

FIFTEENTH ANNUAL MEETING  
OF THE  
ASSOCIATION OF  
EXECUTIVE HEALTH OFFICERS  
OF ONTARIO

HELD AT THE  
CITY OF KINGSTON

ON THE  
14th and 15th of August, 1900.

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TORONTO:  
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FIFTEENTH ANNUAL MEETING  
OF THE  
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EXECUTIVE HEALTH OFFICERS  
OF ONTARIO.

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The Fifteenth Annual Meeting of the Association of Executive Health Officers of Ontario was held in Convocation Hall, Queen's University, Kingston, on Tuesday and Wednesday, August 14th and 15th, 1900.

FIRST SESSION—TUESDAY.

The meeting convened at ten o'clock, but as the President had telegraphed that he was delayed on his journey, Dr. Oldright was voted to the chair *pro tem*.

MAYOR MINNES, of Kingston, on behalf of the corporation of the city extended a hearty and eloquent greeting to the Convention, and after extolling the various advantages of the Limestone City said: I welcome your Association because your work is a noble one; it is a philanthropic and beneficent work. Largely through your efforts we have our present excellent system of quarantine, both federal and municipal. I am pleased to be able to inform you that we have had much satisfaction with our waterworks system since it has come under municipal control. In 1887, when under private ownership there were 987 users, while at present there are about 4,000 names on our waterworks' list. The water rates in Kingston are lower than in any city in Canada or the United States. (Applause.) As a consequence of municipal control, and with the aid of our Board of Health, we have done away with all wells within the city limits, and the closing of these wells has brought our city into a good sanitary condition. His Worship closed by urging the members of the Association to accept the invitation of the city authorities and the Medical Association of Kingston to be present in the evening at a complimentary steamboat excursion to view the Thousand Islands by search-light. (Applause.)

Dr. OLDRIGHT, on behalf of the Association, thanked the Mayor for his cordial welcome and kind invitation. The City of Kingston had come into prominence in the early history of Canada, and he was glad to see that it was making substantial improvement both from a business and a sanitary standpoint. He felt sure that every member present would carry away pleasant memories of the visit.

A. MCGILL, B.A., Assistant Analyst Department of Inland Revenue, Ottawa, then read a paper upon "The Effects of Food Preservatives on the Public Health." He prefaced the reading of the paper by saying that the subject was one of interest not only to the public analyst, but also to the practicing physician and the medical health officer; and at the conclusion of the paper he added the following *extempore* remarks: The evidence before the British Parliamentary Commission has been very extensive, and goes to show that the use of these chemical preservatives is greatly on the increase. At the same time some of the physical modes of preserving foods are also on the increase—cold storage, for instance. Cold storage warehouses are in existence in most of the large towns and cities of Great Britain, and in Canada this system of preserving food is becoming more and more necessary to the success of the retail trade. Perishable goods are now being kept in places properly built to hinder the development of those germs which work injury. I am not in a position to prescribe any particular improvement in dealing with this subject of arresting decay in perishable foods. My own opinion is that the physical methods of subjecting foods to an extra degree of cold or heat, or of hermetically sealing them, are likely to do little, if any, harm to such food by rendering it less digestible, although it has been claimed that the subjection of milk to a temperature necessary for sterilizing is likely to render albumenoids less digestible than they naturally are. The use of chemicals which are poisonous to certain forms of life, and which are used only because they are poisonous to these forms, is *a priori* evidence why their use should be looked upon with dread. And when we realize that the use of these food preservatives is on the increase, as has been proven in England, the importance of the whole matter is pressed upon us. In many instances not only does the man who receives the butter in London treat it with boracic acid, but the dairyman who first handled it has been known to also have treated it with boracic acid, and serious, if not fatal, cases have come to the knowledge of physicians from this overdosing of boracic acid. Strong, well-developed human beings may use some of these foods for a length of time without injury, but this does not justify the use of such preservatives; for it must be remembered that in the use of milk, for instance, the food is so often given to infants and invalids, and these persons certainly ought to be protected.

At the close of reading of the paper a member of the Association asked: "What is the nature of formaldehyde?"

Mr. MCGILL: Formic aldehyde, or formaldehyde, is the first oxid-

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ation product of wood alcohol (methyl alcohol), and bears the same relation to this alcohol that ordinary aldehyde does to common alcohol. The substance is scarcely known in the pure state, but a 40 per cent. solution of it occurs in commerce under the name of formalin; and solutions of various strengths are sold under many fancy names, such as "Freezine," "Icine," etc., these being articles of trade well known to dairymen. However, I have no personal knowledge of the dairy business. Lepierre has shown that proteids are all sensitive to formaldehyde, the changes which they undergo rendering them difficultly soluble by normal gastric juice. Trillat, another experimenter, found that certain proteids became wholly insoluble after formaldehyde treatment. Formaldehyde is a powerful substance. It has been shown that one part of formaldehyde in 50,000 is sufficient to keep milk sweet for twenty-four hours; but dealers use a greater quantity. However, if, under certain circumstances, milk is taken proper care of, in well cleaned vessels, it can be kept sweet for twenty four hours without any of these preservatives. Milk is the only substance in which I have actually established the presence of formaldehyde as a preservative. We know that formaldehyde will render gelatine hard and brittle, and I have no doubt that the gelatinous components of milk must be affected by formaldehyde; but the question has not been studied by me sufficiently to give a decided opinion in regard to the use of this substance as a preservative. It certainly seems to arrest the souring and putrefaction of milk.

Dr. T. V. HUTCHINSON, the President, having arrived took the chair. He stated that he would deliver his address at a later session.

Dr. CONNELL: In regard to preservatives in foods, my experience has been limited, having been confined chiefly to the subject of milk as sent to cheese and butter factories. We have found that milk sent in winter, more particularly to the Dairy School, had preservatives added, principally soda, boracic acid, and of late years, formalin. The action of the former are well known. The latter is a very powerful preserving agent, and can be easily detected. We have found also that so far its use has not had much influence in the quality of cheese or butter, except that where a great deal has been used it acted upon the rennet, curdling the milk, and it took a longer time for the curd to break down.

Dr. OLDRIGHT: The matter of poisoning from boracic acid is very important. I would like to know what the symptoms of such poisoning are, as noticed by the Commission. Is it not possible that we may strike some substances which, though destructive to minute animal life in foods, yet may not destroy animal tissues in the human body? I have often heard it said by housekeepers that if you take milk off ice and boil it without first allowing it to get gradually warm it will sour. I would also like to ask if some of these substances which arrest germs in foods may not be actually beneficial to animal life? Not only does milk sour rapidly,

but it also easily absorbs neighboring odors. It is difficult to devise methods that will keep milk sweet and wholesome, especially while out at summer resorts.

Dr. SHEARD: I have but little to say regarding the excellent paper just read. In the city of Toronto there are various preparations put upon the market to prevent the souring of milk, most of which are composed chiefly of boracic acid, or salicylic acid. We suffer in Toronto occasionally from another form of adulteration—if it can be called such—that is the use of annato to improve the color or appearance of the milk. This coloring matter gives the milk a more creamy look. I sent a notice to dealers using this substance that they would be prosecuted if this practice was continued, and it has been almost entirely stopped, although I fear it may be attempted again in the fall of the year. Milk, cream, and more especially ice-cream, are likely to undergo disintegration in thawing. I am of opinion that in the case of ice-cream the freezing, thawing and re-freezing often develops in the proteids a condition strongly poisonous in its action, causing gastric disturbances and very severe prostration after vomiting.

Dr. CASSIDY: We are under obligation to Prof. Magill for his valuable paper. His ideas are both practical and suggestive. The consideration of matters dietetic is of great importance to the practising physician. In fact, this study of foods is taking a very fast hold of the medical profession. The up-to-date medical man must not only be a thorough therapist, but he must be more of a dietician than he used to be. This question has been receiving a good deal of attention at recent medical gatherings—notably at that of the International Medical Association held at Paris on the 2nd to the 9th of August. These papers were not to be published until after the Association had met. One authority, Johanneesen of Christiana, alludes more especially to the preparation of milk. I cannot summarize the paper, because only a condensation of it has so far been given us. His two most important points are: first, that in order to obtain good milk it is necessary that the municipalities shall have the supervision of all milk supplied to its residents, and so be able to assure its good condition and quality. There is no doubt that this is the proper plan; care and proper handling of the milk will thus be assured. In the second place, he is very much in favour of pasteurization. The proper temperature is placed by him at about 156 or 157 degrees, after which the milk should be reduced to about 64 or 65 degrees. He urges the pasteurization of milk more especially if fed to infants.

Dr. BRYCE: Last winter I was speaking before the Dairy Association of Western Ontario, and urging greater attention to the purity of the milk supply in every department of dairy work. Hon. Thomas Ballantyne said to me that after an experience of thirty years as a practical dairyman he had to confess that the question of cleanliness in the dairy was probably in a worse condition than ever before. In other words, there has not

been progression in cheese factories and ought not to be on the train, and is Such milk is likely been if left alone. clear that there is to dairyman, and it is addition of a few dr case of milk poison ptomaine already in cows, with clean sur clean conveyances—livered in a wholeso the use of a good ref increase in its acidity, tritive quality of the

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Dr. CONNELL: I portance of cleanline he has the desired ic our dairy convention in our milk or butter refuse the milk at th that the farmers may well kept on our farm just on the point of g keep it. Chemical p factories pasteurizati such cases, however, under the circumstan no injury to the nutr cleanliness in connect with this form of pre

Dr. BRYCE: Som



been progression in the matter of cleanliness and general care of milk in cheese factories and on farms. Under certain conditions pasteurization ought not to be encouraged. Take for example, the milk which has come on the train, and is just on the point of souring when it is pasteurized. Such milk is likely to be worse after pasteurization than it would have been if left alone. If Mr. Ballantyne's statement be true, then it is quite clear that there is too often a lack of conscientious care on the part of the dairyman, and it is a bad thing if he thinks he can cover this up by the addition of a few drops of formaldehyde solution. We need to know in a case of milk poisoning whether it was due to boracic acid, or to some ptomaine already in the milk when the preservative was added. Healthy cows, with clean surroundings, clean feeding, clean milking, clean vessels, clean conveyances—all these are absolutely necessary if milk is to be delivered in a wholesome condition. Dr. Mackenzie will tell you that by the use of a good refrigerator milk has been kept for a week without any increase in its acidity. I think this is a great step in advance, as the nutritive quality of the milk is in no way impaired thereby.

Dr. VAUX: Does the pasteurization of milk retard in any way its digestibility? Mothers have often asked this question. Pasteurization is one of the most available methods we have for the preservation of milk. No matter what care dairymen may give to milk it is likely that something may get into the milk which will threaten its purity, and if these germs are destroyed by pasteurization it must be a benefit to the consumer. Which milk would you prefer to use: that from a cow tested by the tuberculin test and found to be satisfactory, just as it came from the animal, or milk taken from a cow without testing, and then pasteurized? We know that pasteurization does overcome these germs. The point I wish to have settled is the matter of the digestibility of the milk.

Dr. CONNELL: In regard to what Dr. Bryce has said about the importance of cleanliness in dairies and cheese factories, I have to say that he has the desired ideal before him. This has been also preached at all our dairy conventions for some years past. We do not want preservatives in our milk or butter. If we find that farmers are using preservatives we refuse the milk at the Kingston Dairy School, and there is a likelihood that the farmers may be fined. In ordinary cases milk is not at present well kept on our farms. But if milk comes to the butter or cheese maker just on the point of going off, something must be done to that milk to keep it. Chemical preservatives are out of the question, and in cheese factories pasteurization is in some ways a solution of the question. In such cases, however, pasteurization is the best treatment milk can receive under the circumstances. Pasteurization under 160° F. can do little or no injury to the nutritive value of milk. But I have a hope that care and cleanliness in connection with the handling of milk will even yet do away with this form of preservation.

Dr. BRYCE: Some years ago a paper was presented at a medical gath-

thering in connection with a Children's Home at Philadelphia on this question of the nutritive quality of milk being affected by heating. After a long discussion the conclusion was arrived at that pasteurization in some way affected the digestibility of milk. Certainly the milk did not give the same satisfaction as where it had not been subject to heating, and seemed to lose something of its assimilative qualities in pasteurization.

Dr. HERALD here reported that the City Council, the Local Board of Health, and the Medical Society of Kingston invited the members of the Association to be their guests on a search-light excursion among the Thousand Islands. The speaker in a most genial manner pictured the delights of the proposed trip.

The invitation was accepted with hearty applause.

### SECOND SESSION—TUESDAY AFTERNOON.

Dr. SHEARD read a paper on "Experience in Recent Vaccination Work."

Dr. KITCHEN: You have given us some interesting experience as a public vaccinator. Please tell us, however, how you would do it in private practice and with what vaccine.

Dr. SHEARD: In private practice I would use ivory points. I have used the ivory points of various makers. I have found in my own experience that glycerinated lymph is too slow in drying, and I have had too many failures from it. I have been twice vaccinated myself with tube lymph and have not had any bad result. I prefer the points, however as I have said. In some families I might use the lymph from the arm again—taken from the same children. My colleague, Dr. Richardson, stated that he used lymph many years ago, and that the old scars were still there. In performing the work I would wash the arm with warm water and a clean sponge, and then dry it nice and clean. I do not believe in washing with any disinfectant, but I would make sure that the arm is perfectly clean. After applying, allow it to dry, having the sleeve loose. Some physicians say when lymph does not take that it is old; but too often the fault is that they have erred by pulling down the sleeve too soon, and the lymph and serum have been wiped off. In regard to vaccination shields, I would say that I have seen a great deal of sloughing on account of the use of these old wire shields strapped on with tape. This does not apply to the same extent to those paper shields of Mulford. However, vaccination has enough to answer for without being blamed for mechanical defects.

Dr. BRYCE: We have had a number of outbreaks of smallpox since last October and I crave the pardon of the meeting for referring to some of them. Last spring the disease developed among some of the French Canadian people of the county of Essex. Dr. Coventry of Windsor, and Dr. Hoare, of Walkerville, dealt with it in the neighborhood of the latter place, and it seemed to disappear by the first of August. However, some

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mild cases must have remained, and in October, after a dance, a number of cases developed. Dr. Hodgetts, acting for the Board, went up and urged the Local Boards of Health to take action. After six weeks or two months we found a few more cases occurring in some of the townships in that section, and this in the face of a general vaccination. We found, too, that while thousands of persons had been vaccinated in many cases the vaccination had not taken. I went to Tilbury and met Drs. Coventry and Hall, and we talked the matter over. It was plain that in too many instances no result had come from the vaccination. The work had been done by public officials, by paid men, and yet smallpox was repeating itself. I went further and made fresh enquiries, especially along the line of what vaccine was used, etc. I found that the particular vaccine had been furnished by one of the largest firms in the United States, and had been made according to the best scientific methods. I took one of the health officers of the Windsor district with me and examined some fifty children in a school near there—primary cases. A few seemed possibly successful cases, but the rest proved failures. I knew the health officer who had vaccinated them, and he said that he had left the arms for half an hour before pulling down the sleeve. He had vaccinated with tubes and was again doing so. At this school glycerinated lymph had been tried and it had failed. Another glycerinated lymph was used over the same ground and it produced a perfectly satisfactory vaccination. The health officer is not appointed to decide what lymph shall be used, but to prevent smallpox. It does not matter so much if one lymph may leave a little greater sore than another. We sent enquiries to many officers as to whether glycerinated lymph was producing unsatisfactory results, and what lymphs were best. Some time ago I went to Carleton Place, and we had general vaccination and the doctors there assisted very generally. The health officer afterwards wrote stating that remarkable differences resulted from the use of certain vaccines by different physicians. In 1885 in Ontario 100,000 persons were vaccinated with bovine lymph, many children among them, and most of these persons presented perfectly normal marks; and this has also been the result with some glycerinated lymphs to-day. There has been one lymph introduced into the market which takes so severely that it is a question with many doctors whether they will apply it, although it makes a sure vaccination. In other cases a lymph has been used which is very mild in its action, but it can hardly be recommended on account of its uncertainty. Now, I have seen as normal vaccinations resulting from glycerinated lymph as from human lymph. For the past year and a half, however, we have had so many failures from the use of glycerinated lymph that I would prefer to pin my faith to lymph taken from a calf, where the scarification has been protected from contamination, but without putting anything on the wound, such as oxide of zinc and not subsequently treated with glycerine. I think that on taking lymph it should be put into an aseptic chamber and

dried at once with chloride of lime or sulphuric acid. Every precaution of cleanliness should be taken with the calf and the lymph placed on aseptic points, and kept as aseptic as possible. Under such conditions I think we are justified in saying that we would have a lymph that a health officer could use with more certainty of success in the case of an outbreak of smallpox and a minimum of danger as regards untoward results.

Dr. CASSIDY: If there is one thing that medical science has been sure of doing this century it is the protective power of vaccination. We have all along felt that we have been right in following the practice. Therefore it seems rather strange that we should now seem to begin to be in doubt in this matter. The observations of Dr. Sheard have given us food for thought. I have compared my arm with those of my children, and not one of them has as satisfactory a mark as mine. They have been vaccinated with glycerinated lymph. I have seen many scars of late, but none of them seem like the marks made forty or fifty years ago. There is a remarkable difference between humanized lymph and bovine lymph. Of course we must recognize the force of the argument that it is well to eliminate all fear of syphilis and other diseases resulting from the use of human lymph. But we have now come to an important stage, and the physician naturally wishes to be in a position where he can speak in an *ex cathedra* manner: "You are protected from an attack of smallpox by vaccination, for I have vaccinated you, and I say so." It is therefore of first importance that we should feel perfectly certain and secure on that one point of the efficiency of vaccination. Of course I would not like to expose the child to the possibility of taking syphilis. I remember that in my early days it was said to have been proved that a child had taken syphilis in this way, but that is the only case I remember of in my experience. My own observation has shown that in many cases the child's arm was sore for five or six weeks, although the child was going to school. The main point, however, as I have already said, is the fact of the efficiency of the vaccination. Can you say, "This person is surely vaccinated?"

Dr. OLDRIGHT: At the present time an outcry is being made against the benefits of vaccination. Of course it is not necessary to say anything to this audience as to the use of vaccination. We are one as to the principle of its benefits. Statistics, and the history of smallpox, are on the side of the practice. In Glasgow they used to vaccinate regularly, and there was practically no smallpox in the city. However, they grew negligent, and an anti-vaccination agitation was started, and the authorities were prevailed upon to make vaccination non-compulsory. The result was that a few years afterwards they had a scourge of smallpox, and the city authorities have again become converted as to the necessity of vaccination. I have seen a great many vaccinations in my day, yet I have never personally known but one child to be seriously injured thereby, and the little one ultimately recovered. At that time arm-to-arm lymph was nearly alto-

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gether used. The results then were deeper scars, going down to the deltoid, and leaving a well-defined mark. The constitutions of the children were never injured. Where we got the lymph ourselves we found it best, and the experience here to-day appears to be in favour of such lymph also. A statement was made, and I think proved, by an Italian physician fifteen years ago regarding the unlikelihood of contracting syphilis by vaccination. He took the vaccine from a syphilitic patient and put it on his own arm, without any transference of the disease. He stated, of course, that he never had had syphilis. I have noticed the tendency to severe wounds and lack of well-defined marks from most of the lymphs now on the market. Where I have used carbolic acid and bichloride I have always been careful to wash it off, as otherwise the vaccine would be affected.

Dr. HALL: We had no cases in Chatham during the recent visitation of smallpox in the west, the scene of the outbreak being about thirty-five miles away. In one of the townships adjoining Chatham vaccination was pretty fully carried out by doctors vaccinating the children in the various school-houses. In one case some of the children refused to be treated by the public vaccinator, and I vaccinated the three of them. In some cases where children were vaccinated by the public vaccinator the results were not satisfactory, and at the end of six weeks they were brought into me, when the second vaccination took perfectly. This gave me an opportunity to compare the two kinds of lymph used. The public officer had used a lymph prepared by a firm in the United States dealing largely in the matter. I also used a United States lymph in the second instance, and in all these cases my vaccination took. I vaccinated about 750 cases in Chatham, and in nearly every instance it took.

Dr. OLDRIGHT: One reason why we have so many failures is that in the time of an epidemic they will drain a calf by trying to take more points from her than she has vaccine to give. Sometimes a medical man does not like to suggest vaccination for fear the family may think he is looking for a job, and hence the paucity of vaccination.

Dr. HUTCHISON: A few years ago there was a scare of smallpox in London, Ont., and we had a rush of people to be vaccinated. Most of the vaccination then took. I think the reason the tube lymph does not take so well is on account of the length of time it requires to dry—from a half to three-quarters of an hour. Regarding vaccine shields, we have found that they tend to draw,—almost like the old soap and sugar plasters our mothers used to put on us.

The meeting then adjourned until the following morning.

#### COMPLIMENTARY EXCURSION.

The complimentary excursion tendered the Association by the City Council, Local Board of Health, and Medical Society of the City of Kingston, took place at eight o'clock on the handsome steamer "America." The trip was a well-selected route among the Thousand Islands, and the

electric searchlight on board the vessel enabled the visitors to get a novel and charming view of many of the islands. Unfortunately rain fell after an hour's outing, and told somewhat against the trip; yet in the face of this disappointment to both hosts and guests a capital time was spent, as the entertainers had made every arrangement for the comfort and pleasure of all on board. Refreshments of various sorts were generously served, and the hospitality of the Kingston friends was extolled by those who had the pleasure of sharing in the outing.

#### A VISIT TO THE PENITENTIARY.

On Wednesday morning the members of the Association, by arrangement, visited the Penitentiary in a body, and were received by the Warden, Dr. Platt, and Dr. Phelan, the surgeon of the institution. Both of these gentlemen explained the working of the prison, and showed the latest means introduced for perfect sanitation, the new cells with water-closet equipment coming in for close examination. The system of disposing of the sewage upon the prison farm was also inspected, and the method was discussed favourably by several delegates. The convicts were seen at work, and the entire institution was considered in all its arrangements. The Warden and surgeon were complimented upon the splendid condition of the Penitentiary.

#### THIRD SESSION—WEDNESDAY MORNING.

Upon the return of the members of the Association from the visit to the Penitentiary, the meeting was called to order at 10.30.

Dr. J. J. CASSIDY of Toronto read a paper entitled "Some Remarks on the Frequency and Curability of Tuberculosis."

Dr. BRYCE: The subject is one that has been threshed over so much by me that I would prefer that some other person would take up the discussion. The subject of the cure of consumption has been approached from a somewhat different standpoint than that usually discussed by us. This question has lately been much discussed in Germany, and it has been found by insurance companies that about fifty per cent. of those who apply for sick benefits between twenty and thirty years of age have been sick from tuberculosis. In that country persons have to be insured if their income is not over \$450 a year. The insurance companies a few years ago tried to see if it were not possible to delay the period when these persons referred to might die; and also, if possible, to improve their health so that they might go to work, and so save the sick benefit and their support. They found, after sending them to The Krankenhaus of Weicker, at Gorborsdorp, that by outdoor treatment 75 per cent. had so improved that they could come back and return to work. The Hanseatic

League insurance sanatoria, and 150 work, thus saving the financial standing of insurance companies soon sixty municipalities to which treatment. This Cassidy's paper. insurance company claims. But by nutritious food, and ing to know that 75 give two or three years and that 25 to 50 per cent. under proper conditions tuberculosis. The more closely as health small city like Toronto culized. If we art practical attention struck this country and thousands of country to take place which they work and of a less favourable tory and done in t very inimical to health and many persons h in order to support statistics of the Pro should we not speak in regard to this old of over-competition If we keep silent th that many of the wo and they are anxious evils. Where compe While girls are eag household service th labour market with over-strain. Worki employed from sever ing they say they do

League insurance company calculated that if they sent 500 persons to sanatoria, and 150 of these improved so as to give the company a year's work, thus saving a year's sick benefit to that corporation, it would from the financial standpoint be a paying transaction. That brought before the insurance companies the question of forming sanatorium associations, and soon sixty municipalities and insurance companies had sanatoria of various extent to which they could send the sick under the insurance law, and in 1899 at least 6,000 persons were in consumptive sanatoria for treatment. This is exactly in accordance with the result found in Dr. Cassidy's paper. By leaving the patient at home it meant a loss to the insurance company, which had to pay sick benefits and ultimately death claims. But by being sent to a sanatorium the patients got fresh air and nutritious food, and in many cases this meant recovery. It is encouraging to know that 75 per cent. of these tuberculous persons were able to give two or three years' work as a result of their stay at these sanatoria, and that 25 to 50 per cent. were actually cured. The question of nutrition under proper conditions and surroundings, is the secret of the cure of tuberculosis. The point of its prevention, however, does touch us still more closely as health officers. One has only to take even a comparatively small city like Toronto to see the process whereby persons become tuberculized. If we art to stamp out this plague in Canada we must give it practical attention so far as its inception is concerned. Industrialism has struck this country with great force during the last ten or fifteen years, and thousands of persons have been attracted into the cities from the country to take places in industrial establishments. The conditions under which they work are sometimes very good; but very frequently conditions of a less favourable nature prevail. Where work is taken from the factory and done in the home conditions are often developed which are very inimical to health. Wages are often cut down to a very low rate, and many persons have to work ten, twelve and even fifteen hours a day in order to support themselves and their families. If this be so—and the statistics of the Province tend to prove the correctness of the position—should we not speak out even more loudly than we have ever done before in regard to this old question of how we are going to lessen the evil results of over-competition in the sedentary industries of our towns and cities? If we keep silent the industrial employers will not speak out. We know that many of the working people are aware of the evils threatening them and they are anxious for us to do something to assist in alleviating these evils. Where competition is keen it is difficult to lessen the hours of labor. While girls are eager to go into shops or factories instead of working in household service there will always be an overcrowding of the industrial labour market with long hours and small wages, and consequent physical over-strain. Working girls, as a rule do not take proper exercise, and if employed from seven o'clock in the morning until six o'clock in the evening they say they do not require any. In any event, fresh air, abundance

of plain, nourishing food, and a correct rule of living are an absolute necessity in order to develop and maintain the right degree of health in the case of such workers. I think it only fair to some employers to say that they appear to be quite willing to help their employees when the latter are in the sanatorium, but how much better it is for both worker and employer to have such assistance prevented by proper sanitation and general care of health?

Dr. ACLAND ORONHYATEKHA: Regarding the question of tuberculosis, I might say that for some years I studied under Dr. Theodore Acland, in Brompton, when a student at St. Thomas' Hospital, London. They then had a theory that there were certain drugs that would in a measure check the activity of the germ; but it all came back to the question that proper nutrition, etc., was the only thing that could really alleviate the progress of the disease. Among other things tried at St. Thomas' Hospital was the giving of bullock's blood to consumptives, in many cases the patients being taken to the slaughter house so as to get the blood in the freshest possible condition.

The PRESIDENT then read his Annual Address, which was heartily received.

Dr. BRYCE moved, seconded by Dr. VAUX, that the President's address be given the place of honor as the first paper in the report of the proceedings of the Association. Carried.

Dr. KITCHEN followed with an address on "Sanitary Needs of Creameries and Cheese Factories."

Dr. CONNELL: Regarding the sub-earth duct in cheese factories, I may say that we have had one in use in the Kingston Dairy School for four years—since 1895.

Dr. MEACHAM: A friend of mine had a ventilator in his curing-room, with an opening from the cellar, and he said the effect was great indeed. Clean water is also an absolute necessity around a cheese factory or dairy. Too many farmers are careless in this regard.

Dr. CONNELL: I would like Dr. Kitchen to have said a little more in his paper regarding drainage. I know there has been a great difficulty in this part of the Province in this regard. Better drainage is needed at cheese factories and creameries. Too often you can smell a cheese factory before you can see it. Then again, the whey tanks are too frequently found in a bad condition.

Dr. BRYCE: From my experience with summer hotels and cheese factories I think it is possible to deal with this matter in an easy, simple and practical manner. Last winter Hon. Thos. Ballantyne asked me if I would assist toward making a model creamery, towards which the Western Dairy Association had donated a bonus. They were going to take an old factory at Milverton, and put it into a good, modern condition. I found the factory located almost in a swamp, and with an old pig pen attached, with a capacity for 200 or 300 hogs. The whey had up to that time been

conveyed to a tank taken as required. Mr. R. Ballantyne's floor were led through more or less than They calculated the gallons a day. They and when a plug and filter through have sub-soil drains hotels in Muskoka 2,000 gallons of water factory at Milverton tiles previously in. When I enquired was doing well—al "and you can smell pigs in an old pen near a cheese factory general improvement worked out, for two

Dr. BRYCE then from the Public Health

Dr. JOHN H. extreme pleasure me first of all to sound common sense that I was considered a rational system of Order has been held up as sacred, and, as it was expected to bow down it adversely was considered and beautiful, and So it was with confidence to the opinion to believe and the opinion that our children Speaking as one who educational work as pupils children who begin are likely to be as fast they were only five educationally, my stronger and intellectual



conveyed to a tank which was usually uncovered, and from which it was taken as required. That was the condition we had undertaken to remedy. Mr. R. Ballantyne took the matter in hand. All the washings of the floor were led through a six-inch pipe into a septic tank. This is nothing more or less than a cesspool through which all the drainage would go. They calculated that the capacity of this septic tank would be about 500 gallons a day. The tank was connected with four-inch tiles at the bottom, and when a plug was pulled the drainage would go through these tiles and filter through the ordinary deeper soil. If clay soils exist they must have sub-soil drainage. This tank might be discharged twice a day. Some hotels in Muskoka are using this system now, and sometimes as many as 2,000 gallons of water are used daily. Mr. Smith, who took charge of the factory at Milverton, said that he found that the old two-inch sub-soil tiles previously in use were not sufficient to drain off the water fast enough. When I enquired as to the success of the system Mr. Smith said that it was doing well—all but the pigs. "The pigs are there still," he said, "and you can smell them all over the factory." If the keeping of 200 pigs in an old pen with broken floors, contaminating the air, is permitted near a cheese factory that is called a "model" one, it is vain to hope for general improvement. This method of drainage is one that can easily be worked out, for twelve four inch tiles will hold a cubic foot of water.

Dr. BRYCE then read his paper on "The Education Problem viewed from the Public Health Standpoint."

Dr. JOHN HERALD: I have listened most attentively, and with extreme pleasure to the paper by Dr. Bryce on "Education." Permit me first of all to compliment the Doctor upon what I believe to be the sound common sense character of his remarks. I should also acknowledge that I was considerably surprised as I listened. For years the educational system of Ontario has been so loudly and so generously vaunted; it has been held up as the best on earth; it has been regarded as something sacred, and, as it were, set up on an altar, and all loyal subjects have been expected to bow down and worship it, and any one who dared to criticise it adversely was considered as wanting in appreciation of the truly good and beautiful, and was even liable to be accused of a lack of patriotism. So it was with considerable astonishment that I heard Dr. Bryce giving voice to the opinion that all was not so perfect as we had been expected to believe and that our system was even defective. With him, I am of opinion that our children are expected to go to school at too early an age. Speaking as one who has throughout his life been connected with educational work as pupil, as teacher, and as trustee, I am of opinion that those children who begin their school career at seven or at eight years of age, are likely to be as far advanced as are those who first went to school when they were only five years old. While such pupils are as far advanced educationally, my experience goes to prove that physically they are stronger and intellectually they are better equipped for their life work

than are those who were sent to school at an earlier age. And allow me to say further that this opinion based upon experience is substantiated and confirmed by medical science. It is a well-known fact that every organ and tissue of the body is strengthened and developed by exercise if that exercise be not too severe or indulged in for too long a time. What is true of the coarser tissues of the body, is true of the finer ones as cerebral and nerve tissue. Over-exertion on the other hand exhausts, and if persisted in, permanently enfeebles. This is particularly true with regard to the tissues of the young. Like the doctor, I am also of opinion that a child under seven years of age should have little or no strain thrown upon his cerebrum, that until the tissues are physically developed intellectual effort, instead of being beneficial is highly injurious. Again, I agree with Dr. Bryce when he pleads for shorter hours, for even those who first go to school when they are seven years old. The development of the various tissues of the body depends upon the amount and character of the pabulum supplied. This pabulum is supplied by the blood, depends in large measure upon the digestion. We all know that any one who is physically exhausted cannot perform the complex act of digestion satisfactorily. A child which has been cooped up in a badly ventilated and overcrowded school room (as many of our school rooms unfortunately are) loses appetite, complains of feeling drowsy and perhaps even of headache. Under such conditions, digestion is impeded, fermentation takes place, poisons are generated, and these by the circulation are carried to the various tissues of the body. And so what was a result becomes a cause increasing the general lassitude of the tissues including the cerebral; development is retarded; the child is injured both physically and mentally. I am also of opinion that the child's physical growth and intellectual development are injuriously affected by the too constant practice of prolonging the hours of mental effort by assigning to it tasks to be done at home for recitation during the next school day. In all conscience, a child of tender years has had enough and more than enough mental exercise when he has been at it from nine to four without forcing upon him an extra hour or two in the evening. Parents are apt to lay the blame upon the teacher for this extra strain upon the children. I am rather of the opinion that the system and not the teachers is responsible. Examinations and their results are by our educational system made the test of a pupil's progress and of a teacher's fitness for his work. So long as this is the case, teachers who are, like the rest of us, only human, will endeavour to have as many of their pupils as possible pass these tests. The pupil, perhaps, may suffer in after life, but the teacher and his school gains a reputation, and our educational authorities can point with pride to the fact that many children owing to our excellent system pass the examination for entrance to our High Schools and Collegiate Institutes at the tender and undeveloped age of eleven or twelve years. Such a result, it seems to me, instead of being a subject of congratulation is deplorable to be

deplorable. A boy who can read Latin and French must do so at the expense of and of lasting injury to the school career, and with less development of plants nor animals, a hot house if we may so remark, and I should like to know just now that particular calling in a certain and limited, and so we see the school curriculum, physiology, sewing, justice of the State, being taught. These are poor illustrations utilized as a means and useful. The special sense of should the State and refuse to provide that the State be placed at the disposition. The special the pupil at his taught to read with express in words, relations, he has will rear any special he may adopt as an old-fashioned modern education "back number," able, and even in "ancients." I of the subject a

Dr. Cassidy children should that during a cold very cold. A girl ren should be expected like to hear of a eight years of age

deplorable. A boy or girl who is to begin the study of geometry, algebra, Latin and French or one of the sciences at eleven or twelve years of age must do so at the risk of permanent injury to his or to her physical health and of lasting impairment of his or her intellectual faculties. To begin the school career at a later age and to carry on the work with less haste and with less desire to see immediate results is the wiser method. Neither plants nor animals (including the human species) should be developed in a hot house if we wish them to retain their vigor in after life. One more remark, and I shall finish. There seems to be a generally accepted opinion just now that our public schools should prepare our children for the particular calling they are to follow in after life. No one will deny this in a certain and restricted sense, but this doctrine is now being specialized, and so we find a number of special subjects being introduced in our school curriculum. Now, however useful such subjects as chemistry, physiology, sewing and carpentering, we may safely call in question the justice of the State and the municipality being required to pay for their being taught. I only use these as illustrations, and perhaps two of them are poor illustrations, viz. : sewing and carpentering. These two may be utilized as a means of recreation. To that extent they may be legitimate and useful. The idea, however, which I wish to combat is this, that in a special sense our school should prepare a boy for his life work. Why should the State specially prepare one boy to be a carpenter or a tailor, and refuse to prepare another to be a lawyer or a doctor? To me it seems that the State has performed its full duty in this respect when it has placed at the disposal of every boy the fundamentals of a general education. The special education can be and should be acquired afterward by the pupil at his own or his parents' expense. When a pupil has been taught to read well, and to understand what he reads, to write and to express in words what he thinks, and to figure and make ordinary calculations, he has acquired an educational foundation upon which he may at will rear any special superstructure he may require for the special calling he may adopt as his life work. This, I am quite aware, may be regarded as old-fashioned doctrine and in all probability I shall be regarded by the modern educationalists as what they are pleased so eloquently to term a "back number." I am quite willing to incur the charge. Age is venerable, and even in education the "moderns" have much to learn from the "ancients." I must apologize for speaking so long, but the importance of the subject and my interest in it must be my excuse.

Dr. CASSIDY : Has there been a definite plan thought out as to how children should occupy their time while in the playground? We know that during a considerable portion of the year in Canada the weather is very cold. A good many parents might not like the idea that their children should be engaged in the exercises of the school playground. I would like to hear of a particular scheme whereby children ranging from five to eight years of age could be occupied in the playground—say in the morn-

ing. Would the school boards have to provide special instructors? A man or woman capable of taking charge of children for hours together in a playground would be worthy of a fair remuneration. How would you arrange for all this? Kindly explain your programme.

Dr. OLDRIGHT: We have been firing over the heads of the people, and we do not appear to have yet impressed them with the reality of what we have been saying. We must realize that we are a part of the people ourselves. We ought to be able to go into a schoolroom and have the teacher welcome us as helpers. We are apt to keep too much aloof as medical men and sanitarians. Some of the authorities will talk wisely and well about the danger of a lack of air space, and then will wink at an actual lack of air space in a particular school. There is a certain schoolroom where there is but 95 cubic feet of air per pupil, and sometimes the pupils are removed into a large room for a while, perhaps on a cold winter's day, and then sent back again into the crowded room. Children are often unable to do the work they get in the school because of the air being impure. If necessary this matter should be brought to the attention of the Minister of Education. It is a question in my mind, also, whether some of our children are not being educated a little above the sphere in life they are going to occupy—certainly away above that of their parents, and of their natural fitness. I fully approve of the half-day system. I fear, however, that our playgrounds are not yet suitable for such a plan as that outlined. Perhaps, too, older pupils might use the playground with advantage. It would be interesting to find out what influence a game of leap-frog might have upon the study of algebra, etc. (Laughter).

Dr. BRYCE: I have no doubt whatever as to the practicability of the scheme, because in New York this very system is being rapidly introduced. And if it could be done in Staten Island, I believe it could be done in Ontario also. You will remember that a few months ago the Toronto School Board asked some of us to go and talk with them over the best methods of ventilating school buildings. A few weeks after that I received a communication from a member of the School Board asking for fuller information, and I found that after all our efforts to teach them wisdom they have gone back to the old style of furnace, etc. I asked in regard to Bathurst Street School, Toronto, that the trustees get a larger lot of land for the proposed new building. I tried to persuade them to get a whole block of land while it was relatively cheap. They decided to go to Bathurst Street where they could get two lots, whereas if they went to Manning Avenue they could have got nearly a whole square for the same amount. For a city school like that they should have had an acre or two. I live in the suburbs, and have two little girls of four and six years of age, and last winter these little ones were out in the snow banks from preference nearly every morning. I believe, also, that our city boys should be drilled in first-class military style by men from C Company, who are stationed in the city. I think, too, that with ample land for school

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Dr. BRYCE the campaign for Health Act is en

The following for the Prevention of Tuberculosis:

To J. J. MCKENZIE  
Secretary of

DEAR DOCTOR,  
Represent

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We remain on  
E. J. BARRICK, PR

A paper up Public Health," motion was taken

Dr. JOHN E Kingston."

premises a building should be erected for a certain amount of manual training, so that the boys by batches might learn how to handle the useful tools which many of them will have to use in the years to come. We could thus assist greatly in the matter of developing technical schools. My boys go to Harbord Collegiate Institute, and they have a good gymnasium there. But owing to the fact that no one is all the time in proper charge of it, they can get only about twenty minutes or so a day twice a week of exercise in it. And then there is so much put into the curriculum that there is hardly a chance for boys to get a proper amount of physical exercise. However, that is a thing that can be remedied if the people will only ask for it.

Dr. OLDRIGHT: I know of one school devoted to technical education, and the boys of other schools can go and take a turn there, and although it is rather crowded still a good work is done.

Dr. BRYCE: I would urge upon Health Officers to do all they can in the campaign for the benefit of the public health, by seeing that the Health Act is enforced as well and wisely as possible.

#### ANTI-CONSUMPTION CAMPAIGN.

The following communication was read from the Toronto Association for the Prevention and Treatment of Consumption and other forms of Tuberculosis:

TORONTO, Aug. 13th, 1900.

To J. J. MCKENZIE, M.D.,

Secretary of Assn of Executive Health Officers,  
Frontenac Hotel, Kingston.

DEAR DOCTOR,

Representing the Anti-Consumption League of Toronto we send to the Association of Executive Health Officers of Ontario in meeting assembled, our hearty greetings and good wishes. We congratulate you on the fact that the principles for which you as well as ourselves have stood in relation to the wise prevention of disease—especially of tuberculosis—by a combination of people with government have lately met with such signal success.

We believe that you will be pleased with the legislation recently passed, "Respecting Municipal Sanatoria for Consumptives," and that you will contribute your powerful influence in the establishing of Local Branches of the Anti-Consumption League, in order to render the permissive legislation an operative factor in establishing a system of Municipal Sanatoria all over this Province as a means to lessen, and if possible to stamp out the disease, in connection with the Preventive Measures which will be in your hands.

Wishing the Association which you represent, and every member of the same, every success,

We remain on behalf of the Anti-Consumption League.

E. J. BARRICK, President.

C. S. EBY, Secretary.

A paper upon "The Physical Education of Women in Relation to Public Health," by Dr. JENNIE G. DRENNAN, was presented, and on motion was taken as read, and ordered to be printed.

Dr. JOHN HERALD then gave an address on "Sewage Disposal in Kingston."

Dr. OLDRIGHT: Dr. Herald said that it was not thought advisable to put in a separate system. Where such a system is put in it generally consists in separating the sewage from the surplus water and house drainage and is therefore preferable.

Dr. HERALD: In this city the rock actually comes to the surface, and every drain of any sort must be blasted almost from one end to the other.

Dr. OLDRIGHT: Is there any reason why the storm water should not take care of itself in Kingston?

Dr. HERALD: There have been cases where the storm water has flooded the stores. If you start out with the idea that one sewer is to do a double purpose they must be large. We have had to deal with old drains of a small size already put in.

A paper by Willis Chipman, C.E., on "Sewage Purification by Bacteria" was presented and taken as read.

Dr. CONNELL then read a paper on "Vitality of Typhoid and Diphtheria Bacilli in Milk."

Dr. BRYCE, in the absence of the author, read a paper by Prof. Shuttleworth on "The Use of Antitoxin."

Dr. OLDRIGHT: This is a very interesting paper inasmuch as it is a record of facts. We must bear in mind that the time of the antitoxin injection was a little late. I have had some good results both with and without antitoxin. If the period of detention has been very much lessened, as I have been informed by experienced physicians that it has been through the use of antitoxin, then it is a great benefit.

Dr. HERALD: I have been surprised to hear that the mortality has been twenty per cent. with antitoxin, especially when I consider the results we have had in Kingston. In the year 1897 I reported 100 successful cases of diphtheria treated in our General Hospital. All these cases were treated with antitoxin. The patients varied in age from two months to sixty-five years. The length of time they had suffered from the disease when brought to the Hospital was from two hours to twelve days, as one of the patients had been brought in from the country. The amount of antitoxin given was nearly 1,000 units. In a few cases we repeated the injection. The diagnosis did not depend upon the attending physician in most of the cases, but the examination of the membrane was made by Dr. Connell. To show that they were not very mild cases of diphtheria, we found that in some cases the membrane appeared not only in the larynx, the nose or the mouth, but also came out on the lips. In some eighteen cases intubation was performed to keep the patients from choking. We had 100 recoveries out of 100 cases of diphtheria treated with antitoxin. We would no more think of treating diphtheria without antitoxin than we would think of murdering the patient; but of course we also believe in local treatment where the antitoxin is not available. In such a case what the antiseptic would be would depend upon the physician attending.

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Dr. BRYCE : Prof. Shuttleworth's figures are also surprising to me. I have received the reports of the Metropolitan Hospitals, and they have a record of all cases of diphtheria treated in these hospitals in 1884-89 and also in 1894-98. In the first five years there were 11,000 cases reported, and the mortality was about 30 per cent.; but in the later period, with 30,000 cases, the mortality was not greater than 14 per cent.

Dr. COWEN : In connection with the cases of intense severity alluded to by Dr. Herald, I may say that last year while discussing this question in Kingston a gentleman from England stated that a leading surgeon there said that he would no more think of using a knife in a case of appendicitis than of flying to the moon; and that he would no more think of using intubation for diphtheria than of flying to the moon. Now, I think there seems to be no question of doubt that intubation has lessened both the suffering and the mortality in these very severe cases of diphtheria. If this feeling is general in England we can understand in part the reason of the high percentage of the statistics given us to-day.

Dr. HUTCHINSON : In London antitoxin has been largely used, and the death rate has been very much decreased.

Dr. OLDRIGHT : In Toronto I had a number of cases of diphtheria, and out of thirty only one died during the attack, and one died afterwards from heart failure. The death rate in England is very much higher than we are used to here.

Dr. COVENTRY's paper, "The Value of Prompt Isolation in Outbreaks of Contagious Disease," was then presented.

The following resolution was then adopted :

Moved by Dr. HERALD, seconded by Dr. MCCRIMMON, "That in view of the fact that as the Provincial Board of Health Laboratory at Toronto is now (according to the report of the late Bacteriologist, Dr. J. J. Mackenzie) worked to its fullest capacity with the present staff, and further that this Laboratory does not serve rapidly the needs of the outlying sections of the Province, owing to the distance, Resolved, that while approving of increasing the central staff, the advisability of establishing Branch Laboratories to serve the needs of each section of the Province be also brought to the attention of the proper authorities. It is suggested that at first such laboratories be established at such centres as London and Kingston, where trained men are now attainable. Gradually this idea could be extended to the appointment in each county of a County Medical Health Officer." Carried.

The carrying of the foregoing resolution was enthusiastically applauded.

The following resolution re Sanatoria for Consumptives was adopted. Moved by Rev. Mr. CUMBERLAND, seconded by Dr. A. P. KNIGHT. "That this Association hereby expresses its hearty approval of the Act, respecting Municipal Sanatoria for Consumptives, thanks the Legislature of Ontario for the same, and strongly urges upon the members of this Association the advisability of forming local Associations to co-operate with Local Boards of Health in carrying out the terms of this Act."

In presenting the motion Mr. CUMBERLAND said: I think this is a move in the right direction. We along the shores of the Bay of Quinte realize the need of something being done. I believe that statistics will bear me out in saying that tuberculosis carries off more than diphtheria, smallpox, typhoid and scarlet fever combined. It may be fitly termed the scourge of our country. And since medical science has arrived at that point where it is certain that much good can be done to those suffering, I think it is our duty to place within the reach of those afflicted everything to help this good work of the amelioration and cure of this dread disease. I think that we have in this part of Ontario a place eminently fitted for a consumptive sanatorium. The height of land back about ninety or a hundred miles is about 1,200 feet above the level of Lake Ontario. It has extensive pine forests, with light loamy soil, and land could be procured there for a mere nominal sum. It is called L'Amable. I have spoken to a number of persons about the matter, and one of them told me of a man he knew of who went up there one year suffering from consumption; he stayed there that winter, and increased over forty pounds in weight, and returned a whole, sound man. I understand that it is the intention of the Provincial Board of Health to send a man properly qualified to instruct us in this scheme; therefore it may not be necessary for this Association to appoint a committee to go to this north country I have referred to, and select a site. I do hope, however, that a first-class man may be sent by the Provincial authorities to enquire into this matter, and that we may consider his report at our next annual meeting. It is a terrible thing to think that we lose from 3,000 to 4,000 annually from this scourge. I sympathize with physicians who have to deal with consumption. They find patients suffering from consumption, they know that removal to more suitable surroundings is an absolutely necessary for recovery, and yet they have no place to send them. (Applause.)

## ELECTION OF OFFICERS.

The election of officers for the ensuing year resulted as follows:

*President.*—Dr. W. T. Connell, Kingston.

*Vice-President.*—Mahlon Davis, C.E., Berlin. ●

*Secretary-Treasurer.*—Dr. P. H. Bryce, Toronto.

*Council.*—Dr. Kitchen, St. George; Dr. H. M. Cowen, Galt; Dr. Vaux, Hamilton; Dr. Crowe, Trenton; Dr. McCrimmon, Palermo; Dr. Herald, Kingston; Dr. McCullough, Owen Sound.

The PRESIDENT elected was then introduced, and briefly thanked the Association for the honor conferred upon him. He asked the full cooperation of all to help to make the next year one of the best in the annals of the Association.

Hearty votes of thanks were passed to the citizens and corporation of Kingston for favors, to the Kingston Medical Society, to the Local Board, to the University authorities for the use of the Hall, and the Convention adjourned.

BY T. V. HO

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## PRESIDENT'S ANNUAL ADDRESS.

BY T. V. HUTCHISON, M. D., MEDICAL HEALTH OFFICER, LONDON.

*Gentlemen of the Association*,—When the Association decided to meet in this, I might term historic city, I felt that a good choice had been made, but when I look about me and see the representatives of the noble men who have at different times addressed gatherings in this place, I am almost led to the conclusion that from my personal standpoint, the choice was most unfortunate. Be this as it may, I must congratulate the Association on the happy conditions under which our meeting is being held.

It is expected that I, as your President, should deliver an address on this occasion, but I have found it almost impossible to concentrate my mind sufficiently owing to the various duties I am called upon to perform.

I do not intend taking up much of your time to-day with a long address, ten or twelve minutes being all the time I shall ask for your attention. Perhaps when I have finished you will think that it has been seven or eight minutes too long.

At our last meeting in London, when you did me the honor of electing me your President, someone suggested that I give you a paper at this meeting on "Facts of which I know nothing." I think it was my friend Dr. MacKenzie who remarked that a subject so vast would take up the whole time of the meeting.

The inestimable value of sanitary work in the maintenance of the public health cannot too frequently be brought under the notice of the profession and public, and there is no better way of educating the public in the prevention of disease, and prolonging life, than gatherings of sanitarians such as the present one in this beautiful City of Kingston, whose history from the time of New France and Jaques Cartier, is replete with stirring events.

In the latter end of the 18th century, the death rate in Great Britain and Europe was 88 out of every 1000 of the population, while at the end of this century, or just 100 years later, it is only 11, or a fraction over.

During the last century there were only the three Sanitary reformers of any note—Jenner, Howard and Captain Cook. Up to Captain Cook's time, 1773, scurvy had decimated the British army and navy. Captain Cook inaugurated such sanitary and hygienic reforms, that in a 3 years voyage around the world, he lost but 4 men out of 300, and these deaths were not due to scurvy. The great value of Captain Cook's reforms will be realized when it is known that in Anson's famous voyage 30 years before, he lost by scurvy alone, in 3 years, 600 men, out of a total of 900.

Contrast this with the pleasant times in which we live. There are 700 or more municipalities in Ontario. In most of these there is a Board of

Health and a Medical Health Officer. Some of these, however, especially in the rural districts, are very lax and apathetic in carrying out the provisions of the Health Act. The majority, however, of Medical Health Officers and medical men are doing their utmost to make Ontario one of the healthiest countries in the world. This is being accomplished in many municipalities under great difficulties. The officers of the board of health are not always seconded by the municipalities, to the extent they should be. The most difficult task of the health officer is to convince the public that they cannot escape disease without absolute cleanliness and pure water. Some of you may remember one of Theodore Hook's novels where Jack is persuading his mother and new step-father to go to a bathing resort to the seaside, while he would entertain some friends. "Why, Jack," his mother said, "I have not had a bath for 25 years, and there never was anything wrong with your father, and he never had a bath since he was first washed."

One subject of great importance, in fact I would place it near the top of the list, is the securing of a supply of pure milk, for the use of the public. How can this best be accomplished? I think one of the first essentials to securing this end, is to make it compulsory upon every person who keeps cows, to see that the animals have an abundant supply of pure water. What can be more detrimental to the health, not only of the animal, but of the people who use the milk, than their being permitted to drink impure water. When we think of the fact that about 88 per cent. of the milk is water, how alarmed we should be at the prospect of selling the milk from herds not properly cared for in this respect. On more than one occasion in my experience I have known cattle to have taken sick, and the owner has not been able to account in any way for the trouble. When questioned as to where the animals were watered, he pointed to a pond "down there." No more questions were necessary. The pond there, meant a large hole probably scooped out near the barn, into which drained all the filthy water from the barn and out-houses, and throwing off an odor which, to say the least, was anything but pleasant. The pond was fenced off with the result that health soon returned to the herd. But the experience was costly, for in the meantime he had lost most of his customers and which would take months or a year to have confidence restored.

It is further advised that milk should be boiled before using. In this connection, I desire to call the attention of this body and of the authorities at large, to the alarming fact that there is not in this Province a running stream which is not being polluted by the inhabitants living along it. Now, when we remember that the cattle of nearly every farmer and dairyman living along the banks of these streams uses them as watering places for his herds, their pollution becomes a grave danger to the public health. If the meat and milk of tuberculous cows produce the same disease in the human body, might not the rapid increase of consumptives

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throughout our fair Dominion be traced to this cause? If the authorities would pay more attention to preventing the pollution of our streams, the furnishing of bad water to herds, and to having proper sanitary arrangements in connection with our dairies there would be less need for a continual begging of funds to build sanatoria for consumptives, and for the accommodation of others suffering from kindred diseases.

I am pleased to say that in carrying out the provisions of the Health Act, the city which I have the honor to represent stands in the front rank. One of the first, if not the first meeting of Sanitarians in Ontario, was held in the City of London in 1883. At this meeting, Dr. C. T. Campbell one of the most advanced Sanitarians in Canada, and who I am happy to say is still a member of our Board of Health, proposed a series of resolutions for the better preservation of the public health. Among other important regulations, that regarding the admission into schools of children from dwellings where there was, or recently had been, infectious diseases. Some of these proposed regulations were afterwards incorporated into the Ontario Public Health Act. In the City of London also, the first systematic inspection of herds, dairies and milk was commenced, and has since been successfully carried out, and to the pure supply of milk can no doubt be attributed the very low death rate in the last ten years among infants and young children in that City. Referring again to the city of London, we are now trying to stop the use by bakers and milk vendors of bread and milk tickets, which by reason of continuous handling become foul and excellent carriers of disease germs, and have substituted therefore perforated tickets bound in booklet form which shall be of no further use after being detached.

As consumption is the most prevalent and the most fatal of diseases in Canada, our efforts should be especially directed against it, and Medical Officers should urge the corporations of all good citizens to wage an increasing war against it.

Last year in the Dominion there were 2000 more deaths from consumption than from all other infectious diseases. In Ontario, one person in every 650 of the population dies annually from consumption. Last year the province lost 2,500 wage earners from this disease, which means a direct loss of \$2,500,000, and an indirect loss of an almost incalculable sum besides.

Consumption is contagious and therefore many deaths from this disease might be prevented. It is almost curable in many cases when taken in time.

The hygienic remedies for consumption are pure air and pure food.

Physicians should impress upon the consumptive patients and their friends the communicable nature of the disease. They should report all cases to the Medical Health Officer for the purpose of record; but the placarding of houses where such patients live is not required.

All deaths from consumption and chronic bronchitis should be promptly

reported by the physician to the Medical Health Officer so that he may order and superintend such measures of disinfection as he may deem necessary and the City Clerk should refuse to issue burial certificates in cases of death from consumption until the death certificate has been endorsed by the Medical Health Officer.

The managers of the Free Library and all other public and Sunday School libraries should not issue books to consumptive patients or their families, and these officials are requested to have printed on their Library cards an announcement to the effect that books will not be issued to persons residing in any house where there is a case of consumption, diphtheria, scarlet fever, typhoid fever, or other infectious diseases.

Twice as many die from consumption as from all other infectious diseases combined. One death in every seven is caused by consumption.

As the poisonous germs of consumption are disseminated through sputa, or matter expectorated from diseased persons, special care should be taken with this substance to prevent the spread of contagion.

There should be no spitting in public buildings, conveyances, or on the streets. Persons with cough should always use a handkerchief or vessel provided for the purpose. The former should be burned and the latter purified frequently by some strong disinfectant. In street cars and other public conveyances, and in public buildings, placards forbidding spitting should be posted.

In order further to avoid danger from infected dust, the rooms occupied by consumptives should have no carpets or unnecessary furniture, ornaments, curtains &c. The floor should be wiped with a damp cloth, and no broom used. The room should be frequently disinfected, and invariably after the death or removal of the patient.

Meanwhile there are duties and responsibilities resting upon citizens and municipalities alike the careful observance of which cannot but result in the great benefit of the community, and the saving of many lives.

While speaking of this it would be very much in the interest of the public health, if the Provincial Board of Health could bring about legislation to compel the banks, as is done in England to withdraw worn out bank notes from circulation. Circulating among all sorts and conditions of men these notes become filthy, foul smelling, and efficient carriers of disease germs.

The good that has been done by the trained Medical Health Officers and Boards of Health, is now readily seen throughout the country, and I hope appreciated. The continual closing of contaminated wells, the isolation of infectious dwellings, the thousands of dollars that are annually spent in drainage and improved methods for the disposal of sewage, the inspection of meat, milk and other food are all tending in the same direction, that of removing the causes of disease from among us. Not that people will live forever, but the general average of life will be

greatly extended, and the best efforts that can be made.

The first provision was not until 1849. In the majority, I believe, with each of these or at least one associated with London.

There is no doubt that diphtheria are spread by teachers by using their hands among the best sanitarians.

While upon the subject of physical development, it is cultivated at the expense of the intellectual faculty. Little attention is given to development means the isolation of an organ which showing unusual results is encouraged.

There are too many things pursued without regard to being harrassed by so many things as it.

The introduction of military discipline in a fourfold manner, viz. discipline in obtaining when on the street ;

The teaching of much good, and the young lady novelist should go with it.

I desire also to see corporate bodies close school buildings through take the county schools in our cities and standpoint are put upon the question of ventilation will be found has been whole building. This should be the very water closets in the

greatly extended, especially among the young, who claim at our hands the best efforts that knowledge and training can secure.

The first properly organized Board of Health in Great Britain, was not until 1849. In the 700 or more municipalities of Ontario, the majority, I believe have duly constituted Boards of Health. Associated with each of these Boards, is a Medical Health Officer, so that one-third or at least one fourth of the practitioners of Ontario are directly associated with Local Boards of Health.

There is no doubt that infectious diseases such as scarlet fever and diphtheria are spread by means of public schools. On the other hand, teachers by using care and caution in admitting children to schools are among the best sanitarians we have.

While upon the subject of school, a word should be said about the physical development *versus* mental culture. That the latter is being cultivated at the expense of the former, will not I think admit of a doubt. The intellectual faculties are stimulated to the utmost while comparatively little attention is given to physical development. Early intellectual development means early intellectual decay. Undue or continuous stimulation of an organ will usually result in paralysis of that organ. A child showing unusual mental capacity should rather be restrained than encouraged.

There are too many studies in our schools. If mental culture can be pursued without worry, then it is not injurious, but when the mind is harrassed by so many studies, instead of strengthening the mind it weakens it.

The introduction into our schools of military drill and especially military discipline is most commendable, and will benefit the country in a fourfold manner, viz. 1. Physical development; 2. The influence of the discipline in obtaining the obedience of the children; 3. Deportment when on the street; and, 4. Benefit to the country in a patriotic sense.

The teaching of rules for the preservation of health will no doubt be of much good, and perhaps the physiology which is taught, although the young lady novelist is in evidence that a slight knowledge of anatomy should go with it.

I desire also to call your attention to the careless manner in which corporate bodies construct public buildings. Take for example the school buildings throughout this Province. I do not care whether you take the county school, which of late years has greatly improved, or the schools in our cities and towns. Expensive structures from an outward standpoint are put up, and often the whole has been completed before the question of ventilation will be considered. Hardly any provision it will be found has been made for this, the most important part of the whole building. The proper heating and ventilation of all buildings should be the very first consideration. Then again the placing of water closets in the basements of schools is a practice which should not

be tolerated, unless it is where a water system is placed and where a good supply of water is always available.

I am sure that in this connection it will not be considered out of place for me to congratulate one of our members on the very firm stand he has taken and the reports which he has prepared on the defective sanitary condition of a number of the school buildings in the city of Toronto. I refer to my old friend and class-mate, Dr. Sheard, Medical Health Officer of that city. We should all be firm in these matters, no matter what councils may say or do. We owe to the public to tell them in plain language if their school buildings are not in the proper state, from a sanitary point of view.

I could elaborate on the question of heating and ventilation of public buildings generally, but will refrain.

Without further delaying the Association, I wish to extend a hearty welcome to all and as the reading of papers and discussions thereon will be published in the daily papers throughout the land, I trust that our deliberations will have a good effect on the public at large, and that a greater interest will result in the questions which are to be discussed, the most vital for the nation at large.

BY CHARLES

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## EXPERIENCE IN RECENT VACCINATION WORK.

BY CHARLES SHEARD, M. D., MEDICAL HEALTH OFFICER, TORONTO.

*Gentlemen:* The question of vaccination necessarily arises in connection with the management and control of smallpox epidemics, and presents itself to the health officer in very different form from that in which it is viewed by the ordinary practitioner, inasmuch as the former is compelled to devise practical means of securing the vaccination of a large community, and which means will materially vary according as to whether or not there is much opposition entertained to the practice. I am pleased to be able to state, that as far as the city of Toronto is concerned, the opposition against the practice of vaccination is a mere nonentity. It is the rule that among the educated and well informed the opposition to vaccination is infinitely less than among the ignorant and superstitious.

With the volume of testimony compiled by reliable medical men in all quarters of the globe, I can scarcely see how any room can be left for the discussion of the efficacy of the practice. The operation of vaccination as practiced to-day upon a large scale is very different from what it was fifteen years ago. At that time the family physician was more in evidence than he is to-day; the development of specialism in Medicine has had its influence, even upon this trifling operation. The family physician formerly attended to all the ailments of the family, and one of his regular duties was the vaccination of the children. He vaccinated with lymph, or crust, obtained from the arms of patients he knew well, whose family histories were as clear to him as a well-written book. Arm to arm vaccination was the practice, and in such practice the typical vaccinations such as described in the text books occurred—the redness and hyperæmia on the third day, vesicles on the 5th, the pearl on the rose leaf—followed by a crust reaching maturity on or about the 8th day. With bovine virus, no matter from what source, all this is changed, and although I have performed many thousands of vaccinations, in my capacity as Health Officer, during the last seven years, I can truthfully say I have never yet seen from bovine virus a typical vaccination as above described. The bovine virus is slower than humanized lymph, it usually begins to take on the 8th day, often later, it develops more or less acute inflammation, a wider extent of hyperæmia, more or less lymphangitis, possibly œdema of the arm, in rare cases extending to the fore-arm, and if the arm be knocked or bruised, or injured by the adherence of the clothing or bandages, a dark greyish, black blood crust forms, which separates by a process of sloughing, leaving behind a more or less cleanly defined ulcer, which generally heals by granulation from the bottom. The scar which ensues is mostly cicatricial, showing at the edge a foveated dimpled appearance.

In some cases the manifestations of inoculation are very much fainter than I have described, but in the common run of cases they pursue a course similar to that briefly outlined.

Recently I have had experience with upwards of 7,000 vaccinations performed in the brief space of one month, using lymph from different sources, and neither in this experience, nor in any during the past, have I found anything that could be construed into harmful or bad results, which fact I think here worth recording, more especially as some have attempted to poison the public mind by harrowing pictures of the permanent evil effects attendant upon the practice.

The following table embraces 2,259 vaccinations, which have been carefully re-inspected at a period varying from three to four weeks after vaccination, and the statistics are prepared with the object of showing the number successful; those not healed at the end of a month; and those in which the vaccination was attended with more or less severe results, such as deep sloughing and inflammation of the fore-arm. It will be noticed that the unsuccessful attempts at vaccination only amounted to 3.6 per cent.

|                  | Cases<br>inspected | Success-<br>ful | Unsuc-<br>cessful | Severe | Unhealed<br>after 28 days. |
|------------------|--------------------|-----------------|-------------------|--------|----------------------------|
| Dr. Creasor..... | 621                | 608             | 13                | 187    | 47                         |
| Dr. Fenton.....  | 604                | 583             | 21                | 1      |                            |
| Dr. McCallum.... | 500                | 472             | 28                | 64     | 39                         |
| Dr. Smith.....   | 534                | 514             | 20                | 31     |                            |
|                  | 2,259              | 2,177           | 82                | 283    |                            |

In my vaccinations I have used ivory points exclusively, as I have found the capillary tubes too slow for practical use by one who has a dozen or two vaccinations to do daily. It is a matter of some importance that the operation be conducted with as little harshness or display of force as possible, so that there may be on this score no foundation for opposition to the practice.

In order to test the quality of the virus used I requested Professor Shuttleworth to examine bacteriologically three of the prominent kinds of vaccine in the Canadian Market. He reports on them as follows:—

No. 1. Vaccine points contained in a corked bottle, enclosed in a wooden case.

No. 2. Vaccine points enclosed in a metallic case.

No. 3. Fluid vaccine, enclosed in a corked tube, enclosed in a wooden case.

“All the samples were unopened original packages, and each of them contained material for ten vaccinations.

“Four bouillon cultures of each were made of Nos. 1 and 2. This was accomplished by clipping off with sterilized scissors the lance shaped ends of the ivory points, and allowing two of these to drop into each tube of bouillon. Four-fifths of sample No. 3 was allowed to drop from the broken capillary end of the containing tube into the culture fluid.

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"All the samples were incubated at 98°. After 24 hours Nos. 1 and 2 were very cloudy, and showed abundant evidence of growth. No. 3 became cloudy by mere mixture of the lymph with the bouillon, but after 24 hours in the incubator, this mixture was tested in fresh tubes of bouillon and in no case gave any evidence of growth. No. 3 may therefore be accepted as being sterile, or at least not containing an organism capable of development in the medium employed.

"The cultures of No. 1 were plated in gelatine, and at 68 showed numerous colonies of two organisms—a liquefier and a non-liquefier. The former proved to be a bacillus, which by microscopical and cultural characteristics could not be identified with any described organism which has the power of readily liquefying gelatine. The non-liquefying bacillus answered to microscopical, cultural, and chemical tests for *bacillus coli communis*.

"Bouillon cultures of No. 2 were plated and found to contain a liquefying, non-motile micrococcus, sometimes solitary, but more frequently appearing as diplococci, somewhat flattened and measuring 1.0 to 1.02 microns for the pair. Liquefaction of gelatine took place rather slowly. I have not been able to identify this coccus as being pathogenic, as for this purpose animal experiments would be necessary, and also for a more complete test of the liquefying organism in No. 1."

I have on previous occasions drawn attention to the necessity for public vaccination by posters and other announcements, and have used the fire-halls as stations at which the public might be vaccinated free of charge. In my experience this method has been found of little or no use, and more recently I have adopted with better success the schools as the avenues by which the public may be reached, and free vaccination in infected districts is now carried on by such means. The first score or so will be watched by the other pupils, and their parents, and after the simple nature of the operation is understood, the unvaccinated pupils will readily submit, and parents of children not attending school will also avail themselves of the facilities thus offered.

To reach the adults I have had better opportunities by communicating with the employers of labor, and attending in work shops and factories, securing from the directorate of such places a detailed statement of those vaccinated, and also of those, who, on inspection, showed satisfactory evidence of protection by a previous operation.

In factories and shops where clothing is handled and made, this plan has been largely put into execution, and with excellent results. The inconvenience and loss of time occasioned in the factory amounts to very little when the system of inspection is thoroughly, carefully, and practically organized. It takes but a short time to have the employees paraded in single fyle, presenting their vaccination marks to the Medical Inspector, while a couple or three clerks

write down the names as fast as they are called, marking them as protected, or otherwise according to the evidence presented.

I hope in the future to have on the books of the Health Department of the City of Toronto, a complete and perfect record as to this particular, with regard to every employee. When we consider how rapidly and insidiously an epidemic of smallpox may gain headway in cities, despite the efficiency of the Health Department, and how the spread of smallpox above and beyond all other diseases is attended by the overwhelming disaster to trade and commerce, and serious financial loss, apart altogether from the question of suffering and loss of life, I think it will be agreed that the work of efficient protection should be carried on at a time when alarm does not exist, and when the duty can be deliberately undertaken.

I cannot leave the subject without expressing some measure of disapproval of the employment of the so called vaccination shield. I am free to admit that dirty clothing, and dirty fingers, will produce sepsis in the abrasion produced for vaccination, the same as in any other wound, but I am also confident that the pressure exercised upon the superficial capillary vessels by the shield tends to produce oedema in the neighbourhood of the inoculation, particularly so if the shield is secured to the arm by strapping or tape, and leads to more sloughing and a greater production of serum. I have found a much better precaution in the liberal application of pure olive oil, or zinc ointment, which when applied immediately the spot begins to be sore will be sufficient to prevent the introduction of dirt, and will also protect the prominent papillae so frequently seen on the arms of those in whom the skin is naturally rough or inclined to chafe.

## SOME REMAR

By J. J. CAS

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## SOME REMARKS ON THE FREQUENCY AND CURABILITY OF TUBERCULOSIS.

BY J. J. CASSIDY, M.D., MEMBER PROVINCIAL BOARD OF HEALTH,  
TORONTO.

*Gentlemen:* At the present time a great deal of excellent advice appears in the Medical Journals on the advisability of sending consumptive persons to sanatoria, and physicians advise patients suspected of tuberculosis to avail themselves of the advantages of such institutions. Unfortunately the occasions for obtaining medical opinions are urgent and appealing, for the number of persons in Ontario affected with consumption is large, the report of the Registrar General for Ontario for 1899 showing that out of 4,894 deaths from the eight contagious diseases tuberculosis caused 3,405 or almost 70%. Then, according to the last census in the United States, out of 872,944 deaths for 1890, consumption caused 102,199 or 25% more than pneumonia, which came next with 76,496.

Johann Flintermann finds that in the city of Detroit from July 1894 to June 30th, 1895, one-fifth of all causes of death were due to tuberculosis. The last report shows an increase in the mortality. In New York City in 1896 there were 35,000 deaths, and 6,000 of these were due to tuberculosis. In Chicago in 1899 there were in a population of 1,750,000, 25,503 deaths and of these 2,516 were due to consumption and 404 to other tubercular diseases, or a tubercular mortality of 2,920, about 11.44% of the total mortality. In fact in every country in Europe, except one, consumption kills more people than any other disease. The one exception is England, where out of every 10,000 deaths 1,100 are caused by consumption and 1,150 by bronchitis. In France consumption kills 25% more people than any other disease; and, excepting pneumonia and typhoid fever, nearly 60% more than any other. In Germany, out of 10,000 deaths, 1,270 are caused by consumption, while the next highest is typhoid fever with 450. In Russia, out of 10,000 deaths, consumption causes 1,960. It would be an easy task to multiply these dolorous statistics; but it is unnecessary, since all are prepared to admit that the disease in question is common and causes a large mortality, in this and every other country. More than all the pestilences, more than war, consumption is the principal destroyer of human life.

Pessimistic as this statement is, it is not so discouraging as it might be, for it simply proves that a large number of persons die of tubercular disease; but does not reveal all the truth. There would be a heavier tubercular mortality to report were it not for the *vis medicatrix nature* which enables infected human organisms, though invaded by the bacillus tuberculosis, to acquire a tolerance of the infection, so that, with advancing

age, though there is an increasing chance for infection, yet there is established a decreasing disposition to lethal tuberculosis. Mortality statistics dealing with the simple fact that certain persons were said to have died of tuberculosis tell a portion of the truth, but are silent about the millions who, after having been infected by this disease, have overcome it and ultimately died of some other disease. A very safe way of forming an opinion on the frequency and curability of tuberculosis is to study the results of the post mortem room, a method which appeals to our professional instincts, and, at the same time, leaves little ground for error or misconception. And to make evidence of this kind more convincing, the material for autopsy should not be taken from an hospital with a disproportionately large number of tuberculous patients; but on the contrary, one whose inmates fairly represent the general community. Then again the superiority of this method over the ordinary clinical method will appeal to most of us, when we reflect that even the most skilled diagnostician cannot discover by a clinical and bacteriological examination of a living patient all the tubercular foci in his body or determine their condition as regards progress or cure. and yet, if reliable statistics on the point at issue,—viz., the frequency and curability of tuberculosis, are to be collected, the work must be done on suitable material, studied with the problems in mind.

For the evidence to sustain these views I am indebted to a report of post mortem work, done at different periods and independently by two European physicians, and I have obtained access to their work through the Journal of the American Medical Association, June 30th, 1900.

"The most painstaking and the most reliable study of the frequency and the curability of pulmonary tuberculosis is by Jens Bugge of Christiania. This work is devoted to the lungs and peri-bronchial glands, and covers the minute examination, including animal inoculation, of these structures, from 200 persons over 14 days old, and belonging to the less favorably situated classes of the population. His results are briefly these;—In 21 cases under the age of one year tuberculosis was not present when death was due to other causes than tuberculosis. Of the remaining 179, tuberculosis was the cause of death of 41. This number, representing a percentage of 20.5, corresponds accurately with the death rate of tuberculosis in the city of Christiania, and we have here a good indication that the material used is a fairly representative one. There are therefore 138 individuals over one year of age, who have died from other causes than tuberculosis in the lungs or the peribronchial glands. Of these 48 or 36% presented changes of healed tuberculosis, and 45 or 33% (about one-fourth of the whole) were from tuberculosis of these structures. . . . . It is of signal value to know positively that in about one-third of those dying from other causes than tuberculosis an actual cure of the tuberculosis process has occurred in the real sense of the word. The curability of tuberculosis is clearly established." (Foot-note.—Bugge's work was published at Christiania in 1896).

More recent tuberculosis, bacteriologic Institute. The thoroughness naturally results in notice in autopsies to the frequency being no less than

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In Nageli's persons over 18 on any special when searched cases of non-fatal cases, and 32 were arbitrary. He Nageli's criteria Bugge's demonstration of tubercle apical adhesion underlying lung was most frequent. The active form increase in age. At the same time 30, steadily falling they show how

In general, —as expressed in diminishing sort the third decade at first sight, and The constant increase in age would indicate as the large majority primary in the lungs, it may be

More recently, Otto Nageli presented a study of the same problems in tuberculosis, based on the results of 500 post-mortems in the Zurich Pathologic Institute. Nageli takes in tuberculosis in all parts of the body. The thoroughness and skill with which the work seems to have been done naturally resulted in unearthing numerous foci which would have escaped notice in autopsies of ordinary completeness. Hence Nageli's figures as to the frequency of non-fatal tuberculosis greatly exceed previous ones, being no less than 97 per cent. for those over 18 years of age.

The number of cases under 18 years of age was 88; of these 15 were tuberculous, and 10 died of the disease. According to Nageli's figures, latent or healed tuberculosis is rare in children as compared with adults. At puberty the disease seems a little less frequent than just before or just after. In 16 autopsies on children under 1 year tuberculosis was not found. In a series of 284 post-mortems on persons over 18, 63 died from tuberculosis—22 per cent.—nearly all the others showed latent tuberculosis, as but 6 were found wholly free from tuberculous invasion. In the fatal cases pulmonary tuberculosis predominated—36 cases of 47, 16 cases of miliary tuberculosis being excluded.

In Nageli's material, latent tuberculosis seems well nigh universal in persons over 18 dying from other causes. This frequency does not depend on any special peculiarities of the material. It is probably to be found when searched for in other similar situations. Nageli divides the 215 cases of non-fatal tuberculosis into 74 cases of active disease, 111 healed cases, and 32 which he regards as uncertain. This division is somewhat arbitrary. He did not resort to animal inoculation, as did Bugge, but Nageli's criteria of healed tuberculosis bear scrutiny well in the light of Bugge's demonstrations, inasmuch as he included here the cases of pleuritic apical adhesions, pleural scars with areas of slaty induration in the underlying lung, and calcareous foci. The active but latent tuberculosis was most frequent in early life, declining steadily with advancing years. The active form, on the other hand, showed a steady increase with increase in age, so that after 40 practically all persons were tuberculous. At the same time the ratio of fatal tuberculosis, greatest between 18 and 30, steadily falls. These figures also contain much of comfort, because they show how well we are able to resist the diseases.

In general, Nageli shows that the disposition to tuberculosis of all kinds—as expressed by the relative frequency of fatal cases—is greatest in youth, diminishing somewhat with puberty; then it increases toward the end of the third decennium, after which it falls gradually. Relative immunity, at first sight, after the eighteenth year increases in proportion to the age. The constant increase of latent—active and inactive—tuberculosis with age would indicate a constantly growing opportunity for infection. And as the large majority of cases of tuberculosis, manifest or latent, are either primary in the apices of the lungs, or in the glands at the hilus of the lungs, it may be concluded that the majority of the human tuberculous

affections are of aërogenous origin. And Nageli's work brings again into the foreground the much greater importance in tuberculosis of that little-known factor that we call disposition, as compared with the chances or possibility of infection. After 18 or 20, infection is almost universal, but, as stated before, the increasing chance for infection is accompanied by a *decreasing disposition to lethal tuberculosis*. Practically this would mean that before 30 the main effort should be to *diminish the disposition to tuberculosis*; and this result is to be accomplished chiefly by securing the birth of healthy children from sound fathers and mothers, by training the children to know the advantages of hygiene, good food and fresh air, and by supporting in the municipal and political spheres policies which make for prosperity and a fair remuneration for work. It is pleasant to see boys and girls grow up in a father's house, made strong and healthy by good, abundant food, enjoying simple, unostentatious plenty. It is not pleasant to see parents hard pushed to make a living, and compelled to stint their children in nutritious food, so that possibly they may be enabled to procure suitable clothing to send them to school and church. Neither is it pleasant to see the poor becoming poorer and the rich growing richer.

The members of this Association are doing a good work in directing public attention to the necessity of disinfecting the tubercular sputum, which all authorities agree in recognizing as the principal source of infection. Physicians are, however, doing more than their share in voicing the appeal. It is high time that the general public should take a more active interest in proclaiming the evil and providing for its suppression. The destruction of the seed of tuberculosis, particularly in dwelling houses, will if properly done tend to lessen the growth of tuberculosis, and, as a recompense, many persons will not be exposed to the infection of these microbes to the same extent as people generally are at the present time.

The other side of the problem,—that is to say the diminution of the disposition to tuberculosis, is to my mind of greater importance. Professors Richet and Hericourt reported at a meeting (June 8th, 1900) of the Biological Society of Paris that a diet of raw meat prevented tuberculosis in dogs, used for their experiments. Professor Richet said that tubercularized dogs fed on raw meat recovered, while dogs not so fed died. Healthy dogs fed on raw meat did not contract tuberculosis, although they were inoculated with the disease. He explained that he obtained the meat juice used in these experiments, by compressing meat in a powerful press, or he had the meat first frozen and then thawed, the juice thus obtained containing the muscular plasma. He stated, moreover, in reply to a question that the dogs when fed on meat juice did not eat the usual amount of their ordinary food rate, so that the results obtained in their cases did not arise from simple over-feeding, but were really phenomena of opotherapy, either because there is in the muscular

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tissue a principle opposed to the development of tuberculosis, or because this same substance acts on the nervous system so as to intensify the activity of the processes of nutrition.

As another valuable contribution showing the curability of tuberculo and the means of securing it, I cannot do better than place before you the views of Dr. Osler on the home treatment of consumption, with the proviso that if good feeding were more practised as a preventative, there would be fewer occasions to employ it as a curative agent in tuberculous affections. Dr. Osler believes that the arrest or cure of tuberculosis is entirely a question of nutrition, and the object of any treatment is to so improve the physical condition of the patient that he can successfully withstand the attacks of the disease-producing organisms. He advises that the patient spend a great deal of time in the open air, or if this be not possible, in a room with a southern exposure, with the windows wide open. The patient should be gradually accustomed to sleep with the windows open. As large quantities of good nutritious food as can be digested should be given; even overfeeding or stuffing should be practiced. Raw eggs are recommended, beginning with three per day and increasing one each week until one or two dozen are taken per day. He reports the case of a young woman who had well marked tuberculosis; her grandmother and two of her father's brothers had died of this disease. For more than a year she had had fever, had lost much in weight and had profuse night sweats. There were signs of extensive disease at the right apex. She was given special rules as to food, and directed to spend most of the day in the open air, even when the weather was very cold. She began with three raw eggs per day and gradually increased to fifteen per day. Other good nutritious food was used with the eggs. At the end of eleven months she had gained 23 pounds, and the cough and fever had disappeared, though there were still some moist rales at the right apex. No medicine was given except a cough mixture part of the time. Osler concludes with the following remark:—"A rigid regimen, a life of rules and regulations, a dominant will on the part of the doctor, willing obedience on the part of the patient,—these, with the conditions we have discussed, are necessary to the successful treatment of pulmonary tuberculosis."

## SANITARY NEEDS OF CHEESE FACTORIES AND CREAMERIES

By E. E. KITCHEN, M.D., MEMBER OF PROVINCIAL BOARD OF HEALTH,  
St. George.

*Gentlemen* :—This subject has been discussed and written upon in various forms for many years and I doubt if there has been that progress in the sanitary needs of this important branch of Agriculture that we had hoped would be made, during the past decade. When it is considered that the product of the cow is to-day the farmer's right hand, we have a right to expect that sanitation in its care and attention should be a prime object. But what are the facts? Every report that reaches the eye, contains the same sad regrets the continued uncleanness in the preparation of the milk, and the losses accruing from the butter and cheese as the result. I find in the returns for 1898 that there were in this Province alone, 965 021 milch cows. In the same year there were 93 creameries and 1187 cheese factories. The former had 22,741 patrons and made 9,008,992 lbs. of butter valued at \$1,652,230 while the latter had 65,921 patrons and received for their output of cheese no less a sum than \$10,262,220. The increase in making butter has been very large and rapid, there being shipped in 1894 only 32,000 packages while in 1899 no less than 451,000 packages; while the increase during the same time in cheese has been from 1,712,715 boxes to 1,896,496 boxes. It is said that the output of butter for 1899 exceeded in value that of the preceding year by \$2,511,000 while during the same time \$2,000,000 more was received for cheese. In this great business no less than \$175,000,000 is invested and still great losses are being sustained.

No less an authority than Mr. Derbyshire says that in a factory, making say, 3000 boxes a year, \$330 is lost in shrinkage from not having a proper curing room, and \$200 in quality, while another authority says, that only 25 per cent. of the butter made is of prime quality, and will bring the highest price. So the losses in these departments alone are formidable and if possible should be remedied.

Look over the Instructor's reports and the same old story is repeated, of bad making and bad curing rooms, bad whey tanks, &c., and if we should judge by the number of convictions, bad patrons as well. Now all this should be easily avoided and nothing but sanitary butter and cheese be made by paying attention to the following: Select only healthy cows for milch purposes, from healthy dams and sires and only those that have proven themselves to give rich milk, and in paying quantities. These cows should be housed in a well-lighted and well-ventilated stable, giving each animal an air space of from 500 to 800 cubic feet. Each cow

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should be supplied with a copious supply of pure water.—The cow must be kept scrupulously clean, and when she is milked, the udder and teats must be cleansed, and the milker have clean, white clothes and a clean body, more especially the hands. Now with a receptacle made of good material, with a cover and a milk spout, he should be able to remove the milk to the house in fair condition and only one cow's milk at a time. Then it should be well aerated, which may be done with a clean dipper, or with one of the many good aerators now made. This milk should, as soon as possible, be placed in the can which has been properly cleansed with hot water or steam and placed in a clean wagon with springs and painted, with a driver who has been ablated, and horses devoid of manure and spreading hairs.

The making room should be placed on an elevation, with good, natural and artificial drainage, and in this age of progress, should be made of brick with concrete floors sloping to a low point, where the washings would gather for exit, through a properly trapped drain. In lieu of concrete floors a wooden one, well tongued and grooved, and put together with lead and oil, afterwards receiving, a yearly coat at least, of oil, turpentine, and a dryer. The walls should be in hard finish, so that they could be properly washed. No accumulations should be allowed beneath the floors, but the space should be kept clean and airy, for if not it becomes a home for bacteria, which owing to the increased temperature of the making room soon find their way to the room above. The maker cannot be too careful in the care of his person, and those of his assistants, and should be sharp in taste and smell and an expert in testing milk.

The curing room can be made with double walls, with an air space, and double windows, and shutters. The temperature must be kept below 70 degrees, or the cheese will become foul and poisonous. This can be done with ice boxes, or by the sub-earth duct, which during the past year or two, has been taking very efficiently the place of ice. By the sub-earth duct, the air can be kept at from 60 to 70 degrees, even when the outside air is 90 degrees or over. The room can be kept sufficiently moist by spraying the floor, with pure water, or letting in steam from the pipes.

The drainings from the factory should be filtered after passing out and the whey placed in an elevated tank, and fed early or steam carried into it, sterilizing its contents. This tank should be frequently cleansed. On no account should the whey be returned to the patrons in the same cans in which the milk was brought.

The buildings should be surrounded by plenty of trees, not only for beauty, but because the leaves absorb foul gases with great readiness. Nor must I omit the piggery, which is oftentimes a great nuisance. This should be as far away from the building as possible and built with concrete floors, with proper drainage and a copious supply of water.

Cheese and butter thus carefully made and shipped in refrigerator cars and refrigerator steamers, and neatly boxed and packed, with no

odorous companions on the voyage, should bring as good a price as the best products of the factories of Denmark. In fact the word "cleanliness" should be painted on every factory, stable, cow-patron, and every person or thing, having aught to do with the manufacture or care of cheese and butter. But how can all this be accomplished? We believe that all that has been said in this paper can be done and to the very great increase of the health and wealth of this Province. I do not believe any great changes for improvement will be made until a Medical Health Officer is appointed for each county—an educated medical gentleman, well trained in biology and chemistry, removed from general practice, with good, common sense, located in the county town, should be given full control in matters of health, food, &c., in his district. The Provincial Board of Health has for some time recommended such an officer, in each of the 44 counties, and he with the assistance of a sanitary inspector for each of the 750 municipalities, as now established by law; these 1280 creameries and cheese factories, together with schools, contagious diseases, &c., would keep him very busy. He could advise the owners of factories in their proper construction as well as see that a pure supply of water was had and the thousand and one other little things, which go to make up the requirements necessary in putting upon the market, sanitary butter and cheese. The savings and extra prices realized in this business would more than a hundred fold pay the expenses of such an official, as well as add largely to the income of those who are financially interested in this department of Agriculture.

## EFFECT

By A. McGL

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## EFFECT OF FOOD PRESERVATIVES ON THE PUBLIC HEALTH.

By A. MCGILL, B. A., ASSISTANT ANALYST, DEPARTMENT OF INLAND REVENUE, OTTAWA.

*Gentlemen* :—The energy which we spend in living is the equivalent of that which is given out by the food we eat, the complex molecules of which are, by the digestive processes, broken down into simpler molecules—the energy thus liberated appearing in the form of human vitality. Our food is, therefore selected from the most complex kinds of matter and we know the most important part of it, indeed, is animal tissue, and those closely similar vegetable substances known as albuminoids, from their essential resemblance to animal albumin. It is not surprising, therefore, that susceptibility to decay should characterize man's food; and as a matter of fact we find that just in the proportion as a substance has high value as a food, in that proportion does it take rank among things "easily spoiled." While the various carbohydrates—sugar, starch, etc.—keep very well indeed the fats are more ready to "go bad," and the proteids are the most perishable of all. Among themselves, too, the proteids differ in their degree of power to resist decay, and it would be interesting to trace a relationship between their digestibility on the one hand and their perishability on the other. Milk, flesh, eggs, etc., spoil much more readily than do the cereal grains, peas, beans, etc., which contain nearly the same percentage of proteid matter.

Within quite recent years this proneness to decay has been shown to be associated with the possession of qualities which fit these substances to become the supporters of life. Everywhere are found living germs which only require a suitable nidus to enable them to grow and multiply in a most amazing way. And this nidus is found in the most important of those substances which constitute the food of man. Milk, which is the most complete and perfect food stuff we know, is notoriously subject to decay, and a few hours' exposure at ordinary temperature is sufficient to make it turn sour. In order to preserve our food material, and especially the most valuable kinds (proteids) we have to resort to certain special modes of treatment; and all of these, without exception, will be found upon enquiry, to fall under the heading "Conditions unfavourable to the existence of life."

Now, we know that life desiderates certain temperatures, a certain degree of moisture, generally the presence of oxygen and the absence of a class of substances known as poisons. We take advantage of our knowledge of these facts and endeavour to "keep" our food by making the temperature lower than is consistent with life (cold storage) or higher than is consistent with life (pasteurization and sterilization) or dryer than is consistent with life (dessication, either by evaporation or refrigeration)

or by cutting off the supply of air (hermetical sealing). All the methods referred to leave the food substances essentially unaltered in character, i.e., only altered in such a degree that all the original characters may be given to it by simply restoring the original conditions of temperature or moisture.

There would seem to be an impracticability about using poisons to prevent the decay of proteid food, since whatever can act as a poison in the case of the germ, whose growth conditions this decay, is likely to act as a poison towards the consumer of the substance as a food. And yet this use of poisons is the characteristic feature of food preservation in our day. Among the substances best known and most widely used for this purpose are salicylic acid, boracic acid and borax, formaldehyde, saccharin, sodium-benzoate, sodium fluoride and sodium silicofluoride. I have omitted the most common of all, viz., chloride of sodium, because it has been so long in use and is in demand as a condiment even where not required as a preservative, that it seems to merit mention by itself. But not only common salt, but saltpetre, should be mentioned among these germicides, for such they are, in the pickling of fish and the "corning" or curing of meat.

Whether these substances—or any of them—or any others, (for new ones are constantly being added to the list) can be considered as harmless to human life, when used in quantities sufficient to be effective as microbe killers, is the very important question which presents itself for solution to the medical men of to-day. It is already recognized as of national importance in England, where a Parliamentary Commission was named in July of last year, with the Right Hon. Sir Herbert Maxwell as chairman for the purpose of investigating this whole matter. Since its appointment this Commission has held numerous sittings, and has heard evidence given by many manufacturers and scientific experts—and has at least succeeded in demonstrating the tremendous extent to which this use of chemical preservatives is carried. It is too early yet to prognose what will be the outcome of its deliberations, but of the first class importance of the subject, there is no room for doubt. If these preservatives are dangerous, then the national health is imperilled. Milk supplied to the City of London is regularly treated with boracic acid before being delivered to consumers.

France has already moved in this matter by entirely condemning and prohibiting the use of salicylic acid in any kind of food; and several other European countries have followed her example.

The most contrary evidence is forthcoming in regard to boracic acid and borax. On the one hand Prof. Oscar Liebreich publishes the result of his own experiments, and sums up the results of much work done by other experimenters, concluding that boracic acid is not only harmless, but actually beneficial to health. On the other hand, the English Commission has placed on record many instances where gastric derangement

and even death.

It is quite subject to you proceeding, and weigh the evidence matter is in their conclusion as physicians, data necessary careful and so yourselves. M perfecting of antiseptics use of their use in of the physiology at all) they may become especially matter for students, are dire

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and even death have resulted from the use of food containing this substance.

It is quite impossible for me to do more just now than bring the subject to your notice. As I have said, the collection of evidence is now proceeding, and while it would be very interesting to sum up and to weigh the evidence already available, it is satisfactory to know that the matter is in the hands of thoroughly competent men, and we may await their conclusions with perfect confidence. Meantime it is well for you, as physicians, to bear in mind that the only possible method of getting the data necessary to furnish a sure basis for legislative action, is by the careful and scientific experiment and observation of medical men like yourselves. My duty, and that of professional analysts generally is the perfecting of methods for the detection and estimating of the various antiseptics used as food preservatives, and the recording of the frequency of their use in the food-stuffs put upon our own markets. The question of the physiological action of these substances; the quantities in which (if at all) they may be safely used; the conditions of health under which they become especially dangerous, and similar questions are proper subject matter for study by physicians, and especially by those who, like yourselves, are directly entrusted with the care of the public health.

Although I cannot go fully into the matter of experimental evidence already put on record, I may be allowed to refer to a very suggestive paper by H. Leffmann which was recently published in the Journal of the Franklin Institute. Leffmann's experiments were made with a view to determine the extent to which artificial digestion with pepsin, pancreatin and malt diastase was affected by the presence of definite percentages of various preservatives in the food-stuff operated upon. Without going into detail I may say that he found certain preservatives more decidedly inimical to one kind of digestion than to other kinds. For instance beta naphthol hinders the action of malt diastase, but does not seem to interfere with that of taka diastase or pancreatic extract. Boracic acid, borax and boroglyceride interfere but little with either starch digestion or proteid digestion. Salicylic acid interferes with most enzymes, and especially with the amylolytic enzymes, but does not seriously affect proteid (peptic) digestion. Sodium benzoate has no appreciable injurious action on any digestive process, unless employed in excess. Sodium fluoride does not interfere with the digestion of starch, but the silicofluoride is very decidedly prejudicial to the action of pancreatin. On the whole, Leffmann considers boracic acid and sodium benzoate to be the least harmful of the preservatives now in use.

I must now leave the subject in your hands; would respectfully suggest that it receive experimental treatment by you and your brother physicians during the coming year, and that a symposium in regard to the influence of preservatives in food be part of the exercises arranged for at your next annual meeting.

## THE EDUCATIONAL PROBLEM REVIEWED FROM A PUBLIC HEALTH STANDPOINT.

BY P. H. BRYCE, M.A., M.D., SECRETARY PROVINCIAL BOARD OF HEALTH,  
TORONTO.

*Gentlemen* :—To every good citizen the problem of the education of the youth of the country must be of interest; but to none more than to an Association whose work brings its members daily into contact with some question, affecting directly or indirectly the health and welfare of the children shortly to become the dominant factors in the progress and welfare of the State.

It is inevitable that to different persons and different sections of the community, the question of "What is Education?" demands a different answer. To some the whole question revolves around the interests of the individual personally. To others, the question is that of the greatest good to the greatest number, in other words the highest interests of the State itself. Rightly understood the two are the same question, for the interests of the whole are those of its individual parts.

It is apparent, however, that the views of those who in the early years of the Christian era gave an extreme meaning to the teaching of St. Paul, as to the need for subordinating the merely animal part of our natures to the spiritual, ending in the extravagances of anchorites and hermits, which views we have seen, indeed, to have been perpetuated by individuals in many religious communities to-day, are very far separated from those which a broader theology, and a wider knowledge of the physiology of man teach regarding that highest creation, man :—

"What a piece of work is man!  
How noble in reason! How infinite in faculty!  
In form and moving how express and admirable!  
In action how like an Angel!  
In apprehension how like a God!  
The beauty of the world! The paragon of animals!"

It was indeed a true conception of education when Montaigne said "*non l'objet, le savoir, mais le sujet, c'est l'homme*" or "man is not the object but the subject of learning." To students of the history of intellectual development, the problems of heredity, the influence of climate, of industries, of occupations and character of life, whether rural or urban, all take their place as factors in determining the extent to which a rise in the scale of being has taken place in the different races of the world. As a part of this development, the ethical factor has always taken a prominent place, since in it we recognize that relation which man understands as existing, not alone between him and his fellow-man and the world of

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nature around him, but his relationship to the Great First Cause from whom emanate all things, and toward the fulfilment of whose purposes in His creation all created things proceed. Nowhere, indeed, that we are aware of, is this idea set forth with greater clearness as the basis of education, than in the much discussed works of Fröebel, whose system of education all centred around the thought of cultivating in the child and upward to manhood, the conscious desire to establish a unity between the internal consciousness—the *ego*—and the external world,—the *non-ego*. Or as Fröebel says :—

“ Education should guide a man to clearness concerning himself, to peace with nature, and to unity with God: hence it should lift him up to a knowledge of himself and of mankind, to a knowledge of God and of nature, and to the pure and holy life to which such knowledge leads.” Beginning with the infant he traces its first attempts through the progressive development of its different senses to establish such a harmony through the sensations, subsequently united into concepts; and points out with wonderful clearness the part which the educationist, whether parent or teacher, may play in directing this development along the higher ethical plane; since as he says, “ Development is produced by exercise of function, use of faculty.” While we are thoroughly convinced of the correctness of the teaching of Fröebel and his followers, that the plays of children rightly interpreted all partake of ethical qualities, since they are part of their physical nature, and therefore from the Divine, it becomes especially the province of the sanitarian to point out that any system of education in which the importance of the training of any organ of sense or of motion is overlooked, neglected or but partially recognized, must *pro tanto* result in defects not alone in the development of the perfect man physically, but also the perfect man morally and intellectually. Recognizing this, the sanitarian therefore realizes that the education of the future men and women of his country begins with the parent—even pre nately—and has to do both with the physical and moral nature of the parent and of the sum-total of the environment of both parent and child. It means proper food, dress, fresh-air, exercises, or indeed all of what makes up the life of any community, until and indeed after manhood is reached.

Passing, however, from the period of infancy to the period when the State assumes some degree of authority over the child, fixed by law in Ontario public schools for kindergartens at 4 years and 5 for the ordinary course, we have here presented for our consideration the question of what responsibility is thereby assumed by the State under the Statuté. Theoretically it will be agreed that the State shall continue to supply for the child all the conditions, which as sanitarians we have assumed are requisite for the full development of the child from birth to manhood. Roughly, the State assumes control of the life of the child for from one-eighth to one-quarter of his life during five days of the week, and

does it on the assumption that in the highest interests of the State, the interests of the child are better guarded in school than if the child were left to its parents.

Let us examine the problem. By a system of objects as playthings, the child's attention is attracted in kindergarten to cubes, cylinders and figures on paper to be cut, and gradually built up into forms of objects. Besides this, the motions and sounds of birds and other animals are imitated, and muscular movements are co-ordinated by rhythmic movements of the body, encouraged by music.

Surely then much is to be said for such an education; but when we examine into the environment of the child during the hours of education, we hesitate indeed to express approval. It is not an uncommon thing to find in an ordinary school-room 50 to 60 children, with a per capita air-space not exceeding 150 cubic feet in rooms (one case indeed referred to below being actually 107 feet for 62 children) ventilated if at all but accidentally, brought into personal contact and often seated at tables and with thread and needle doing work which is trying to an eye, made naturally to observe outward and distant objects, and in a light, as I have seen it in an instance from windows in a basement with seven feet ceilings and from the ground to only three feet above it, and supplying direct light to not more than 10 feet of floor space. The law states that the inspector shall withhold the Government grant until trustees supply school buildings in good sanitary condition, and see that the requirements of the Public Health Act are complied with.

The Public School Act further states that it shall be the duty of teachers "to give assiduous attention to the health and comfort of pupils, to the cleanliness, temperature and ventilation of the school-rooms."

In a report upon 29 rooms or buildings used as temporary school-rooms in Toronto, the writer was forced a year or two ago to state, after an analysis of the lighting, heating, ventilation, air-space and sanitary conveniences, that it will be seen with regret "That not a single room does in all the several points fulfil fairly reasonable requirements." "If, however, pale and wearied looking faces are to be taken as evidences, then it can only be said that such insanitary conditions are producing results on both teacher, and children, demanding a prompt and effective remedy."

Again in a report of an inspection by the writer on the Paris schools last year, it is stated: "Contagious diseases have existed to an unusual degree amongst the school children during the past year, and while there may have been in some instances a recurrence of cases owing to children returning to school too soon after sickness, yet the condition of the school buildings is such that any attempt to cleanse and disinfect them must prove difficult, while the crowding and lack of ventilation must make the dissemination of disease from one pupil to another almost inevitable."

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If it was necessary to make such reports of actual conditions, and if in a report by the Medical Health Officer of Toronto three years ago, the average cubic air-space was less than 200 cubic feet for the various rooms necessary to accommodate 26,000 children, it would appear that sanitarians can no longer hesitate to assert that the conditions under which the children of the Province spend the earlier years of their lives, when physically and mentally they are influenced most rapidly for good or ill, are such as to demand radical changes in the methods which are being pursued, if the growing generation are to be properly equipped for the struggle of national existence, and to be provided with an adequate mental and physical armamentarium for ensuring that upward progress of the race which is our dream.

Now, lest it should be imagined that we are attacking the laws of the Legislature, it may be stated as seen in the quotations given, that in both the law and school regulations, the intention is manifest that the local school authorities and boards of health be given ample powers to deal with the sanitary conditions already illustrated; but the trouble is that neither authority adequately realizes its obligations or its powers, or rather perhaps the people have not been educated up to a sense of the dangers which exist, or the means to avert them. That Ontario is not a sinner beyond other countries may be amply illustrated by the reports from many different States of the American Union, and above all by a reference to the new Education Code, 1899, of England.

In a discussion before the Sanitary Institute, Great Britain in December 1899, Dr. Arthur Newsholme, Medical Officer for a London district, criticized its provisions. So similar are the conditions to many we find in Ontario, that some brief attention may be given to them.

He points out "that from the utilitarian standpoint it is obvious that efforts to secure the highest standard of health amongst the young are of extreme importance, as upon the conditions under which they are living during the first fifteen, and more particularly the first ten years of their life, depend very largely their future prospects of good or ill health, of long or short life." Newsholme points out that there has been a great advance in the structural excellency of elementary schools during the past 20 years; and yet he points out that the floor space required under the new code is only 10 square feet, or in a room 12 feet high by 10, the cubic air-space would be only 120 feet. He further points out that the Code states, "there must be outlets for foul air at the highest point of the room, having " motive power by heat or exhaust." "It does not contemplate the possibility of warming the incoming air." The system he states seems to provide for direct heating by steam or hot water without any provisions for the entry of fresh air over them. After discussing the quite inadequate provisions of the Code, Newsholme states, "the problem of the ventilation of schools towers over all others in importance, and upon its satisfactory solution depends in a large measure the healthiness and efficiency of school life."

Dealing then with the problem as it is presented, whether in Ontario or England, we, as physicians and health officers, have forced upon us the question of how best to minimize existing difficulties. Naturally we cannot do less than demand that if children from four years onward are going to school, they shall be supplied with sufficient warm, pure air to prevent direct ill-health from their close confinement.

There is to my mind, however, a yet further remedy, and that is, extending the time of entrance to the schools to seven or eight years. It has been the observation of many that the child mind left to develop normally, does not earlier come naturally to that stage where it desires in any intelligent way to read, or will without serious effort concentrate its attention even for a few minutes upon a reading lesson.

It has also been the observation of many teachers, that children beginning school at 8 years, will, within two years have equalled or distanced those who began two years sooner.

It would seem as if the power to grasp an idea when represented by a series of letters, is in an entirely different category to that of seizing upon the idea as represented by the thing itself. The training of the attention is equally slow, so that in any case the child were better spending a few minutes at lessons under the mother's eye, at home, and having the balance of the time for "learning its limbs" in the fresh air. But the common objection is raised that for many mothers the child's hours at school are simply time gained for other duties. Even so, there seems no reason that children should be crowded into the impure air of school rooms, where public play grounds would serve equally the purpose of a *crèche*. Indeed, so fixed has become this idea, that for myself I believe the play ground with roof shelter for cold and wet weather to be the complete and economical solution of the vexing problem of how city and town school boards are going to relieve the school rooms of their congested population, to the advantage of the child, to the relief of the working mother, to the efficiency of the work of the teacher dealing with two separate lots of scholars daily—each class coming fresh to the school, and a notable economy in the supply of sufficient school space for the increasing population of towns.

This belief brings me at once to refer to the benefits of exercise in its mental and moral effects. Mr. Treves, F. R. C. S., a surgeon of London Hospital, in an extended article on "Physical Education," says: "Moderate, regular and systematic exercise, by stimulating the circulation of the body, improves also that of the brain, and so there ore, is an aid to cerebral movements." And again: "It offers too an admirable change of employment." There is no better rest from severe mental work than well-selected bodily exercise." But that what may be called the *half-time* system, is actually a means of increased progress, has been shown again and again.

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Mr Charles Paget, at one time M. P. for Nottingham, tried the following experiment in the village school on his estate: He provided the school with a large garden, and then divided the boys into two squads, one of which was kept at school for the ordinary number of hours, the others for half the time only, the rest of the time being given to work in the garden. "At the end of the term the half-time or  $\frac{1}{2}$  gardening boys had excelled the others in every respect—in conduct, in diligence and in the results of study." I may say that personal knowledge in different cases has quite confirmed this statement. This, however, is not new information, although it would seem that either a want of knowledge of the fact, or a lack of resource in adapting our school system to the utilization of it, has wholly prevented its adoption here. It is indeed some forty years since Sir Edwin Chadwick, the father of sanitary reform in England, and who labored with his pen for fifty years in its promotion, read a paper before the Social Science Congress of Great Britain, "On the expediency of measures for lessening the hours of instruction in Schools." Summarized, he dealt with the two points: 1st. The personal future welfare of the individual. 2nd. The interests of the nation.

Regarding the educational standpoint, he stated:

1st. That the results of the half-time system have been shown to produce at least as good progress in study as full time.

2nd. That this was further promoted by drill and industrial training.

3rd. That it has been proved that the time given to sedentary pursuits extends beyond the capacity of pupils for profitable attention, while being detrimental to bodily health.

In this paper he further makes a special plea for military and naval drill, summing up his arguments as follows:

1st This is demanded on sanitary grounds as good and requisite to correct physical defects.

2nd. On moral grounds it is needed for developing a sense of duty, self-restraint, order, punctuality, obedience and patience.

3rd. It is economical on the ground that increasing the suppleness of the joints and coordination of muscular movements gives an efficiency and productive value to the laborer's energy. How greatly such exercises are needed has recently been shown in examination of recruits for the Canadian contingents and for the Spanish-American war—a large percentage of those presenting themselves having such physical defects as to cause them to be refused.

From the natural standpoint Chadwick further argued:

1st. That drill is more effectually and permanently taught in the years of childhood and boyhood than in advanced and adult life.

2nd. That drilling the child at school is most economical to the State, as it does not interfere with the productive labor of men, as now necessary in our militia and volunteer systems. He had the accurate calculation made that by using retired drill sergeants thirty or forty schoolboys could be taught as cheaply as one adult soldier.

In these recent years, when spasmodic attempts are being made towards technical education, it is most notable that one hundred years ago the enthusiast, Pestalozzi of Zurich, a disciple of Rousseau, had solved this problem most successfully. As a philanthropist he had taken to his farm in Newhof some twenty poor children from the streets of Basle. They worked with him in garden, fields, and in the house. Very little time was given to separate lessons, the children often learning as they worked with their hands. We are told that in a few months these poor creatures were entirely changed, and even cheerful, frank and intelligent, "and made good progress in the work of their hands as well as in the associated lessons, and took pleasure in both." He says, "The path of nature, which brings out the powers of men, must be open and plain; and human education to true peace-giving wisdom, must be simple and available for all. "Nature brings out all men's powers by practice, and this increase springs from use."

The same ideas much more philosophically developed, appear in the work of his successor in Germany, the remarkable Frederick Fröbel. Two centuries before him, Bacon had said: "We command nature by obeying her," but it remained for Fröbel to develop the idea in his educational methods. He said, "The starting point of all that appears, of all that exists, and therefore of all intellectual conception, is act, action."

"From the act, from action, must therefore start true human education, the developing the education of the man in action, in acting it must be rooted and must spring up."

Without further developing this idea, it is only necessary to recall our school methods, where young children sit hour after hour, as if on a stool of penitence, to realize how utterly we have departed from these ideas. To decide as to which is the proper method, we may properly apply the definition given by Mr. Herbert Spencer, of the end of education. He says:—"To prepare us for complete living, is the function which education has to discharge, and the only rational mode of judging of an educational course, is to judge in what degree it discharges such function."

Without, however, pursuing these thoughts further, it will be proper for us as sanitarians to indicate what practical direction ought, in our opinion, to be given to our educational methods, as we to-day find them. Summarizing them I would say—

1. Extend the age at which admission to school and kindergarten is permitted, to at least 7 years.
2. If kindergartens are to be encouraged, make the hours so short indoors, that several squads may follow each other during the day with a teacher so that sufficient accommodation is possible without increased expense.

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3. Extend the half-time system to children up to ten or twelve years.
4. Supply playgrounds where children may go daily, where physical drill and gymnastics are taught, and where employment under instructors in some technical work may be given to groups of children in succession.
5. Have this work assisted, as it properly ought to be, by the Federal authorities supplying from the sergeants of our regular military establishments, instructors who will systematize the work, develop it, and report regularly the results to the Department.

*Docendo discimus* is an old adage, and it would be found that our soldiers in teaching others and studying the growing youth, would themselves become more proficient. The cost to the State of the training of the whole youth of the country would be infinitesimal as compared with the same work, were it to be done later.

But as Mr. Chadwick and others quoted have remarked, the economic results from physically perfect men, applying their trained powers to industry, would be yet more important. Many interesting illustrations of this fact might be given; but those of Mr. McLaren of the Oxford gymnasium, are of present use. By extended anthropometric measurements he has shown, as have others, that systematic exercises promote the regular and systematic development of a youth or man; and further, that when intelligently directed, grave congenital or acquired defects may in a large measure be overcome. He gives cases such as the following:

Case 1—Training 7 years. Height at first above average. From commencement growth was rapid and sustained with regular and uniform development.

Case 2—Training 3 years. Height greatly below average, and other measurements below average. Instant acceleration of growth with moderate increase in development.

Case 3—Twelve recruits sent to the gymnasium to be trained as instructors for the soldiers. In picked men, within a few months, the chest measurement was increased on an average by 3 inches, the weight by 10 lbs., and all the limbs in girth proportionately.

Along with all this the grace of movement, and suppleness of limbs and even development of the parts of the body, are the common result. But to the physician and sanitarian, the results as regards health, are much farther reaching.

For years this Association has illustrated from every standpoint the growing prevalence of that disease, the vice of nutrition, consumption, following industrial development, and the growth of city populations; and to-day the Legislature by its action, has proclaimed along with the profession, its belief that in fresh air, abundant food, and regular hygiene and exercise, we are alone to look for the cure of this chronic disease.

But if, as Newsholme has said, and as we all agree, the future of the individual physically, is in large part, dependent upon what he has become by his fifteenth year, it is plain that to the school and gymnasium, we are to look primarily for the prevention of this disease, through buttressing up weak children by adequate means, and by preventing naturally strong children from being injured through bad ventilation, defective lighting and bad seating, thereby becoming candidates for consumption.

That the results of physical training conduce to permanent good health have been shown by an enquiry by Dr. Morgan of Manchester, into the health of the men who rowed in the Oxford and Cambridge Boat-races from 1829-1869. "His evidence shows that such exercise is in the great majority of instances, no other than beneficial."

That the need of this training is not to be limited to the young children, enough has been said to show. In the modern systems of our High Schools and Colleges, the same defects as regards the public schools are present. Masters will inform you, even in cases where a good gymnasium exists, that they have no instructor supplied by the School Board, and moreover, that the curriculum of studies does not permit of a regular daily gymnastic hour. Referring to the education of the modern girl, Mr. Treves sarcastically remarks: "There is something about the higher education of the modern girl, which is comparable to the manufacture of the finest Sèvres china. The result is beautiful from the designer's standpoint, but the cup is delicate; it cannot be used in daily life, and it must be kept in a cabinet."

"A good digestion and an active liver are more useful in the battle of life than a knowledge of advanced mathematics, and sturdy limbs and strong hands are of more value to the mother of children, than even decimal fractions and a familiarity with irregular verbs." Fortunately, however, these literary desiderata are even more attainable by the wholesomely trained student, than by the fag.

But enough has been said to indicate from our point of view, and indeed from any point of view—the need for a radical reform in the views and methods of much of what is called "modern education." What would seem to be the primary difficulty, is the persistence of the old philosophical ideas, that mind and thought are something distinct from in their essence the physical part of man; that, indeed, they do not form a part of the *unity of nature* so constantly preached by Fröebel and believed by all of us; and that therefore the operations of mind and body in the factory, in the field, and on the playground, are things *sui generis*, and without anything in common with the learning which is in books. It would appear, indeed, from such a view that the mental operations of the scholar represent a superior kind of sense, found only in Dry-as-Dusts, and those who indulge in the poetry of the Transcendental. Let

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us hope at any rate, that this phase of mediæval scholasticism will have been left behind with the dying century, and that the coming century will see realized the truth expressed by Browning:—

“I have gone the whole round of creation : I saw and I spoke ;

“I, a work of God's hand, for that purpose, received in my brain

“And pronounced on the rest of His handiwork—return Him again,

“His creature's approval or censure ; I spoke as I saw,

“I report, as a man may of God's work—all's love, yet all's law.”

## THE PHYSICAL EDUCATION OF WOMEN IN RELATION TO PUBLIC HEALTH.

BY JENNIE D. DRENNAN, M. D., KINGSTON.

*Mr. President:*—In order to have healthy women we must have healthy girls, and to have healthy girls, healthy women. This law like many another works in a cycle. The health of our women has a farther reaching influence than would at first right appear; for on it depends to a certain extent the physical, intellectual and moral health of the nation. To have healthy women their physical education must be commenced in early life—"As the twig's bent, so is the tree inclined"—and not only her physical, but also her moral as the one re-acts on the other. Without a true sense of right any one lacks the necessary stamina, which is required to maintain one in the right path. When women desire good health from a sense of duty and not alone as a means to enjoy the pleasures of this world, they will be more anxious to do their utmost to possess it. From the time they are infants they must receive good wholesome food. All the functions of their bodies must be performed in accordance with the laws of health. They must be allowed free muscular movements. Let them use their muscles and gain strength in them. Plenty of fresh air and sunshine is also requisite. The idea some mothers have, that a child is deriving any benefit from being out of doors in a carriage with the top securely fastened down on it and perhaps its face covered with a rug is almost too absurd to be tolerated. Unless it may have access to the fresh outside air it has no opportunity of benefitting by it. The sleeping apartments should be well aired and not used as a family sitting room during the day or evening. When old enough to play girls should have the freedom allowed to their brothers. Do not give them the chance of saying, "I wish I were a boy for boys can have such lots of fun." Boys and girls should have much the same training during their earlier days. They have bodies which contain the same essential organs, which require the same care. The muscles of both require similar training. We admire the sturdy little lad, who clenches his fist, fixes his forearm and with pride shows up his well contracted biceps; why not admire the little girl, who can do the same! On the other hand we admire her dainty little rounded arm, pretty as an ornament, but useless as a means of enduring fatigue. Let her romp and play. It will give her strength and a grace of movement which no amount of coddling can give her. There is no reason why she cannot climb a fence just as well as her ten year old brother. Under this heading comes the desideratum of clothing. Hers may be more elaborate and therefore ought to be taken better care of. Lace and muslin here are "kittle cattle" to be exposed to branches of trees and rough fences. For fear of spoiling this finery or for fear of

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the awful reproaches which shall greet her on the discovery of the rents she usually refrains from such fun, and if she be of a revengeful nature, in reply to her brother's civil invitation to climb a tree, says, "No, I don't want to be a Tom-boy. Boys are so rough." This is one of her early lessons in insincerity, for in the bottom of her heart she does desire it. In the lower animal world there is no differentiation in the games of the young. Who ever saw a male kitten enjoying different sport from the female? Then in the name of all that is just and fair clothe her in suitable clothing. The happiness and development of a sweet, dainty disposition is more to be sought for than her fairy-like appearance in muslin or lace. I once heard a kindergarten teacher say, "I do wish mothers would send their little girls to school, dressed suitably, for my heart aches for some of the tiny dots, who are in terror of soiling their dainty frocks." Such a strain cannot but have an injurious effect on the child's nervous system; for such nervous impressions once created cannot be easily eradicated. In terror of being scolded they resort to all sorts of artifices to avert such punishment. Another lesson in untruth. Let a girl have sports which have some danger in them, for only through facing such can she cultivate that needful courage to successfully battle with her future life. The girl who is brought up so carefully shielded from harm and danger, is the one who, in after years, oftentimes has a burden cast upon her, which her poor weak shoulders and will cannot carry. Her association in the games of her brothers will give her a sense of honor and justice which she will not have if she associate alone with girls. Boys have a higher sense of honor in their play. They are more apt to see the justice of a disputed point and yield to that point; whereas the play of small girls is often interrupted, when such a dispute arises, by one and all exclaiming "I'm not going to play with you any more." It does the boys good also. Then further, if boys and girls are accustomed to be together more the abominable differentiation of sex becomes less. There will be less of he and she and a friendship between them will be a possibility and not an impossibility, as it is to-day, and also as in the case of the small boy and the orchard with the high stone wall, having more freedom they will not have to descend to clandestine meetings and have their young heads filled with such an abundance of sentimental trash.

The girl who is allowed the freedom of outdoor sports and access to the gymnasium will not complain of a weak back and stooping shoulders requiring some shoulder brace. Her muscles and educated will power will prevent such from being necessary. How few gymnasiums there are for our girls as compared to boys. A boy must have muscle, and therefore is allowed to romp and tear. No wonder he exclaims with disgust, "I wouldn't be a girl, girls don't have any fun." The girl who has not enjoyed a good game of baseball and tag is indeed to be pitied. At the age of twelve or thereabouts it is considered she must settle down and learn how to be a young lady,—rather late for the latter qualification.

which is born, not made. Such a dictum may serve for eastern countries where marriages are early, but our girl is in no hurry for settling down, especially now that she does not marry until much later than her grandmother did. She requires an active life in which sports suitable to her age, and they are not few, should fill in the hours of recreation. Released from school she should have recreation instead of being forced to the piano to drum away an hour, every minute of which she often detests. That music conveys no message to her soul. Music is a necessary part of her education; but it should be so arranged as not to interfere with it. Tired out with her long siege of school hours she is in no condition to profit by it.

There are many ways at present in which a woman can have exercise, which were unknown to our foremothers. We have fewer of the languid Arabellas, but too many still. Our girls and women are much better developed! The wasp-like waist is disappearing.

The world is awakening to the fact that it is not necessary that every girl, apart from any individual inclinations, shall have all the little accomplishments, so-called, of her grandmother. The times do not require it. Much done by them by hand can be done for us by machinery. It is no longer necessary that she should fatigue back and eye muscles over a piece of embroidery. A certain amount of such work is necessary to furnish her with dexterity of hand; but whole hours should not be spent on it. Let her sit crouched up over it in a hot, ill-ventilated room by an improper light and she will have a deformed body, injured sight, enlarged pelvic organs and a mind given to dwelling on the merest trifles. The flavor of courage and daring is absent from such work. It inclines to a taste for gossiping and talking of small nothings which form so large a part of woman's life. In times of war women have a common interest with men, and from these times, awful in themselves, some of our best women have arisen. In the truer outdoor life she will have no taste for such nothings. Out in nature's broad field the little things fade away into their proper place. A girl's education is too much the same for every girl. They are as diverse in their tastes, or would be if their tastes were given a chance to assert themselves, as the boys are. Many a bright, sport-loving girl is irritated beyond degree because she must be educated exactly like her quieter sister. "What is one man's food is another man's poison," is true for women as well, and in a moral and intellectual sense also. It would be strange, indeed, if the Creator had created one sex with such numerous predilections and the other with only one. There has not been sufficient attention paid to her tastes. Her education should train her for the work best suited to her. It has been taken for granted—though there is a change for the better of late—that every woman must marry, whether physically, mentally or by inclination so fitted. It is the highest calling for any woman, provided that she has the necessary qualifications; the one in which she has the highest possibilities for good

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to herself and the world. A mother who trains her children well and attends to her home well must develop. She cannot do otherwise. The idea that one's education is finished at the close of one's school life is a prevalent one among many young women. The woman who enters on her married life with the satisfaction that she has attained her acme of success in life, and now need not make any further exertions to develop, will never do much for the world. She will be simply a drone. Imagine our disgust for a man at twenty-five who says, "I am satisfied. I shall settle down to hum-drum life and not seek to raise myself any higher." In too many cases she has been led to believe that she must marry for her future income. Let every woman have a means of earning her own livelihood and when she marries—freed from the thought that she has to for a home—she will be free to choose a suitable helpmate. She will be a capable wife and mother, in whom her husband and children can trust and there moreover her influence on public health will be manifest. Having learned to use her reason instead of mere intuition, she will think before she acts and will not be governed by mere rule of thumb and do so and so because mother did it or because Mrs. Neighbor does so. Having an independence of her own, a healthy body, a mind free and active, a sense of honor and justice she will not marry every Tom, Dick or Harry. She will from her independence be able to choose a suitable husband and father to her children. She will know the duties, which are expected of her and not rush into a state of which she is totally ignorant. Is there any other condition in life into which any person enters so blindly as the young woman into matrimony? Blind-folded because it is womanly and modest to be so. She risked her all to gain this and not alone her all; but her children's for this womanly ignorance, so called unmanliness, than which there is nothing so loathing. Imagine our soldiers going forth so unprepared. It makes no matter whether she is physically capable of enduring the life. Enter it she must; it is woman's one avenue to income. The question of hereditary weakness is not thought of, she marries, sows the seeds of her disease far and broad and all for the sake of a home in many cases and at any rate for love so called. Such sentiment is as mistaken for the true thing. A woman with a right idea of love would in such a case think more of the welfare of others than of herself. The poor, weak, physically undeveloped woman, nervous, unable to stand the strain, gives a weakened physique to her offspring. They are weak from inheritance and rendered yet more so by contact with an irritable mother from whom no sense of justice and wisdom can be expected, give a few more weakened ones to the world and so the woman will ever send forth material for our asylums, prisons and hospitals. Give our people healthier bodies and we shall have healthier morals. Vice cannot thrive in strong minds. Education and not legislation must do this. Give a woman health and she will not look on her motherhood as a horror; but as a privilege and will not stoop to feticide or try to make the penitentiary the resting place of many of us.

In her ignorance and weakness do not blame her but rather give her a chance to develop, eradicate the conditions which have rendered her weak and render such artifices her only means of freeing herself from a burden which she cannot carry. Man has even aided woman in this. Her position of to-day is due to his assistance and the unwillingness of some women who have taken advantage of the opportunity, but she must help herself. In doing so she will alone gain strength.

Now physical education to be successful must be carried out by thorough methods as well as any other kind of education. Girls must have it as a part of their curriculum. We must have gymnasiums for them as well as for the boys. Then in order to prepare them for the work which many of them will have in after life, they require to receive instruction in domestic science, which should be taught in the public schools where the class most in need of it will be reached. The art of house-keeping is not one to be despised. By bringing it up to its proper level it will become less of a drudgery and more fitted to woman's tastes. Time which now is squandered and strength wasted will be saved. Her family will have better food. It is strange that for ages the very ones who prepare our food should be in such utter ignorance of its qualities and effects on the body. Can we wonder that dyspepsia is such a common disease? Rather should we wonder that we are alive to tell the tale of our woes. The knowledge which man has been accumulating for ages woman has been in no condition to use for the good of mankind. Instead of profiting by his knowledge or that of her own sex and giving in each generation an addition to it, she for the great part has been content to go on in the old way, doing as her grandmother did. Our women, and by women I mean the girls approaching womanhood, must be prepared for their future work. A higher degree of education is required in every department of labor. The Redferns and other dressmakers and style furnishers must have some idea of the human body. How can we expect healthful clothing for women when the idea of health is utterly ignored and vanity of style alone considered? What painter ever took a maiden of the Elizabethan or following periods, with the long stiff waist and hooped skirt, and painted her as a sample of womanly beauty of figure. No, he takes such from the Grecian or Roman ages or from the peasant class, who have allowed their figures to develop according to nature and are clothed in garments which allow freedom and grace of movement. Until we are educated we will not be freed from such ignorance.

Girls must be taught to think for themselves. Not to jump at conclusions, or to rush recklessly into any new field, this exercise which is to develop their bodies they must use common sense in. Too many in this age, when outdoor sports are becoming more general, have abused the opportunity and have been injured instead of benefitted by it. The bicycle, than which there is no better instrument of pleasure and exercise, has in this way been abused. Some girls have rushed it to death for a

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season, ridden far too long distances, ridden up every steep hill and then worn out have flung it aside it as a cause of disease and are now pursuing with the same impetuosity, the latest fad, or having found exercise not suited to them have gone to the opposite extreme and take none. A case of all or nothing. When their exercise becomes a part of their education such baneful effects will disappear and woman will stand before us in all her attributes of loveliness of body and mind.

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## SEWAGE PURIFICATION BY BACTERIA.

BY WILLIS CHIPMAN, CIVIL AND SANITARY ENGINEER, TORONTO.

*Gentlemen* :—During the past winter and spring, the writer visited nearly all of the important sewage disposal works in Great Britain, giving particular attention as an engineer, to the practical experiments now being carried on at different places and carefully inspecting recent installations of the Dibdin bed system and the septic tank system.

The following paper may be considered as a summary of the results of the writer's observations :

The problem of sewage purification has been given more or less study by municipal engineers, chemists, sanitary boards and others interested in sanitary improvements for many years, in all portions of the civilized world, but in no country has it been given so close attention as in Great Britain. The density of the population, the great volume of the liquid manufacturing wastes, the small size of the streams into which sewage could be discharged, and the limited areas from which water supplies could be drawn have all contributed to the development and extension of sewage purification works that have become models for the world. As a corollary to these conditions, the general public in England has been educated to the necessity of such works, and the vast sums now being expended on sanitary works by different cities and towns have been voted by the ratepayers ungrudgingly.

In no country have so many experiments been made, in no country have so many failures been recorded as in England. Patented processes have from time to time been received with favour, but in most cases, only to be discarded within a few years for simpler or less expensive methods.

Land treatment has been recognized for many years as the most economical method of disposing of sewage and as giving the best results.

There is probably to-day a larger area of land devoted to broad irrigation in England than at any other period, and the acreage is constantly increasing. Nottingham with a population of 250,000, has a sewage farm with an area of 900 acres, about 200 acres additional are now being prepared for use, and 700 acres adjoining have been purchased for future requirements. At Leicester, population 217,000, the sewage is raised 170 feet to a sewage farm of 1,700 acres ; and at Birmingham there is a sewage farm of 2,800 acres.

In most places, the cost of operating the sewage farms, nearly equals the revenue derived therefrom, leaving the interest of the cost of works to be borne by taxation.

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So satisfactory has been land treatment, and so unsatisfactory have been all other processes and methods, that to-day the Local Government Board (a standing Committee of the Houses of Parliament), will not sanction a loan for sewage purposes except with the provision that a certain area of land is provided and the effluent from all works must pass over and through land before being turned into a stream. This rule was adopted some years ago, and before the results of the experiments at Barking, Sutton and Exeter were known.

In many places, however, there has not been a sufficient area of suitable land available to treat the crude sewage by broad irrigation and other auxiliary methods have been adopted. Sedimentation tanks were introduced by which a part of the solids in suspension were separated, the proportion depending upon the tank capacity.

The liquid part was then applied to the land or discharged into a stream, but the solids deposited in the tank, known as sludge, remained to be disposed of. In some places the neighboring farmers would remove it or a portion of it, but such removal was intermittent, thus demanding st range at the works. Sludge, however, decomposes rapidly, and storage meant nuisance. By adding lime, copperas, allumina ferric or other precipitants, the amount of sludge deposited in the tanks was greatly increased, and the decomposition delayed, thus permitting of storage for a limited time. By the introduction of sludge presses, with air compressors and other machinery for operating the same, the wet sludge was compressed into cakes that could be handled, and the volume was reduced to about one-tenth of that of the wet sludge, but pressing cost money, and did not disp se of the cakes.

At Glasgow, about ninety tons of cake is now produced daily from 13,000,000 gallons of sewage from the east portion of the city only. At London, Manchester and Salford, pressing has been abandoned, and the wet sludge is now carried out to sea by specially constructed steamers, and doubtless this is the most satisfactory and the cheapest way for sea-coast cities.

At Sheffield, Birmingham and many other places the sludge is partially dried, then deposited in trenches and covered with earth, while in some places it is run into pits or lagoons and allowed to dry out slowly. Sludge is an abomination everywhere.

At Glasgow, and in a few other places, a portion of the cake is manufactured into "poudrette," a marketable manure, which, in other places, is made from the contents of tubs and middens. This is, however, exceptional, and it must be borne in mind that the cake is made into manure in order to dispose of it, and to prevent an accumulation at the works, not because there is any profit in the manufacture.

The enormous extravagance in permitting sewage to be wasted instead of converting it into a valuable manure has served as a text for many a paper at sanitary conventions, but it will be found that, as a rule, they

have been presented to persons who have had no practical training or experience in such matter, visions that may be realized some day, but at present we must be content with what is practical.

The experiments of the Massachusetts State Board of Health, at Lawrence, which have been carried on continuously since 1889, have been studied very carefully in England as in America. These experiments clearly established the fact that the purification of sewage was performed through the agency of bacteria, the necessary conditions being the presence of air and the slow movement of thin films of water over the surfaces of the units of the materials composing the filtering materials.

In the United States and Canada, intermittent downward filtration has been generally adopted as a result of these experiments. In this method the sewage is purified at the rate of about 50,000 gallons per acre per twenty-four hours, upon specially prepared beds of sand and gravel, no attempt being made to raise crops.

The effluent is satisfactory, with proper management, if the beds are not overdosed, and there is practically no sludge to be dealt with.

In Great Britain filtration beds have been adopted in a few unimportant places.

As the purification of sewage depends upon the action of bacteria, the term filters, which implies mechanical, removal of suspended impurities, should now be abandoned.

Between the years 1884 and 1896, experiments on sewage treatment were made by the Metropolitan Board of Works and the London County Council, under the direction of Mr. J. W. Dibdin, their chemist, which may be considered as a continuation of those of the Massachusetts Board.

When Mr. Dibdin, in 1887, propounded the theory of microbial action in a paper read before a convention of engineers, and suggested that the proper way of treating sewage would probably be found in cultivating proper organisms, the whole audience laughed heartily. He persevered in his work, however, and in 1892 he was authorized to lay out a bed of one acre at Barking, which was filled to a depth of about three feet with pan breeze.

After many experiments, and some failures, this bed was found to remove 85 per cent. of the impurities from sewage when applied at the enormous rate of 800,000 gallons per day. In 1898 the depth of material was increased to six feet, but the writer was informed by the present chemist in charge, Mr. E. Brooke Pike, that the increased depth of filling did not increase the capacity of the bed.

In 1894, Sutton (Surrey) laid out and built sewage disposal works at a cost of £66,000. The system adopted was one of chemical precipitation followed by artificial filtration through a patented material, the sludge being pressed into cakes.

In 1895 the Sutton authorities found that the works were unable to so purify the sewage as to meet the requirements of the Thames Conserv-

ancy Board, and, in 1896, take the place of all of the sludge of the filling and the sludge satisfactory.

Sutton journeyed from cities and towns old sediment conservative experiments with various materials for all of the

The writer Huddersfield, places, but as yet been published from bacteria

In the Sutton coarse material The sewage from which it is a lower level.

The following ending March

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Experiment London crude sewage on coke beds of



ancy Board, owing to a failure of filters. Mr. Dibdin was then consulted and, in 1896, a coarse bed was constructed, according to his designs, to take the place of the chemical precipitation and the sludge pressing plant, all of the suspended matter in the sewage being destroyed in the interstices of the filling material. Additional beds have been constructed since 1896, and the sludge pressing plant is now for sale, while the effluent is quite satisfactory.

Sutton soon became a Mecca to which deputations and sanitarians journeyed from all parts of the kingdom, and there are now dozens of cities and towns that are constructing bacteria beds, or converting their old sedimentation tanks into bacteria beds. The English engineer is so conservative and cautious that, as a rule, he insists on conducting experiments with the sewage from his own town on small beds filled with various materials, before recommending the adoption of any general plan for all of the sewage.

The writer visited the experimental works at Manchester, Oldham, Huddersfield, Salford, Leeds, Sheffield, Accrington, Bristol, and other places, but as the final reports on some of these experiments have not as yet been published, it can only be stated in a general way, that the results from bacteria beds are satisfactory in every way.

In the Sutton system there are two sets of beds, the first filled with coarse material, the second with finer.

The sewage is first roughly screened, then flows on the coarse beds, from which it is discharged intermittently on the fine beds which are on a lower level.

The following average of the analyses of the effluents for the year ending March 31st, 1899 may be of interest:—

| Effluent from   | Ammonia.       |          | Oxygen Absorbed |             | Nitrogen.    |              | Suspended matters. | Chlorine |
|-----------------|----------------|----------|-----------------|-------------|--------------|--------------|--------------------|----------|
|                 | Free & Saline. | Organic. | At once.        | In 4 hours. | As Nitrites. | As Nitrates. |                    |          |
| Coarse bed .... | 5.14           | 0.217    | 0.39            | 2.034       | 0.028        | 0.110        | 5.87               | 9.6      |
| Fine bed .....  | 1.21           | 0.084    | .....           | 0.828       | 0.04         | 3.03         | .....              | 9.34     |

All in parts per 100,000.

The Sutton sewage is purely domestic but is very concentrated and foul.

It will be noticed that all of the suspended matters have been removed, and that the amount of oxygen consumed falls well below the standard prescribed by the Local Government Board which is one grain per gallon of oxygen absorbed in four hours.

Experiments have been continued in during 1898 and 1899 upon the London crude sewage at the Barking and Crossness outfalls by treating it on coke beds of different depths, the results of which will be found in the



Birmingham—Experimental Bed.



Reigate—Candy Sprinkler.

Whittaker & Bryant's Thermal Aërobic, Sewage Filter, showing Sprinkler.

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reports to the London County Council by Dr. Frank Clowes, successor to Mr. Dibdin. The bacteriological experiments have been conducted by Dr. A. C. Houston.

By applying crude sewage at the rate of 1,665,000 gallons per acre per day to a six foot coke bed, over 50 per cent. of the dissolved oxidisable and putrescible matters of raw sewage were removed and all of the suspended matter.

By a second treatment about 20 per cent. additional were removed thus giving a total average purification of 70 per cent. In these experiments the sewage had been roughly screened before reaching the beds, that is, it was free from what is usually described as filth and free from coarse sand and heavy mineral road detritus, but it contained all the suspended matter called sludge.

No trouble whatever was found in keeping the coke beds free as they only required raking over occasionally.

The effluent from these beds was not offensive in character and did not become so when kept, even when the sewage was poured upon the the beds in a most foul condition.

Many engineers are now experimenting with deep bacteria beds filled with various materials, and some now believe that better results can be obtained by a constant application of sewage in a spray to the surface of the beds and allowing it to trickle through the material, than by intermittingly flooding and draining a bed. Several devices have been patented for distributing the sewage. The Whittaker, Candy, Harding and Stoddard methods are shown in the accompanying photographs taken by the writer.

Where there is ample fall at the location of the disposal works, the method of continuous application of the sewage to coarse beds of considerable depth will no doubt prove fully satisfactory.

Mr. Stoddart of Bristol, has succeeded in successfully treating sewage at the rate of from  $2\frac{1}{2}$  to  $6\frac{1}{2}$  million gallons per day upon one acre, by means of his patent distributor, the depth of bed material being only five feet. The purification effected as determined by the oxygen consumed was 90 per cent.

Mr. Stoddart experimented on different methods of distributing the sewage over the surface of the bed, and worked for some years on the principal of a perforated plate or tube but ultimately abandoned it as impracticable, as he found that the liquid treated is never free from suspended solids, and gelatinous growths form, that soon block up the apertures in the plate tube.

The Candy and Whittaker distributors, which the writer saw in operation, are, however, made of perforated pipes, and those who were in charge of the works where they were in use stated that there was very little trouble from the above causes.



wing Sprinkler.

Among the prominent variations of the bacterial process are the Scott-Moncrieff system, the Ducat system, the Adeney, the Waring, the Garfield and the Whittaker, all essentially Dibdin Bacteria Beds, with patented appliances added, some of very doubtful utility.

The purification is effected in bacteria beds, principally by aerobic bacteria, or those that work when supplied with air, although anaerobic bacteria are also present.

In 1895, Mr. Donald Cameron, city surveyor of Exeter, became convinced as a result of experiments, that the solid matters in sewage could be dissolved and destroyed by anaerobic bacteria, and the first septic tank system was constructed to deal with the sewage from a small part of the city.

The system consists of a small grit chamber, a closed septic tank, and five small filter beds. The crude sewage flows into the septic tank with a capacity equal to twenty hours' flow, in which the sewage stands about seven feet in depth, thence through a submerged outlet pipe to an aerating device, thence to the beds, which are operated in exactly the same way as the finer beds in the Sutton system.

Mr. Cameron has devised a most ingenious apparatus for automatically filling and emptying the beds in rotation.

Judging from analysis, the action of the septic tank is anaerobic.

The effluent from the tank is dark and soon becomes offensive, that is the solids have been broken up and dissolved, and the sewage is prepared for rapid decomposition or for immediate treatment in the finer bed.

Upon the surface of the sewage in the tank a scum or blanket forms, that varies in thickness and consistency with the temperature. The company claims that one cubic foot of gas per capita per day is also produced, that can be utilized for lighting.

The Exeter plant was put in operation in August 1896, and the writer was informed that it had not been cleaned out since the works started. There was in March last about three feet of semi-fluid sediment, etc., in bottom, but the work being done in the tank was better than during the first year or so.

The effluent produced by this double process is satisfactory in every way, colorless, odorless, and not decomposing.

The effluents at Exeter have been analysed by many chemists, the results being uniformly good. The following table gives the results by Messrs. Dibdin and Thudicum. in parts per 100,000 :

|                     | Ammonia.         |          | Oxygen absorbed in four hours | Nitrites and Nitrates. |
|---------------------|------------------|----------|-------------------------------|------------------------|
|                     | Free and Saline. | Organic. |                               |                        |
| Tank effluent.....  | 3.94             | 0.25     | 2                             | 0                      |
| Final effluent..... | 2.43             | 0.11     | 0.55                          | 0.864                  |

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The Septic Tank Syndicate designed the works for Barrhead, near Glasgow, which were completed in 1899. These works are intended to treat 400,000 gallons per 24 hours. The sewage is practically domestic with some street water, which carries down dirt.

Two small grit tanks remove the road detritus. From these the sewage flows through four closed septic tanks, thence through aerators to eight beds, the filling and emptying being automatically regulated. The effluent from these works at the time of the writer's visit, was exceptionally clear and odorless. The Septic Tank Syndicate has now under construction several works in Great Britain and has established agencies in other countries.

The writer found many engineers in England who believed that an open settling tank would be substituted for the septic tank, and in several places sedimentation tanks were being experimented with as open septic, with results that were generally considered as satisfactory.

Very extended and practical experiments were made at Leicester during the years 1898 and 1899, under the direction of E. George Mawby, M. Inst. C.E., to prove the efficiency of the following:—

- (a) An open detritus tank of comparatively small capacity.
- (b) A closed detritus tank " " "
- (c) An open settling tank.
- (d) A septic tank of same capacity as (c).
- (e) Coarse bacteria beds.
- (f) Treating effluent from (e) on land.
- (g) Treating effluent from (e) on fine bacteria beds, and not on land.

The capacity of the tanks was 144,593 gallons, area of coarse beds one tenth of an acre, and area of fine beds 150 square yards. From 62,000 gallons to 429 000 gallons (in storms) was treated per day.

He obtained the best results by using either the detritus tank (closed or open) followed by treating the sewage on coarse bacteria beds then on land, the beds being worked on the intermittent system.

The following table shows the degree of purification obtained, the quantities being given in grains per gallon:—

|                         | Crude Sewage. | Effluent from  |                |             |
|-------------------------|---------------|----------------|----------------|-------------|
|                         |               | Detritus Tank. | Bacteria Beds. | Grass Land. |
| Suspended Matters ..... | 43.7          | 20.32          | 4.87           | 0.385       |
| Alb. Ammonia .....      | 1.182         | 0.893          | 0.343          | 0.156       |
| Oxygen absorbed .....   | 7.442         | 5.795          | 2.145          | 0.663       |

The Leicester sewage is strong, particularly in albumenoid ammonia. The purification effected before reaching the grass land averaged 77 per cent.

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Land purification is now recognized as being due to bacterial action, as in the Suttron system, but in the majority of cities and towns a sufficient area of suitable land is not available within a reasonable distance, or at such an elevation that sewage can be conveyed to it by gravity.

At Manchester the experts engaged by the city have advised the adoption of the double contact beds preceded by a septic tank, and state that this system is not only the best for Manchester but for the whole world.

The construction of bacteria beds and of septic tanks are simple problems in engineering, but the area of tanks and beds, the materials and grade of the filling materials, and method of working, must be determined in each case by an experienced sanitary engineer. Where the fall available at the works is limited, the septic tank method has an advantage over double contact bacteria beds, but in most cases the cost will be greater and there are royalties to be paid. Either system will work satisfactorily during winter, no sludge is produced, no chemicals are used, and the effluent can be discharged into any stream without creating a nuisance.

One acre of beds four feet deep may be relied on to remove 90 per cent. of the impurities from the domestic sewage produced by a population of 5,000 people, the works will cost less than precipitation works, the operating expenses only a fraction of those of the latter, while the effluent will be much purer.

Within the next few years the precipitation works now so general in Great Britain, will in the writer's opinion, be converted into bacteria tanks, the press rooms closed and machinery sold. In several places visited, the pressing machinery was now idle although the conversion of the works was not fully completed.

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## THE VITALITY OF TYPHOID, DIPHTHERIA AND CHOLERA BACTERIA IN MILK.

By W. T. CONNELL, M.D., PROF. OF PATHOLOGY AND HYGIENE,  
QUEEN'S UNIVERSITY.

*Gentlemen*:—The role of milk as a carrier of the infective agents of disease has long been recognized as a highly important one, but it is not the purpose of this paper to take up all the infective forms so carried. All it is necessary to say generally is that practically, with the exception of the tubercle bacillus, all these agents are derived from without. We have very many forms of bacterial invasion of milk which lead to manifold disturbances in the body, varying from the simple digestive disturbances of children due to chemical poisoning, to non-specific and specific forms of infection. Among the specific morbid agents which may and frequently do infect through milk are the causal bacteria of typhoid fever, diphtheria and Asiatic cholera, and numerous outbreaks of these diseases have been traced to infection of the milk supply.

At varying periods I have made experiments on the viability and vitality of the bacteria of these three diseases, when placed in milk. My experiments are still but in the preliminary stages as they only apply to milk kept at the average heat of the laboratory, viz. 70° to 72° F. This, however, is the average temperature at which milk would be kept in houses and hence is the most important temperature range.

Sterilized milk is an excellent culture medium for all three bacteria. In it they develop and retain their vitality for from three to six months. Tubes have not been examined after the latter period but no doubt living bacteria could be demonstrated (particularly of typhoid and diphtheria) after this period.

*Diphtheria Bacillus*.—The diphtheria bacillus in sterilized milk at average summer temperature (70° F) multiplies quite slowly. As the temperature rises so does the rapidity of multiplication. Even then under the best conditions at average room temperature the diphtheria bacillus does not markedly flourish.

Sterilized milk tubes were inoculated with the diphtheria bacillus and the bacillus acidi lactici. This latter microbe was selected because it is the common cause of souring and curdling of milk and again because it is practically always present in fresh milk as it can usually be demonstrated in the "fore" milk. In such tubes the diphtheria bacillus was noticed to have never increased in number while of course the lactic acid germ multiplied enormously. Gradually the diphtheria bacilli died out of the milk and were never recovered after the seventh day. The growth of the lactic acid germ has in all my experiments been inimical to the devel-

opment of the diphtheria bacillus. I may say that in attempting to recover the diphtheria bacillus from milk I used blood serum as is used in ordinary clinical diagnosis. On this medium the lactic acid bacillus practically refuses to grow at body heat. In sterilized milk inoculated with diphtheria bacilli and the common blue mould, *Penicillium glaucum*, one notes a slight multiplication of the bacillus during the first few days but the mould then rapidly develops and destroys the bacillus from the 5th to the 10th day. Fresh milk was also inoculated with diphtheria and examined at 4 hour intervals. Here again no increase in the diphtheria bacillus was noted, though they were present and retained their vitality at least 5 days. In the fresh milk samples the lactic acid was constantly present and with it various other species such as *sarcina lutea*, a variety of bacillus coli, a yeast and the common blue mould.

From the above experiments it appears that at an average temperature of 70° to 72° F. the diphtheria bacillus, while it remains alive and virulent during the period in which the milk is used domestically, yet does not tend to multiply in such milk and is sooner or later killed out in competition with the common milk saprophytes. In other words milk infected with the diphtheria microbe at average even heat does not increase in virulency. As these statements do not seem to be in line with many facts noted in connection with some diphtheria infections I mean to again repeat my experiments to see if any previous results can be confirmed.

*Typhoid Bacillus.*—In sterilized milk at the room temperature the typhoid bacillus multiplies very rapidly and continuously for two or three days.

In sterilized milk inoculated with the bacillus and the lactic acid bacillus, both forms multiply rapidly neither seeming to exert a restraining influence on the other during the first two days at least. The typhoid bacillus is not killed out in such culture, being readily demonstrated 6 to 8 weeks after. The typhoid bacillus and penecillium glaucum flourish well together for 3 or 4 weeks when the typhoid germ gradually begins to die out though cultures can still be obtained after 3 or 4 months.

In fresh unsterilized milk the typhoid bacillus increases rapidly in numbers for the first 24 hours at least and could be demonstrated several weeks after infection of the tubes. I may say that in the fresh milk obtainable within an hour from the dairy, I was much bothered with the frequent presence of an actively motile bacillus of the color group which in many of its cultural characters resembled *B. typhosus* so that it was not possible to trace with accuracy the progress of the typhoid bacillus in such milk after the first 24 hours. These experiments show that the typhoid bacillus, once it obtains entry into the milk, rapidly and readily multiplies therein and remains alive for long periods. This last point assumes importance as it heightens the risk of infection of the succeeding day's supply when the milk utensils have not been properly cleansed.

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Epidemics of enteric fever from infected milk are usually looked upon as of severe type, perhaps owing to the large numbers of microbes which would be swallowed with the milk. For it is a well recognized fact that the number of infecting bacteria often exercises an influence on the severity of the infection owing perhaps to the fact that the tissue cannot at once cope with them.

*Spirillum of Asiatic Cholera.*—In sterilized milk at room heat the spirillum of cholera rapidly multiplies and remains alive for long periods.

In milk infected with the lactic acid bacillus as well as this germ, the cholera vibrio multiplies from 6 to 16 hours according to the activity of the lactic germ. This latter microbe soon obtains the ascendancy and rapidly kills out the cholera vibrio. Very seldom were any living spirilla obtained after 48 hours and never after 72. Practically the same results were noted in connection with samples of fresh milk inoculated. Thus the danger from cholera infected milk is during the periods immediately following its infection which is of course the common period of use of the milk. Later the lactic acid formed rapidly kills the cholera spirillum which as is well known is highly sensitive to the effects of the acids.

SUMMARY OF PAPER ON RESULTS OF DIPHTHERIA ANTI-TOXIN TREATMENT IN ISOLATION HOSPITAL, TORONTO.

BY E. B. SHUTTLEWORTH, PH. D., BACTERIOLOGIST TORONTO LOCAL BOARD OF HEALTH.

*Gentlemen:*—Experiments with antitoxin were made at the Isolation Hospital, Toronto, as early as November, 1894, shortly after the Budapest Congress, when Roux's paper called special attention to this branch of serum therapy. Fourteen patients suffering from true diphtheria, as proved by bacteriological test, were injected with serum. Three died, making a mortality of 21.4 per cent. as against 14.07 per cent. for the hospital mortality for the year.

This discouraging result, though not regarded as final, put a stop to experiments for the time, but last year they were resumed and continued so as to cover 100 cases of true diphtheria. Every alternate child under ten years of age admitted to the hospital was at once treated with antitoxin, in quantities varying from 500 to 5,000 units, as indicated by the symptoms, and a complete and systematic record was kept of each case. Similar records were made in regard to 100 contemporaneous cases represented by the alternate admissions, and in which antitoxin was not employed. In other regards the treatment of the two classes of cases was precisely the same.

The results have again proved unfortunate to the antitoxin treatment. The sexes were represented nearly equally, and the average ages, 5.42 and 5.64, were practically identical. The site of the membrane, a good indication of the probable character of the attack, was somewhat different, there being four per cent. more laryngeal cases among the antitoxin patients and thirteen per cent. less naso-pharyngeal cases. These numbers would to some extent balance one another, with a leaning towards the antitoxin side. The average time of disappearance of the membrane was 8 days in antitoxin cases, against 9.1 days; while the disappearance of bacilli, as shown by examinations of cultures took place rather more rapidly in the untreated cases, the number of days being respectively 25.5 and 24.0. The mortality in the antitoxin cases was nineteen per cent., against sixteen per cent. for the ordinary treatment. Paralysis followed in eight per cent. of the antitoxin cases, and in one per cent. of the other class. The average time at which the injection was made was 2.67 days after the occurrence of sickness, as reported by parents.

During 1895-6-7-8 some patients were treated with serum before their admission to hospital. When such was reported by attendant physicians a record of the fact was made, and in this way 43 cases can be added to the list. It may be presumed that the injection was made at an earlier

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period than in the above 100 cases. Among the 43 patients there were 13 deaths, or 37.8, and the average detention in hospital was 25.3 days. The General Hospital mortality for all the years covering these cases gave an average of 14.34 per cent., and the hospital term was nearly two days less than that above specified.

If the above results be taken collectively there are in all 157 anti-toxin cases, with 33 deaths, or 21 per cent., and a duration of disease extending over 35 to 36 days. The mortality is much greater than usually recorded at the Isolation Hospital, and the term is longer. The writer does not pretend to explain this matter, but simply presents it as a plain statement of fact.

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## THE VALUE OF PROMPT ISOLATION.

BY J. COVENTRY, M. D., MEDICAL HEALTH OFFICER, WINDSOR.

*Gentlemen:*—The annals of contagious diseases in all countries where sanitary regulations are enforced show a marked diminution in the number of persons attacked, and what is still better, a smaller death rate.

While a number of distinct methods of prevention have contributed to this result, perhaps not any one of them has been more successful—certainly none of them more rational—than isolation.

It is not easy of application in many cases, but when its value is fully appreciated by the physician and the laity there are only a few cases where it cannot be accomplished in one way or another.

All health officers who have handled epidemics know that the first case in a community is by far the most important one—whether it is mild or severe. Physicians also know that from a sanitary standpoint the milder the disease the greater the danger to the public, because it is apt to be overlooked. In any event it is the nidus from which all other cases radiate, and geometrical progression hardly represents the rapidity of its radiation. How very important, then, is it to deal—and to deal promptly—with the first case, whether we estimate it from a sanitary, social or commercial standpoint!

From a sanitary point of view not a single word need be wasted on the subject, only to say that every health officer and every physician is charged with this mandate—"Isolate."

At the social threshold our troubles begin. Called to see a suspected case, the familiar expression is, "Doctor, I hope it is not scarlet fever," or diphtheria, as the case may be. The doctor, who is discreet, has his suspicions, takes refuge behind his facial entrenchments, dodges the question and says nothing. "Oh, Doctor, if it is really scarlet fever don't placard the house. Father works at a factory, John is in an office, Mary is in a dressmaking establishment, and Maggie and Willie and Charlie are just ready for their school examination, and if they do not pass they will be in the same form for another year." It does seem that the doctor, who is also the life-long friend of the family, would not hear such an appeal in vain. The stubborn facts are, however, that sometimes he does—and sometimes he does not.

If he reports the case to the Health Board he ties up the bread-winners of the family, and then next to committing sin against the Holy Ghost he interferes with promotion in the schools, and we all know what that means.

No matter how successful that physician may have been during many years in ministering to the ills of that family, his stock falls 50 per cent.,

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as soon as the Health Inspector sets his seal on the door lintel, and it would be good gambling to wager, that if another contagious disease were to make its appearance in that household, another physician would be called in, if there happened to be one within reach, who had the reputation of seeing things as policemen don't see them.

On the other hand if he allows his sympathies to outrun his judgment and does not report the case, an out-break of the disease is the result. For although he may elude the vigilance of the Health Officer, and stow the patient away in a remote part of the house, and the family may succeed in concealing the disease from the neighbors, amateur attempts at isolation and disinfection are almost certain to result in an outbreak of the disease, among relatives, neighbours and schoolmates of that family.

As a rule, however, I believe that schedule diseases are reported according to the rules laid down by the Health Boards, but not as promptly as they should be, owing partly to the doubt in the doctor's mind as to the true character of the disease, and, before the diagnosis has been made absolute, the disease has been communicated to others.

Too often the physician is reluctant to call on the Medical Health Officer for advice. True Medical Health Officers are not always good diagnosticians, although if politics did not cut so large a figure in their appointment, their selection would be contingent on special qualification in this direction.

Now let us consider what is to be done with a case of scarlet fever, or smallpox in the typical family, I have mentioned, but where there is no attempt made to conceal anything where the medical attendant is not sure, and the Medical Health Officer is also in doubt. Isolation is the only safeguard, but how is it to be accomplished? Certainly not successfully under the same roof with the rest of the family.

As yet there are very few communities educated up to the necessity of providing "Detention" Hospitals.

In the large cities and a few towns in Canada and the United States, Isolation Hospitals, so called, have been provided. They may be "isolated" enough, but they are generally very uninviting in appearance, and afford very few more comforts than a barn floor. Instead of this the very opposite should prevail. Accommodation equal to that of the very best Hospitals should be provided, and the attendance should be on a par with the other appointments. Why not? scarlet fever and smallpox patients are not criminals, neither are they paupers. They have the misfortune to be seized with a disease which, if they are not isolated, would endanger the lives of others, and if they allow themselves to be separated from their families and from comfortable homes, the State is bound to take the very best care of them it can.

I would go farther. There should also be a "Detention" Hospital, separate entirely from the other, where suspicious cases could be sent, until such time as the true character of the disease was determined. This

would guard against two sources of danger. The rest of the family would be safe, and so would the patient, because he would not come in contact with developed contagion.

This brings me to the consideration of something which is a little in advance of popular opinion, but which must appeal to all health officers who have struggled with epidemics. The expense of building and maintaining such hospitals is the only reason they are not in use. Just what branch of the Government machine should bear the expense is not easy to determine. There is no use in talking about County Councils taking it in hand. There are professional and social problems in connection with it which their philosophy never dreamed of.

The Legislature is handicapped by similar influences, and we turn to the Federal Government as a last resort. But here again we strike a snag. The last two bodies stand in the relation of a couple who have a judicial separation. They are not divorced, but still on visiting terms, and sometimes give and receive favors, when the signs are right. The Dominion has no control over contagious disease except at quarantine stations, and the anomaly is maintained of having no permanent quarantine officer or isolation grounds at inland points, or along the inland frontier, where the greatest danger exists.

I am happy to say, however, that this subject is receiving at present the attention of the Provincial Board of Health, and I am led to believe that an important step will be made in the near future towards isolation. But this will only cover the frontiers, and inland places will still be without detention and contagious disease hospitals unless the Legislature takes the initiative by offering to bear a portion of the cost of caring for them.

It is premature to suggest that townships or small towns should provide buildings, but every town of 5,000 inhabitants and upwards should have suitable buildings for the care of these cases, and this brings me to the commercial side of the question—the *argumentum ad hominem*—the ledger account.

A case of smallpox runs from twenty-five to thirty-five days, scarlet fever not quite so long, but as all members of the members of the family do not develop the disease at the same time, the house is liable to be placarded from six weeks to two months.

A low average salary would be \$45.00 per month, and this would show a loss of \$67.50 if only one member of the family was earning money. But in the average family of the present day in towns and cities the gross family earnings would be \$90.00 a month. For six weeks then, the loss would be \$157.50 to every family which had the misfortune to be shut up with one of the diseases mentioned. Without the application of strict sanitary methods twenty families would be a low estimate of the probable number attacked, and this would represent an annual loss of \$3,150. This only represents loss of earnings. Medical attendance, medicine,

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nursing and extras would amount to \$800. There is also a death rate to be reckoned with, which as we are making a minimum calculation we will place at two deaths, and as they will be more apt to be children than adults we will call their commercial value \$500 each. Funeral expenses would make up another \$100. This gives a total of \$4,850, and you will observe that it is an annual calculation.

This amount in one year would build all the hospital accommodation for the needs of a town of 5,000 inhabitants and the attendant cost would average less than \$1,000 a year. If this sum, or whatever sum it would cost to support the Hospital, was borne in part by the Government, in municipalities erecting these buildings, the burden would be easy to bear. The individual expense would be distributed equitably as it should be, and instead of an average sum of \$241 in loss of wages, and outlay by each family attacked the sum of \$30.00 for medical attendance and incidentals would cover this item. This anticipates the employment of the family physician, the nursing and medicine being supplied by the Hospital. Taking the total expenses of twenty families attacked every year and loss of wages the amount is given above at \$4,850. Under the method proposed, medical attendance would amount to say \$400, and incidentals \$200 more. The death loss of \$900 added would make the sum of \$1500 to be deducted from \$4,850. This shows an annual saving to twenty families of \$3,350 and the municipality after the first outlay for Hospitals would only have to pay from five to seven hundred dollars a year to support them, provided the Government would guarantee liberal aid towards their maintenance. There is always a good deal of difficulty in convincing people that new methods are better than old ones, and in matters of this kind the public may be slow to avail themselves of it, but an object lesson is the best educator. Let the public see that the proper accommodations and comforts are provided, and that dangerous contagious diseases can be limited to a single member of the family,—that sickness and suffering can be reduced to a minimum; that neither their occupation nor the education of their family is interfered with,—and last—but by far the most convincing appeal ever made to mortal man, that they will both save, and make money by it. *In hoc signo vinces.*

Demonstrate to a man that his neighbor has escaped a contagious disease by the isolation of one member of his family, while the neighbor across the street who has neglected to "isolate," has all his family down with the disease, and you are on the highway to convert the public, but this object will never be attained as long as the Isolation Hospital deserves the name of "Pest House" and is conducted on the financial system which prevails in managing a County Poor House.

The Provincial Board of Health could render no better service to the country than by designing a model Detention Hospital and another for infectious diseases, so planned that they can be added to as the needs of the place require, and so divided that a disease could not be communi-

cated to another part of the building. If they could see their way clear to do so some of the more enterprising towns would adopt their plan, and if successfully managed other places would follow suit. I am not sufficiently advanced in my sanitary education to recognize the necessity of including measles, whooping cough and chickenpox in the same category as smallpox, diphtheria and scarlet fever, but a beginning should be made somewhere and I would make it by isolating every case of the three latter diseases.

The value of isolation in dealing with the "Great White Plague" cannot be over estimated, but as the methods of handling it differ so radically from the management of the diseases above referred to, it would only render a somewhat complex question more complicated by including it in this paper, but there is no doubt in my mind that if we are to reduce the ravages of that disease its reduction will be largely accomplished by suitable methods of isolation.

All this is hypothecated on early detection, prompt isolation in providing properly constructed "Detention" and "Isolation" Hospitals, liberally assisted by Government aid in municipalities establishing them.