Vol 1 # 6

MEDICAL SCIENCE

ISSUED MONTHLY VIDEO MELIORA PROBOQUE TORONTO, MAR. 1, 1888

CONTENTS

MEDICAL SCIENCE

VIDEO MELIORA PROBOQUE

EDITORS

P. H. BRYCE, M.A., M.B., L.R.C.P. & S., EDIN. — P. J. STRATHY, M.D., M.R.C.S., ENG.
WILLIAM NATTRESS, M.D., M.R.C.S., ENG. — W. B. NESBITT, B.A., M.D., C.M.

ADDRESS ALL COMMUNICATIONS, EXCHANGES, ETC., TO DR. W. B. NESBITT, COR. COLLEGE & MCCAUL STS., TORONTO

ISSUED MONTHLY
VOL. 1: NO. 5

TORONTO, MARCH 1, 1888

SUBSCRIPTION, IN ADVANCE
$2.00 PER ANNUM

ORIGINAL ARTICLES.

ANNUAL ADDRESS.

BY JOHN COVENTRY, M.D., WINDSOR, PRESIDENT OF THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS OF ONTARIO.

Ladies and Gentlemen: This organization has now been in existence since October 1886. The duties which the members of it then took upon themselves and those since added, together with the results, are legitimate subjects for enquiry and criticism, not only by members of the Association, but by the public at large, who have been lead to expect some tangible proof of the usefulness of the society.

The constitution sets forth that the objects of the Association shall be to promote the interests of the public health. The progress made is certainly not such as could have been desired. With a view to assisting the Mayor of Woodstock and other gentlemen who were associated with him including nearly the whole of the medical profession of the town—to adopt a a system whereby a pure supply of water could be obtained for the use of the inhabitants, our last meeting was held there. Although that and other subjects were fully discussed, and the danger of drinking well water from a porous soil, was fully set forth, a by-law to introduce waterworks, was rejected shortly after our meeting.

For the purpose of collecting information which would enable us to place in a tabulated form the principal dangers menacing human life and the means used for preventing them, it was suggested at our last meeting that the work be divided among ten committees those you see named in the programme—to report at this meeting. I trust that the reports, generally, will be more satisfactory than the one assigned to myself.

If the health officers from whom information was asked, have failed to respond to our enquiries we readily anticipate the reason of their silence. In times past, and to a very great extent at the present time, medical men have had nearly the whole of the sanitary work of the country to look after. Some municipalities have appointed Medical Health Officers under the statute. Some have not. Nearly all have small salaries, some have none at all. One series of questions after another is sent to them and extended answers are requested, until the limit of unremunerated human endurance is reached and small blame attaches if the inquisitive circular is assigned to the waste basket.

A scriptural maxim says that "the laborer is worthy of his hire;" the sanitary laborer is expected to work without hire. Just how long this condition of affairs will last, is a problem that those who are entrusted with the legislation of the country are to consider. Is the Medical Health Officer a necessity? If he is, what should be his duties? what sum should he be paid for the faithful discharge of these duties? These points determined, it will be in order to enquire into the fitness of the physician to occupy this office.

We must not be too exacting at first but it will not be amiss to contemplate the Medical Health Officer of the future. It will not suffice that he is a good practitioner, or that he is a kindly, benevolent gentleman—nearly all doctors possess these qualifications. It is not enough that he is an abstemious man—that he does not drink nor smoke—shall I mention the hope that few medical men do either? It will not fill the bill that he keeps books correctly and makes regular returns to the Department. The Health Officer of the future will be an embodiment of a physician, a chemist, detective, an engineer, and if he is a bit of a lawyer it will be all the better. For present necessi-

ties we must use the talent we possess, but, if we are to lead and mould public opinion we must be provided with the means to require the knowledge necessary to make the Health Officer something more than a bureau for collecting statistics.

Medical schools in Canada and the United States give a nominal course in Hygiene called by courtesy, State Medicine, but falls short of conveying the technical knowledge or even the rhetorical instruction which would fit a student to assume the duties of a Medical Health Officer. When I saw it announced that the Ministry contemplated the addition of another Minister to the Cabinet a day dream recurred to me to which I had given expression at St. Thomas nearly six years ago, when the first Sanitary Convention was held there.

I then expressed the hope that the day was not far distant when a Minister with a portfolio of Public Health would take rank with other members of the Government, and such appropriation of money be made as would secure the services of the most intelligent men in the country, through whose efforts, preventable diseases and the mortality caused by them would be reduced to a minimum. Although agriculture and statistics are most important factors in the management of a country, public health, as will be clearly demonstrated by my friend Dr. Burrows and others, has a financial as well as a humanitarian side to it. If the whole attention of the Minister could not be given to it, the Government might see their way to the establishment of a Health Department under this Minister, that an efficient deputy with a permanent staff could lay the foundation of a technical and experimental school, a school provided with a laboratory where applied chemistry would be adapted to sanitary work, where instructions in the use of the microscope in making examination of specimens of water, milk and other articles of food could be given to those who desired to learn, where practical sanitary engineering and a thorough acquaintance with drainage and the modern methods of plumbing could be systematically taught, where instructions in the latest and most approved methods of heating and ventilation could be given, wherein the sanitarian *de nomine* would be transformed into the sanitarian *de facto*.

From such a school the country would be supplied with Health Officers who would not pedantically assert theories, but, having learned the methods of scientific investigation, would be prepared to do intelligent work.

These are ideas suggested in the performance of every-day health work, from a feeling of the necessity of a more extended knowledge in order to cope successfully with questions of daily occurrence, and I think that I express the wishes of a very large proportion of Medical Health Officers, as well as a very general desire on the part of the public at large, that means for improvement be placed within our reach.

If further argument were necessary I would point to other countries which have taken steps to accomplish a higher order of scientific investigation. The scope of this paper will not admit of detail, but I would point to the following countries which have appropriated large sums of money for the advancement of health work. Commencing with our nearest neighbor on the west, the State of Michigan, an institute of Hygiene has been established at a cost of $35,000. Other states of the Union are introducing plans for similar action. In Europe, we have Sweden with a school for technical sanitary teaching, costing 20,000 francs. England, France, Russia, Hungary, Switzerland, Germany, Denmark, Holland, Belgium, Italy and Spain have all Institutions of State Medicine, supported and, in some instances, liberally endowed from the public purse.

Ontario, as far as sanitary legislation goes, is in the front rank among the nations of the earth. Why not keep abreast with the times in the matter of scientific investigation and teaching? This step once taken it would be in order to adopt a curriculum for Medical Health Officers, to define in detail the work they shall perform. They might be classified and paid according to their qualifications, or on a basis of population. Some of the suggestions are intended for reflection more than for present action, but as the representatives of public health, we must be prepared for the progressive evolution which is going on throughout the world in the economics of human health, happiness and existence. As the bill of fare covers a very large area of health work. I do not wish to anticipate the conclusions of the committee at this stage of the proceedings by making too many suggestions, but I cannot help availing myself of the opportunity of urging upon your notice a few points which I think are worthy of your consideration.

There still exists a woful lack of uniformity in dealing with contagious disease. The time has come when individuals and ignorant committees who, from superstition and preconceived prejudices, systematically conceal disease, must be made to conform to the law of notification, and that inspectors who are entrusted with the process of disinfection, shall be required to do more thorough work than the general practice which prevails among them of merely deodorizing the premises. Disinfection means the destruction of all animal and vegetable life on the premises, and even more, the germs and spores must also be destroyed. To do it carelessly merely throws people off their guard, and, under the impression of safety, they are lured into greater danger.

The Health Officer's duties towards public and private schools should be defined by statute, and the result of his inspections should be embodied into quarterly reports, and forwarded to the Department of Education.

It would greatly assist in the diffusion of hygienic information among the masses if one of the duties of the Medical Health Officer was to deliver, say, two or three lectures annually in his municipality. Besides the information he could impart, it would draw around him those who have a natural taste for sanitary work, and afford a more beneficial direction for the pent-up energies which seek an outlet in the formation of secret and other societies, and I am sure that if subjects pertaining to health were discussed with the same earnestness which characterizes the deliberations of these organizations, the sum of the results would reach a ten-fold measure of usefulness to the community at large.

There is no more popular subject to-day than public sanitation. Let those of us, therefore, who are entrusted with the guidance of its methods, act with that deliberation, firmness and discretion which should mark the action of men having a sacred duty to perform.

THE DUTY OF THE STATE IN INVESTIGATING THE CAUSE OF DISEASES.

AN ADDRESS BY PROF. VICTOR VAUGHAN, OF THE LABORATORY OF HYGIENE, ANN ARBOR, MICHIGAN, BEFORE THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS OF ONTARIO.

Mr. President, Ladies and Gentlemen,—The great pestilential diseases which have at one time or another visited every part of the inhabited globe have had their origin in man's ignorance. Some twenty-three hundred years ago, when the Athenians were suffering from the pestilence, they said that someone had poisoned their drinking water. The same cry went up three years ago when hundreds of the inhabitants of the village of Plymouth, Pa., were prostrated with typhoid fever. In both instances the accusation was correct, but the poisoning had not in either case been done maliciously, but ignorantly. No enemy had come stealing by night and cast the powerful poison into the water, but the people themselves had allowed their excretions to accumulate about them until the germs of disease thus furnished with suitable material elaborated poisons more powerful than those known to the chemist. In the Middle Ages, the black-plague spread time and time again over Europe. In 1348, between the 1st of March and the last of July, there died in Florence more than 100,000 people from this disease, Geneva lost 40,000 inhabitants, Naples 60,000, Venice 70,000, and within four years there died in Southern Europe not less than 4,000,000 people, of this disease. In 1665 in London, the plague destroyed not less than 100,000. After the plague came the sweating sickness, typhus fever and cholera, all of which are now recognized as having their origin and spread in the ignorance and carelessness of man. "But," says one, "all of this refers to the past." "We will admit that past generations of men were ignorant and frequently brought upon themselves disease and death, but we live in an enlightened day and generation, and certainly there are no great plagues among us, which might be removed by more information." Let us see about this, my friend. Let us inquire into the ravages of a single disease now existing. We will take as the type of filth diseases of the present, typhoid fever, a disease which owes its existence and spread to the ignorance and carelessness of man. To what extent does this disease exist? In the Province of Ontario, there die on an average each year not less than 500 people from this one disease. For every death there are at least 10 cases of sickness. Thus, there are each year in this Province at least 5,000 persons sick with typhoid fever. The average duration of the illness is about four weeks, making an aggregate of 20,000 weeks of sickness each year from this one disease. For each person sick, the time and attention of at least one attendant is necessary. There are therefore 10,000 people

each year suffering from or nursing those sick with typhoid fever. Supposing that the time of the sick man and his attendant is worth only 50 cents per day each, then the actual money loss to the Province in time each year from this disease is not less that $140,000. Add to this $1,000 for each death from this disease and you will see that this disease is costing the people of Ontario not less than $640,000 per year. An expensive luxury, is it not? But we have been looking at this matter only from the financial standpoint. Look at it from the humane standpoint and it becomes more appalling still. Statisticians coolly calculate the value of each adult to the state at $1,000. But ask the mother whose son, just coming into a bright and vigorous manhood, has been stricken down with this disease, the value of that life, which has just been lost to her, and through her tears, she will look upon you as a madman. That life was worth to her more than all the gold which has ever been washed from the glittering sands of California, more than all the diamonds of Brazil—that life to her was beyond and above all financial consideration. Then typhoid fever strikes down those yet in the early morning of manhood and womanhood. If the value of the average human life is $1,000, that of the average life which is cut short by typhoid fever is much greater. The young man has just ceased to be only a consumer, he is now a producer. He has been raised with care through infancy, his time and his father's money and his mother's labor have secured for him an education. Twenty years have been spent in the preparation for life, and now just as he promises to be a support and solace to his parents, as he prepares to make for himself a home, he is cut down by this disease, which owes its existence to man's ignorance and carelessness, a disease which in the great sanitary millenium which is coming will be no more known than is the black plague to-day. People of Toronto, how much are you paying to maintain this disease in your midst? how many lives are you sacrificing each year to this demon? The average death-rate in Toronto from this disease is about 8 per 10,000, and with a population of 150,000, which all of you will say is altogether too low, 120 of your men and women die each year from this disease. This alone is a money loss of $120,000, and we will say nothing of the loss from sickness, of the many who are left partial invalids for years and some of them for life. But you are ready to say that Toronto is a healthy city and its death-rate compares favorably with that of almost any other city as large as Toronto. Let us see about that. The death-rate from typhoid fever in Munich, which was in 1859 about 30 per 10,000, has been cut down, mainly by following the advice of Pettenkofer founded upon researches made by himself and his students in the famous laboratory of hygiene, to less than one per 10,000. The same results obtained in Toronto would save not less than 100 lives per year and prevent not less than 1,000 cases of illness. Is not this a work that is worth doing? Should it not appeal to the philanthropist, to the humanitarian, to the christians, to all the people, to the Government? It will appeal to all and, I predict, not in vain. The historian of 1887 will record to our shame that the death-rate from that dreaded, filth disease in Toronto in 1887 was as high as a 8 per 10,000. How is this great work to be done? Can it be done by following the advice of Pettenkofer to the citizens of Munich? In fact that advice can be followed. But typhoid fever depends upon local conditions and these local conditions must be investigated. The drinking water-supply must be investigated by the chemist and by the bacteriologist. The organic matter in the soil and in the air must be studied in the same way. Do as Munich did. Build and equip a laboratory of Hygiene. Furnish your Provincial Board of Health with the facilities, and a Canadian Pettenkofer will appear, whom the present generation will bless and whose name will be honored by the generations of the future.

In the past, the world has always given more honor to him who destroyed than to him who saved life. The pages of history are covered with the names of the heroes of battles, but have failed to mention, or have barely mentioned, the names of those who have walked in the pestilence in order to save life. Masters in art have spread upon the canvas the features of the tyrant and have left to the tyro to portray the saviors of mankind. The multitude cried, "great is Cæsar," and "to the cross" with Him who healed the sick and raised the dead. The London laryngologist might have removed a hundred tumors from the throats of as many plebeians and he would have been plain Dr. Mackenzie yet, but after he performed the

operation on the Crown Prince he became Sir Morell Mackenzie. Germany with liberal hand has bestowed honors upon her military heroes, but her greatest scientist, Virchow, wears no decoration on his breast.

But times are changing and all classes of people are changing with them. Charles Darwin, weak in body, but a giant in mind, teaching a doctrine repugnant to the majority of mankind, wrung from the greatest universities of England recognition, and obtained a resting place for his ashes among the heroes of his land. People are beginning to recognize the fact that brain is mightier than muscle, that he who saves is greater than he who destroys, that he who builds is more to be honored than he who tears down, that the Pasteurs and Victor Hugos are better than the Napoleons. In this change, sanitary Science, or the prevention of disease and death, is beginning to receive the recognition which it deserves. We have already referred to the labors of Pettenkofer at Munich. Koch in his great laboratory at Berlin has demonstrated the true cause of cholera and consumption. Eberth has succeeded in isolating the germs of typhoid fever. Pasteur in France protects the domestic animals against anthrax and man against hydrophobia. Burdon-Sanderson, Klein, and others in England, have done valuable health work. Laboratories of Hygiene are in operation not only in Germany and France, but in Austria, Hungary, Holland, Belgium, Italy, Denmark, Sweden and Russia. In 1887 the Michigan State Board of Health and the Regents of the State University united in asking an appropriation of $70,000 for building and equipping laboratories of hygiene and auxiliary sciences. The people generally, took up the request. The business men's Association, representing more than 1,800 business men, petitioned that the appropriation be granted. The secretary of the Dairymen's Association interested himself and the Association in the work. Scientific societies and eminent sanitarians outside of the State joined in urging the appropriation. The leading newspapers, without reference to party, did for it a great work. The bill passed the Senate without a dissenting vote and had in the House many more than the required majority. But by the antagonism of the Governor, the amount was cut down to $35,000, half the sum allowed by the Legislature. With this, the laboratory is being constructed and the work has already been begun, the first quarterly report having just been issued and by it the people of the State may judge as to their wisdom in establishing the laboratory.

The work thus begun will grow until every State in the Union and each Province in Canada will have its hygienic laboratory.

Now, suppose that some foreign foe should invade the United States each year and slay 35,000 persons and disable ten times that number, or suppose that no lives were destroyed, but $35,000,000 worth of property should be seized by this foe and carried away, what would be the result? The clash of arms would be heard from one side of the continent to the other. The surplus in the treasury would trouble us no longer. It would be exhausted immediately in equipping armies for the field and navies for the sea. Millions of dollars and thousands of lives would be freely given to protect the property and lives of the citizen, *especially the property.*

On our side of the lakes we believe in protecting property. We throw special protection about our infant industries, and you seem to have some protection ideas, at least you appear to have great solicitude at present for a few fish which have escaped into the Atlantic.

Our Governments build upon every dangerous rock a light-house to protect the property of those whose ships ride upon the sea. The Signal Service, maintained in the United States at a cost of more than one million of dollars annually, gives daily warning of approaching storms, and watches most closely every change in barometer and temperature. Even the clouds cannot float in the sky without having their movements observed, chronicled and telegraphed all over the country. Through its efficient Bureau of Animal Industry, the general government of the United States has done much in the scientific investigation of some of the diseases of our domestic animals. As soon as an outbreak of pleuro-pneumonia or swine-plague is reported, an expert is sent from Washington to investigate the matter. Skilful bacteriologists study the germs of these diseases, and work really of great value is done.

The building of light-houses, the establishment and maintenance of the Signal Service and of the Bureau of Animal Industry are all praiseworthy. But what are the Governments on this side of the

Atlantic doing to ascertain the cause of the diseases which affect humanity? The United States has spent more money in investigating the causation of hog cholera than it has in similar investigations concerning any or all diseases of man. The lives of hogs, we will admit, are of great value, but are human lives worth nothing? We say that the chief duty of the State is to protect the property and life of the citizen. It is for this purpose that Governments come into existence. With this in view loyal people enact and obey the laws. Then is it not strange that disease, the most relentless enemy which man has, has not been combatted by the combined energy and strength of all—by the State? "But," says one, "we leave all to the medical profession. We expect the physicians to find out everything about disease." The medical profession has done much in this direction. It has numbered among its followers many noble men, who have devoted their time and energy and given their lives to the prevention of diseases. More than two thousand years ago the Athenians cried to Hippocrates to save them from the pestilence, and, if history be true, that cry was not in vain. We are all ready to do honor to the name of Jenner, who, unaided, robbed that loathsome disease, small-pox, of its horrors. Many other less known names might be mentioned. Indeed, the history of the profession is crowded with the record of the names and deeds of these lovers of science and of humanity.

But it should be clearly understood that all work of this kind lies outside of strict professional duty. The prevention of disease is no more the duty of the medical man than is the prevention of litigation the duty of the lawyer. Notwithstanding these facts, the majority of those now engaged in sanitary work are physicians.

But inquiries concerning the causation of sickness and death are of too much importance to be relegated wholly to any one profession, and to be forgotten by all others. It is a work in which all are interested and in which all should labor in one way or another. It is a matter in which all have direct financial interests. If properly carried out it saves time and money for all, and all should see that it is well done. If diligently pursued it will save many lives to the State, and the State should see that it is diligently pursued.

The prosecution of these inquiries should not be forced to await the convenience of any individual nor of any profession. It should be advanced systematically and scientifically, and this can best be done by the Government. Year in and year out this warfare against disease should be urged and individuals cannot be expected to do work of that kind.

Individuals cannot afford the time and money to prosecute these investigations. While the expense to the whole, that is, to the State, would be comparatively small, to the individual, it would be much more than he could bear. Laboratories and apparatus are needed in this work. Trained assistants must aid in carrying out the work planned by the investigator. Physics, chemistry and biology must yield service. The microscope, retort and culture flask must all be used. Time, patience and skill must be exercised for a long time, before the ignorance and superstition concerning the causation of disease can be removed.

Then, again, many questions concerning the causation of disease can be studied only under the direction of the State. The investigator must at times be allowed to enter private premises or to investigate the property of corporations in the prosecution of his studies, and in doing so he must be authorized by the Government.

"But," says one, "what benefit should the people expect to receive from such studies? They might help physicians in the treatment of disease, but is not that all?" My friend, were that all, it would be enough. If years of such research carried on by the Province of Ontario should furnish the information by which the physicians within its borders could cut down the death-rate one-half, then the work would still be worth the doing. In every life which he saves, the physician makes only a few dollars for himself, but he saves, as we have seen, $1,000 for the State. Then if money spent in investigating the causes of disease did nothing more than aid physicians in the treatment of disease, it would be well spent. But it would do more than this. It would abate disease, save life and increase the average duration of life. And this means much. It means increased prosperity and happiness. It will lead to contentment and improvement of the working classes. Poverty with health can be borne; indeed, it may be a blessing. Poverty with disease is an unmitigated

curse. This is a combination which leads to discontent and even to despair. Taxes raised to prosecute studies with reference to the causation of disease is a legitimate and an effectual way in which the sick man may aid the poor. It is a proper method by which the State may take from the one and give to the other. The same is true of taxation for the support of the public schools. Liberated from the bondage of disease and with the highest education free to him, the son of the poorest man among us need no longer suffer for the necessities of life, he need no longer be poor. An anti-poverty society which demands taxation for public health and public education would be one to which all of us should give our warmest support. This would be a kind of communism which statesmen should encourage and Governments foster. People of Ontario, there should be no education among you too costly for the son of the poor man to acquire! There should be among your laboring classes no disease which human skill, liberally aided by the Government, cannot eradicate. Is there a laboring man among your lawgivers? if so, I would say to him, never cease from your efforts until your Government has done all that it can to remove the shackles of ignorance and disease from those for whom you labor. Education and health for all. Ministers of every creed should plead for this. Physicians and scientists should labor for it. Journalists should use their mighty power, the press, in its behalf. Statesmen should, for a while, forget parties and strive to do all in their power for public education and public health. Governments should see to it that these are secured, as far as is possible, to all.

METHODS OF BIOLOGICAL ANALYSIS OF DRINKING WATER.

BY R. RAMSAY WRIGHT, M.A., PROF. OF BIOLOGY, UNIVERSITY COLLEGE, TORONTO.

PROF. RAMSAY WRIGHT, of University College, Toronto, delivered an address on this subject, before the Association of Executive Health Officers, illustrating his remarks by displaying several specimens of bacteria of different kinds in process of culture. He said:—

Mr. President and Gentlemen.—When your secretary asked me to address you on some subject in harmony with the general objects of your meeting, it occurred to me that I might interest you for a few minutes by speaking of the methods of biological analysis of drinking water. Disease germs or microbes are things we often hear of, but seldom see; so I have brought with me this evening some specimens of the growths found in drinking water. Some of the water I obtained from the lake and some from the bay opposite the city of Toronto, for the examination of the bacteria present therein, and in doing so I have employed the little machine which I have brought with me, the invention of an Edinburgh chemist, and which fits a four-ounce bottle and enables me to obtain several specimens of that quantity and at whatever depth desired. In that way I can sterilize a dozen different bottles of water. This little machine is a very convenient contrivance, being provided with two strings arranged in such a way that by means of one you can let down the bottle, and by means of the other you can remove the stopper, so as to fill the bottle at any depth you choose. By this means you are sure of obtaining an accurate sample of water.

After the water has been secured in a bottle in this way, it is necessary to proceed to examine it at once, because we know that bacteria will increase very rapidly in water which is above its natural temperature. The quantity taken is about one cubic centimetre, equal to something less than a half spoonful. That is placed in a small quantity of nutrient jelly, something like calf's foot jelly, which you see is so clear that the housewife might never suspect it. It is provided with *peptones* and *bouillon*; water is added to that, and the substance is poured out on a plate, on which it can be sterilized in an oven. I have a sample of tap water which I took on Saturday, and you will see that it is not in very good condition. It contains more points in development than it did in summer. All of the points comprise colonies of bacteria, by far the most of them I think perfectly harmless forms. You can see the separate points in the jelly, and it is a very simple matter to estimate the number of bacteria present in such a small quantity of water. One simply counts the number of colonies formed on the plate, which has been marked into squares, and estimates the number of germs in the vessel. Each of these has been provided with food, and the jelly has restrained the development of the bacteria, so as to form the separate little points shown in the preparation.

That gives a quantitative estimate of the bacteria in tap-water. But of course a very much more important thing is a qualitative study of them, which is also much more difficult. I have listened with great pleasure to the gentlemen who have preceded me and who expressed their opinion as to the desirability of our having a laboratory of hygiene, where such investigations could be properly made. I am only an amateur in this matter, for, although our bacteriology is a portion of our biological department, still it is only a very small portion, and although we have a bacteriological department in our laboratory it forms a very small part of it. But I can understand the value of an efficient laboratory in which it might easily be determined whether there are on these plates typhoid germs, germs of pus-producing organisms, etc. The qualitative analysis is made by transferring the points on the plate to various culture media, in which they can be recognized. If I were to take these bacteria and hold them on the point of a platinum point heated, and plunge it into the jelly, I would get the different forms of bacteria. On looking at them, one can recognize them as belonging to different species. By thus transferring the points of bacteria to different culture media, one can recognize the different kinds. Here is another culture medium that rather resembles Irish moss. It is a Japanese substitute for Irish moss called *agar*, which can be subjected to the ordinary temperature of the body, as jelly cannot be. It is one of the so-called pus-producing forms of germs, and occasions abscesses and other diseases such as ulcerative carditis. That germ is called staphylococcus aureus and it produces quite serious consequences in the human body. The potato is another celebrated culture medium of various forms. I pass around two segments of potatoes bearing some of the forms in a state of cultivation.

Now, the question arises, how are we to remove these germs from water? Of course, boiling is undoubtedly the most effective way to remove microbes of any form from drinking water. It is urged as an objection to this that boiling makes the water flat and disagreeable to drink, and so it does; but that objection may be got rid of by charging the water with carbonic acid, which can be done in any family. I pass around a specimen bottle of soda water. If is undoubtedly the case that carbonic acid is very unfavorable to the development of germs of various kinds of pathogenic bacteria, although typhoid germs display the greatest resistance. Another method of removing the germs is by filtration. There are undoubtedly some filters which will remove large quantities of germs from drinking water, but unfortunately a great many of the filters in common use are by no means free from objection. Some of the more modern filters, however, have been proved to be very good indeed. I have one here which has been especially praised, though I am sorry to say I have not secured any agency for it. It is called the Chamberland and Roux filter. It is simply a clay cylinder which is closed perfectly everywhere, except that it has an orifice at one end into which passes a tube, and the water has to pass through the clay into the interior of the tube. It has been observed that if the water is forced through the clay under high pressure such as our ordinary tap pressure, microbes will pass through, but that if the water is forced through under low pressure it will be comparatively free from germs. It requires a considerable amount of patience, however, to wait for the water to find its way through this filter. This is a disadvantage, of course, but the same thing has been said of the asbestos filter.

Now, it may be of interest to say a word or two as to the effect of freezing upon water germs, a subject that was discussed in some of the Toronto newspapers not long ago. I happened to be out of town while that discussion was in progress, otherwise I might have contributed something to it. The question is, does the freezing of water purify it? We know very well that ice which forms on even dirty water looks comparatively pure. In connection with this question we may also ask, how does freezing affect microbes and disease germs which are present in the water, and how does the length of time that they are very often kept in this frozen condition affect the life of the germs? I have not myself made any experiments bearing on this question, but a series of very excellent experiments have been made in Turin, Italy, by an eminent bacteriologist. Large quantities of ice taken for the use of the citizens of Turin were examined. The ice was put into a hermetically closed refrigerator, and a small quantity was examined every month from January until the summer time. As a result of the experiment, it was found, on comparing the ice with the water

at the point where the ice was taken, that 90 per cent. of the germs had disappeared—that is to say, 10 per cent. of the germs persisted, a sufficient quantity to give points in development in the ordinary culture methods, thus proving that freezing is by no means sufficient to render water pure; also found that of the 10 per cent. of germs that persisted as many lived on until May or June as were to be detected in January, so that the mere fact of their having been found in a frozen condition did not appear to destroy their vitality at all. I do not know very much about the ice supply of Toronto, but I should say if ice is taken from any place where there is any danger of contamination from typhoid germs, that it is a very serious matter, because typhoid bacilli are known to be among the most resistant. Dr. Prudden, of New York, found that he could keep typhoid germs in existence for 103 days. Of course, there is no danger in using impure ice in refrigerators, so long as it does not come into contact with food; but so much ice is used in drinking water that we cannot be too careful about its character and the source from which it comes. Dr. Prudden found that the ice of the Hudson River, which is supplied to the city of New York, contained a number of pathogenic bacilli, which apparently came from the numerous towns and villages along the banks of the river.

The Italian gentleman whose investigations I have referred to, suggested that ice intended for drinking purposes should be made artificially, and that the so-called natural ice might be used for general cooling purposes. I think, sir, these are most of the remarks it has occurred to me to make.

REPORT OF COMMITTEE NO. 1 ON HOUSE AND LAND DRAINAGE, AND DISPOSAL OF SEWAGE.

PRESENTED BY C. S. ELLIOTT, M. D., CHAIRMAN, AND MEMBERS OF COMMITTEE TO THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS OF ONTARIO.

Mr. President, and Members of the Association:

IN accordance with the suggestions of Dr. Coventry, President of this Association, made at the last annual meeting, committees representing the ten Health Districts previously formed in this Province, were appointed by the executive committee, and a series of questions bearing on nine of the most important subjects connected with sanitary science, were, in November last, addressed to the several members of said committees. The executive committee did me the honor of appointing me chairman of committee No. 1, composed of eighteen members, to which was assigned the task of reporting on House and Land Drainage and the Disposal of Sewage, which, though not an inviting subject, is perhaps the most important and at the same time the most difficult that has engaged the attention of sanitarians in modern times. I regret that the selection was not made of one more able than myself to do the subject ample justice. On accepting the position of chairman, however, I had hoped that my own deficiencies would, in some measure, at least, be compensated for by the assistance I should receive from the members of the committee, but alas, in this I have been disappointed. Four only, out of eighteen have made returns, though reminders have been addressed to them, with an earnest request that they should report as early as possible, and of the four reports made, with one exception, the answers to the several questions were so meagre and indefinite it would be very difficult, if not impossible to base anything like an intelligent or instructive report thereon. The apathy and indifference usually manifested by the general public in matters sanitary, is a subject which those interested in sanitary reform, ever have to deplore, but I am sure it cannot be with other than feelings of shame that the members of this Association will unite with me in deploring the fact that so many Medical Health Officers and others interested with the important duty of carrying out the requirements of the Public Health Act, should manifest so little interest in the work of this Association; the objects of which are to popularize and extend a knowledge of these facts in sanitary science, which would, if acted upon, prove a priceless boon to our fellow countrymen.

In presenting this report it is perhaps needless for me to say that I have nothing new to advance upon this important subject. All I shall attempt or hope to do is to say a few words, which, though already familiar in substance to the members of this Association may provoke discussion and perhaps arouse some little interest in the minds of the general public on a subject which should be of vital importance to every one as an introduction to what I shall presently say in regard to defective drains and sewers. I shall then dwell for a few

moments upon the nature of sewer gas and mention some of the more palpable and fatal effects it is capable of producing when taken into the human system. Sewer gas, or more properly sewer air, is a compound, and analytical chemists tell us that the elements of which it is composed are sulphuretted hydrogen, carburetted hydrogen, sulphide of ammonia, oxygen, nitrogen, carbonic acid gas, and organic matter. But the constituents are not always the same, nor do they always exist in the same proportion. The noxious effects of the gas are fully shown by the fact that men have dropped instantly dead while at work in the sewers of London from breathing it, and that in some instances it has found its way into bedrooms through pipes and has caused the instant death of the occupants. If in a comparatively pure state its effects, in the smallest quantities, are so exceedingly dangerous, it must under other circumstances be considered capable of doing much harm. Its known effects are when present in exceedingly minute quantities in air which is breathed a feeling of lassitude, headache, drowsiness, vomiting, while the poisonous and deleterious effects of the organic elements, which are the decaying particles of animal and vegetable matter are well known to medical men as a frightful and frequent source of many of the most fatal diseases. It is now generally admitted that sewer air can be the source or promoter of all the diseases known as zymotic, viz.: typhoid, typhus, scarlet, cerebro-spinal and malarial fevers, small-pox, measles, dysentry, cholera, cholera morbus, cholera infantum, croup, diphtheria, whooping cough, puerperal diseases and some others. Of all the elements which enter into the cause of preventable diseases the influence and effect of this poisonous air which escapes from sewers must occupy the first and most important place, and there is reason to believe that in large cities it is the source of more physical suffering and the cause of more diseases than any other one thing. Theologians tell us that the arch-enemy of the human race is his satanic majesty, but sanitarians tell us that the arch-enemy of the human race is sewer gas, and being so unanimous in according that distinction to this terrible agent, it would scarcely be safe to hesitate to agree with them. It does not always kill, but it poisons the blood and lowers the vitality of once healthy men and women. It destroys or cripples their capacity for business or enjoyment. It robs men of ambition and women of beauty. It paves the way for specific diseases which would otherwise never have sent strong men to bed for months. It not only robs life of enjoyment, but it often renders it a burden, almost too intolerable to bear, and there are thousands suffering from its baneful effects who are entirely ignorant of the fact. It should need no argument to prove to any intelligent man that cesspools, whether open or covered, are an unmitigated nuisance and a frequent source of disease, and yet we are told on the best authority that most sewers are nothing but elongated cesspools, constantly generating poisonous gases which find a ready entrance into the houses with which they are connected. No sane man would build his house over an open cesspool, and yet in cities where there are public sewers, houses are built over or in connection with hidden cesspools, a thousand times more dangerous than one above ground. Into it empty thousands of drains, which in turn are connected by waste pipes and soil pipes with basins, kitchen sinks and water closets. Into these are deposited the waste of human bodies and the liquid waste of kitchens, laundries and lavatories. Through the waste pipes of the house this liquid filth is conveyed directly to the street sewer in which are also liquid abominations that often hold in solution matter still more objectionable. The pipes that connect a house with a sewer may perform their duty well enough as drains, but practically, they may be said to be *serviceable* as ventilating shafts for the hidden cesspool—the sewer. There is nothing about which the people of towns and cities seem to know so little as their sewage, while there is nothing relating to the comfort and healthy condition of a habitation with which any one of mature years should and might be more familiar. House drainage, an adjunct of sewage, is next in importance to the construction of the four walls of a house, but it is often the last thing that an occupant considers. If waste water runs off he is satisfied; he may even evince surprise when told it is not sufficient to know that the waste will be carried out of sight, that there should be no doubt that it reaches the sewer and that there is no leaking and spilling along the way. Every one ought to know that there should be such appliances in and about the pipes as would prevent the return of sewage

gas to the rooms of a house and every one ought to know that the time to see that a house is supplied with good and efficient drainage is when the house is being constructed. The trouble is that houses are built over sewers and connected with them with as much unconcern as though they were streams of pure water. Unfortnately sewers and drains are out of sight. A man may easily settle the question whether decaying garbage, in or about his premises, is responsible for obnoxious smells, but he cannot of his own knowledge say that they come from a defective drain or sewer. He can learn something of the architecture and mechanical construction of a house by observation, but he cannot so readily learn how a house should be drained even if the thought ever occurred to him that house-drainage consisted of anything more than getting waste water out of sight. He has possibly heard something about traps in pipes and drains but does not know where to look for them and very likely would not know their use when found. A plumber's advice and services are paid for but often to no good end. There is no part of a house in which imperfect work may so effectually escape detection as the drainage, hence there is often but little good work in the construction of drains. So long as the man who builds his own house does not know how sewage should be properly disposed of, it will have defective drainage and he will be troubled with sewer gas. So long as the tenant of a house is not able when he rents to determine whether the drainage is properly constructed, as he is that the house is secure, commodious and warm, those who have money to invest will continue to construct houses better adapted to ventilating the street sewers than for occupation. A man might better put his family into a shed in which they would suffer from cold in winter and heat in summer than into a brick mansion where the waste pipe of its kitchen sink is not securely tapped and ventilated, better for a family to live on a house-top where poisonous gases are sure to be disinfected by pure air, than within the house, although it has all the conveniences which human ingenuity can devise, and yet have defective drains beneath it. No provision of the Public Health Act of Ontario is of more importance than that which provides for the inspection of house drains, during construction by the local health authorities, and I think I am safe in saying no provision of that Act is so systematically ignored. Speaking from my own observations and experience during several years in which I was a Medical Health Officer, and judging from the negative replies sent me by the four members of this committee who have replied to the following question, viz.: Are house drains and plumbings inspected during construction, by municipal authorities? The requirements of the Act, in this particular, are seldom, if ever, complied with, at least in the villages and smaller towns of the Province. Both builders and owners generally regard an interference in the matter on the part of local health authorities, as gratuitous and unnecessary, and the construction of house drains, is now, as it ever has been, left almost exclusively to drain-layers and plumbers who are permitted to do work to suit themselves alone. When completed the work is so effectually concealed that no one could find out, if he desired to, whether it was done well or not, the result is that in many instances, competition has reduced the work to a sham and those houses which do not have defective drainage are the exception. The worst of it is, that the people themselves, who must suffer the consequences do not realize this, and are slow to learn the fact that the penalty of death even has been paid and must be paid over and over again, for the ignorance. It will be a blessed thing for this country and for every other, when every man and woman possesses such a knowledge of this subject and of its important bearing upon their health and comfort that the first enquiry about the house he or she is about to move into will be as to its drainage, and if not thoroughly satisfied as to its thoroughness and efficiency, shun it as they would a pest house. Then and then only shall we have happy homes, then and only then will those plagues such as diphtheria and kindred diseases which carry our children by hundreds to early graves, be unknown to our land.

Dr. Teale, a prominent physician and sanitarian, of Leeds, England, says, "That having discovered and rectified, one by one, numerous defects of drainage in my own house and in property under my charge, and having further traced illness among my patients to scandalous carelessness and gross dishonesty in drain work, I became indignantly alive to the fact that very few houses are safe to live in. The conviction struck deeply into my mind that probably one-third at least of the incidental illness and some of the fatal results in surgi-

cal operations in hospitals and private houses are the direct result of drainage defects and therefore can and ought to be prevented. Preventive medicine has long been producing such facts and long have we turned a deaf ear, and we of the medical profession in general, are only beginning to see the great reality of her teaching. If any one challenges this assertion in reference to my own profession I will reply by the enquiry, how many medical men can he tell me of who understand the sanitary condition of their own houses, or have adequately ascertained that those conditions are, so far as our knowledge at present goes, free from dangers to health? If by any possibility it could be brought about that every medical man in the kingdom should realize the necessity for looking into the state of his own house, and act upon that conviction, I feel certain that the discovery would be made in so great a proportion of instances that they were living over a pent up pestilence, that we should at once have an army of sanitarians, earnest and kind to ferret out unsuspected sources of illness." Dr. Teale goes on to say that he has been taught by observation and experience that if we are ever to have sound sanitary legislation, if we are ever to have our sanitary arrangements carried out in first-rate workmanship, it must be by the education of the public in the details of domestic sanitary matters, so that, realizing their vital importance, knowing what ought to be avoided, and able to judge of the correctness and quality of the work done, they may demand, and so obtain, first-rate workmanship. When diseases arise which we call preventable, depend upon it some one ought to have prevented it. Probably no work done throughout the kingdom is so badly done as work in house drains and pipes which are out of sight and I have no hesitation in declaring that defective work is due both to ignorance and dishonesty on the part of the workmen. Many more valuable opinions could be quoted to the same effect and thousands of instances could be given, where through the culpable carelessness, ignorance or neglect of of the workmen hundreds of lives have been sacrificed. Time, however, will only enable to briefly allude to one. I am sure there are but few present who will not be able to recall the memorable instance of the Toronto Lunatic Asylum, which was perhaps one of the most notable illustrations Canada has ever afforded of the sad consequences of defective drainage. Through the blundering, the stupidity, or the carelessness of some one, the basement drains had never been connected with the main sewer, and for four years after the occupancy of the institution all the sewage from kitchen and water-closets freely flowed into the basement, forming an enormous cesspool. It is needless to say that during all those years there was much sickness among the inmates and attendants and many were carried off by erysipelas, dysentry, typhoid, etc., till finally a fatal outbreak of cholera, regarded at the time as the genuine Asiatic type, lead to a thorough investigation and a discovery of the cause.

It is plain that a system of house drainage which will provide securely against sewage gas, must be perfect, both in construction and adaptation. The best possible material must be used, and the greatest care taken in the work; with the single exception of a defective joint there is as much danger as though the whole system were deficient. House drains should never become ventilating pipes for the street sewer, nor should they bring cesspools into or under a house in useless traps and catch-basins. House drains should carry waste out of a house, not much nor little, but all, and do it promptly. When that which is intended for the street sewer is started on its journey from kitchen sink, wash basin, or water closet, it should be afforded a means of reaching its destination at once and without interruption. Not an atom of filth should be allowed to cling to the sides of the waste pipes, nor be held in solution in some trap until it begins to decompose and give off its dangerous gases. A perfect system of house drainage will not leak, nor even contain any foul odors. It will not get out of repair at some unexpected moment, nor will it soon wear out. There is no more reason why there should be perishable material used, and defective joints made in house drains than in the pipes which conduct illuminating gas into a house. The latter are air tight and gas tight, so should the former be. House drains should be recognized as part of a house, not as an obnoxious adjunct, and be as accessible as any other part of the building. A perfect system of house drainage is possible, and until its essential details are understood by those who build houses to live in, the supervision, and construction of it should be entrusted to a sanitary engineer, just as the construc-

tion of the house itself is entrusted to an architect.

In only a few of the smaller cities and towns in Canada has the water carriage system yet been introduced, or if introduced, is only very partial in its application, and it may be safely said that but few, if any of the towns of 5,000 inhabitants and downward have got beyond the old privy vault and cesspool. I will speak now principally of the town of Orillia, but I am satisfied that what I am about to say of it will equally apply to most, if not all the towns of the same size in the province. The population of Orillia is about 5,000, but it is much older than many other towns in Ontario of the same population. It celebrated its jubilee several years ago. No attempt has ever yet been made in the construction of public sewers. A few private parties who have of recent years built better class houses have had constructed covered drains leading from their house drains to the open street gutter and the sewage from those, together with the surface drainage of the town is conducted through open ditches or gutters at the side of the street to the lake front. It may be said that Orillia possesses many advantages over most other towns of a similar size. She is situated on elevated ground so that from all directions she can command a good fall for a free outflow to a lake of considerable size. She possesses an excellent water system with an abundant supply of water, which by gravitation can be furnished to the greater number of her inhabitants in copious quantities. Everything, in fact, is favorable for the introduction of a perfect system of drainage, but although I have frequently urged upon the authorities the necessity for taking steps in the matter, no movement has yet been made in that direction. Various expedients and methods have been suggested and in many instances adopted, for supplanting the old-fashioned privy vault in towns where the water carriage system is not practicable, but I shall only be able to briefly allude to them. Among those found to be most useful may be mentioned the "ash closet system," the "dry earth system," and the "Rochdale pail system," each one of which are very good in their way and have been found to answer the purpose for which they are intended, fairly well, when the system is properly carried out, which is seldom the case, especially among the poorer and more ignorant classes. Much of the attention of sanitarians and others has been given of late years to the disposal of excreta and sewage, and the subject demands all the attention that can be given to it, in view of the dangers to life and health, arising, not only from foul and noxious gases, but through water contamination. The system of discharging sewage into rivers and creeks is universally condemned, and for obvious reasons, properly so. A system of carbonization in retorts has been attempted in some countries, but I believe is considered impracticable as it is tedious and expensive. The system which above all others must commend itself to those who are interested in the matter, must be that of employing it as a fertilizer, either after it has been deodorized by dry earth or after certain processes of manufacture applying it directly to the soil, or by the passage of liquid sewage over and through the soil. The reports of Dr. Alfred Carpenter, giving his experiences of sewage farming at Croyden, England, must be familiar to the members of this Association. By skillful and scientific processes he was able to utilize the whole of the sewage of Croyden, a town of between fifty and sixty thousand inhabitants, in such a satisfactory manner that he raised it from being one of the worst into one of the best sewered towns in the kingdom and at the same time made the investment a paying one. He has satisfactorily proved that sewage can be disposed of with advantage to the health of the people and as a paying investment by utilizing it as a fertilizer. From my own knowledge and experience I should strongly advocate the adoption of the dry earth system for solid excreta, in the smaller towns and villages throughout this country.

The question of land drainage is one which I shall leave to some members of this committee who may be present, or to an open discussion by the members of this Association, with one remark only; there are still thousands of acres of land in this province waiting to be drained, and year after year they continue, by their malarial exhalations, to contribute their full quota to the long list of preventable diseases.

CHLORAL AMMONIUM—TRICHLORAMIDO-ETHYLIC ALCOHOL.

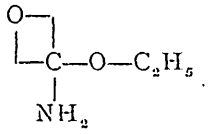
BY W. B. NESBITT, B.A., M.D., TORONTO, CANADA.

Read before the Canadian Institute, February 4th, 1888.

THE above compound is of interest to us, inasmuch as it promises to be an example of the modification of physiological action derived from a definite modification in chemical constitution. The discoveries of Crum-Brown, Fraser, and Schroff have shown that by modifying artificially the chemical constitution of a compound it is possible to definitely modify its physiological action.

Thus the introduction of the same radical—viz.: methyl—into various compounds always gives rise to similar modifications in physiological action, as when they introduced methyl into strychnine, brucine, and thebaine, and formed methylstrychnine, methylbrucine, etc. Instead of the usual convulsive action on the cord of the unmodified substances, the methyl derivatives had a paralyzing effect on motor nerve terminations, while other drugs which have no convulsive action, yet exert a paralyzing action on the introduction of the methyl radicle into their constitution. Thus we have methylcodeine, methylmorphine, ditoluyldiethyl, etc.

Still more recently Schmiedeberg has given us urethan ethylcarbamate,



as he considered that from the chemical constitution there should be a combination of physiological actions, a sedative effect being exercised by the ethyl radicle C_2H_5 on the cerebrum, and a stimulating one on the medulla and cord by the amidogen NH_2. In this, therefore, there should be, as in chloral, a soporific action, without the concomitant danger of paralyzing the respiratory centre and heart.

It was on reading Schmiedeberg's work and the inferences drawn as to the superiority of urethan over chloral, and also, from a consideration of the instances in which chloral would be superior to urethan, that it occurred to me that chloral might be so modified in chemical constitution as to obviate some of its dangers. The next point was to modify it, and at the same time affect as little as possible its normal action. Knowing that ordinary aldehyde (ethaldhyde), combined with ammonia to form aldehyde ammonia, or, more correctly, from its reactions, *amidoethylic alcohol*, $CH_3.CH(NH_2)OH.$, the inference was that trichlorethaldehyde, chloral, would act in the same way. On consulting the literature of the subject I found that the compound chloral ammonia, or, more correctly, *trichloramidoethylic alcohol*, $CCl_3.CH(NH_2)OH.$, was a definite crystalline one, and had been made so long ago that the original worker's name was not mentioned, but what was of more practical importance to me was the description by Schiff of the best method of preparing it. This consists in dissolving *dry* chloral, CCl_3CHO (not the hydrate), in one and a half times its bulk of *dry* chloroform, and passing cooled *dry* ammonia gas rapidly through the solution until the whole suddenly solidifies. The italics are mine, and the whole does not suddenly solidify. In preparing it we place the solution in an ordinary *wide-mouthed* bottle, fitted with a cork and two bent tubes, one of which, the afferent, passes just below the liquid at about the centre of the bottle, the other, the efferent, passing just through the cork. This bottle is then placed in a beaker of ice-water, and the cooled gas passed into it. It is necessary to keep the whole quite cool, otherwise the heat of reaction would decompose the compound. The ammonia is absorbed very rapidly. First that portion of the bottle above the contained liquid becomes filled with dense white fumes. These speedily disappear leaving the upper portion quite clear, and the liquid becomes dull, owing to commencing crystalization. If the gas-supply is now properly regulated, the ammonia will be absorbed as fast as it passes in, and no odor of it can be detected at the efferent tube. The bottle now gradually becomes filled with white crystals, closely packed from the bottom up, and from the sides towards the centre, until only a small portion of the solution is left, and the ammonia may be perceived to be passing over without being absorbed. As soon as this occurs the reaction must be stopped. The superabundant chloroform is now poured off (and preserved for future use). The resulting mass, which consists of fine crystals, must be pressed in filter-paper and dried in vacuo. The odor of the compound is peculiar but not unpleasant. The taste, when a very small portion is taken, was compared by a friend to that of butter-

nuts. However, when a dose is taken, it leaves a taste similar to that of chloral; but, unlike the latter, it immediately disappears upon taking a couple of mouthfuls of water. I have administered it in some forty different cases, and have not found any unpleasant effects to occur. The dose has been from 5 to 20 grains.

In all the instances, but three, mentioned above there was an increase in the number of respirations and in the pulse rate, for as long as I observed them, usually from half an hour to an hour. In some cases (nine) the increase was slight. In three the respiration and pulse remained the same.

The symptoms manifested immediately on taking the drug were a feeling of fulness or tension in the head, particularly noticeable in the region of the nostrils, and a pleasant diffusible warmth radiating from the stomach over the abdomen. The tension disappeared in a few minutes. In five observations with doses of five grains, made on myself, the symptoms were fully manifested, the respirations increased at the regular rate of about two per ten minutes for half an hour, the pulse increasing about twelve beats for that time.

For these latter *auto-observations*, however, I do not ask much credence, because, well knowing the close relations existing between the cerebrum and other nerve-centres, it is impossible to say, in this instance, just how far the *wish*, for favorable results, was *father* to the observed physiological action.

That there is, however, an undoubted stimulating action I am convinced, which I think is easily accounted for if we consider the amount of amidogen present. According to the molecular weight of trichloramido-ethylic alcohol, 164.5 parts of it will contain 16 parts of amidogen, and 1 part will contain a little less than $\frac{1}{10}$, or 1 gramme (15½ grains) will contain 1 centigramme, or 1½ grains of amidogen, so that we have in a dose of 15 grains of chloral ammonia 1½ grains of amidogen, which would undoubtedly produce considerable stimulation. In comparison, with urethan, it may be administered in any desired dose at once without disturbing the stomach. Indeed, it has a pleasant rather than an unpleasant influence on that organ, whereas urethan has to be administered in small doses that it may not cause vomiting. As to whether the choral ammonium lessens the blood-tension, like chloral, especially in the kidneys, in the diseases of which the latter is such value, I did not have the apparatus to determine, but from the close similarity in chemical constitution I should think it would, especially as the stimulating effects were much more noticeable on the respiration than on the pulse.

EDITORIAL.

RELATION OF PUTREFACTION TO INFECTIOUS DISEASES.

THIS question lying at the basis of all practical measures which have for their aim the removal of the causes lying at the bottom of all septicæmias whether of an erysipelatous, carbuncular or puerperal character, or belonging to that class known *par excellence* as zymotic, such as typhoid, diphtheria, and eruptive fevers, has once more been brought before the scientific public by an address by Dr. Hueppe on the above subject, delivered at the recent meeting of the German Scientific and Medical Association, at Wiesbaden. It is an attempt to reconcile the existing discrepancies between bacteriology and clinical medicine. He gives an historical sketch of the various theories relating to infectious diseases before the age of the microscope. Hippocrates and Diodorus believed them to be connected with putrefaction processes, and the latter associated with the plague at Athens, previously occurring copious rains, followed by great heat, thereby causing the former to give evil vapors which poisoned the air. Frascatori, in the Middle Ages ascribed to putrefaction, plagues, typhus, sporadic fevers and diarrhœa, and states that it could cause both contagious and un-contagious diseases. Stall, Baglivi and others in the eighteenth century professed the humoral pathology, and ascribed the fevers to alterations of the body fluids; but Rœderer and Pringle reverted to the theory of putrefaction, the first believing it present in the intestines during typhoid, and the latter connected "putrid fevers" with external putrefaction. Pathology began to make immense strides with the present century, again causing external putrefaction to be in large part neglected. "Malignancy" which in a previous period had been regarded as synonymous with putridity, now came

to be directly opposed to it. The old idea that vital force was opposed to putrefaction was now extended to mean that external putrefaction extinguished the causes of diseases and could have nothing to do with life. Henle introduced more modern views. From the labours of Schwann, Latour, etc., he believed putrefaction to be dependent upon infusorial life, and on the ground of the observations of Bassi and Andouin connected infectious diseases with the life of micro-organisms, thus associating decompositions whether occurring within or without the body. According as the infection multiplied without or within the body, Henle called it a *miasma* or a *contagion* and further believed the true contagion could live for some time apart from the body. He further makes the following clear-sighted statement: "But since the putrefaction does not invariably cause disease, it must depend upon special conditions what kinds of infusoria and plants develop, and they do not act equally detrimentally upon health." In any case where the body in health has not resisted the entry and multiplication within, of organisms, "a special direction is given to the putrefactive process, which still remains essentially the same as external putrefaction." This position is maintained by the teachings on the chemistry of bacteria of Nencki, Gautier, Selmi and Brieger. Pettenkofer, later, in subscribing to these views, gave the infectious material the terms *entogenous* and *ectogenous* when internal or external to the body, and maintained that the *entogenous* completed their cycle in the external air (as for instance the germs of typhoid and the spore-formation in the bacilli of anthrax). Believing with Pettenkofer that infection was borne into the body only with the atmosphere, Vogt maintained that the gases and ground vapours were the true causes of putrefaction

With these views we arrive at the bacteriological era, ushered in by the endeavours of Pasteur, Hallier, Klebs, etc., to cultivate pathogenic bacteria.

The ectogenous cultivation of various pathogenic bacteria by Koch, proved that they possess a saprophytic stage like ordinary putrefaction bacteria, and that a parasitic stage within the human body is not necessary to their existence as a species, but is merely accidental. This view had long been taught regarding the parasites of plants. Panum supposed that bacteria within the body produced a poison which was the cause of the trouble; which poisons (e.g. tyrotoxicon) was equally potent apart from the presence of the organism.* Finally, Sirotium, Peiper and Beumer showed that typhoid bacteria, which in man act as invasive parasites, acted in animals experimented upon like the ordinary bacteria of putrefaction. A tissue already diseased offers so much the less resistance to pathogenic organisms, and every one will now admit that putrefaction is a predisposing cause of infectious disease. Naegeli maintains that the contagious organisms are derived from the miasmatic, and these again form the putrefactive, these later organisms having an unlimited variability of form and action. Various experiments have, however, proved that the more contagious the organisms are the more distinct are they from those of putrefaction: indeed, there is antagonism between true contagion and putrefactive bacteria, the former succumbing in the struggle, e.g. Koch's *comma* bacillus surviving for about a fortnight.

Turning to the bacteria which accompany intestinal decomposition it is known that they may cause disease by means of their formation of ptomaines (and not necessarily with Wernich by becoming invasive bacteria). Pasteur formerly taught that bacteria in the intestines always act beneficially. It is satisfactory to be assured that the production there of ptomaines in such amounts as to be injurious to health would be abnormal biologically and chemically. Here the distinction between saprogenic and pathogenic bacteria is wholly effaced, and it must be granted for the whole class of cases, from the simplest diarrhœa to cholera nostras, that no line of demarcation can be drawn between putrid "intoxication" and specific infection. Dr. Hueppe contends that all specific bacteria owe their origin to putrefaction bacteria, on the Darwinian principle of modification by descent, and that a hygiene of cleanliness is the best prophylactic against infectious disease.

With such views the closest observations of the practical sanitarian and Medical Health Officer must coincide; and the argument through all the teachings of the eminent scientists of a whole century brings us back simply to the old crusade against filth in its Protean forms, and to the common sense though old teachings of the Jewish economy.

*This subject is developed fully in the article on "Ptomaines," found on page 118 of February number.

DIPHTHERIA AS A SEPTIC DISEASE.

WITH the present prevalence over all parts of the American continent of this disease, which has been well termed "the world's pest," the attention of practitioners everywhere is almost daily being directed to its real nature, a question which has been matter for discussion since the early part of the present century, and which is not at present by any means settled. Since the apparently well-supported evidence of there being present in the diphtheritic membrane a bacillus, whose characters have been described by Loeffler, the disease has been generally accepted as belonging to the zymotics, and its contagious nature lends the strongest countenance to this theory. But the very varied circumstances under which the disease is known to occur, and its almost constant occurrence, when not by direct contact, in those situations where decomposing organic matter, both of vegetable and animal origin, is present, inclines many to the opinion that, though it be true that a specific bacillus has been proven by experimental inoculation to be present in membrane, yet there are probably several species of micro-organisms which, finding a *nidus* outside the body in decomposing organic matter, produce, when received into the system, an exudation in mucous membranes, commonly called diphtheria. The often slight exudation, with mild constitutional symptoms, which is in Ontario so frequently seen in cases of sore throat, its brief life, and the short period of constitutional disturbance has, however, led, and we have no doubt will so continue, to constant discussion as to whether or not such cases are diphtheria.

The old question as to whether cases of laryngitis with exudation where no faucial exudation is present are diphtheritic has apparently been settled in the affirmative, and still more generally is it agreed that in young children there often is diphtheritic exudation present in the post-nasal region when no faucial exudation on ordinary examination can be recognized. That other condition where constitutional disturbance with the peculiar congestion characteristic of the fauces, tonsils, uvula, etc., but without exudation is present, is at present a *questio vexata* in the minds of many who, from either limited experience or the general description which in text-books has in the past been given of diphtheria, are accustomed to consider the disease rather as of a local than a constitutional character. The matter is one, however, of the greatest practical importance, whether viewed from the preventive or the curative standpoint. Holding as we do strongly to the belief in the constitutional character of diphtheria, it appears to us that no satisfactory knowledge of the disease will ever be obtained until it is everywhere recognised that diphtheria is a septic disease. In an article on "Putrefaction in Relation to Infectious Diseases," appearing elsewhere in this number, is set forth in an admirable manner the most recent views on the subject of zymotic diseases, and applying the argument therein set forth we are in a position to understand that, whether from the growth of bacteria in the buccal mucous tract, or in the intestinal mucous membrane, the presence of the poisonous substances, ptomaines, elaborated by them, must naturally, where of a pathogenic character, produce specific effects when introduced into the blood. The process is practically the same as where a sapræmia is produced by the absorption of the products of putrefaction in gangrenous tissue, due to frost-bite or other destructive process. The fact that the diphtheritic exudation appears most commonly on the buccal mucous membrane is illustrative simply of the well-known law of growth, by which different vegetable micro-organisms by a selective process develop most rapidly in the soil most suited to them; but the well-known instances where in severe cases the diphtheritic exudation appears in the larynx and bronchi, in the post-nasal and even in the anterior nares, and on abraded surfaces, as seen in tracheotomy cases, make it abundantly plain that the disease is a true septicæmia with local manifestations. But the condition which in practice becomes the most difficult to deal with is in such a case as the following: A child, after a day or two, sickens and shows some evidence of sore-throat; the tongue on examination is found to be coated, the tonsils swollen and congested, sometimes with a cheesy exudation at first seen in mouths of the glandular follicles, apparently amygdaloid tonsillitis. This exudat, on further examination, however, will be found often to have extended somewhat, appearing in the *sulci* formed by the pillars of the fauces. Here it may persist several days. In other instances, notably in children of two or three years, little will be seen but a thickish mucus, of a partially organized character, or one in which cellular elements pre-

dominate. The external glands may be somewhat swollen; the temperature may or may not be above the normal, but the depressed and rapid pulse, so commonly found with diphtheria, is present. The child is evidently sick to an extent not usual with the ordinary sore-throat due to cold, and the throat is less painful than with the common pharyngitis. The symptoms point evidently to toxæmia. If neglected, the child in a day or two becomes very ill; depression continues, and the child weakens rapidly; anorexia often becomes very marked, and if neglected the child dies, often with secondary symptoms, pharyngeal or laryngeal well developed. Such a case, and there are many, presents to the practising physician points of more than ordinary difficulty and delicacy. If he sees little, or in some cases, no exudation, he hesitates or refuses to call it diphtheria, knowing that with active treatment the condition is likely to pass away in a few days, and his diagnosis be discredited; he has made a great noise about nothing, or has added another to his list of cases of a disease popularly believed to be almost invariably fatal. He, too, has placed himself in the position of having to notify the local health authorities, has caused all the necessary inconvenience of isolation, inspection and fumigation; the children are kept from going to school, and he is voted either a fool or a crank. He has earned contempt instead of gratitude. On the other hand, should he have made light of the case, ordered a gargle and a little castor-oil, the child, if not exposed to cold, will probably recover from the local symptoms, and after an anæmia, more or less marked, recovers if the weather and the sanitary surroundings are improved. But what might be expected usually follows. The original cause, if on the premises, has not been removed, another child is taken ill either from infection from the first, or from exposure to the same cause. It may have caught a severe cold, or may be more delicate. In this case the parents assuming it to be the same sore-throat neglect to send for the physician until the child is far advanced in diphtheria. His efforts are futile, and the child dies. The physician is now discredited for not having diagnosed diphtheria in the first instance, and for thus having neglected to isolate, and disinfect and have the bad plumbing or choked house drain inspected. Truly his lot is not a happy one!

When it is asked in what direction we are to seek for a change from this unsatisfactory state of affairs our answer is that it must be in the recognition of the disease for what it is, a true septicæmia; and when we have done so we then place ourselves in a position to understand how it is that with early and prompt measures for the removal of this pathological condition we are taking the most effective means for not only curing our patient, but also for preventing any second case. But should any reply that popular opinion prevents us from being judged fairly regarding either our diagnostic skill or our motives, we have to content ourselves with the reflection "that knowledge grows but wisdom lingers," and that what is new to-day is old to-morrow.

MEETING OF THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS OF ONTARIO.

THE programme of this Association, which was published in the last number of MEDICAL SCIENCE, has been carried out. The meetings took place in the Normal School on the 14th and 15th ult., and considering the time since its organization, and the peculiar and special work of the Association, it will generally be conceded when we compare the numbers present with those of other executive associations that the attendance was most satisfactory. An association made up very largely of Medical Health Officers, all of whom are largely engaged in private practice, convened during a month when medical men are at their busiest, must indeed have created a strong interest to have brought some forty members from the most diverse localities of the Province to discuss matters relating rather to the needs of the public than to anything having personal advantages attaching to it. The subjects contained in the programme were pregnant with practical interest, and created most animated discussions. The whole question of the disposal of sewage was brought into prominence by the report from Committee No 1. What is to be done with the effete human material has ever been a question of difficulty, and the attempts at its solution have been as numerous as they have been different in their methods. The point of special importance which was elicited by the discussion on the report and Alderman Drayton's paper is that the return of this material to the soil is becoming generally conceded to be the solution of the difficulty when looked at from the sanitary or the economic stand-

point. But more necessary is it to give to the soil its food, which it has generously supplied to man, than it is to prevent the effete matter, if misplaced, from destroying the healthful properties of that complement of good bread, viz. good water. In presenting the report of Committee No. 5, Dr. Griffin, of Brantford, in his concise and pointed style made this point very plain. In effect he said: It is proper for governments to aid agriculture by Ministers of Agriculture, by Agricultural Colleges, by Farmers' Institutes, in order to teach them how to make bread, a matter they are already tolerably familiar with. But man does not live by bread alone, he needs its complement, good water. And inasmuch as the people know but little regarding good water, and inasmuch as the dangers to the public health are much greater from the water they drink than from the food they eat, it would seem a matter of urgent necessity that the government while doing so much for bread should not neglect the water.

The report of Committee No. 2 on Ventilation resolved itself very largely into one of heating and ventilating by the Smead-Dowd system. The absence of a special report on this subject was unfortunate, as it prevented a subject of increasing importance from being treated as widely as it deserved.

The reports of Committees No. 3 and 4 on Adulteration of Food and Milk Supplies were full and complete, and supplied subject for much discussion. The immense importance of good milk and milk products is in a most remarkable manner becoming well understood and appreciated, and rural municipalities even, as well as urban, are in various instances making arrangements for the inspection of public milk supplies, whether as milk proper or as supplied to cheese factories and creameries.

The paper of Dr. Oldright on Cremation of Town Refuse was of especial value, from the fact that up to the present the knowledge of what to do with garbage and other refuse has in Canada remained in a chaotic state. In this paper were illustrated the different methods, their results and expense, as far as obtainable, and as it will appear in MEDICAL SCIENCE it will be read by many with interest.

The programme of the Second Session was especially enjoyable, as the audience had the pleasure of addresses by two gentlemen, admirable as public lecturers, as well as of high standing as scientific experimenters. Their papers, found elsewhere in this number, will speak for themselves.

The various other reports presented, some of which were presented without there being time for more than brief discussion, will appear in their order in MEDICAL SCIENCE, which, by a motion unanimously adopted, was made the official organ of the Association. We feel that this compliment paid to MEDICAL SCIENCE is not wholly undeserved. While we have not hitherto had a standing column speaking as "the largest circulation," or "the most popular medical journal in Canada," we have been content to let the work which MEDICAL SCIENCE has marked out for itself make itself felt, and as Frederick Harrison says, "be content with an immortality due to the good deeds appreciated by the generations which are to follow."

The resolutions which grew out of the several subjects discussed (found elsewhere in this report), notably those regarding the necessity for governmental aid to scientific investigation, and for indicating the views held by the Association regarding quarantine protection, were most timely. There can be no doubt but that, should the Association continue to evince the activity hitherto shown by it, the coming meeting, which, by invitation of the Mayor and Health authorities of Lindsay, was fixed for July or August next, will be of as great public importance as it will be of pleasant interest and entertainment to the members.

INDEX OF PROGRESS.

SURGERY.

Urine Fever and Toxic Urine.

The first of the series of Lettsomian lectures delivered before the Medical Society of London by Reginald Harrison, was a very able address on some points in the surgery of the urinary organs. In referring to urine fever the lecturer, using this term in preference to urethral fever, describes it as a fever occurring only after lesions involving the urinary tract. Not unlike ague in many respects its onset is marked by a rigor followed by fever which declines in a few hours possibly to be again repeated. This aguish

form of pyrexia he believes is generated by the presence of urine in the wound, and the intensity of the attack is not always relative to the amount of injury sustained by the urethra. Death has sometimes resulted upon the mere introduction of a catheter or bougie. The lecturer bases his discussion upon the two following enunciations:—(1) The relationship between urine and a wound which leads to the development of urine fever; (2) the probable nature of the influence or material producing it.

The following is extracted from the lecture which appears in the *Brit. Med. Jour.* for Jan., 1888., as bearing upon these two important practical points:—

"In the first place, it appeared to me that the development of urine fever might be traceable to the kind of contact that existed between a wound and the urine. I thought I would test it in the following way. Taking a number of cases of subpubic urethral stricture, which were unfitted for treatment by dilatation, I adopted the following procedure:—

Internal urethrotomy having been performed, and all obstruction being removed, so that a full sized grooved staff could be passed into the bladder, the patient was placed in the lithotomy position, and a median cystotomy was performed, quite independent of the previous internal operation, so as to admit a full sized drainage tube, such as I usually employ for this purpose, to be passed into the bladder. By this combination of internal and external urethrotomy I treated a considerable number of urethral strictures of the worst type with results which time has already shown have been eminently satisfactory, both so far as the immediate comfort of the patient was concerned and the permanency of the relief that was afforded.

After a number of trials of this kind, I soon found that as was my drainage, so was my freedom from fever; urine fever only occurred where the former was imperfect. When urine, even in very small quantities, was pent up in a recent wound, fever resembling ague invariably followed. When, on the other hand, urine was allowed to escape freely and continuously, as after a lateral lithotomy, no such symptoms were developed. But, further than this, in connection with the operative treatment of strictures, it was observed with much uniformity that, in cases where it was impossible to obtain perfect urine drainage, the urine might, so to speak, be sterilised by local or general measures. This tended considerably to prevent the urine undergoing changes and yielding products which were calculated by their absorption to produce this special kind of fever. For instance, I found that after an internal urethrotomy, certain antiseptic precautions, directed towards the wound as well as the bladder, for the purpose of acting against the latter, considerably reduced both the frequency of these attacks as well as their severity. This was chiefly noticeable in connection with the use of solutions of corrosive sublimate for irrigating the wound, as well as for retaining within the bladder. Further, it was impossible not to recognise the importance of certain drugs which, by their elimination in some degree through the urine, seemed to render the latter less capable of exciting a specific fever where it remained in contact with a recent wound. This was most marked in the case of quinine, which is so largely eliminated by the urinary apparatus. In some cases of internal urethrotomy that were observed, the production or not of urine fever could be largely influenced by the administration of quinine. As bearing upon the sterilism of urine in connection with operative procedures on the urinary apparatus, I will refer to a passage from a recent writer who, in bearing testimony to the value of boracic acid as a prophylactic against urethral fever, states that in some forty urethrotomies he had had but one case of urethral fever, and that occurred in an instance where the precaution of sterilising the urine by the administration of boracic acid had been accidentally omitted. The consequence of this was a violent chill on the third day after the operation, with a high temperature. These observations, then, taken collectively, seemed to me clearly to indicate that the kind of contact between fresh urine and a recently made wound was in itself sufficient to determine the occurrence of urine fever as a consequence.

I now pass on to notice, in the second place, the probable nature of the influence or material by which the fever is actually produced.

During the last few years some important investigations have been made relative to the development of animal alkaloids, both in the dead and living, by Messrs Gautier, Peter, and Bouchard, in France; and by Drs. Lauder Brunton and A. M. Brown, in this country. An address of much in-

terest on this subject, in its relation to practical medicine, has also been recently delivered by Sir William Aitken. To all these gentlemen we are indebted for much valuable information. From these investigations I do not think there can be any doubt in coming to the conclusion that the secretions of living beings are capable of forming leucomaines, alkaloid bodies having poisonous properties, and that many phenomena connected both with health and disease may thus be accounted for. For, as Gautier remarks,* "Of all the extractive composite residua, the alkaloids of animal origin are worthy of the deepest interest. It is only now that they have become familiar to us. They claim our special study from the fact of their constant presence in normal secretions, and must be classed with the most active agents known." From my observations in connection with the surgery of these parts, it seems probable that the development of urine fever is really due to the absorption of some such poisonous compound as an alkaloid which is derived either from urine, or tissue, or wound décomposition, or from all combined, and I would base this conclusion not from any chemical discovery that, so far as I know, has hitherto been made, but from the following deductions which seem to be warrantable from what I have stated :

1. That the presence of urine in relation with a recent wound is necessary for the production of what I have spoken of as urine fever.

2. The mere contact of urine with a wound is not sufficient for its production.

3. That the retention of fresh urine within the area of a recent wound is almost invariably followed by its development in a greater or lesser degree.

4. That where urine is placed under such circumstances as have been last mentioned, the liability to the development of urine fever is greatly diminished when it is sterilised by local or general means.

5. That the retention of fresh urine, blood, and the *débris* of damaged tissue in the confines of a recent wound for a certain time, at a temperature of somewhere about 100° F., could hardly be possible without chemical changes taking place in the constitutents referred to.

6. That there is a common origin for urine fever is rendered probable by the uniformity of the symptoms attending it, which, though differing in degree, are identical, whether following a surgical operation or an accidental wound.

As some may not be prepared to accept from me, though fortified with the reasons I have urged, that urine or urethral fever is the product of a definite poison introduced into the system, let me occupy your time for a few moments, while I quote from the last essay* of one of the most original thinkers the medical world ever produced, I refer to the late Dr. Austin Flint, of New York.

"Analytical chemistry," he observes, "carries investigation beyond the limits of microscopical observation. The latter, at the present moment, both in pathology and physiology, seems to promise most; but is it not a rational anticipation to look for future results from chemical analysis of the components of the body, in health and disease, which in brilliancy and practical utility may surpass those of the labors in this field of investigation during the past half century? The medical semi-centenarian can recall the enthusiasm aroused by the labors of Liebig. Histology is now in the ascendant, but is it not safe to predict that before the lapse of another half century there will be another era in organic chemistry, and that light will penetrate dark recesses which histology cannot reach? The supreme objects of study in pathology at the present time are the discovery of micro-organisms and their natural history. But these agents it is probable, are pathogenitic, not directly, but indirectly, by means of the toxical products of their activity. What are these products, and how do they give rise to the phenonema of disease? We may ask the same question of certain of the poisons introduced from without the body. How is it that fractional quantities of morphine, hyoscyamin, strychnine, aconitine, atropine, and other alkaloids produce their lethal effects? It conveys no adequate information to say that they act upon the nervous system. This is merely the statement of a fact, not an explanation. For the latter we must look to the organic chemistry of the future."

But objection may be raised against the views I am advocating relative to the way in which urine or urethral fever is developed, by the fact that it

*Professor Armand Gautier's *Introduction to the Animal Alkaloids*, by Dr. A. M. Brown.

**Medicine of the Future*: Address written for the Annual Meeting of the British Medical Association, 1886.

sometimes arises under circumstances where it may be difficult to prove that any actual breach of surface in the urinary tract has been inflicted. For instance, as I have already said in illustration, some degree of urine fever frequently follows the passing of instruments along the urethra, as in the treatment of urethral stricture. It would not be difficult to illustrate every degree of this complication, from the most transient rigor with slight febrile excitement, to the severest form of septic intoxication, rapidly terminating in death. And this leads me to speak of the influence of the epithelial lining of the urethra making the canal water-tight, or more correctly speaking, urine tight. Let me take an illustration of what I mean by the protecting power of the epithelial lining. A patient with a stricture, I will say, has a catheter or bougie passed; this may be followed in the course of a short time with a rigor and some fever, and no further inconvenience is experienced. What has actually taken place is that the epithelial lining has been scraped off at one or more points, and this has permitted urine leakage and absorption to take place at the points injured. If further proof of this be required, take instances where prolonged attempts to pass catheters in cases of urethral stricture have been made, and proved futile. Then, in consequence of the degree of retention, and as an alternative, an aspirator needle is introduced above the pubes, and the urine is drawn off in this way without coming in contact, or remaining so, with any portion of the urethra which may have been wounded by the attempts made to give relief by catheterism. I have never known rigors or fever follow the relief of retention by suprapubic aspiration, though the amount to which the urethra has been lacerated by attempts at catheterism has been considerable as well as sanguinary. There can be no other explanation of the absence of characteristic rigors and fever under these circumstances than the fact that urine has not been allowed to come and remain in contact with a freshly-made wound. And in connection with this point I cannot help remarking that in the protecting power which the epithelial lining of the urinary apparatus exercises we probably have an explanation of certain phenomena which have been observed but not accounted for. Some have concluded that the bladder is capable of absorbing some of its contents, whilst others, on the contrary, not only have denied the possibility of such an inference being drawn, but have pointed out how serious might be the consequence if there was any liability to such a contingency. It seems that both of these conclusions may be true, and the explanation I would offer is that, by injury to, or disease of, its epithelial coat, the bladder may be rendered capable of absorbing what it contains, to the detriment of the individual, as we see in those cases now often referred to by the name of catheter fever. In recognizing the power of the epithelium to prevent or admit absorption, I am in agreement with other observers, amongst whom I may mention Dr. London, of Carlsbad, who has made some investigations upon this point.* Further, it is important to notice that when a urine fistula is transformed into a permanent urine channel, as after Cook's operation, we find the passage becomes lined like the urethra with epithelium, and thus it acquires the power of transmitting urine without leakage. We could not have more positive evidence than this in support of the view that the epithelial coat is a necessary part of any canal which has to perform the function of transmitting urine."

MEDICINE.

Neurasthenia and Lithæmia.

A paper on this most important and interesting subject was read before the New York Neurological Society, on the 7th of February, by Prof. A. D. Rockwell, M.D. After referring to the convenience of the term neurasthenia, which serves like malaria as a convenient refuge to perplexed practitioners, the writer stated that such a diagnosis, while often satisfactory to the patient, who ever after may allude to himself as a victim of nervous exhaustion, often is most injurious from the standpoint of therapeutic results. What must be recognized he says, is that many of these patients are not neurasthenic and under hardly any circumstances could they become neurasthenic. They do not belong to the type out of which neurasthenia is born, either mentally or physically. Many of them are unintellectual, phlegmatic and indolent and are pleased at a dose which touches the nerves rather than the stomach, bowels and liver. Instead of rest, quiet and soothing draughts, they need mental and physicial activity and depletion rather than repletion of food.

* *Berlin. Klin. Wochen.*, No. 11, 1881.

These patients are lithæmic and not neurasthenic. The nervous system is strong enough, and would give no trouble were it not poisoned by the abnormal products of digestion that enter the blood and circulate through every tissue of the body.

But realizing the existence of true neurasthenia, it is of the greatest importance, he says, that we make the differential diagnosis between it and lithæmia or functional disturbance of the liver. In a case referred to, complaining of neurasthenia, Rockwell found evidence of intestinal and liver indigestion and an abundance of uric acid in the urine. She had for years taken but little exercise and indulged her appetite without restraint. Under a reversal of this condition in treatment many of her worst symptoms disappeared. [Probably the historic case of the patient of the late Dr. John Brown, of Edinburgh, who, whenever the bowels became torpid, becoming very anxious concerning her soul's salvation, would send her servant at all hours, stating to the doctor how ill she was, was a case of this kind. "Rax me down yon pill-box, John," was his answer to John's statements regarding the condition of his mistress on one occasion when John was indroduced to Brown's bedside, and "tell your mistress to take twa and I'll come to see her the morrow's morn."] And the illustration is given from two cases, indicating the close similarity between the two diseases.

Mr. O consulted him for symptoms that for five or six years had greatly interfered with his happiness and capacity for work. Was well formed, well nourished, and intellectually above the average. He had for years with few intervals of rest devoted himself to the details of a mercantile business. He complained of a settled melancholia, with a morbid and baseless fear of financial ruin and yet not ill-natured or irritable. On the contrary was more or less a model of dignity and gentle demeanour. Pulse was more or less irregular, making him fearful of heart disease. Appetite fair, weight varied but little. He looked strong, yet was easily exhausted mentally and physically. Constipation was troublesome. He possessed no reserve force with any undue exertion showing the hyperæmia due to enervation. His previous medication had been chiefly devoted to correcting the function of food assimilation but without marked effort. He was induced to temporarily give up business, he journeyed to the west, doing the Yellowstone region, was absent some eighteen months and returned a well man. This, said Rockwell, was neurasthenia pure and simple. Whether such is to become permanent will depend on whether the temporary acute or functional neurasthenia is allowed to become chronic causing finally changes in nerve tissue.

Mr. N, a stout gentleman with sallow complexion, consulted Dr. Rockwell for what he believed were neurasthenic symptoms and had been taking nerve-tonics. He suffered from periodical attacks of constipation making him irritable and disagreeable. He took salines, but paid little attention to diet, eating freely. No uric acid was present in urine when bowels were free. He consented to a limited dietary and to an increased exercise. No medication throughout the whole treatment was attempted except an occasional glass of Rubinat water. With the relief of constipation all his symptoms disappeared.

Functional diseases of the nervous system are probably more important perhaps than those that are organic or structural. Long experience has taught us how very little all our boasted therapeutics amounts to in dealing with any progressive degeneration of nerve-tissue.

The most obvious diagnostic difference, Rockwell thinks, is in the mental phenomena. Both suffer from mental depression and a profound sense of misery. While, however, the neurasthenic may imagine himself heir to a thousand ills, he becomes the victim as a rule of no such irritability as the man whose blood is habitually poisoned with the products of indigestion. His irritability is likely to be more passive than active. The touchy mood of the lithæmic may on the contrary last for weeks, due to actual toxæmia to be after relieved by a cholgaogue. In neurasthenia cold hands and feet are not usually complained of, but the tonic spasm of arterioles due to irritation from nitrogenoius waste in the system results often in cold hands and feet so bitterly complained of by sufferers from lithæmia. The tongue in lithæmia is coated far more commonly than in neurasthenia. Often in lithæmia, where apparently clean, a close inspection reveals a brownish coating. The pulse in lithæmia is rather slow than fast as in neurasthenia. If we recognize the destructive differences between the two diseases our knowledge of our food and drink will enable us to treat those differences with satisfactory results.

THERAPEUTIC NOTES.

Arsenic in Gastralgia.

Of all the directly curative results with which he is acquainted, Dr. Sawyer, *(The Lancet)*, believes that one of the most demonstrable is that which can be produced by the suitable administration of arsenious acid in simple gastralgia. He gives one-twenty-fourth of a grain of arsenious acid made into a pill with two grains of extract of gentian, thrice daily between meals. The use of this remedy must be continued for a few weeks. In a case of moderate severity no other medicinal treatment is necessary. The gastralgic pains become less frequent and less severe, and recovery is steadily and surely attained. In severer cases he recommends the use of some form of counter-irritation to the epigastrium, and he usually employs a rubefacient liniment of ammonia. In the severest cases vesication by a fly-blister is of service, and the blistered surface should be kept raw for some days by means of a daily dressing of savin ointment. But treatment by drugs must not alone be relied upon. Every hygienic adjuvant which tends to raise the strength of the patient is of high value in the cure of gastralgia. It is especially necessary to make sure the sufferer feeds well and fully. The diet should be generous. A "dyspeptic" regimen makes a case of gastralgia worse. When we are satisfied there is no, or but slight, gastric catarrh in the gastralgia of a fairly vigorous adult, we should direct a dietary after this plan: Breakfast, bread-and-butter or dry toast, with some fresh white fish, or some cold chicken or game, or a mutton chop, with a breakfast-cupful of cocoa or weak tea or coffee. Dinner (1 p.m.), fresh beef or mutton, with bread, potatoes, cooked green vegetables, a fruit tart or a farinaceous pudding, with a glass of light bitter ale. Tea (5 p.m.), bread-and-butter or dry toast, with a small cupful of cocoa, tea or milk and water. Supper (not later than 9. p.m.), white fish, or some cold chicken or game, or a little cold meat, white bread and a glass of ale.

The Time for the Administration of Certain Medicines.

Sir Robert Christison in *Med. Waif*, Jan., says: Iodine and the iodides should be given on an empty stomach. If given during digestion the acids and starch alter and weaken their action. Acids, as a rule, should be given between meals. Acids given before meals check the excessive secretion of the acids of the gastric juice. Irritating and poisonous drugs, such as salts of arsenic, copper, zinc and iron, should be given directly after meals. Oxide and nitrate of silver should be given after the process of digestion is ended; if given during or close after meals, the chemicals destroy or impair their action. Potassium permanganate also, should not be given until the process of digestion is ended; inasmuch as organic matter decomposes it and renders it inert. The active principle of the gastric juice is impaired and rendered inert by corrosive sublimate, tannin and pure alcohol; hence they should be given at the close of digestion. Malt extracts, cod-liver oil, the phosphates, etc., should be given with or directly after food.

Hydrochlorate of Apomorphine in Dry Cough.

The following is from *Medical Record* per *Medical Age*:—This drug has been extensively tried by Dr. Stocquart, of Brussels, as a remedy for certain kinds of cough, and he speaks highly of its value. The kind of cough in which it has proved most successful is a distressing and frequent hacking, unattended with expectoration, or with exceedingly difficult expectoration. The improvement of the patient's condition is usually effected in a few days. The drug is, as a rule, well borne, although a few individuals manifest a special susceptibility to its action, and rarely, nausea, colic, and diarrhœa result from its employment. The dose is a minute one, only about one-twentieth grain of this alkaloid being given in water in the twenty-four hours. As the solution rapidly alters by keeping, it is advised to prevent its decomposition by the addition of a few drops of hydrochloric acid, which does not interfere with the therapeutic effects.

The Diuretic Action of Calomel.

According to Dr. Silva, in *La Riforma Medica*, the diuretic action of calomel is due to a variety of causes. It induces increased activity of the liver in the production of glycogen and urea, causes a dilation of the renal vessels and irritates directly the epithelium of the convoluted tubules. This last named action is so marked that there may ensue, if the administration of the drug is too long continued in experiments upon dogs, a true glomerulo-nephritis. It is for this reason chiefly that the drug should be given only in cardiac troubles and is contra-indicated in renal disease.

NEUROLOGY.

Total Blindness from Cortical Lesion.

By Dr. L. Bouveret, Agrégé, médécin des hôpitaux de Lyon. (Translated from Révue Générale D'Ophthalmologie.)

The researches of Munk appear to have demonstrated that the centre of visual perceptions is found in the cortex of the occipital lobes. Each occipital centre is in relation with the two retinas. The destruction of the cortical substance of the occipital lobe of the left side is followed by the paralysis of the left half of the two retinas, in other words, a lateral right hemianopsis, (experiments on dogs and monkeys). Does such a similar localization of visual perceptions exist in man? A certain number of observations tend to demonstrate it.

M. Seguin has collated 45 cases of hemianopsis due to lesions of the encephalon. These are divided into six groups. The last contains 16 cases in which the hemianopsis is related to destructive lesions of the cerebral cortex alone or simultaneously in the cerebral cortex and in the subjacent white matter. Amongst the 16 cases there are a number in which the lesions are extensive and do not exist only over the regions where is found the probable seat of the visual cortical centre. But in four cases the lesion affects only a very limited portion of the cerebral cortex. Now these four lesions are in a manner superposable ; they all engage *le coin* that is the internal face of the occipital lobe. They encroach more or less upon the neighboring regions of the cortex, for example on the posterior extremity of the temporo-occipital convolutions ; but the destruction of a notable extent of the cortex of *le coin* is never wanting. Thus there are in the experimental facts and those of pathology a very remarkable analogy. Dr Bouveret adds a fifth example to Seguin's in the case of a patient in whom the seat of the lesion was diagnosed from the conclusions arrived at by M. Seguin. In the patient a softening (un ramollisssement) probably of embolic origin has destroyed the cortical substance of the two angles (*coin*) and the principal symptom noticed during life—we may say the unique symptom, was a complete abolition of vision. The article here gives at length a complete history of the patient, a workman on the highway, from the time he was admitted into the hospital, having been seized with the malady suddenly. He lived 17 days after the attack. In the autopsy the arteries of the base were found atheromatous whilst the two posterior cerebral arteries were found to be obliterated by a reddish grey clot, quite firm, and quite filling the calibre of the vessel. In relation with these obliterations of the arteries were found two foci of softening of unequal extent on the lower internal surfaces of the brain. Throughout all the area the pia-mater was adherent to the cortical substance. (The more minute details of the autopsy as regards the extent and location of the lesion are given at length). The rest of the cerebral cortex carefully examined showed no lesion. Examination of the different organs of the body showed the existence of interstitial nephritis, with associated atrophy of the cortical substance of the kidneys and hypertrophy of the left ventricle.

The coincidence of the centres of softening occupying the same situation on the inferior internal face of the two hemispheres is quite remarkable. The blindness was the capital symptom, it was sudden and complete and persisted until death. To ophthalmoscopic examination the retina and transparent centres presented no lesion. At the autopsy the optic nerves, chiasma, etc., were all found healthy. Whether the thromboses were autochthonic or of embolic origin, matters little, says Bouveret, although he inclined to the opinion that it was of embolic origin.

BACTERIOLOGY

Inoculation Experiments with Bacteria of Pear Blight.

To many of our readers, perhaps too much accustomed to think of the modern researches in bacteriology as having an interest only for them in their bearing upon human disease, we present a *resumé* of investigations upon *pear blight*, chiefly known by the blackening of the branches and foliage, and usually accompanied with a putrefactive odor. The inoculation experiments have many points of interest in elucidating the predisposition to immunity from contagious diseases, which have so long presented difficulties to the modern germ theory of disease. It may attack any part of the tree excepting, perhaps, the roots, and usually progresses till the tree succumbs. Prof. T. J. Burrell, Illinois, in 1877 noticed bacteria in connection with pear blight. In 1880 he made an extended series of inoculations, showing that the disease could be easily communicated from

one pear tree to another by introducing a little of the exudation from a diseased part, and in the same way could be communicated to the apple and quince. How the disease under ordinary circumstances is communicated was, however, for a time a matter for doubt. The yellow disease of hyacinths has been proven recently to be similarly due to microphytes.

In 1884 experiments were carried on at the New York Agricultural Experimental Station, with a view to determining further the facts regarding this disease. In an orchard free from the blight 120 inoculations were made by removing a small amount of the sticky exudation from a freshly blighted pear branch and inserting it in the tissue to be infected by using the point of a pin in 17 cases: but in the remainder the inoculations were from an infusion made with slices from a diseased branch, a drop of it being placed in the pin puncture. These inoculations were made in the afternoon, and when convenient on a damp day. The source of the infection was from *pear*, *apple* and *quince* trees. The average period of incubation from time of inoculation until some external indication showed that the disease had taken hold of healthy tissue was about a week, and it was soon found that the location of the inoculation was a matter of importance. Although it took hold on thrifty parts yet in order to get best results it was found necessary to use green or immature parts which were still elongating. Thus in shoots of this year's growth, but which had reached their growth at the point chosen, the infection would succeed only after a long period, but in yet older wood it invariably failed.

In tender, elongating shoots, the arrest of growth at the point of inoculation often tends to a curvature, owing to an extension of the opposite tissues. In the case of leaves its failure to infect is directly traceable to the age of the leaf, and as they have been known to appear green for two or three weeks after the death of the branch, they are proven in every way fairly suited to the growth of bacteria. Similarly fruit about two-thirds grown takes the infection with astonishing virulence, while inoculations in fruit of full size take it but slowly. Another element affecting its virulence is the succulency of the fruit. Thus a Bartlett pear inoculated on July 24, and examined on July 30, showed a wholly unexpected form of malady. A circular spot three-fourths of an inch across had taken on the brown color of rotting fruit. At the centre of this spot, and immediately surrounding the wound made by the inoculation, the tissues had sunken somewhat, while from the slightly enlarged wound there flowed an abundant yellowish pus that ran down the surface of the pear and dropped on the ground. It was an ulcer of quite as sickening appearance as if on animal flesh. Upon opening the pears three days afterwards, having in the meantime been kept under a bell-jar, their interiors were found almost wholly diseased and brown. The disease was found capable of attacking the June-berry and Crataegus, with tolerably successful results. In peach trees it did not produce the blight, but led to a genuine gummosis. The variability in the time taken to pass through incubation and become outwardly visible was evidently due to a number of influences. The most obvious were the maturity and succulency of the tissues. The influence of the vigor of the tree, aside from the succulency of the part inoculated, the lateness of the season, the weather, and particularly the temperature and moisture of the air, all combined to vary the progress of the disease. The outward progress was always commensurate with the progress within.

Regarding the microphytic nature of the disease, the experiment was readily made by taking a thin slice of diseased pear wood, at an active stage of the disease, and placing it in a drop of water. A white cloud will be seen to emanate from it and spread through the water. At 400 diameters bacteria are seen in inconceivable numbers. They have been found to be a constant accompaniment of the disease. They vary in size, being smaller than *bacterium termo*; neither can the latter be substituted for them, as inoculation with it invariably failed. With regard to the mode of propagation, Prof. Burrell failed to inoculate by bringing diseased branches into contact with healthy ones. Prof. Arthur found contact by smearing with virus a very young shoot enough to produce the disease. It was done by keeping the cut end of the shoot in water.

On the whole, evidence as to methods of ordinary infection is deficient. Arthur suggests that, as bacteria escape from the tissues in the slimy drops that ooze out, especially in damp weather, they are washed off and freed from viscid part by rain, and on becoming dry are taken up by winds. Being now suspended in air, a damp day, dewy night, or light

rain would bring them in contact with the delicate surface of expanding buds, or the exposed internal tissues of fresh cracks or wounds. Observation has shown some connection between the attacks of blight and the direction of the wind, since trees to the windward of an orchard are most severely blighted; and again that a tall hedge has checked the progress of the disease. Puncture by insects is another method of inoculation.

As over cultivation, mulching, etc., seems through causing prolific growth to make trees peculiarly liable to disease, it is recommended to lessen the manuring, putting land in grass, etc.

It has been noticed that trees of stunted growth in poor, sandy soils do not suffer greatly from the disease.

REPORTS OF SOCIETIES.

Toronto Medical Society.

STATED MEETINGS, *February 2nd, 1888.*

Pathological Specimens.—Dr. H. W. Aikins exhibited a portion of the small intestines taken from the guard, Rutledge, who was stabbed on the morning of the 19th January, at the Central Prison, and gave the history of the case as follows:

The blade, about five inches in length, entered the abdomen at a point about two and a half inches to the left side of, and one and a quarter inches below the umbilicus, and passed backwards and a little inwards to the front of the vertebral column. During the day he complained of some local tenderness at the seat of the wound; the pulse gradually quickened, and towards evening there was some elevation of the temperature. Tympany became pretty well marked, with considerable nausea and vomiting.

The same evening Dr. W. T. Aikins, the prison surgeon, performed laparotomy with a view to securing any bleeding vessels, and sewing up any wounded intestine. The abdominal incision, about seven inches in length, extended from a point a little above and to the left of the umbilicus downwards in the middle line to a little above the pubes. A clot of blood, four inches in diameter and half an inch thick was found immediately beneath the abdominal wall. On removal of the clot, together with a moderate quantity of sero-sanguineous fluid, an examination of the small intestine from the commencement of the jejunum to the ileo-caecal valve was made without discovering any opening, nor was there any trace of the intestinal contents in the abdominal cavity. The mesentery, however, was pierced, and on tracing back an opening in the peritoneum was found not more than half an inch from the abdominal aorta. There was some oozing of blood from this opening, which was immediately arrested by catgut ligature.

The intestines were now returned, a drainage tube inserted, and the abdominal wound closed.

The patient was kept well under the influence of morphine, yet the symptoms gradually became more grave until the following evening the pulse had reached 160, and the temperature rose to 103.7°. Early the following morning he appeared a little better, but during the forenoon he became much worse, and rapidly sinking he died the same afternoon.

Post mortem.—Evidences of intense diffuse peritonitis, with scattered collections of pus. A wound was found in the jejunum about two feet from the duodenum, circular in shape, and about a quarter of an inch in diameter. It was situated on the convex surface, about one-third of the way around from the attachment of the mesentery. Diametrically opposite this a piece of the mucous lining of the gut had been shaved off. Evidently the gut was empty and its walls collapsed at the time the wound was made. Most probably the edges were inverted, closing the wound, and when the examination was made, covered with lymph. The after distension of the intestine had very probably reopened the wound and allowed the escape of gas, etc., into the peritoneal cavity. No other opening was found, and remaining organs in this, and those in the other cavities of the body were healthy.

A discussion followed, during which cases were cited where, as in this one, persons have been known to walk a considerable distance after the reception of so severe an injury.

In answer to a question Dr. Aikins said the indications for an operation were: the increasing tym-

pany and tenderness; the presence of nausea and vomiting; the rise of temperature and pulse, and the very great probability, as indicated by these signs, of hæmorrhage from some concealed point.

Dr. Atherton gave some notes of a case in his own practice where a man had fallen from a load of hay, alighting upon the prongs of his pitchfork, which pierced the body, entering the abdominal walls about the level of the umbilicus, and passing out about the left shoulder blade. There was evidence that the lung was pierced. Notwithstanding the severity of the injury recovery ensued.

February 9th, 1888.

Dr. McPhedran presented a man with a painful affection of the foot. The great, second and fourth toes, and the outside of the heel are the parts affected; the most painful region being the under surface of the great toe.

The history of the case is brief. It began about ten months ago, after a long walk, and for a time only troubled him after much walking. Now any walking at all causes pain. Nothing abnormal can be felt. The joints appear healthy. The tenderness is both superficial and deep. Sensation reflexes and muscular power are normal.

The condition is probably due to some neurotic affection, causing the vascular changes and swelling.

Dr. Reeve showed a small piece of steel he had removed from a patient's eye—the anterior part of the lens—by means of the electro-magnet. He also explained to the Society the *modus operandi*, and peculiar advantages of Maloney's Conversation Otophone. By the use of this instrument the very deaf can be made to hear low tones and even whispers.

Dr. Machell gave the following history of a somewhat peculiar case:

T. A., a teamster, while sitting upon his load, proceeding over smooth ground, was suddenly seized with an acute pain in the centre of the breast. He lost consciousness and fell from the wagon, the wheel passing over his left arm without breaking it. He soon rallied but found himself unable to use his hands properly, and the pain in the breast was still intense. He was taken home, and when seen two hours after the accident the pulse and respiration were normal, the face anxious, the movements natural and the pain still intense behind the sternum, between the third and fourth ribs. He complained of a tingling sensation in the arms and hands, and exhibited great restlessness. There was some tenderness over the epigastrium, with occasional belching of wind. The heart and chest sounds were normal.

The previous history was excellent with the exception of an attack of acute rheumatism thirteen years ago. He had not been lifting any heavy weight or over-exerting himself in any way previous to the onset of the pain.

The diagnosis was obscure. Gastric disturbance and aneurism seemed to be excluded. Rupture of some vessel into the mediastinum was thought of. A sedative mixture was ordered. At midnight the pain was still intense causing great restlessness. Consulted with Dr. Spragge.

The next morning the pulse and respirations were slightly quickened and the pain not much lessened, although the patient was well under the influence of morphia; extremities cold and the face anxious. On the morning of the second day the pulse respirations and temperature were still greater than before, and auscultation revealed a systolic murmur heard over the sternum between the junctions of the third and fourth ribs, loudest on the right side.

A slight impulse could be seen and felt in the second and third interspaces to the right of the sternum, being further removed from the border of the sternum in the third than in the second interspace. Purgatives were given to evacuate the bowels.

The day following neither the murmur nor the impulse was so marked. The pulse ran from 106 to 112. The bowels moved very freely and with pain. The restlessness and frequency of evacuation increased steadily, till he died on the morning of the fifth day, two minutes after he had been out of bed and at stool.

Unfortunately no *post-mortem* could be obtained.

February 16, 1888.

Dr. Nevitt presented for examination a case of heart trouble, a peculiar murmur being present in the aortic region. The opinion was expressed that the murmur was aortic regurgitant and that there might be present a commencing aneurismal dilatation of part of the arch of the aorta.

Annual Meeting of Association of Executive Health Officers of Ontario.

The Association assembled in Toronto on Tuesday February 14th, 1888, at 2 p.m., the President, Dr. J. Coventry, Windsor, in the chair. The Secretary was called upon to read the minutes of the last meeting, held at Woodstock, which were on motion adopted. The Secretary read letters from Dr. Fred. Montizambert, Chief Quarantine Officer, Grosse Isle Station; Dr. H. P. Yeomans, Mt. Forest; Dr. Chas. W. Covernton, Toronto; and Dr. J. D. Macdonald, Hamilton, regretting their inability to be present and take part in the meeting.

The regular work of the session was then opened by Dr. C. S. Elliot, of Toronto (formerly of Orillia), who presented the report of Committee No. 1 on "House and Land Drainage." After this paper, Ald. P. H. Drayton, Chairman of Toronto Local Board, read a paper on "Methods of dealing with City Sewage." A general discussion on the papers followed, engaged in by Dr. Burrows, Lindsay, Dr. Griffin, Brantford, Dr. Oldright, Toronto, Dr. Canniff, Toronto, Dr. McLellan, Trenton, Dr. Ross, Woodstock, and Dr. Sweetland, Ottawa.

Dr. J. J. Cassidy, of Toronto, in the absence of the Chairman of Committee, R. B. Smith, M.D., Seaforth, introduced the subject of report of Committee No. 2 on "Ventilation of Houses, Schools, and Public Halls." The Smead-Dowd system of ventilating public schools was fully described by Dr. Cassidy, and the general subject discussed by Dr. Lundy, Preston; Mr. Dolsen, Chairman Local Board, St. Catharines; Dr. Irving, Kirkton; Dr. Steuart, Wallaceburg; Dr. Griffin, and Dr. McLellan.

Dr. C. McLellan, Trenton, presented the report of Committee No. 3 on "Food, its Adulteration and Unwholesome Supply;" and was followed by the report of Committee No. 4 on "Milk Supply, its Sources and Contamination," presented by Dr. Lundy, Preston. The hour for adjournment having arrived, the technical paper by W. B. Nesbitt, B.A., M.D., Toronto, "On Methods of Milk Analysis," was read by title, and the discussion on these various subjects postponed to a subsequent session. The session then adjourned.

2nd Session.—The meeting was opened with prayer by Rev. S. H. Kellogg, D.D., after which Ald. Drayton welcomed the Association to Toronto in the following address:

Mr. Chairman, Ladies and Gentlemen,—I had hoped that his worship the Mayor would have been present to-night to welcome you to our Queen City, but owing to the press of legislative and other duties he is debarred from this pleasure, and the gratifying duty has devolved on me as Chairman of the Local Board of Health. It is matter of congratulation to the inhabitants of our fair Province of Ontario (the gem, if I may be permitted to say so without egotism, of our Dominion of Canada), to be made aware of the fact by such a gathering as this that the care of their general health is intrusted to so representative and intelligent a body of men as those I now have the pleasure of addressing. The majority of you gentlemen have the honor of belonging to a profession whose acknowledged aim and object is the amelioration of human suffering and the bettering of the human race; and what nobler object could man desire? Your profession, gentlemen, furnishes some of the grandest examples of pure self-sacrifice for the benefit of mankind. In cases, for instance, of violent epidemics, such as those of cholera and yellow fever, when all who can flee from the plague-stricken spot, the faithful physician is found at his post hurrying hither and thither on his mission of mercy, regardless of the danger of contagion, and regardless, also, of pecuniary reward. You, gentlemen, who represent the (if I may so style it), executive part of the various Health Boards of the Province, have an onerous and a delicate duty to perform. In many cases strong prejudice and gross ignorance have to be by you combatted and overcome in such a manner as to insure, if possible, the future co-operation of the very parties opposing you. I contend, at the risk of being considered a "crank" on such matters, that national health is the corner-stone in the structure of national greatness. As in the individual so in the nation the maxim "*mens sana in corpore sano*" holds good. To you, gentlemen, is largely intrusted the task of so enforcing sanitary reforms, and of so educating the minds of the inhabitants of the various municipalities you represent, as to largely increase the national greatness through the increased longevity and consequent value to the community of every individual life. Let me suggest to you as a motto the well known paraphrase of the late Lord Beaconsfield: "*Sanitas sanitatem omnia est sanitas.*" Work on with this as your watchword and success will in the end crown your efforts. In conclusion, in the name of the corporation of the city of Toronto and especially on behalf of our own Local Board of Health, I bid you heartily welcome to our midst.

The President then read the annual address.

Prof. Victor C. Vaughan, M.D., of the Laboratory of Hygiene, Ann Arbor, Michigan, delivered a powerful and eloquent address on "The Duty of the State in Investigating the Causes of

Disease;" which was followed by Prof. R. Ramsay Wright, M.A., University College, on "Methods of Biological Analysis of Drinking Water." The able lecturer illustrated by specimens and apparatus the various methods and described the results.

After the addresses, Dr. Burrows, Lindsay, seconded by Dr. Lundy, Preston, moved the following resolution:

"That in view of the Provincial interests involved in the maintenance of the public health and of the economic loss which follows the prevalence of epidemic diseases, and the desirability of taking every effective measure to lessen such prevalence; that while at present the Government has established a Provincial Board of Health and armed Local Boards with powers to carry on sanitary work, yet the many questions which are constantly demanding solution by Local Boards, and which, owing to lack of experience and facilities, are referred to the Provincial Board of Health, which, owing to officers whose time is only partially given to public health duties, is not placed in such a position as to give to Local Boards that assistance to be derived only by local investigations and practical experiments; be it resolved: that this Association appoint a Committee to be named by the President, to bring these views before the Attorney-General and the Minister of Agriculture, and to urge the great necessity of placing the Provincial Board in a position to give practical support to the efforts of Local Boards to improve the public health."

The resolution was supported unanimously, with remarks strongly accentuated by Dr. McLellan, Dr. Griffin, and Dr. Sweetland.

Dr. Bryce thereafter moved, seconded by Dr. Oldright, that a vote of thanks be tendered by the Association to Profs. Vaughan and Wright for their admirable addresses. The motion was carried with applause.

Dr. McMahon, M.P.P., being present on the platform, was invited by the President to address the meeting, and made a stirring address congratulating the Association on the work which it assigned itself, indicated the urgent public need for such an Association, and stated that he would have much pleasure in taking the earliest opportunity of introducing the deputation to the Attorney-General and Minister of Agriculture.

The adjourned discussion of the reports on Food, Milk, etc., was then taken up, introduced by Prof. Vaughan; various other members, amongst them Dr. Griffin, and Dr. Robillard, of Ottawa, continued the discussion till the time of adjournment.

3rd Session.—The meeting was opened with prayer by Rev. Father Laurent, P.P.V.G.

The Secretary-Treasurer presented his report, which showed the finances to be in a satisfactory condition.

The election of officers was then proceeded with when the following were elected: President, Dr. P. P. Burrows, Lindsay; 1st Vice-President, Dr. E Griffin, Brantford; 2nd Vice-President, Dr. C. McLellan, Trenton; Secretary-Treasurer, Dr. P. H. Bryce, Toronto. Members of Council were afterwards ballotted for, the following being elected: Dr. Tracy, Belleville; Dr. Sweetland, Ottawa; Dr. Lundy, Preston; Dr. Cassidy, Toronto; and Col. Deacon, Lindsay.

Dr. Bryce gave notice that he would move an amendment to clause 16 of the constitution at the next annual meeting.

Dr. Griffin, Brantford, then presented the report of Committee No. 5 on "Water Supplies and their Pollution." Dr. Robillard, Ottawa, opened the discussion on the paper. Dr. Tracy, in further discussion, introduced a motion, seconded by Dr. Fee, which condemned the pollution of the Bay of Quinté by the sewage from the Deaf and Dumb Institute. Dr. McLellan, of Trenton, supported the principle of the motion, after which Dr. Bryce stated that the matter would be brought by him before the Inspector, and thought a remedy might be found possible.

It was thereafter moved by Dr. Cassidy, and seconded by Dr. Lundy, that the ex-Presidents, Drs. Sweetland and Coventry, and Prof. V. C. Vaughan, M.D., Prof. R. Ramsay Wright, M. A., and Prof. W. Oldright, M.A., M.D., be elected honorary members of the Association. The motion was carried.

It was thereafter moved by Dr. Burrows, seconded by Dr. McLellan: "That this Association recognizes the necessity of having some official medium for the expression of views regarding its work and interests, and that it gladly avails itself of the kind offices of MEDICAL SCIENCE, a journal specially devoted to the interests of public health, and desires to express its approval of the efforts of that journal, and will heartily lend to it countenance and support."

4th Session.—The President took the chair at 2 p.m., and presented a communication from Dr. A. Temple, Toronto, asking that the Association discuss the following questions: (1) Is the ice used in this city, taken from Toronto Bay and surround-

ing ponds a source of danger and disease? (2) Should it be used in hospitals and by householders? (3) How far can it be said to affect the general health? The President referring to each of the questions, indicated that they had been answered in the discussion following Prof. Wright's paper on water analysis, which will be found printed in the proceedings.

The Secretary read a telegram from Col. Deacon, of Lindsay, expressing his regret at inability to attend. Thereafter the President presented a request from the Mayor, Town Council, and Local Board of Health of Lindsay, asking that the Association hold one of its regular meetings in Lindsay during the coming summer. The invitation was accepted on motion of Dr. Griffin, seconded by Capt. Clarke, of Guelph, and the Secretary instructed to officially accept the invitation in the name of the Association.

Dr. Bryce then in a few remarks referred to a resolution adopted by the Provincial Board of Health, instructing its representatives at this meeting to urge its support of the resolutions passed by that Board regarding quarantine. The following motion was then adopted on motion of Dr. Burrows, Lindsay, seconded by Dr. Ford, Norwood:

"That this Association desires to express its concurrence in the views contained in the resolutions passed at the last meeting of the Provincial Board of Health *re* quarantine, and to further state that the responsibilities thrown upon Local Medical Health Officers when small-pox and cholera are introduced, are such as to cause them to view with pleasure the recent improvements which have been made in the Dominion quarantine, and to express the hope that such measures will be still further perfected and such appropriations made as will equip and maintain the same in the highest state of efficiency."

Dr. Coventry, Chairman, then presented the report of Committee No. 7 on "Control and Prevention of Disease." The report was adopted after a short discussion. It was thereafter moved by Dr. Griffin, seconded by Capt. Clarke, that the report of Committee No. 8 on "Dangerous and Unhealthy Occupations;" that of J. R. Brown, on "Condition of Factories in Ontario;" and that of Dr. Burrows on the "Commercial Value of Sanitation," be read by title. Carried.

The Secretary thereafter presented the report of the Committee on Statistics and Printing *re* the incorporation of the Association. It was received and he was instructed to prosecute the matter to completion.

Dr. Coventry urged the necessity of having a list of Medical Health Officers of the Province placed in the hands of each executive officer, and that the names of the members of the same committee be supplied to each member of the committee. The suggestion was approved of on motion of Mr. Dolsen, seconded by Dr. Robillard.

The following resolution was carried on motion of Dr. Lundy, seconded by Dr. Robillard:

"That the thanks of this Association be tendered to Dr. Bryce, the Secretary-Treasurer, for his intelligent, earnest, and unceasing efforts to promote the interests of the public health, and that we deem this recognition of his services more necessary in consequence of the inadequacy of the compensation attached to his official position."

Dr. Bryce briefly thanked the Association.

Mr. Dowd was, on motion, heard briefly regarding the criticisms made *re* the Smead-Dowd system of heating and ventilation at a previous session. His explanations appeared to meet with general satisfaction.

The Secretary having placed in the hands of the President a communication from Dr. McMahon, M.P.P., stating that the Attorney-General and Minister of Agriculture had fixed an hour for receiving the deputation from the Association that afternoon, the meeting finally adjourned to the call of the chair.

ANNUAL GOVERNMENT REPORTS.

HEALTH IN OUR PUBLIC SCHOOLS.

The following extract from the interesting report of the Minister of Education is important information, and at the same time supplies material worthy of remark from MEDICAL SCIENCE.

Speaking of the average attendance throughout the year the report states that it is 47% and 45% respectively of the registered number of pupils in separate schools and rural public schools. In Paris the average attendance reaches 78%, and in Whitby it falls to 38%. Then follows the quotation "I have mentioned these averages for two purposes: (1) to point out as strongly as possible a grievous fault, for which only parents and guardians can provide a remedy; and (2) to show that there is

very little to fear from so called over pressure in the public schools. By reference to table A it will be seen that out of a registered school population of 487,496 only 14,918 attend school over 200 days in the year, while 344,242 attend less than 150 days in the year. If there is any danger at all from over pressure it can only be in the case of those who attend regularly. Now what is the extent of this danger? A pupil who attends school say 200 days in the year applies his mind for only 1,200 hours, allowing 6 hours per day (or if another hour is allowed for home work, 1,400 hours), in the year, or a trifle over one-seventh of the time. This is the maximum mental strain on any part of our school population; a strain, if I might call it such, which could only affect the most delicate constitutions. I fear there are greater evils in our schools than over pressure. Bad ventilation, defective sewerage, and a disregard of the ordinary laws of health have much more to do with the physical condition of pupils than any pressure imposed by heavy tasks or school programmes."

These points treated of by the Minister have so much practical interest attaching to them that we have examined the voluminous report of over 300 pages with the hope of finding more on the same subjects, but alas! we find in the report proper of over 60 pages extended paragraphs relating to agriculture and temperance teaching in our schools, and 16 pages devoted to religious instruction, but no more regarding the health of nearly 25 per cent. of the whole population of Ontario. We quite agree with the remarks contained in the last lines of the quotation, and must suppose that the Minister, whom we know to have more than ordinary interest and knowledge regarding the sanitary condition of our schools, intends, in a succeeding report to take up his parable where he has left it this year.

The two points of sanitary importance which attach to the quotation refer to (1) the cause of the absence of so large a proportion of pupils, and (2) the opinion expressed regarding *over pressure*.

In the report of the Provincial Board of Health for 1883 is printed an admirable report by G. Dickson, M.A., of Hamilton Collegiate Institute, and now Principal of Upper Canada College, in which is statistically set forth certain facts regarding the health of school children. From it we find that of 5,000 pupils in attendance per month throughout the year, an average of 500 per month is reported absent through sickness; 5 per cent. of these being noted as colds, and headaches. In the only school of the whole city reported to be well heated and ventilated, the number of absentees from sickness during the months of January, February and March was 25 per cent. less than in any other school in the city. With the liberty of the Minister we shall take and apply the facts statistically supplied us by Mr Dickson in their bearing on the health of over 487,496 school children. According to the average registered attendance in Hamilton, 10 per cent. of all the school children are reported absent through sickness. Take our school population in round number as 500,000, and applying the Hamilton standard we have during the year 50,000 sick school children. As the common ratio of cases of sickness to the number of deaths is 10 to 1, we would, applying this rule, have 5,000 deaths yearly among school children, a figure which, comparing it with the Registrar-General's returns, is not very far astray. But Mr. Dickson informs us that half of the sickness is reported as head-aches and colds. Unfortunately these symptoms are so indefinite as to give us no positive information as to whether they were the prodromous symptoms of some acute disease, or evidences of bad ventilation, or over pressure. We take it that they might fairly be divided as belonging to the three mentioned causes. In a previous part of Mr. Dickson's report we find this statement: "On several occasions during the past few years whole divisions were affected with sickness, and before anything could be done to check the spread of the disease nearly all the class were under the doctor's treatment; and in some instances happy households were quickly transformed into dreary habitations.". We trust that the next annual report will tell us how the statutory regulations regarding the registration and reporting of cases of infectious diseases by the school trustees, have been carried out, and that we shall be supplied with such an amount of exact information regarding sickness amongst school children as will give us a basis for discussing infectious diseases in their wide-reaching influence upon the prosperity of the whole community. Regarding the sickness caused by the bad ventilation of schools, there can be no doubt but that the Minister has touched upon the sore spot in all this school business. A school or other building will, generally speaking, have fresh air in it if it is not overcrowded; but if, as in some Hamilton schools, the floor space per pupil average 2½ square feet, it needs no argument to show that not only must the air become absolutely filthy, but that a child harboring infectious disease germs, either in its own system, as in the respiratory passages, or in its clothing, cannot fail to infect all near it, and many others who may be susceptible. Remembering further the mental condition induced by air with carbonic acid and animal exhalations in excess, we marvel how either the teacher can be expected to teach, or the pupil, the victim of foul air, be able to comprehend, with any degree of clearness, what is taught. Under such conditions any mental effort, becomes largely impossible, and any study is over pressure; for to use a common-place illustration, the strain of the load upon the horse depends rather upon the constitution of the horse than upon the size of the load. To old raw-bones the empty cart is a load, but to the Clydesdale three tons may not be too much.