a width of four feet of cobble stones which are also continued some feet down the slope from the top. The whole basin will be protected with an eight foot high closely woven wire fence.

In the basin are three brick towers, from top of embankment to which are connecting bridges. The induction tower, through which the river water enters the basin, is in the centre of the end of the excavation nearest the city. Below the pipe is a strong stone and concrete foundation to prevent scouring action of water entering basin. At the opposite or far end of the basin, is the tower through

which the water is received from the basin to be conducted to the filters, into the water-tower, and thence to the mains. The water is conducted through pipes which thus traverse the whole length of the basin. In the southwesterly corner of the reservoir, is a third tower for drainage emergencies. Amount of earth excavated, 31,750 cubic yards, 11,245 for embankment, 20,505 removed. Mean depth of water, 16 feet, capacity of basin, 1 foot below top of bank, 8,454,900 imperial gallons, in round numbers, 8½ millions, in summer, the water can be oxygenated by being thrown into the air before falling into the basin. Cost of basin $9,000.

As at present constituted, the Chatham City Waterworks system consists of a pumping station with four sets of pumps, having a combined pumping capacity of about 4¼ millions of imperial gallons in 24 hours; two sets of boilers and a water tower, height 105 feet, diameter 20 feet, capacity of 202,175 imperial gallons. Two horizontal Hyatt filters with an estimated filtering combined capacity of one million gallons. Sedimentation basin as above described.

At present (Aug. 15th 1897) there are 166 fire hydrants, 15 miles of pipe, 700 users of city water, the G. T. R. Co., being one of these and paying an annual rental of $900. Suitable buildings for engines etc. Total estimated cost of plant to city as it now stands, $170,000. The management of the works is in the hands of three commissioners —the mayor of the city and two others elected by the city people.

The officers consist of a superintendant, 1st and 2nd engineer, an inspector and secretary treasurer; cost of operating, annually including salaries, $6,267.52; annual income from rates, $6,834.60. To this should be added, credit from city for water used for fire protection, sprinkling streets etc.

The water gives excellent satisfaction to the consumers, and it is a fact that up to the present time, all cases of typhoid fever, which have occurred in the city, have been traced to the use of well water or other sources of supply and that the city water has never been even suspected of producing any disease or ailment.

All this in the face of a very violent prejudice on the part of the citizens, against using the river water in any form, either filtered or unfiltered; this prejudice largely and naturally arising from the

turbid look of the water in the river with its many apparent sources of contamination, as in flood time, it overflows its banks, increasing the organic matter by washing down vegetable refuse from the creeks, cultivated fields, barn yards and other origins of impurity. The possession of the sedimentation basin will enable the waterworks authorities, during flood time to allow this impure torrent to pass by, while they draw on the still water of their reservoir, and do not pump from the river till that source of supply has resumed its normal state.

These exceptionally adverse and contaminating conditions of the river only obtain during flood time—say about from four to twenty days in the spring and four to six days in the fall, when the basin will furnish a reserve to meet such contingencies.

At other seasons of the year the river water has only that moderate turbidity which is common to all streams with clay banks, and chemical analysis by Wanklyn's standard combined with bacteriological examination, shows the Thames to be well within the standard of second-class water, and infinitely purer than many of the streams constantly utilized, even unfiltered in Europe and United States, for town supplies.

All slaughterhouses for at least five miles above the intake have been abolished and other sources of contamination removed or lessened by order of the energetic Water Commissioners in charge.

The suggestions of Mr. J. J. Mackenzie, bacteriologist, who made a careful and extensive investigation of the conditions necessary to get the best results for the filtering plant, are being carefully followed. Among these I may enumerate a careful apportionment of coagulant, rejection of the first water after washing the filters and regulation of the pressure so that in no case can the filters be overworked, to accomplish which end, all the water is now passed through each of the two Hyatt filters before being pumped into the mains. The conditions enjoined by the Provincial Board of Health have been strictly observed.

In conclusion, the history of the Chatham Waterworks goes to show what can be accomplished by careful filtration of a water which at first sight might be considered out of the question as a domestic source of supply.

SEWAGE DISPOSAL.

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Gentlemen :—The smaller cities and towns of Ontario are not apparently prepared to expend large sums of money on sewage purification works, since it is with great difficulty that even a moderate appropriation for sewer construction can be obtained.

Sewerage is a necessity, and no town in Ontario can long afford to be without a system. Sewage purification in the most approved manner is not always necessary, as in many cases the streams and bodies of water into which sewers discharge are not used for water supply.

It is well understood that complete purification of sewage can be arrived at only by application to land, either by broad irrigation or by intermittent filtration through sand, gravel or other porous material. Partial purification of sewage may, however, be attained by several well understood methods and in a great many cases will be sufficient for practical purposes.

Complete purification, where a sufficient area of suitable land s not available, is expensive and difficult to attain, hence a too severe ruling by the health authorities will evidently tend to discourage and delay the construction of many much needed sewerage systems.

The courts will apparently prevent pollution of a stream or body of water if riparian proprietors are materially injured, but will take into consideration the balance of inconvenience should the injury be trifling and can be compensated by a payment of money.

The "Rivers Pollution Act" is enforced by the authorities in England with great mildness, complete purification of sewage not being insisted upon unless water is taken for domestic supply from the rivers and streams at points which may be reached by the discharged sewage. When such is the case, however, land treatment is insisted upon. Of this class of streams are those within the watersheds from which the water supply of London is taken. Upon these streams there are thirty-eight towns which purify sewage by application to land and only one permitted to use chemical methods.

In the case of streams not used for domestic water supply, any method is allowed that will purify the sewage to an extent sufficient to prevent its becoming a nuisance. Chemical precipitation is the most common method of treating sewage in this class, and in many cases experiments have been and are being made in further treating the effluents from precipitation tanks, by rapid filtration.

When a small quantity of sewage is discharged into a large volume of comparatively pure water, the organic matter in the sewage is destroyed by the oxygen of the air contained in the water and by the action of the minute forms of animal and vegetable life in the water and bed of stream. In cases, however, where the quantity of sewage is greater than can be thus consumed, part of the proceeds of decomposition of the organic matter takes place in the ab ence of air, causing objectionable odors and serious pollution of the stream. This condition is greatly aggravated by sedimentation where streams have small velocity or where water is still, as in the case of lakes, etc.

The sewage of towns and cities in Ontario and the United States is much more dilute than that of English towns, owing to the much greater quantities of water consumed. The average for English towns being about twenty-five gallons per head per day, while that of Canada and the United States is about one hundred gallons per head per day. Further, most of the towns and cities of Ontario have a very small population per acre and by far the greater part of the washing water and excreta is deposited on the land in a way familiar to all, and never reaches the sewers.

It will be found that in nearly all cases the quantity of sludge to be removed from the sewage is very small as compared with that required in large cities and in England. It is therefore probable that where partial purification only is required, that the methods most in use will not be necessary or advisable and will seldom prove both effective and cheap if applied without taking into consideration the different conditions which obtain here. Chemical precipitation will without doubt prove much more expensive than rapid filtration through gravel aided by a current of air, or than straining through coke. The annual cost of chemicals alone, for chemical precipitation

is given by the State Board of Health of Massachusetts is thirty cents for each head of population, not to mention the extensive plant necessary and the cost of labor.

The methods above mentioned, of rapid filtration and straining through coke, have the further advantage of disposing of the sludge to a considerable extent and in a much more cleanly and satisfactory manner.

The following table of results is taken from the report of the Massachusetts State Board of Health and shows the comparative efficiency of the different methods of sludge removal from sewage:

Method.	Average per cent. removal of		Bacteria.
	Alb. Ammonia.	Oxygen consumed.	
Rapid filtration through gravel	89	87	96
Chemical precipitation.....	57	50	68
Sedimentation.....	30	21	15
Straining through coke.....	52	44	43

The above results were obtained from experimental filters and tanks, using city sewage and operated under trained scientific supervision. Consequently it is to be expected that the less complicated methods would prove comparatively more efficient in general practice in the smaller cities and towns.

A dilute sewage will naturally show a smaller percentage of purification by any method of treatment than a more concentrated sample, but on the other hand it will pass through the filters at a higher rate of flow per acre and with less clogging of the upper layers of filtering material.

The above considerations would indicate that it will be possible to discharge sewage of many small cities and towns into streams during periods of high water without causing a nuisance, but that some means of partial purification during the periods of low water and small flow is desirable; also that the method of straining through coke will give satisfactory results where the sewage to be treated is dilute. It should not be lost sight of that complete purification can readily be obtained by conducting the effluents from the coke strainers to filter beds of sand or other porous material.