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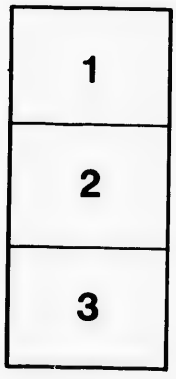

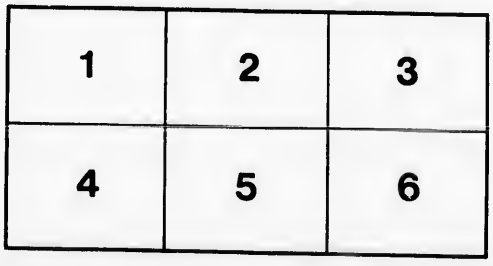

REPORT OF PROCEEDINGS

OF THE

WOODSTOCK

SANITARY CONVENTION

AND

ANNUAL MEETING

OF THE

ASSOCIATION OF EXECUTIVE HEALTH OFFICERS

OF ONTARIO.

HELD AT WOODSTOCK, MAY 17th & 18th, 1887.

TORONTO:
PRINTED BY WARWICK & SONS, 26 AND 28 FRONT STREET.
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WOODSTOCK SANITARY CONVENTION

AND

ANNUAL MEETING OF THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS OF ONTARIO

HELD AT WOODSTOCK, MAY 17th AND 18th, 1887.

Through the active exertions of the members of the Local Board of Health of Woodstock, ably seconded by the citizens represented in a large committee, arrangements were made for holding a Convention in May. As the general desire was expressed that the Convention should be given a broad, provincial character, the Association of Executive Health Officers of Ontario was invited to hold the sessions of its next meeting at the same time and place. The proposition being agreeable to the Executive of this Association, the invitation was accepted, and thus a conjoint Conference of health officers and the public was decided upon.

The programme was arranged, by which it was hoped that the interests both of the citizens of Woodstock, represented in their Local Board, and of the Association of Health Officers would be advanced.

The following programme, with two or three exceptions, was carried out. The papers in most instances are given *verbatim*, while the discussions thereon contain the principal points in the remarks of the various speakers:—

PROGRAMME.

MAY 17TH.—FIRST SESSION—2 P.M.

Dr. H. M. MacKay, Chairman Local Committee, presiding.

1. *Opening Prayer;* 2. *Mayor's Address of Welcome;* 3. *Chairman's Address*—Dr. H. M. MacKay.

4. *Water Supplies of Towns.*—Impurities, Methods of Purification, Cost: Dr. H. P. Yeomans, Mount Forest; Dr. J. P. Rutherford, Chatham; Dr. L. H. Swan, Woodstock; J. J. Hall, Esq., Woodstock.

5. *Food Supplies.*—Sources, Contaminations and Adulterations, Cooking: Dr. C. McLellan, Trenton; Rev. Wm. Cuthbertson, Woodstock.
6. *Dangers in Dirt.*—Dr. J. H. Kellogg, Battle Creek, Michigan.

MAY 17TH.—SECOND SESSION—8 P.M.

Dr. J. Coventry, First Vice-President of Association, presiding.
1. *Opening Prayer;* 2. *President's Annual Address;* 3. *Brain-forcing of School Children.*—Dr. D. Clark, Toronto; Rev. Prof. Rand, Woodstock; Rev. W. T. McMullen, Woodstock.
4. *Impurities of House Air and Ventilation of Schools, etc.*—Dr. J. J. Cassidy, Toronto; Rev. Prof. Wolverton, Woodstock; T. J. Lennox, B.A., Woodstock.

MAY 18TH.—THIRD SESSION—9 A.M.

Dr. J. Coventry, First Vice-President of the Association, presiding.
1. *Opening Prayer;* 2. *Election of Officers of Association and Reception of Reports;* 3. *Method of Appointment, Duties and Compensation of Health Officers.*—Dr. P. P. Burrows, Lindsay; Dr. Wm. Burt, Paris.
4. *Notification, Isolation, and Disinfection of Contagious Diseases.*—Dr. J. Coventry, Windsor.
5. *Dry-Earth Disposal and Sewerage.*—Dr. E. Griffin, Brantford; Dr. C. S. Elliott, Orillia; Dr. J. H. Thrall, Woodstock.

Through the courtesy of the citizens of Woodstock the Local Committee arranged for the entertainment of the visitors to the Convention at a lunch, immediately after the concluding session. John White, Esq., President Board of Trade, and G. R. Pattullo, Esq., Registrar of Oxford, presided.

The objects of the Convention, while partaking of a character especially intended to promote sanitary progress in Woodstock, were those peculiar to the newly-organized Association of Executive Health Officers of Ontario.

By the constitution of this Association, the basis of membership is such as to include all present or past members of Local Boards of Health and their officers throughout the Province.

The first session opened in the Town Hall on the afternoon of May 17th. Dr. H. M. McKay, Chairman of the Local Committee, presiding. Among the delegates present were several members of the Provincial Board of Health and a very considerable number of medical men, Medical Health Officers, Sanitary Inspectors, and members of Local Boards of Health from different parts of the Province.

After an opening service of prayer, conducted by Rev. W. H. Laird, Central Methodist Church, Mayor Francis extended a hearty welcome to the delegates present. He said that this was the second Convention of the

kind held in Woodstock, but he was sorry to see that the meetings were not as well attended as they should be. "Our town has been so healthy that we have not had much need for such things in the past, but now the town is becoming of sufficient size to make sanitation something that must be attended to."

Dr. H. M. MacKay, Chairman, thereafter read the opening address.

ADDRESS OF THE CHAIRMAN.

By Dr. H. M. Mackay, Woodstock.

Ladies and Gentlemen:

I consider it an honour to preside at this meeting. I am not, however, insensible to the difficulties and responsibilities attached to the task of delivering "the Chairman's address," which should be pitched in a key of no uncertain sound; and I only wish I could command words befitting the occasion, that I might introduce and press home with the emphasis it deserves the importance of the subjects about to be discussed.

We may well congratulate ourselves upon the excellent programme that has been provided, and we cannot but feel pleased to know that so many men of ability, specialists in their respective departments, could spare the time to leave their homes, no doubt at considerable inconvenience and sacrifice, to come here to assist in promoting sanitary science. The names on the programme, many of whom have a wider than provincial reputation, give sufficient guarantee that the readings and discussions will be of a high order of merit. And we are all grateful for the kindness and courtesy that delegated to our convention a distinguished sanitarian from Michigan, a state where sanitary science has made and is making rapid progress.

Seeing that there is a large amount of work to be gone over, I will take the liberty of repeating a suggestion made by Dr. Bryce, the Secretary of the Association of Executive Health Officers, during the preliminary arrangements for this conference. And we all know that the doctor means business when he takes anything in hand. It was this: "We must try and eliminate all discursiveness from the discussions." The advice is good. We are told that "one fact is worth a shipload of theory." There is no desire, however, on the part of anyone to interfere with a free and full discussion of the different subjects as they are presented; but rather that every one present be afforded an opportunity of contributing to the general fund of information.

With the Secretary's advice present to my mind, and knowing that there is much to be gone over, perhaps the best thing I could do at this point would be to stop and call for the next item on the programme. But feeling as I do the vast importance of the subjects pertaining to public health, and believing that they require to be again and again brought to the notice of the public before much progress is made in securing any degree of co-operation in regard to sanitary measures, I would like to occupy a few minutes to say why the people of Woodstock should show their appreciation of the efforts being put forth and endeavor to secure a large attendance at the meeting about to be held. The healthfulness of a place concerns either directly or indirectly every individual in it. It is of paramount interest to each householder in Woodstock that his neighbours should become well acquainted with the best ideas on how to regulate their sanitary surroundings, and moreover, that they be fully convinced of the necessity of having them put into effect. We are promised some excellent information touching upon health in the schools, when such questions as the difference between educating and examining the principles that should control and direct the lighting and ventilating the school rooms, etc., will be explained. This cannot but be of special interest to teachers and parents, for we are assured that untold mischief to children often results from ignorance or indifference in respect to these matters.

Moreover, we have on the programme such important subjects as water supplies, impurities of the atmosphere, whether generated in ill-ventilated rooms, from decaying animal or vegetable matter or from damp and foul soil, also alimentation, adulteration of food, and quality, quantity and proper cooking.

In this enlightened nineteenth century, in an especial manner noted for scientific advancement, it would seem at first glance as if all the subjects on the programme were common-place matters that science had long ago, and finally, disposed of. That surely there should be no necessity for discussing them before an intelligent audience at this late age. But alas! facts are against the thought. Although knowledge has undoubtedly increased, it is in many respects more apparent than real and we sometimes mistake shunting for progress. This is particularly true in reference to matters pertaining to health.

The present is pre-eminently a mechanical age, boasts of being practical, yet in many respects is most impractical. We go in pursuit of phantoms,

disregarding the realities inseparable from ourselves and designed to be evolved and developed by the dynamic forces within ourselves, and upon which devolves not only our own wholeness and happiness but also, so far as our individual influence goes, the future destiny of the race.

The tendency of to-day seems to be to estimate the value of everything on a cash, profit and loss basis,—the question being "Is it convertible?" How soon and for how much can it be converted? Even our health, nay our very lives, we barter for the benefit of posterity. A man insures his life or enslaves himself to business in order that someone may live in luxury and idleness for a little while after he is dead and gone.

How often a child is sent to school, not to be educated, but to cram a sufficient number of facts into the memory to enable him or her to squeeze through some examination, at the earliest possible point in order to be able the sooner to convert that knowledge, such as it is, into money or position. Teachers are not to blame for this, as they are the creatures of circumstances and must supply what the times demand.

The ancients were much wiser in these respects, judging from their records, than we are, and were far-seeing enough to recognize the truth that national prosperity is inseparable from national health and individual wholeness.

According to the Darwinian theory of development, of survival of the fittest cherished by the nurturing and fostering care of science, the human race should by this time have attained to the status of perfect giants, physically and mentally, as compared with the ancients. But it is very doubtful if the individual type has advanced either physically or mentally since the days of Solomon, nor yet since the still more remote days of Rameses. It is, I believe, an indisputable fact that the sanitary regulations of the Jews have not been surpassed in any age of the world's history.

If the Jews did not know categorically the different germs of disease as is claimed by some knowing ones at the present day, their methods certainly implied an acquaintance with some disease generating influence in the atmosphere. For were not their frequent purifications and precautions against defilement, more especially during the puerperal period, of the same nature as our own antiseptics. When founding new cities the ancients considered choice of location as of primary importance, and resorted to the following practical test as to the comparative healthfulness of different sites. Animals were killed; their bodies and entrails cut up

and left exposed on the surface of the ground to see how long it took putrefaction to set in. This surely implied germs as a factor in disease.

The ancients also attached very great importance to an abundant supply of wholesome water. Some years ago the world went into ecstacy over the achievements of science in supplying cities with water from a distance, as the Croton works of New York, supplying Glasgow from Loch Katrine, etc., etc. But these works sink into insignificance in comparison with the aqueducts of Rome, supplying at the rate of 312 imperial gallons daily to each inhabitant. The importance attached by the Greeks and Romans to bathing is sufficiently attested by the remains of magnificent structures which still excite the admiration of the beholder. It is computed that in the baths of Caracalla as many as 3,000 people could bathe at the same time.

The people of Woodstock may well regard it a privilege to have this conference held here. And I am sure I am safe in saying that the selection has not been made on the principle of "bearding the lion in his den," for Woodstock in respect of location, soil, healthfulness and general prosperity compares favorably with the best towns in the Province. Yet there may be other respects in which the discussions about to take place may have a pertinent reference to ourselves. I said that the Romans ages ago, at an enormous expense, supplied the citizens of Rome with fresh water at the rate of 312 gallons per individual, daily. New York at present is supplied at the rate of 76 gallons per individual, daily. We, in Woodstock, are still trusting to well-water with all that it implies. I am happy, however, to be able to state that the prospects of early improvements in this respect are encouraging, as we have magnificent fresh water springs within easy reach of our town that can be utilized at, comparatively speaking, small expense, and the authorities are making enquiries into the details with the view of taking special action. I might go on to enumerate some other directions in which there is room for improvement, but lest I might be accused of being too particular I will desist, in the hope, however, that our people will keep their eyes and ears open and become possessed of the best information that is known in these respects, and that as soon as these good friends are gone we will proceed at once to carry out their suggestions.

This concluded the interesting and instructive address of the Chairman; and after the audience had appropriately expressed its appreciation of the Chairman's introductory remarks, the regular papers of the programme were proceeded with.

PAPER I.—WATER SUPPLIES OF SMALL TOWNS.

By. H. P. Yeomans, B.A., M.D., Mount Forest, Member of the Provincial Board of Health.

Mr. Chairman, Ladies and Gentlemen :

There are two methods of water supply suitable for small towns, which may be considered :—

1. A system of public water works.

2. Wells or borings.

A comprehensive system of water works is generally considered to be too expensive for very small towns, and consequently the only method supposed to be practicable has been a supply by wells.

With commendable energy and enterprise, however, some small towns in Ontario have solved the problem and secured a water supply by a system of water works.

Brampton, the county town of Peel, having a population estimated at about 3,500, some few years ago adopted a scheme whereby water is brought from a lake four and a-half miles distant, and distributed to all parts of the town for domestic and fire purposes.

The lake, which is the source of supply, is fed by natural springs, and is situated at an elevation of 130 feet above the town, giving a pressure of forty-seven to fifty-five pounds to the inch. The supply of pure, wholesome water is inexhaustible, and the system works satisfactorily. The total cost up to the present is estimated to be about $62,000. Having adopted the system of supply by gravitation the annual running expenses are very small. Sixty-two thousand dollars may at first seem to be a large expenditure for a population of 3,500, but from a sanitary point of view the cost will be returned tenfold in the saving of the lives and health of the inhabitants. When we reflect on the days and weeks spent in sickness, on the lives destroyed, and on the unhealthiness of many or most of our small towns in Ontario, an expenditure of $60,000 or $70,000 for

the removal of one of the greatest causes of sickness, (viz., impure well water), does not appear to be an extravagant sum.

Besides this, a water supply for fire purposes, by the reduction of insurance, saves annually a large sum to business men, leaving the actual cost for a supply of pure water for domestic purposes only a small amount.

There are also the advantages of water for various mechanical purposes, lawns and all household purposes, which contribute to make a town desirable for residence. In no other way could money be spent in a small town with better present and future results.

We may also mention the town of Owen Sound as an instance of a small town having a population of about 5,500, and possessing a good and efficient system of water supply. We refer to this town for the reason that the system is somewhat peculiar, as the accompanying roughly sketched diagram will serve to illustrate. During a visit there for the space of a week last September, I was informed by the inhabitants that the system of water supply gave the greatest satisfaction to water takers in every respect. From information obtained through the kindness of the proprietors, one of whom is Mr. S. J. Parker, County Treasurer of Grey, I am able to give a description of this system. The method is by gravitation. The source is distant from the town about two and a-half miles. Its height above market square is 177 feet, and the water is conveyed in iron pipes (six, eight and ten-inch) to a reservoir inside the town, the height of which above the market square is 165 feet, giving a pressure on hydrants of from seventy to seventy-three pounds to the square inch, according to location of hydrants. The water supply at its source passes through limestone on a bed of blue clay. It is tapped as it flows from the rock, and is not exposed to daylight until it issues from the tap for domestic purposes. The surplus passes on to the reservoir there to remain stored for fire purposes. In cases of heavy drain from hydrants for fire or other purposes, the fresh water from the spring mixes with the reservoir water. But as soon as the hydrants close, the water proceeding directly from the spring fills the pipes, pushes back the reservoir water and the circulation goes on as before.

The cost—Families of 4 and under, 4 rooms and under, $6.00 per annum.

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The total cost of the works was about $40,000. The revenue at first was poor, but has gradually been improving as the water takers increased. It yields now about eight per cent on the investment.

We might now cite another example. We will take that of a town of 12,000 inhabitants, having a water supply with the power derived from an engine, which method is considered to be the most expensive.

In 1882, I accompanied Dr. Covernton in making an investigation as to the cause of typhoid fever in Sarnia. It was necessary to visit the Town of Port Huron, in Michigan, where Dr. Stockwell, with very great kindness, invited us to visit and inspect their system of waterworks. We found everything in first-class order and working satisfactorily. The water supply was derived from the River St. Clair, where the stream passes rapidly the American shore. At that time Port Huron was entirely free from the scourge of typhoid fever, which infested Sarnia, for the reason that they had an abundant supply of pure, wholesome water. Since that time, I am glad to say, Sarnia has, by the expenditure of a sufficient sum of money, relieved itself of the cause of typhoid fever, which existed at that time. Dr. Stockwell informs me, in a letter received a few days ago, that the cost of construction was $209,324; revenue last year, $18,621; population, about 12,000; annual expenses, $8,406; cost per individual or family, $3.90. There are 2,154 takers. The cost per individual is the result of dividing the annual operating expenses, $8,406, by the number of takers. This does not include interest expenses. The system is eminently satisfactory. The number of takers is always increasing. Amount of water pumped last year, was 505,606,400 gallons; daily consumption, 1,385,233 gallons; revenue, $18,621; annual expenses, $8,406=$10,215 for interest, repairs, etc.

We have selected three examples of towns—one having a population of about 3,500, another of 5,500, and one of 12,000—two of these having the system of gravitation.

We may draw your attention to the following inferences, which naturally suggest themselves from the examples just mentioned :—

1. It is possible, under favourable circumstances, for a town having a population of 3,500, to successfully procure a public water supply.

2. That the investment may be a good one, financially, even when the source is 4½ miles distant, as in the case of Brampton.

3. That a supply flowing from natural springs directly into the houses, as in the case of Owen Sound, is most likely to be free from contamination.

4. That when the supply is derived from a swiftly-flowing river, as in the case of Port Huron, the agitation and aeration of the water as it flows over a rough river bed, tends towards its purification by favouring oxidation of the organic impurities especially when these are not derived from sewage.

With regard to impurities in water and their removal, it appears to be the opinion of all experienced sanitarians that there is a great difference between those of vegetable origin and those derived from animal organic matter or sewage.

The Rivers'-pollution Commissioners in their sixth report, presented in 1874, affirm :—

"That the oxidation of organic matter in sewage proceeds with extreme slowness, and that it is impossible to say how far water must flow before the sewage matter becomes thoroughly oxidized. That when sewage is mixed with twenty times its volume of water, scarcely two-thirds of it would be oxydized in a flow of 168 miles, at the rate of one mile an hour, after the lapse of a week."

Numerous instances of the disregard of this principle have occurred in Ontario. In these cases sewage poured into a bay or other source of water supply, has been the direct cause of typhoid fever epidemics.

Filters have been used for the removal of organic impurities, and various kinds have been constructed of more or less utility. There may be, and no doubt are, instances where towns find it difficult or impossible to adopt any other method for procuring a supply of potable water.

This method is open to objections, among which may be stated the following :—

1. When sewage is present in the water to be filtered, the difficulty of removal.

2. There is always more or less danger of neglect in carrying out the precautions necessary for the proper cleansing of filtering material.

The safest plan, when in any way possible, is to remove the cause of impurity, to prevent contamination of the source of water supply and thus avoid any danger of the propagation or spread of disease.

On this point Dr. R. A. Smith testified before the Royal Commissioners of water supply of London :—

"That no one has conclusively shown that it is safe to trust to dilution, storage, filtration, or periods of time, for the complete removal from water of disease-producing elements, whatever they may be."

These principles in procuring a source of pure water supply for the City of Toronto, are to some extent observed in the plan proposed by Messrs. J. McAlpine and Kivas Tully, Civil Engineers. The supply is to be derived from Oak Ridge lakes and the rivers Don and Rouge. The plan contemplates the removal of all objectionable, decaying or growing vegetable matter from the bed of the lake to a depth of fifteen to twenty feet, and that the surface should be covered with coarse gravel. They also propose that the water be conveyed in an open channel for a considerable distance in order to expose it to the purifying effects of the atmosphere.

We have another illustration of the same principle in connection with the water supply of the city of Boston. The impurity of the water had been noticed for a length of time, while the cause remained undiscovered.

The Board of Aldermen appointed Commissioners, who engaged the services of Prof. Remsen, of the Johns Hopkins University, to make a thorough scientific investigation for the purpose of deciding the cause of the contamination.

After a careful and long-continued search, he found that the decomposition of a fresh water sponge (Spongilla fluviatilis) caused the impurity, and in presenting his report he recommended various plans for the removal and prevention of this cause of impurity.

Wells.—Contamination of well-water by sewage in small towns in this Province is a common and constant cause of disease. Imperfect sewerage or

drainage, the accumulation of refuse and filth of all kinds on the surface of the ground in the vicinity of wells, have all contributed to render well water unfit for domestic use. Nothwithstanding the efforts of Medical Health Officers, Local Boards of Health and others interested in promoting public health, great carelessness still exists in many localities regarding the condition of well water. However, at the present time more than ever, people generally seem to realise the necessity of having well water frequently tested, and the surroundings of wells examined in order to prevent contamination. There is a great change for the better in public sentiment within the past few years in all portions of Ontario, and we may confidently hope for greater advance in the future. It is a noted fact that typhoid fever and diphtheria have destroyed more lives in small towns and rural districts than in cities, according to our provincial registration returns; a circumstance attributable, no doubt, to impurity of water-supply from wells. There are instances even yet where individuals resist the orders given by local health authorities to close wells situated within fifteen or twenty feet of cess-pools, actuated by the erroneous notion that there *can* be no danger. Old prejudices are hard to eradicate, and frequently nothing but the occurrence of death in a neighbourhood will serve to awaken the suspicion of individuals who refuse to admit the truths of sanitary science.

It has been frequently proved by actual experience that a well drains an extent of ground nearly the shape of an inverted cone, and that, as a rule, the area drained is about four times the depth of the well. The extent depends on the nature of the soil, the length of time during which the well has been in the locality, and other circumstances or conditions of the soil surrounding the well. Shallow wells are those from four to thirty feet deep. The question sometimes arises whether deep wells are not more likely than shallow wells to contain pure water. While it is true that deep wells reaching below the rock or thick clay beds are, under some circumstances, less liable to contamination from surface soakage of impurities, it may be possible to have pure water in shallow wells, even where the source is near the surface. When the ground surrounding the well is cultivated as, for instance, in a clean, carefully tilled garden, the plant growth destroys all decaying organic matter, and purifies the soil. In such a case the clean earth acts as a filter, and the water may be pure. I have known instances where a shallow well under these circumstances contained water which by ordinary chemical tests proved itself to be fit

for use. Shallow wells may be more easily cleaned out. When the supply is abundant, and issues from a spring in the well, and the water is being constantly pumped out, agitation and aeration tend to purify the water. The *situation* and *surroundings* of a well should be carefully considered, and this is of more importance than the *depth*. In pronouncing on the purity or impurity of well water it is necessary to consider, not only the results of chemical analysis, but also the conditions of soil and sources of impurity surrounding the well. It is possible for sewage to be present in water, and still to escape detection by chemical tests. If, however, by ordinary chemical tests we find in well water a considerable quantity of solid matter, together with an abnormal quantity of chlorine nitrates, nitrites and nitrogenous organic matter, the presence of sewage is suspected. If, in *addition* to this, the *surroundings* are such that *sewage* might find its way into the well, the water should be condemned at once. Under ordinary circumstances, where only a qualitative test is made, a fairly correct conclusion may be arrived at by carefully considering the surroundings of the well, and the results of the testing. On the other hand, again, water may be clear, sparkling, and devoid of any bad taste, and still be contaminated with disease germs.

In towns, where well water is used, great care should be exercised by local health authorities to prevent the contamination of the soil by accumulations of filth, and by the careless disposal of slops or house refuse. The drainage, also, of the surface should be attended to, and all possibilities of contamination, from sewage finding its way into wells, removed. In the report of the Connecticut State Board of Health lately issued, there may be found the result of the analysis of the water from 110 wells, situated in New Haven. This report shows the importance of preventing the contamination of the soil surrounding wells. This investigation was suggested owing to the high rate of infant mortality in certain parts of the city. The conclusions arrived at were, "That the great majority of deaths occurred in *unsewered* districts, *not densely* populated, but where the soil was polluted with filth and the inhabitants lived in the midst of it." In these districts more than 30 per cent. of the infant deaths occurred. On the other hand, in the *well-drained* and *sewered* districts, where the city was more densely populated, only 2.5 per cent. of deaths were reported.

In the "plague district," as it was significantly named, the well water

contained the usual evidences of organic impurities, viz. :— ammonia, albuminoid ammonia, nitrates and nitrites.

Lest I may continue beyond my allotted time, I shall conclude with a few suggestions regarding precautions for preventing contamination of well water.

1. Care in the construction of wells, in order to prevent as far as possible the soakage into the well of surface impurities.

2. Preserving cleanliness of earth around in the vicinity of wells.

3. Adopting proper methods for the disposal of kitchen slops and house refuse, so as not to pollute the surface soil of yards or grounds in vicinity of wells.

4. Care in locating wells in relation to houses, wood-sheds, cesspools, drains, or other sources of contamination.

5. Proper drainage of small towns by public drains or sewers, having a free main outlet capable of carrying away all surface water — not from lot to lot, or cellar to cellar, as frequently done in towns.

6. Frequent examinations and cleaning of wells.

7. Admission of air to wells by an air pipe beside the pump ; platform of well to be made tight.

8. Wells used constantly are more apt to contain pure water from frequent pumping.

9. Adoption of the dry-earth system in towns where a proper system of sewerage cannot be established.

10. Drains or sewers constructed at first for the purpose of surface drainage should not afterwards be used to carry off the water from cellars, water-closets and dwellings, as has been done in some places with unfortunate results.

11. Enforcing the Public Health Act and the Local Health By-law regarding the closing and filling up of all wells containing impure water, when the source of pollution cannot be removed.

Local health authorities have supreme authority to prevent the using or keeping on any premises wells containing impure water ; and therefore, whenever, in the opinion of the authorities, any such case of sickness exists they can, in the exercise of their own judgment, condemn the well, and order the owner or tenant to close it up immediately.

The Public Health Act in this way grants to local health authorities absolute and unlimited power in removing anything which in their opinion is prejudicial to the health of the people. The removal of causes of sickness and disease rests with the local health authorities and the people who invested them with powers to legally enforce health legislation.

PAPER II.—By Mr. J. J. Hall, Woodstock, Chairman Local Board of Health.

Mr. Chairman, Members of the Association of Executive Health Officers of Ontario, Ladies and Gentlemen:

While assuming that the majority of papers read at this Convention would be, as heretofore, the thoughts of scientists and doctors, couched in what to them is the most appropriate and concise language—the nomenclature of science, I am pleased to see that, in compiling your programme from the number of practical subjects set forth, you have not been unmindful of the fact that a very large proportion who will attend these discussions, and for whose benefit especially these conventions are held, have not had the advantages of a technical education that familiarizes them with such scientific terms as infusoria, bacilli, bacteria, spores, etc., etc. Believing that for this purpose, or as a compliment to our Local Board of Health, through me, its Chairman, you have invited me to give a short paper upon the practical side of the water supply of towns, I am the more persuaded that a few comprehensive practical suggestions upon these abstract subjects do the most good. From my experience of a year ago, when, in conjunction with Dr. Bryce, we prepared a number of samples of drinking water from various sources about our town, submitted them to the physiological and qualitative test, the result, with the samples of water, was submitted to you in an admirable address by Dr. Bryce; but the discussion and practical results, I fear, were largely confined to the professional members of the convention.

I regret to say that the circumstances, as they at present exist in our larger towns—the only source being such as we ourselves have, the old well-hole—preclude me from offering a comparison between ourselves and the vastly improved sanitary conditions that must prevail in similar towns,

where a bountiful supply of wholesome water is obtainable by a system of water-works.

The first practical view of my text suggests to my mind that a town occupies, in regard to water supply, a position mid-way and more dangerous than either a village or city because, in the first instance, the ratio of population per acre is so low that a very considerable amount of objectionable matter of various kinds may be deposited in and upon the soil without any contamination of the water supply; in fact, in such places the all but universal mode of disposing of all kinds of filth is to dump it into a hole in the ground without any absorbent or disinfectant whatever, as being the least troublesome and expensive. As it is a worse practice than even the uncivilized barbarian is guilty of, it is astonishing to what extent this abuse of nature can be resorted to with impunity. I venture to say that, of all the *high-falutin'* named disinfectants of the present day, none are so efficacious as an absorbent and deodorizer as dry earth, and if those people who live outside the pale of the jurisdiction of some Board of Health would frequently spade up the ground where their slops are thrown so that the sun and air could freely circulate through it and oxidize it, and throw a plentiful supply of dry earth in their closets, they would be amply repaid for the trouble; and in cities a proper system of domestic water supply is almost universal.

But to return to my text—the water supply of towns. I believe that, should it be our privilege to have Woodstock chosen as your place of meeting next year, we will be able, perhaps, to point to one practical result that your meeting last year and this has helped to bring into prominence—the supply of pure spring water to our town through an efficient system of water works. We believe we have at our doors the best and purest water to be found, at comparatively little cost. At present we are in that transition state verging on a city. Like a youth in adolescence, whom it behooves to guard well all his avenues of health, so that he may enter the lists in the life-struggle upon even terms with his competitors, so with us, the foundation we now lay will be the measure of prosperity and health of the city. As members of Boards of Health, what we have to struggle with incidental to a new country, the population of which is largely composed either of original settlers and their progeny, or else accessions from the rural parts of our own or foreign countries, who do not realize the utility of our proclamations and Govern-

ment legislation, who have had access to pure and wholesome spring water bubbling from every hillside in all its crystal purity. These natural sources of water supply are rapidly disappearing, owing to the clearing of our forests and other causes that follow in the wake of civilization. We now have to dig below the surface for these natural currents of water, which in this country are by nature so abundantly provided. How essential is it, then, that every precaution is used to see to it that the filter medium —the earth—through which this water is carried into the pockets and underground reservoirs is kept as free from objectionable matter as science and common sense can make it. In such cases as ours the time has arrived when a halt must be called to the indiscriminate use of the soil as a deodorizer and absorbent for all the rapidly accumulating *debris* of a thickly settled town. The almost universal system in vogue here and elsewhere to get a supply of water for domestic use is the well-hole, in depth varying from ten to forty feet and some five feet in diameter, encased with brick and pumped through wooden logs. This plan is, perhaps, the most objectionable that could be devised, for the reason that the hole is carried down until a current of water is reached, which if, as is generally the case, the reservoir supplying the water is at a greater elevation, forcing the water in the well to the same height where it remains, the excavation or hollow above acting as a suction for a large surrounding territory to drain its surface water into until the hole is full of the most objectionable juices and organic matter extracted from a great radius of ground around the vacuum ; and as the warm weather in summer evaporates the water the organic and other impurities remain to increase the gravity of the water, and cause it to descend to the bottom and be pumped up through slimy pump logs to do duty as tea and coffee. I have frequently known real fine—"the best well in town"—to be dried up completely by a good surface drain or sewer passing somewhere in the neighborhood, proving conclusively from what source that well drained its supply. As a matter of economy, there is now no longer any excuse for digging these old-fashioned wells. Good drive wells can now be had at as little cost. These consist of a perforated point attached to a hollow iron pipe driven into the ground until a spring is reached, when a pump is attached, and no toads or filth of any kind can enter.

Or else, if those that have already one of the "best wells in town," if it wasn't for the toads and fish-worms, would have a very large sewer pipe

or dome-shaped inverted reservoir of brick, with holes in it to allow the water to enter, built down in the well where the spring enters, and continue it upwards with sewer pipe to the top, then fill in around with earth or gravel and introduce an iron pump, which could be withdrawn to repair if anything went wrong. This I believe to be entirely practicable, and, if deep enough, I can think of no objection, and the old brick, if removed, would more than pay for the sewer pipe; the great objection to the surface water entering the well as it does, through brick, would in either case be removed.

And now, on behalf of our Local Board of Health, I extend to you a cordial welcome, with the hope and expectation that the advent into our midst of so many eminent authorities from every part of our Province, with the acquired knowledge from years of practical experience that you have gained, will develop an interest and study of hygiene among our people that the importance of the subject demands.

Discussion.

Dr. Swan, Woodstock, said this is one of the most important subjects that could come before a Woodstock audience, as the question of water supply is now before our citizens. He described the geological formation of the soil beneath Woodstock, and showed that in Woodstock, because of the nature of some of the substrata, cesspools, etc., are apt to become unusually deadly. Our wells, which are generally shallow, do not and cannot be made pure and healthful, so we will soon have to secure a supply from the springs that are found in abundance in the vicinity of the town. An alternative plan to this would be to sink artesian wells down to the limestone rock, from which a good pure supply could be obtained. An artesian well was sunk some years ago near Beachville, and at a depth of about 500 feet a supply was obtained, and a constant flow has continued ever since. Other such wells are found in the county, and no doubt a sufficient supply could be similarly obtained.

PAPER III.—FOOD SUPPLIES, THEIR CONTAMINATION AND ADULTERATION.

By Dr. C. McLellan, Trenton, Medical Health Officer.

Mr. Chairman, Ladies and Gentlemen:

In our favoured land the subject of our food supply may be approached without the startling idea that a scarcity is to be feared, or that the sources are threatened with exhaustion. The blessing of abundance is enjoyed in the great majority of our homes, and the thought of pinching want, much less of actual starvation, with its terrible suffering, is not often contemplated by our well-fed population. The almost unlimited supply of raw material for food should lead neither to temptation nor leave any excuse for adulteration in its manufacture; while only criminal negligence of filthiness can account for its contamination.

Our existence depends on a supply of wholesome food sufficient for the nourishment of our bodies. The material is drawn largely from the organic world, with salines and water from the inorganic kingdom. The essential constituents are nitrogenous matter, fat, carbohydrates, and mineral matter. It has been proved by many experiments that no one of these principles alone suffices for the proper sustenance of our physical organization. A combination of nitrogenous and non-nitrogenous principles seems essential to our health and life. The nitrogenous matter is derived mainly from animal food, such as flesh, milk and eggs, and is applied to the nutrition of our tissues, while the non-nitrogenous matter is derived from fat, and vegetables which contain the starch, sugar, gum, utilized in the production of heat, and transmuted into force or energy. Inorganic matter, in the form of water and saline matters, constitutes an indispensable part of every living being; the water supplies a necessary condition for the play of chemical changes essential to the production of mobility, while the saline matter assists in the formation of the secretions.

The proper amount of food depends on the circumstances of temperature, exercise and habit, or other individual peculiarity. Nitrogenous matter should form, according to authorities, about one-fifth of the water-free food, or between four and five ounces daily. This applies to a person in good health with active habits. One part of animal with three parts of

vegetable food suffices to maintain the tissues and to replace without waste the carbon and nitrogen daily eliminated from the system. Twelve to fifteen drachms of mineral matter are required to maintain the secretions. Sufficient water to compensate for the waste by the skin, lungs and kidneys must be taken, viz., from eighty to one hundred ounces daily, in addition to about twenty ounces, which we consume with the solid food; and as long as the water, says Dr. Pavy, is free from noxious properties, a large supply must be regarded as beneficial by assisting to carry off impurities from the system. In regard to quantity, also, there is no doubt that the evils encountered in this country from over-feeding are much greater than from under-feeding. To the so called improvements in the art of cooking much of the evil results of eating to excess is chargeable.

The actual length of time life may be maintained in the complete absence of food does not exceed ten or eleven days, though temperature and moisture exercise an important influence in shortening or prolonging the period. Cold, in conjunction with starvation, accelerates death; moisture and warmth favor a longer life.

A meal is ordinarily digested in four hours, and our practice of taking three meals a day is a custom that seems to have physiological sanction. A writer on this subject calls attention to the practice of business and professional men of taking little if any food in the middle of the day while engaged, as sooner or later leading to exhaustion of the system, causing dyspepsia and kindred evils which medical treatment, in the absence of a generous luncheon or dinner, fails to remedy.

In slaughtering animals the blood should be thoroughly drained off, both to improve the keeping qualities and appearance of the meat. The blood is quite as good an article of food as flesh, but is more perishable. "Hanging the meat for a few days till *rigor mortis* passes off increases its tenderness. The flesh of animals is unfit for food if the animal, previous to death, was unhealthy, or if decomposition has taken place in meat slaughtered in a healthy state. Previous to death the principal danger arises from the presence of parasites or infectious diseases. The *cysticercus cellulosæ*, of the size of a hemp seed, found in measly pigs, and the *cysticercus bovis*, of much smaller size, found mostly in cattle, give rise to tape-worm, unless in the preparation the meat has been thoroughly cooked in every part. The tape-worm from pig's flesh is the *taenia solium*, and from beef, *taenia-medio canellata*.

Another parasite, found principally in pig's flesh, the *trichina spiralis*, was formerly thought harmless, but is now known to produce more serious effects than either of the others. Though described by Tiedman in 1822, its evil effects were not well known till 1860, and in 1863 many deaths occurred from eating smoked German sausages made from ill-conditioned pigs. The Academy of Sciences, Chicago, are said to have proved the existence of *trichinæ* in one out of fifty of the hogs inspected, and that the animals are nearly always out of health.

A report to the Privy Council, in 1863, by Prof. Gamgee, is quoted by Dr. Pavy to the effect that "one-fifth of the common meat of England was derived from animals in a state of disease." It is affirmed that the flesh of cattle is rendered poisonous by the food they consume, without the animals themselves being seriously affected; and some of the pheasants and partridges of our own country are known to be poisonous during winter and spring while feeding on the buds of certain trees, such as *calmia latifolia*. This is equally true of some shell-fish, such as mussels. It would seem that persons acquire a certain immunity from the custom of eating putrid or poisonous food, judging from the state in which meat is eaten in some countries; but the ordinary person will find it unsafe and unhealthy to partake of tainted meat.

Our supply of fish food is of national importance, and it is pleasing to reflect that with wise regulations, looking to the careful husbanding of our resources, an ample supply for our own and future generations may be maintained. The same evils attend the eating of diseased and decomposed fish as in the case of meat. Their flavour depends also to some extent on the feeding. The reputation of Loch Fyne herrings and Dublin Bay haddock from this cause is world wide. Fish is not so stimulating an article of diet as the flesh of fowls or quadrupeds, but is yet sufficiently so to maintain vigorous health. Dr. Pavy says, the robust health of the dwellers in fishing districts is remarkable. A writer on the subject says, that in no other class do we see larger, handsomer women or more robust and active men.

Milk may be taken as the typical food. It contains all the elements of the body. Its usual adulterant is water. If the water contains impurities the evil effects are conveyed in the milk. Even washing pans in water contaminated with typhoid poison, has given rise to an outbreak of that disease. It is also susceptible of being influenced by the nature of the

herbage on which the cows feed in regard to colour, taste, and, it is said, also of poisonous properties. In my own neighborhood a marsh, extending from the head of the Bay of Quinté westward, is used in the dry season for pasturage. The farmers have frequently to remove the cattle, especially the younger ones, to high lands, as they lose many from what they consider poisoning from the herbage. The milch cows escape with much lighter mortality, but a similar sickness to the one from which the young cattle suffer attacks persons who use the milk. A medical man of the neighborhood attributes the illness of the people to malarial fever, and, unless the contention of the farmers that the milk is the source of trouble be correct, the cattle must, it is presumed, die of the effect of marsh miasma. Milk, otherwise pure, acquires poisonous properties by exposure in filthy and unwholesome shops, kitchens or living rooms. From its peculiar sensitiveness to noxious influences it is suspected that its organic constituents serve as a pabulum for the development and multiplication of disease germs. Greater safety in using such milk may, as in the case of meat, be attained by boiling.

Butter undergoes change in warm weather, the nitrogenous matter promoting fermentation. Excessive washing, while favouring longer keeping, injures its flavour. Adulteration is not often practised in this country, though it is easy of adulteration with animal fats. It is counterfeited by preparations from ordinary animal fats, known as butterine and oleomargarine. This is pretty largely done in the United States and France, and if prepared from the fat of healthy animals, it is wholesome, though not so digestible as genuine butter. The danger, however, is that fat of all kinds, will be indiscriminately employed, and evil consequences result from its use.

Discussion.

Rev. Wm. Cuthbertson, Woodstock, said he could not attempt to talk as an expert on this subject, when surrounded by representatives of the medical profession. But there cannot be any complete conference on this or any subject without due respect to the religious aspect of the matter, so he felt he was not out of place here in taking some little part in what is going on. It should be the aim of such an assembly as this to bring the masses into sympathy with the subject of sanitation and of health, and this can best be done by giving the people to understand that these subjects form a large part of the whole duty of man. In England the question of getting

enough bread to eat is the main question among the masses, and it is a good sign that in this land, where food is abundant, people should be discussing the question of seeing that that food be wholesome and healthful, and free from all adulteration and contamination. In connection with the question under discussion he would like to lay particular stress on cleanliness, and in the manner of cooking food, both of which are too much neglected. It is our duty to instruct the people in the fact that plain food, well cooked, is what people want to fit them for the proper discharge of all the duties of life. He thought at least the first principles of this subject should be taught in our schools, as well as inculcated at home.

Dr. Swan, Woodstock, said no other animal, except man, is subject to dyspepsia and indigestion, and he wondered if our way of preparing food had not something to do with it. He doubted if our roller mill was not a curse instead of a blessing.

Dr. Ross, Embro, said he was thinking on the subject of milk-fever. Dr. McLellan said impure milk is caused by malaria, but he had an idea that their malaria is a sort of scapegoat with the profession. He had an idea that milk-fever is not caused by malaria, for the conditions of this disease are such that they cannot be attributed to malaria.

Dr. Bryce, Toronto, said that during the last year his attention had been largely directed to the public supply of our food while on the way to market, in the slaughter houses, etc. He thought a great deal of the unhealthy meat is largely due to the bad food and air supplied to cattle while being fed in the stables. Lung diseases among cattle are becoming very common, and he doubted not it would soon be necessary for some legal steps to be taken to remedy this evil. It has been estimated that twenty-five per cent. of all the cattle from which the milk supply of New York city is derived are afflicted with tuberculosis. The fact of cattle having considerable flesh upon them is by no means conclusive evidence that they are fit for food. The best veterinarians say that tuberculosis is a contagious and hereditary disease, and that no meat or milk of cattle so afflicted should ever be offered for sale, but at once destroyed. The new Act passed this session gives every town the power to have examined every cow from which the milk supply of the town is derived, and the people should see that this inspection be made.

PAPER IV.—DANGERS IN DIRT.

By Dr. J. H. Kellogg, M.A., M.D., Battle Creek, Michigan, Member State Board of Health.

Mr. President, Ladies and Gentlemen:

In accepting the invitation of your Committee of Arrangements to address you at this Convention, I chose as the topic of my remarks the subject, "Dangers in Dirt"; but the large audience which I see gathered here to-day, and the intelligent discussions of the papers to which I have listened, lead me to believe that the people of Woodstock are probably in less need of information upon this subject than are those in most of the States on my side of the line which divides the two great countries of the North American Continent. I understood the nature of your Convention to be the same as that of the Conventions which the State Board of Health of Michigan frequently holds in my own State, namely, the education of the general public in sanitary matters. I have prepared no elaborate lecture to deliver to you, but propose to talk for a short time upon the subject announced.

Dirt has been defined as being "matter out of place." I think this definition a very good one and applicable to all kinds of dirt. There are various substances which may be included under the general head of dirt, of which some are gaseous, some solid, some liquid. Associated with the worst forms of dirt, there are living organisms called *germs*, to which, indeed, the worst results attributable to too intimate contact with filth are due. If any mass of decomposing matter is examined by the microscope, it is found to contain myriads of minute specks of life, which have been termed germs, or rather, which are the result of the development of germs. Wherever decomposition of animal or vegetable is taking place, these germs are present in countless numbers. Infinitesimal in size,—so small that millions may range with unrestricted freedom in the smallest drop of water,—they are yet more potent for harm to human life and health than all other agencies combined. Undoubtedly these are the active agencies which give rise to the terrible typhoid fever which annually carries off thousands of victims, to dysentery, cholera, diphtheria, yellow fever, the plague, and a long list of diseases, the exact number of which is not yet known.

There is some difference of opinion respecting the exact nature of the germs which give rise to different diseases, and as to the exact mode of their development and transmission; but it is certainly settled that decomposing matter furnishes a fertile soil for the development of the germ-causes of the diseases mentioned, and many others.

Noxious gases and disease-germs are usually associated together: a fortunate fact, as it enables us to detect the dangerous character of an infected atmosphere without the trouble of a chemical analysis. It is possible for the air to be swarming with disease-germs without an offensive odor being present; but it seldom happens that we have an odor of putrescence without the presence of noxious germs. It is perfectly safe to say that a foul-smelling air is a dangerous air. If our eyes were microscopic, we should daily, hourly, behold sights that would appal the stoutest heart.

Perhaps we may with profit consider for a moment some of the most common sources of these deadly enemies to human life. We need not seek long for an illustration of the source from which these unseen foes sally forth to prey upon our dearest friends, ourselves. Let us picture to ourselves an average human habitation. We have a fine, commodious dwelling, ample room, plenty of comforts of every sort, every convenience that money can procure, or ingenuity devise. It would seem that the occupants ought to be hale and hearty, but they are not. Every now and then Death makes a visit to the household, carrying off its brightest members, ruthlessly slaying father, mother, brother, sister; the strong man, or the feeble infant. Why this sacrifice, this ruthless slaughter? Who are the invisible monsters invading this happy circle? In olden times it would have been said, "an evil spirit hath done this;" but the days of witchcraft and superstition have gone by, and we must look for some more rational solution of the mystery.

Let us look around. We will begin our investigation at the lowest portion of the house, and proceed to examine the cellar. We must have a light, as no ray of sunlight ever enters into this subterranean store-house. We open the door to descend. Whew! what a "smell!" A "smell," did we say? Not one, but many smells. A conglomeration of vile odors of every variety and degree. Let us descend. Take care of your nose, if it is not used to such explorations, you had better protect it a little with your handkerchief. As we grope about, the air seems thick, and the candle burns dimly. A suffocating sensation tells of carbonic-acid gas, and a

stinging smart in the nose suggests ammonia, while a sharp headache setting in betrays the presence of that deadly gas, sulphuretted hydrogen.

Where do they come from, these pestilential gases? Sources are abundant. Here is a bin of potatoes laid away for winter's use. The warm, close air of the unventilated cellar has hastened their decay, and the peculiar penetrating odor which arises is evidence that we have located at least one "smell." Here is a barrel which emits a mouldy, vinegar-like odor, and a close inspection shows it to be half filled with rotten apples. Each day, the cook picks out the sounder ones, and leaves the balance to decay and mould.

A peculiarly offensive odor attracts us to a corner in which has been stored a heap of cabbages and other products of the vegetable garden. The insufferable stench arising assures us that the sulphuretted hydrogen and and its allies have here a stronghold. Half-decomposed cabbages and turnips contribute their share to the general stench. Overhead hang sundry stubs of moldy bacon, a smoked ham covered with a green coat, and a half-rotten codfish which has been forgotten. A glance around shows mold and mildew everywhere. A student of fungi would here find a rich field for specimens.

There are cellars which contain no vegetables or other decomposable stuff, and yet are not healthful. A cellar which is damp, or one which is not cemented at the sides or bottom, is properly open to suspicion. A dry, well-ventilated cellar or basement adds to the healthfulness of a house; but a cellar which is filled with damp or stagnant air is productive of disease. This is particularly true during those seasons of the year when a house is likely to have its doors and windows closed, and fires burning in grates or stoves. The heating of the air in the living rooms of the house creates an upward draft, which draws up through every crack and crevice in the floor streams of stale, damp, cellar air, spreading it through the entire building. This is undoubtedly a source of numberless sore throats, catarrhs, rheumatisms, and other maladies which are wrongfully charged to Providence or the weather.

Cellars with uncemented walls and floors are certain to be filled with bad air derived from the soil, known to sanitary scientists as "ground air." Scientific investigations have shown that the air of the soil is always more or less impure, and it may be so greatly contaminated as to become deadly in its effects.

We ascend to the kitchen. Here we find an accumulation of what everybody recognizes as kitchen-smells. In one corner stands the antiquated wood-box, the mute receptacle of a hundred things besides its daily supply of fuel. If the witnesses were not mute, we might listen to a surprising tale of sanitary transgressions connected with that homely piece of furniture in the corner. Let us turn out upon the floor the contents, and scrutinize them. Rotten bark, decomposing apple-cores, odds and ends of almost every imaginable eatable, the remnants of the cozy nest in which several generations of house mice have been reared, a mouldy, putrescent conglomeration of everything perishable that enters a household, teeming with filth, redolent with putrefaction, and crawling with vermin—such are the contents of the average kitchen wood-box. Not a few such have we seen, and a still larger number, out of sight, but conveniently near, we have smelled!

In another corner is the inevitable "sink," made of wood, and saturated with decomposing "dish-water." Hiding in its secret corners are ancient rags in an advanced state of decay; and the drain pipe connected with its bottom, affords an open channel for the ingress of pestilential odours from the cess-pool just outside the door.

The plastered walls, saturated with the accumulations of a quarter of a century, pour forth an odoriferous stream of gaseous filth, which is unobserved only because overpowered by the other sources of contamination.

But we must not omit to take a peep into the pantry close at hand, before proceeding elsewhere with our investigations. I wonder if the goddess of Health ever looked into a modern pantry! If she did, it is a marvel that she did not send her emblematic serpent on a mission of punishment among the cooks, for such flagrant infractions of her laws. Our olfactories are the only guide necessary to enable us to discover the whereabouts of the precious corner where is hoarded the provisions for daily consumption by the family. An odour of sourness which betrays unmistakably the presence of decomposing milk, leads us to the doorway of the pantry, and we enter to make a closer inspection. With the exception of a few pans of milk which has lost its useful properties, and acquired some which are not useful, all looks neat and orderly; but a musty odour, not perceptible, perhaps, to those who have become accustomed to it, but apparent and significant to the sensitive olfactories of a sanitarian, attracts our attention to sundry drawers and corners which

might otherwise have escaped notice. We will not pain the sensibilities of our hearers with all the possible revelations from an investigation of the hidden recesses of the ordinary pantry. Fragments of mouldy bread, stale food of various kinds, perhaps a churn, with its souring, fermenting contents, awaiting the weekly churning-day, are but a few of the items which would be included in a complete inventory. It is a magnificent place for germs of every description to hold high carnival. And they do. Every housewife knows that a pan of new milk placed in a close room or pantry with a pan of sour milk, sours much sooner than if set in a perfectly fresh and wholesome place.

Let us take a look into the sitting-room, the chief living-room of the house. Here again we are pretty sure to find a wood-box, nicely papered or painted outside, but no less uninviting inside than its humble brother in the kitchen. We find no kitchen-sink with its unsavory odours, but that source of contamination is within easy smelling distance, and so is still able to do its work of mischief. So, too, the putrescent fumes from the cellar and pantry are plainly discernible, and the walls are covered with a layer of decomposable matter condensed from the vapours rising from the cooking of vegetables, boiling of soiled garments, and other culinary and domestic operations. Many other such layers have been formed and buried by the new layer of paper and paste added every two or three years, or oftener, until, as we have seen in some instances, as many as eight or ten layers may be counted. Where could a more fertile field for germs or parasitic fungi be found?

A dark spot a foot or two in diameter in one corner marks the spot where, as a housekeeper says, the paper has been stained as the result of a defective roof. A close inspection shows something more than a stain, a flourishing crop of mould. Put a speck of that same mould under the microscope, and we behold a forest. Every twig bears fine, large, round fruit, which consists of sacs filled with minute specks called spores. Some of the sacs are ripe and bursting, throwing the spores with which they are filled in every direction. This is what is taking place on the wall, and those same spores fill the air in every direction, getting into the dough and making the bread sour, creeping into the fruit-cans, stealing into the pantry, and spoiling the labour of the housewife in a hundred ways, besides creating a musty odour which is constantly inhaled by the occupants of the house, and possibly conveying to them the seeds of disease and death.

A beautiful carpet upon the floor conceals beneath its delicate shades a conglomerate accumulation of contributions from every source of impurity within the dwelling and without. Let the children romp about the room a few minutes, and see what a cloud of witnesses arise to testify that the shades of death are lurking just beneath its graceful patterns. Every day in the year this Pandora's box is compelled, by a vigorous application of the housewife's broom, to send out its miscellaneous store. Each sweep of the broom sends up a cloud of germs, and spores, and decomposing and decomposable fragments, garnered from the kitchen, the yard, the street, the gutter,—a thousand sources,—until the air becomes almost as opaque as the densest fog. Every living occupant of the room prudently retires —even to the household cat—except the sweeper, who plies her broom with industrious activity, with head and nose enveloped in the folds of a handkerchief, to act as a protector and a strainer. When the commotion is ended, the dusty filth settles upon the tops of book-cases, cupboards, and other articles of furniture, among the folds of lace window-curtains, upon the ceiling and walls of the room, and wherever it can find a lodgment. Pretty soon the housekeeper comes back, and with a duster stirs up anew the dust which has settled upon tables, chairs, window-sills, picture-frames, and other articles within easy reach, driving it up to higher lodgement from which it is destined to be constantly swept by currents of air, movements of windows, swinging of hanging articles, and in various other ways, to be breathed, after all, by the daily occupants of the house, who thought to escape by avoiding the commotion created by the morning's sweeping. Such air, like the mines of Nevada, has "millions in it," all alive, and ready to develop, in a fertile soil, into disease and death.

But we have not seen all yet. Here is the parlour, with its close, musty smell and its chilly dampness. An "odour of sanctity" pervades the place. It is sacred to use on great occasions, when its death-dealing walls are made to witness the still more deadly depredations of a fashionable festival. Upon its cold walls are condensed the steam from kitchen and wash-room, and the organic filth carried with it. "What makes the walls of my parlour sweat so?" has been asked me many times by housekeepers who were annoyed by the dampness of their parlour walls and ceiling, often giving rise to mould and mildew. The explanation is already given. The sunshine never gets into this sacred corner of the dwelling, or at most only a glimmer now and then. Its walls are never disinfected by the sun's full,

warm rays. Hence its air is constantly charged with death-dealing properties, which are ready to exhibit their potency whenever a favourable opportunity affords.

And there is the parlour bedroom, a veritable man-trap, containing all the dangers enumerated for the contiguous apartments, and more.

Let us ascend to the upper part of the house. An open stairway is in direct communication with the lower rooms; and the heated air from below, which ascends to the apartments above, carries with it its gleanings from cellar, sink, pantry, dusty carpets, mouldy walls, fermenting wood-boxes, and the various contributions to the insanitary condition to the house, so that the upper rooms become a receptacle for the overflow from below. Closets, garrets, and unventilated rooms above become, in time, charged with the most virulent enemies to health.

Before we pass to the outside let us pause a moment to ascertain, if possible, the cause of that peculiar sickening odour, which seems to emanate from the hall. The occupants of the house say they noticed a bad smell there last fall, and now, as the warm days of spring are coming on, it has reappeared. What is it? Each member of the family has sniffed it, and scolded at it, and echoed "what is it?" a hundred times. It is not mouldy walls nor foul wood-boxes; gas from the sink-pipe, nor decaying vegetables in the cellar; sourness from the pantry, nor ancient dust from under the carpet. Possibly it may be something under the floor. No one has ever taken the trouble to look and see, as the space under the floor is not spacious enough for one to visit without considerable inconvenience, and so the matter has not been investigated. Besides there is no ready means of access to the enclosure except by making a hole through a stone wall. Suppose we step outside and undertake the task. What do we find? Perhaps a dozen rats who were fed arsenic in the cellar or pantry, and sought out this as a convenient place to die in; or may be maliciously thought to retaliate for their own poisoning by poisoning their destroyers. Perhaps the pet rabbit, which so mysteriously disappeared a few months ago, apprehending approaching death from surfeiting, has sought this secluded spot to breathe his last, as evidenced by his decomposing remains. At any rate there is great need of the services of a scavenger, and we wonder how it would be possible to invent a more ingenious contrivance for accomplishing the physical ruin of a family, if such a fiendish design were to be executed.

Now let us glance around a little. The front yard is orderly and inviting, of course. Graveled walks, a smoothly-cut lawn, a few elegant shrubs and evergreens, all suggest the highest degree of neatness and good taste. Let us step around to the back yard. What a contrast! Close by the door stands a garbage-barrel which testifies to at least two of the senses that its history goes far back into the dim past. Once a week the milkman comes with a cart and empties the unsavory receptacle, stirring to the bottom its reeking contents. (Let me whisper in parenthesis that some of the same comes back in tin cans and earthen jars.) Swill-milk is not an unknown article, even in rural districts, where hay and grain bring a good price. At all hours of the day and night this half-rotten receptacle of decomposing organic matter sends out upon the air its filthy emanations.

Near by is a brown looking spot of earth, over which are crawling eagerly myriads of the first insects of the season, and from which ascends a noxious vapour, visible in the cool morning air, and not difficult to discover, if not visible, by its pungent, nauseating odour. This, the gardener explains, is the dumping-place for the dish-pan and the wash-tub since the drain-pipe became clogged a few months ago. Frozen up during the winter; it was annoying only by its unsightly appearance; but now that the vernal sun has come, the accumulations of months send forth a constant stream of noisome smells, which are too often experienced to need further description.

A rod or two from the house we notice a little depression in the ground. This, we learn, is the location of the cesspool. The boards which once formed its roof have rotted away and allowed the overlying earth to drop into the receptacle beneath, which originally consisted of a bottomless box or barrel, half-filled with stones, and connected with the kitchen sink by means of a long wooden box. The wood has now nearly disappeared, a few rotten fragments only remaining. Out of this putrescent hole arises a stench which finds no counterpart elsewhere than in a similar contrivance for domestic poisoning. Horrible, nauseating, loathsome, are faint words to describe the dense vapours which ascend from this repository of liquid filth.

A few feet distant is an edifice which we are at a loss to know how to describe. A correspondent was in the same predicament when he sent us a clipping for publication which he said was "rescued from a place consigned to infamy." The edifice referred to probably ought to have been

consigned to infamy, if it had not been, and the same should be said of most others of the same class. Though carefully guarded from observation by a close lattice, covered by clambering vines, its presence is easily detected, and that without close proximity. How often, as we walk along the streets at night, does the air, which Heaven sends us pure, sweet, and potent with life-giving energies, come to us laden with the poisonous exhalations from dozens of such sources, and freighted with the agencies of death. The vault of an out-house often becomes a much more dangerous enemy to human life than a powder-magazine, or a nitro-glycerine factory; yet the latter are by law required to be located far apart from human habitations, while the former is tolerated in the closest proximity to human dwellings, often even under the same roof with human beings.

A man passing along the street in Detroit sometime ago, met a little boy selling fruit, and said to him, "Young man, what makes you put all the nice large peaches on the top of your basket, while the bottom is filled up with little green knerly ones?" The little boy replied, "For the same reason, sir, that you have brown stone for the front of your house, while the back side is chiefly slop barrel, sir." There is a vast deal of this sort of sanitary hypocrisy. The flies discover it right away. This is the reason you see very few flies around the front door, while the back door may be swarming with them. By the way, did you ever watch a fly circling around in the air on a summer day, apparently without any end in view? I used to wonder why the little creature should spend its time so aimlessly. The reason is readily found. Catch and kill one, and put it under the microscope. Observe its wings. These filmy objects when magnified present a formidable array of spikes and needle points. Here and there among them are some of the very germs which we find in the air, in water, in decomposing matter. Now, let us dissect the insect, and examine the contents of its stomach. Here, also, we find great numbers of those same germs. Now, let us watch the little creature again. Here is one which has been soaring about and now alights, apparently to rest upon the window-pane. Watch him a moment. Now he is standing on the forward four of his six legs, and is brushing his wings with the hinder two. He brushes a few seconds, then rubs his feet together, then brushes again and again, rubs his feet, then passes something from one hind foot to the middle one, then to the front foot of the same side, then rubs the two front feet for an instant, brings both feet to his mouth and repeats the

process. Now he is brushing his head in the same way. Do you suppose he is making his toilet? Quite a mistake. The fly is not so fastidious as to spend so much time over his appearance. He is making a meal of germs. He prefers them raw and takes them alive. He soars around until his wings are loaded, then rests upon some object while he scrapes them together, rolls them into little balls, and makes a meal of them. Every time you see a fly going through such antics think of germs, and hunt around for the hot-bed where they are propagating.

In the midst of all the sources of dangerous filth which have been mentioned, is located the well, from which is to be daily drawn one of the most essential of the necessaries of life. Is it any wonder that the cup of life is often transformed to the cup of death? Only think of the condition of a family with death enthroned in the well, and daily dealing out his poisonous draughts to its members! The mysterious Providence which deprives a family of its loved ones through the agency of typhoid fever may, in a majority of instances, be proved to be a mysterious connection between the well and a privy-vault or cesspool.

A settler in a new country generally digs two holes in the ground after erecting his humble cottage. Into one goes all the filth and offal; out of the other comes all the water for family use. These holes are usually so near together that the contents mingle, so that what goes into one comes out of the other. In an old settled country a man, in making a home, digs two or three holes for filth and one for water, so that the latter is often surrounded with the former. As most of the water from the well is returned to the holes for the reception of filth, a very large share of it may find its way back to its original source. A very economical arrangement when the water-supply is short, so far as the water is concerned, but not to be recommended if health and long life are valuable.

Each of the sources of filth mentioned, is a contributor to the well. What becomes of the slops which are deposited upon the ground? A portion evaporates, but the greater part soaks into the ground. Many persons imagine that what goes into the ground is destroyed. Certainly this is a mistake. The filth which has disappeared from the surface is out of sight, but not out of existence. It is present in the soil, and even more active for evil than if it were still upon the surface. The water which we derive from our wells comes from the soil. If the soil is filled with filth, the water will necessarily be contaminated. Whatever filth is deposited

upon the surface in the vicinity of a well, may sooner or later find its way into the well. Every rain washes it a little deeper down until it reaches the well itself or the underground veins of water by which it is fed.

Scientific investigations have shown that typhoid fever, cholera, diphtheria, and possibly malaria and a number of other diseases may make their entrance into the system in this way. Indeed, as regards the two first named maladies, it is known that drinking water is almost the sole means of communication of the disease. So it is perfectly safe to say that if one will take care to see that his drinking-water is always pure, he will escape death from either typhoid fever or cholera. And it is also evident that if one suffers from either of the diseases named, it is because he or some other person has been guilty of neglecting to protect his drinking water from contamination. The late Dr. Parkes, of England, once remarked, "When a man dies of typhoid fever, some one ought to be hanged."

Cesspools, vaults, and other sources of filth, have no business within many rods of a well; but the probability of something of this sort being placed near to any well is so strong, that it is much the safer way to make the well in such a manner that it will be practically safe from contamination from sources of this kind under any circumstances. This may be accomplished by making what is commonly termed a bored or driven well. An iron pipe is driven into the ground until water is reached. This will prevent the surface water from getting into the well, and if the pipe is carried down until the "second water" is reached, so that it penetrates some distance of dense rock or clay, the protection may be considered as practically perfect.

Every housekeeper should know how to tell bad water from good, which is not always very easy to do, at least not unless one has some instructions in methods. The following rules for the examination of water are so simple that they may be followed by any person of intelligence, and they will be found to be sufficiently reliable to answer a very useful purpose:—

How to Examine Water.—Only a skillful chemist can make a perfectly accurate and reliable examination of water, but the following suggestions will enable any intelligent person to make such an examination of drinking water as will greatly diminish the chances of injury from this potent source of disease:—

1. Notice the colour of the water. Pure water has no colour, is free from sediment, and does not contain suspended or floating specks or particles.

2. Observe the odour. Pure water is absolutely free from odour. Water which has a distinct odour is to be suspected.

3. Notice also the taste. Pure water is free from flavour.

Remember. Good water is *colourless, odourless, tasteless.*

If you wish to test the water further—and it is necessary to do so to be even reasonably sure that it is pure, as some waters which are free from colour, taste, or odour, are still very impure—take a few ounces of water, place it in a clean bottle, add a small lump of white sugar, and put it in a warm place for a few days. If the slightest turbidity appears within a week or two, the water is unsafe to use.

Here is another test: Get at a drug store a solution consisting of three grains of permanganate of potash, twelve grains of caustic potash, and an ounce of distilled water. This is a test solution by means of which organic impurities may be detected. Put some of the water to be tested in a clean glass. Add a drop of the purple test solution to the glassful of water. It will produce a faint pinkish tinge. If the water is pure, the pink colour will remain; if the water is impure the colour will disappear. If the colour disappears within half an hour, the water is unfit to drink. The more impure the water is, the sooner the colour will disappear.

The danger of using water which is suspected of being impure is greatly lessened by boiling. Filters may be relied upon for removing suspended particles and for removing the unpleasant flavour of rain waters; but a really dangerous water is not rendered safe by filtering in the ordinary manner.

I understand that you are contemplating the introduction of a city water supply and a sewerage system. It seems to me that the most superficial knowledge of the needs of a general supply of pure water to a city of the size of Woodstock, must be sufficient to convince any one of the propriety of an improvement of this sort, and I hope the enterprise will receive the cordial support which it deserves. From what your health officer has told me, I am convinced that the water supply of your city, as at present obtained from dug wells, is exposed to great and constant danger of contamination from many of the sources of filth to which I have called attention, and that the introduction of a general supply of good quality

will unquestionably diminish the annual mortality of your city to a very appreciable degree, and I would suggest as one of the most efficient means of rendering this enterprise popular and successful, the undertaking of a thorough sanitary survey of your city. The effect of a sanitary survey of each individual's premises in your city, would be to stir your citizens up to anxious and careful enquiry respecting sanitary matters, and would call their attention directly to causes of disease and death, which to many of them are unsuspected. From what I have heard, I believe that a very pure and abundant water supply may be secured in your city at a very reasonable outlay of money, and that an abundant supply of pure water may be thus secured to every citizen at a small annual expense.

The Conference resumed work in the evening as the first session of the Meeting of Executive Health Officers of Ontario, the Vice-President of the Association, Dr. J. Coventry, Windsor, being in the chair.

An opening service of prayer was conducted by Rev. J. J. Hill, Rector of St. Paul's, after which Dr. Coventry read the President's annual address.

PRESIDENT'S ANNUAL ADDRESS.

By Dr. J. Coventry, Windsor, Medical Health Officer.

Ladies and Members of the Association:

Organized public sanitation, as you all know, is of very recent date, but there is probably no country in the world where it has been crystallized into law and system more perfectly and in shorter time than Ontario.

This is due in a large measure to the fact that the appeal was made to a people of cosmopolitan habits and by a Board of gentlemen who had a thorough appreciation of the work entrusted to them—I refer to the Provincial Board of Health—and aided by their most efficient Secretary, who, by his energy, good judgment and untiring endeavors, has won the gratitude due to him, at home, and made Ontario a model of sanitary organization in the eyes of our sister Provinces and the neighbouring States.

In 1882 the Board began by directing public attention to existing evils and pointing out their remedies, followed by judicious enactments, and by compiling and circulating authentic reports, public attention was aroused to dangers that were but lightly thought of, and many which were actually being propagated.

But the task was no easy one. It lacked the great incentive to secure public adoration—it had no direct financial aspect. Show the world where money can be made and you attract everybody. Tell them that they can find gold in California, that they can get diamonds in Africa, pearls in the ocean, and there is a scramble for the coveted prizes. But tell them that health is to be had by pursuing a certain course, and it is a good while before you observe any considerable current of people travelling in that direction.

The apathy regarding the nation's health would be best shown by a comparison of the annual appropriations for commerce as compared with the grants for health. I find it most difficult to get figures for com-

parison, but at a future meeting will try to demonstrate the proposition that in the fierce struggle for wealth, public health is sadly neglected.

Let me quote half a dozen examples : The grant to the Board of Health of the State of New York is only $20,000 ; the State of Illinois is $12,000; Mississippi, $45,000 ; Ontario, $8,000 or $9,000.

The Dominion estimates for 1886 were as follows: Quarantine, $25,966; contingency for cholera, $15,000 ; immigrants in Winnipeg Hospitals, $14,000. I do not wish to make a political point against the Government, for all parties are alike inconsiderate in matters of public health, but I ask you to note that cattle are protected by a grant of $23,000, just $2,966 less than the quarantine grant for the protection of human beings. None of the Provinces except Ontario, make any grant for public health.

If the relationship between health and commerce was better understood it is safe to say that more money would be spent on public sanitation.

Religion, politics, and commercial pursuits are the subjects which, to a very large extent, monopolize the public mind. The clergy have not yet, as a class, become active sanitarians ; politicians have no use whatever for cleanliness, unless it is a little whitewash now and again ; and commerce only recognizes it when epidemics of contagious disease threaten to interfere with and blockade its channels.

The Association of Executive Health Officers was formed last year for the purpose of aiding the Provincial Board of Health in its labours, to discuss the practical working of sanitary laws and regulations, and to suggest such amendments or alterations as will enable the Provincial and Local Boards to bring about a more salutary condition of the country at large, and to reduce the death-rate to figures that will contrast favourably with other countries. In doing this we want to secure uniformity of action in dealing with matters affecting the public health, so that one section of the country will not be exerting its ingenuity and spending its money to control disease, while its neighbours are cultivating and spreading it. We want an understanding that when a contagious disease breaks out among us the health officer of the municipality will do his best to prevent other municipalities being infected with it.

It is our desire to remove everything calculated to contaminate the air we breathe, the water we drink, and the food we eat. We will endeavour to detect the common causes of disease and to remove them. In doing so we are looking into the domestic circle, into school-houses, churches, public halls, and out-buildings. We go down into cellars, drains, sewers,

wells and other sources of drinking water. In all of these hiding places we find disease and death lurking, waiting only for favourable surroundings to develop into deadly pestilence. In our daily rounds we find magazines of disease awaiting the torches of air, light and heat, to burst into epidemics.

We proclaim to the public, and we challenge contradiction, that the modern slaughter-pen is a pestiferous charnel-house; that a large proportion of the milk supplied to cities and towns is a mere filtration of the vilest slops and garbage. We warn the public that adulteration of food constitutes a very large proportion of its manufacture.

We will aim to prevent and rectify many of the abuses practiced on the public by sewer contractors and plumbers, and in doing all this we want it fully understood that we have no wish to enact oppressive regulations.

If any of our acts meet with the disapproval of even the most obscure citizen, we want the benefit of his suggestions, and if we cannot reasonably combat his objections we will adopt his advice.

We want to enlist the attention, sympathy and assistance of every intelligent man and woman, of every parent entrusted with the lives of children, every councillor, every school trustee, every teacher; in short, we want every man to become a philanthropist, and to feel that he cannot better demonstrate his right to be considered a useful member of society than by coming forward as a worker in a cause that has for its purpose the increase of health and happiness and the preservation of human life.

As this is a new organization, meeting for its first time, I cannot give any results of what it has done; I venture, however, to hope that a programme for work will be adopted before we part that will make our next meeting one of great interest to all concerned.

I would suggest the formation of ten committees representing the ten Health Districts already formed, and that each committee be asked to bring in a separate report on the following subjects:—

1. House and land drainage and disposal of sewerage; 2. Ventilation of houses, schools and public halls; 3. Food: its adulteration, and unwholesome supply; 4. Milk supply: its sources, and contamination; 5. Water supply, and its pollution; 6. Removal of night-soil and garbage; 7. Control and prevention of disease; 8. Dangerous and unhealthy occupations; 9. Statistics and printing; 10. Sanitary legislation.

The last might be under the management of the Executive Committee.

If from each District a report on these subjects were forwarded to the Executive Committee a month before the next meeting, a great deal will have been accomplished that will tend to unify our efforts and extend our usefulness.

I would venture the perhaps unnecessary suggestion, that the papers read should be made as short as would be consistent with the subjects dealt with, and the discussion on them be kept strictly within the scope of the papers.

I am sure that I speak for you all when I express regret that our President, Dr. Sweetland, cannot be with us, and our regrets are deepened to sorrow at the cause of his absence.

With your forbearance I will do my best to discharge the duties of his chair.

PAPER V.—BRAIN STUFFING AND FORCING.

By Dr. Daniel Clark, Medical Superintendent of the Asylum for the Insane, Toronto.

Mr. Chairman, Ladies and Gentlemen:

It is not my intention to inflict an elaborate essay on this Association. My object will be attained by giving hints to enlist your attention; by summarizing facts which are accumulating daily, and by simply stating conclusions which are forcing themselves with saddening emphasis upon the sensible educator, the physician and the social reformer of to-day. Much has been written on the best methods to educate children from a metaphysical and purely mental standpoint, but it is only within the last few years that the warning voice of the physiologist has been heard on behalf of suffering childhood. So far he has been as a voice crying in the wilderness, and ridicule has pointed at him its long, gaunt finger of scorn, charging him with being a mere alarmist or a hobby rider. The voice of the scorner is now being hushed. He meets an ever increasing throng of nervous invalids; he sees a change in the physical condition of the young since his school days; as a tax-payer he spends $700,000 annually to maintain the defective classes in this Province, and to-day one person in every 620 persons in Ontario is insane. This is a startling catalogue. Were I to add to this list the weakling, who is a chronic drunkard; the moral imbecile, who is a chronic criminal; the habitual vagrant, with limited intellect, who is a life-long tramp; and trace the existence of such classes to vicious conditions of society and to ignorance of Nature's laws in their operations on our social systems, my statement would be complete.

Let me, however, confine myself to a consideration of the brain in relation to modern education and to the results which flow therefrom.

I start by making this statement: the more highly organized brain will bear mental strain better than will the more simple nervous center of the ignorant, if the building-up process have been in accordance with the laws of health.

It is also a fact that the educated insane recover, as a rule, more readily and in proportionately larger numbers than do the ignorant. I do not refer here to mere culture, but to that standard of knowledge and wisdom which is possessed by an average all-around man, who, although intelligent and well-informed, may never have studied within the walls of a college,

nor prided himself in having a university degree. Many self-made men are truly educated, and have more capacious brains and fertile minds than have many a graduate who has had the high opportunity of a scholastic training. I classify the educated by the standard of healthy brain work and mental scope. The operations of the mind are bounded by capacity of the organ, and we can no more elicit mental operations of a great power from a defective or limited brain than can a musician bring eight octaves of music out of a six octave instrument.

It is not, I repeat, the more highly organized brain which suffers the most in the mental struggle for mastery in the school; it is the weak organization, which breaks down first in the abnormal effort to keep up to an unreasonable demand made upon it. There is as much difference in brains as there is between iron and steel, and to attempt to manifest the elasticity of the former to the same extent as may be done with safety to the latter is only to show the weakness of the material and its lack of spring to regain its former position. To attempt to work up a 15 horse-power engine to that of a 25 horse-power engine means ruin to the machine by extra pressure, wear and tear. Applying this principle of mechanics to the equally mechanical brain, which is only a working organ of the mind, and we are demanding of it in its chemical, vital and physical operations more than nature intended it to do. The uniformity of standard of work for every brain means the same demand on brain dynamics, irrespective of capacity. You might as well expect to be able to put a quart of water into a pint measure, as to attempt to cram into or eliminate from any brain more knowledge or mentality than its capability will allow.

The attempt to get out of a Clyde horse the swiftness which is in a thoroughbred racer would be extremely ridiculous. On the other hand, to put the same load upon a swift runner which is put upon a draft horse would be equally futile. Each excels according to its kind and capacity. So to expect uniformity, capacity and mental power equally in any two human brains is very absurd to any one who has given the matter even ordinary consideration. There never have been, nor are there now, any two of the sons and daughters of Adam counterparts of one another in physical conformation or mental construction, and no two can bear worry, emotion and general fighting against all the untoward circumstances of life in exactly the same ratio. This is a truism which is of daily experience in all our lives. Yet in the face of this appeal to ourselves we

senselessly, sinfully, unpatriotically, force the juvenile brain beyond its strength in our schools and colleges in order to produce automatic prodigies of learning in youth, and—too often—also produce insane patients or imbecile nonentities in adult life. At best, it means the thrusting out into the battle of life tens of thousands of young people whose life "gumption" has been used up, and to whom is left a legacy of crippled energies and curtailed possibilities. When a common standard of education is needed for all kinds and conditions of mind, then is it evident the more limited working power must suffer in the struggle towards the unattainable. What is easy of accomplishment in one scholar may be almost impossible in his next neighbour in the class. Hence the benefit of options in the advanced studies. Each student can take those subjects which are in line of his aptitudes and likings. This is quite a different thing, however, from forcing a mind forward by an undue effort to keep all its powers up to their full tension in all directions. Let me repeat what I have already said in an Essay on "*Health and Education*:"

"As a result, the reserves of nature are called upon at the expense of growth, brain nutrition, and the building up processes. All minds put forth energies in one direction more than another. Here our individual differences come in. None of us are formed in the same mental mould. Even our potentialities vary, but are interdependent upon one another. They have a community of interests and draw resources from one another. This being the case, it is evident that the pushing forward of all the faculties at once, irrespective of natural bias and aptitudes, means a dwarfage of individual leaning because of the dissipation of reserve energies. Let me repeat. The educator looks at the mind development alone as evidence of his skill and assiduity. The physician looks upon both body and mind as objects of care, and endeavours to keep both under healthful conditions. The educator thinks that the mind in each individual has possibilities and potentialities almost unlimited if pushed to the test. The physician knows that each person has powers of growth and development beyond which such cannot go, by any amount of mental training. No forcing can go beyond the brain capacity, and that at its weakest point. This is especially true, when hereditary tendencies are taken into account. We have at our disposal only a certain amount of energy. It is transferable to some extent, and if used in one direction it is lost in another. This law is seen in operation in animal life as well as in mind phenomena. Exhausted muscular force means to some extent mental loss; violent emotion, or sudden physical shock means in some degree muscular and organic enfeeblement. To a large extent this duality co-relates with one another. This being the case, it is evident that undue forcing in any one direction affects the whole organism.

"This mind organ is delicate, simple, and easily impressed. It can be operated upon or it can be used as an instrument to envolve all mind

action. In other words, it may receive impressions, or it may inherently manifest mental power. It may merely be filled with easily acquired knowledge, which may be the work of others, or it may give out its own energizing creations. In the former class of impressions it is only receptive, which is merely an appeal to memory; in the latter, is exercised in mental dynamics, and brings into being new ideas and native conceptions. To imbibe as a sponge gives no energy and no strength, but to grow as a tree gives power by virtue of the exercise of its increasing activity. Not only so, but this energizing entity increases the volume and stability of the organ, as physical exercise increases muscular tone and fibre. Inertia means debility, for

'Labor is life.
'Tis the still water faileth.'

"On the other hand early precocity mostly means adult enfeeblement. It is taxing the future by unduly straining the brain, from which it seldom recovers, and as a result we have a languid organ and a stunted intellect. Those who educate scout this idea, because their handiwork is best seen in forced effort and juvenile automatic memorizing. These prodigies of learning astonish trustees and parents and redound to the teachers' credit. Those who teach believe that there is an unlimited capacity for thinking in all directions in every person. All the mental powers are pushed on all sides without respect to weak points.

"It is self-evident that to merely cultivate memory is one thing and to evolve thinking is quite another. Cramming means mere remembrance, and may be indulged in with no more originality than are the chatterings of a parrot. This system carried to extremes gives mental dyspepsia, because there is not sufficient intellectual energy to assimilate the pabulum provided. Memory has its function, but to put mere recollection in the place of education is to dwarf all originality of thought for want of mental development. The good memory is the means of carrying off all the prizes at competitive examinations, yet the best average mind will eclipse such in life's struggles for the mastery. There are, no doubt, a great many of our educated people who depend largely on remembered learning, and that many self-made men are distinguished by virtue of inherent power to originate. The great are not mere receptive machines; they put their talents out to usury; they are not merely recording instruments, but add to the common stock of knowledge by exploring new fields and by giving their experiences and discoveries to the world. Were it not for these pioneers we would still be floundering in the slough of barbarism.

(*Vide* "Education in relation to Health, by Dr. D. Clark)."

We have the two extremes of danger. On the one hand the brain inertia, which means loose organization, and which is too often called "mental laziness," in which extra effort means using up the limited reserves of such feeble intellects. On the other hand we have the active mind and brain, which need to be checked in their mettlesome ambition to go ahead. Such a constitution will go at headlong speed in its race for

knowledge, until it falls helpless by the way from sheer congenital pluck. I could give a long and sad recital of cases brought to me by parents, or of young people who came voluntarily in whose histories, shattered nerves, low vitality and fagged mental energies could be traced directly the deplorable effects of over study, and of an unduly forced education. The nervous headaches, the sleeplessness, the loss of appetite, the low-spiritedness, the lack of energy, the hot and throbbing temples, the temporary impairment of vision, (which causes two lines on the page of a book to blurr into one), the partial loss of the usual facility to memorize, the lack of power to concentrate on one study, the night sweats, the panorama of dreams instead of the natural and profound sleep of childhood, the muscular twitchings and unusual thirst, and the morbid fancies, are only a few of the symptons of many of those afflicted with the epidemic of over study. We see what is the cause of all this physical disturbance, from one fact alone, namely,— —unless permanent injury is already done—these signals of distress and danger disappear during vacation. I have seen the symptons intermittently moderate and subside during the rest of Saturday or Sunday, unless the victim is burdened with heavy tasks on these days also. The writer knows whereof he affirms in this respect.

Christian and moral precepts and duties can be taught on Sundays to week day scholars without injury and it may be with much profit, but to ask young children to distinguish themselves by memorizing Biblical biography, geography and topography, in addition to week-day lessons, is a system fraught with mind-destroying peril. It is now bearing its evil fruits in our country. It is not "malice aforethought" which prompts this pressure, it is gross ignorance, which sees only evidence of good work in phenomenal children, who are mentally old men and women in their childhood.

The teacher—poor fellow—often says to me: "I know what you say is true, but were I not to push my scholars to the utmost of their ability, by means of this hot-house growth, I would be condemned as producing no evidence of my diligence and capacity to teach. I must push forward, as rapidly as possible, all my scholars from one form to another. I must prepare as many as I can for the High Schools and Collegiate Institutes. These in turn compete with one another as to how many from each can matriculate in our several Universities and carry off scholarships. These glory in the machine-made scholars sent up in shoals from these centres of education."

The teachers are not altogether to blame. The system is at fault. There will be no redress nor relief to the tender and immature brains of the rising generation until public opinion is educated to such a point as to demand a check being put upon this deleterious system of cramming and pushing beyond natural demands.

In the higher schools there are added from year to year new studies to the great catalogue already in existence. There is no knowing where this craze of hobby riders will end. In the meantime the coming race is being sacrificed to lack of judgment and discretion.

Let the next book issued to the public by our educators be for the use of teachers and parents, and let it show that secret vices and public school high pressure in the education of our youths are sapping the foundations of the Christian nations of to-day, by insidious approaches into the brain world of our womanhood and manhood. Some apologetic and ardent school teachers say to me that the children are as healthy looking and robust as they were in our young days, or even in the times of our fathers. The testimony of those best qualified to judge is not in accord with this view. Take for granted, however, that on the surface this appears to be the case with the majority of children, yet, such apologists do not know or seem to forget, that the general muscular health of an individual may be comparatively good, and at the same time the nervous and mental systems may be mere wrecks. The automatic life of the body may exist in its usual vigor when the organ of the mind is diseased or, at least, out of tune. The majority of the chronic insane eat well, sleep well, and are in prime physical order, but who can doubt their deplorable mental condition? In the same way the scholar may give little evidence of the deterioration of organic life, especially the muscular, while, at the same time, the mind in its operations is daily throwing out signals of distress, to which no heed is given until serious injury is done and it is too late to mend. The warnings are not heeded in the foolish competitive race for scholastic supremacy, until a general breaking up takes place and this great evil is seen in permanent brain disease. The majority of children thus sacrificed show failure of bodily health, but much mischief is done to them when apparent health exists. The brain is a long-suffering instrument, and—like the stomach—will endure much ill-usage before it shows any disability. When patience no longer becomes a virtue, it gives up the struggle and capitulates to the invader of its wonderful domain. Mind must of necessity suffer with it,

as—in this life at least—they are a duality for, as Shakespeare puts it in King Lear :

"For we are not ourselves, when Nature being overcome,
Compels the mind to suffer with the body."

If this is not so, what means all these refuges in educated Christendom for the insane, the idiotic, the feeble-minded—in short, the great and ever increasing army of defectives? The like was never known before in the history of our race, and means its utter extinction, as the same inexorable law has done when operating among the nations of antiquity. There is great significance in the fact that nervous diseases have increased a thousand fold within the last half century. I have in my library volume upon volume, devoted solely to the study of these diseases. Under the name of *neurasthenia* or *nerve-weakness* or *nerve-starvation*, a legion of modern brain and general nerve troubles are indicated. They crop up from childhood to old age in all classes of the community, but especially in those to whom life has been a fierce struggle, and who gallop through the world and trot into the grave.

"The mill of God grinds slowly,
But it grinds exceeding small."

I am glad to know that in many of our schools, especially in the cities, industrial work, calesthenics and kindergarten, are being introduced during school hours into the child-life and youthful recreations of more adult age. This is a step in the right direction, thanks to the persevering efforts of our physicians and the intelligent teachers, who are educating the people in respect to their duty to the young. Other malign influences, such as bad sanitation, troubles, drunkenness, fast living, in all their phases, are among potent causes. After making all allowance for hereditary possibilities based upon their existence among parents, and which lead to a downward tendency in their progeny, a large balance yet remains which is directly traceable to over-pressure of juvenile brains, and which is sapping the mentality of our people. It is a grand thing for Christendom that it is a law of Nature to fight against the invasion of disease, and to seek to come back to healthy conditions.

Dr. Y. S. Clouston, Medical Superintendent of Morningside Asylum, Edinburgh, says in *The Journal of Mental Science*, April, 1882 :

"I cannot help adverting to the absurd and unphysiological theories of education which are sometimes taught, and which we as medical men should combat with all our might. The old plan of attending to the

acquisitive and mnemonic faculties of brain alone in education is now fortunately giving way. The theory of any education worth the name should be to bring the whole organism to such perfection as it is capable of, and to train the brain power in accordance with its capacity, most carefully avoiding any overstraining of weak points ; and an apparently strong point in the brain capacity of a young child may in reality be its weakest point from hyperactivity of one part. I have known a child with an extraordinary memory at eight, who at fifteen could scarcely remember anything at all. Then, as the age of puberty approaches, one would imagine, to hear some scholastic *doctrinaires* talk, that it was the right thing to set ourselves by every means to assimilate the mental faculties and acquirements of the two sexes, to fight against nature's laws as hard as possible, and to turn out physically hermaphrodite specimens of humanity by making our young men and women alike in all respects, to make our girls pundits and doctors, and our young men mere examination passers.

"Some educationists go on the theory that there is an unlimited capacity in every individual brain for education to any extent in any direction you like, and that after you have strained the power of the mental medium to its utmost there is plenty of energy left for growth nutrition and reproduction. Nothing is more certain than that every brain has at starting just a certain potentiality of education in one direction and of power generally, and that it is far better not to exhaust that potentiality, and that if too great calls are made in any one direction it will withdraw energy from some other portion of the organ. These persons forget that the brain, though it has multiform functions, yet has a solidarity and interdependence through which no portion of it can be injured or exhausted without in some way interfering with the functions of other portions. To say that any one man could have the biceps of a blacksmith, the reasoning powers of a Darwin, the poetic feeling of a Tennyson, the procreative power of a Solomon, and the longevity of a Parr, is simply to state a physiological absurdity. No prudent engineer sets its safety valve at the point above which the boiler will burst, and no good architect puts weight on his beam just up to the calculation above which it will break. Nature generally provides infinitely more reserve power than the most cautious engineer or architect, but the brain in its work should not be strained up to its full capacity except on extreme emergencies. Especially do these principles apply if we have transmitted weakness in any function or part of the organ ; and what child is born in a civilized country without inheriting brain weakness of some sort ?"

Dr. Butler, late superintendent of the Hartford Retreat, says in one of his reports :

"Over three thousand cases of insanity have now come under my direct observation and care. In a large proportion of those whose histories I could obtain, I have found that the remote and predisposing causes of insanity could be traced to malign influences on childhood. The neglect of physical training, and the imperfect physical devlopment which follows from this neglect, are strikingly evident in many of our female patients. The various causes which are reported to me as the sources of

disease, and which are classified in the tables under the head of "ill health," "undue mental effort," "domestic unhappiness," etc., may very frequently be traced in their primary influences to the one cause of a want of physical stamina. We press the training of the mind by all possible hours of study in and out of school, and by the added stimulus of emulation, while we neglect the training of the body in disregard of that mysterious but absolute law of sympathy which compels the debility of the latter to cripple the action of the former. My own observation leads me to think this error will be found to exist more frequently with parents than with the more intelligent and advanced of our teachers; and its pernicious tendencies are beginning to be better appreciated."

"Prof. N. J. Bystroff has examined 7,478 boys and girls in the St. Petersburg schools during the last five years, and found headache in 868, that is 11½ per cent. He states that the percentage of headaches increases almost in a direct progression with the age of the children, as well as with the number of hours occupied by them for mental labour; thus, while headache occurred in only 5 per cent. of the children aged eight, it attacked 28 to 40 per cent. of the pupils aged from fourteen to eighteen. The author argues that an essential cause of obstinate headache in school children is the excessive mental strain enforced by the present educational programme, which leaves out of consideration the peculiarities of the child's nature and the elementary principles of scientific hygiene. The over-strain brings about an increased irritability of the brain and consecutive disturbances in the cerebral circulation. Prof. Bystroff emphatically insists on the imperative necessity of permanently admitting medical men to conferences of school boards."—(*British Medical Journal.*)

The above is a warning voice from far off Russia by one of its distinguished scientists.

"We hide our defectives, our dements, and our pauper infirm in havens of refuge out of our sight. Had we not these retreats and all our mentally and physically afflicted were allowed to drift about in the community as in former times, these ever-present evils and evidences of national depreciation would frighten us. We would study more than we do the laws of health, and how best to develop and maintain moral, intellectual and national supremacy.

"Look at the ever increasing demands for hospitals, asylums for insane and imbeciles, schools for feeble-minded, retreats for nervous complaints, almshouses for human wrecks, prisons for chronic and congenital vagabonds, and then say if a vicious system of sanitation, of customs, of habits, and of education has not something to do with this state of things. This is not the Jeremiad of the pessimist: rather it is the story of a danger signal to which we would do well to take heed. The great restorer of brain power is profound sleep, and plenty of it to the school-going child. It stores the vital battery with mental energy. The child wants a dreamless forgetfulness to fully recuperate from its daily exhaustion. This is a physiological axiom. It is also forgotten that much depends upon the kind of exercise a scholar takes. Work of some kind is better than none, but it is not invigorating like play or some kind of amusement or enjoy-

ment. These are mental tonics which have no equivalents. The boy will soon tire or weary sawing wood or weeding flower-beds; but let him play fox and hounds, or football, and his energy is almost tireless. The girl sees no pleasure in practising on a piano at her lessons, or washing dishes in the kitchen, but let her dance from evening till morning, or roam the woods at a picnic, or go a boating, and her endurance is a matter of astonishment. Pleasure goes with the exercise, thus it is nature's stimulant and invigorator. When such boys and girls are approaching adolescence it is well to find out their natural bent of mind, and having done so, to lead the superabundant energy in the direction of well-liked and well-directed technical, professional, or mechanical pursuits. This is the critical time when a proper choice of occupation may mean pleasure in its pursuit, or a life-long drudgery in unnatural and unpalatable employment. Brain work is needful and healthful. It is a law of nature that activity is necessary to health, but it must be exercised in accordance with the laws of health. We are violating rightful conditions. Over-pressure, undue anxiety, violent passion, worry without needful rest and fresh air, always mean a premature wearing out of the machine. A brain under such disadvantages is heavily handicapped in the hot race of life.

"Education should be conducted somewhat as follows, viz.:—

"1. No teaching beyond object lessons up to six years of age.

"2. Object lessons with reading and writing up to nine years of age.

"3. Reading, writing and arithmetic, in its four primary divisions, and geography up to twelve years of age.

"4. The preceding, with primary arithmetic, history and grammar up to fifteen years of age.

"5. From this age such studies as will assist the girl in feminine duties and the boy to some definite employment or profession.

"6. No studies in the evening until after fifteen years of age.

"7. Three hours daily of school time up to nine years of age, four hours to twelve, and six hours until fifteen years of age.

"8. After fifteen years of age studies to be intermingled with congenial and useful mechanical work. This to apply to both sexes."—(Dr. D. Clark's *Health in relation to Education.*)

Discussion.

Theodore H. Rand, M.A., D.C.L., Principal of Woodstock College, said: The paper presented by Dr. Clarke contained very important statements calculated to direct public attention to the importance of the subject dealt with. He could not, however, help feeling that the emphatic presentation of one phase of the subject, to the almost complete suppression of other phases, might do almost as much harm as good. It was not practicable, perhaps, to group in proportionate treatment all the known causes of cerebral impairment in an hour's paper, yet, unless the "conspiracy of

causes" at work was recognized, remedial means could not be successfully applied. If Dr. Richardson should deal with the subject before us from one point of view, he would probably tell us that alcohol, directly and through heredity, was the great agent at work in bringing about functional brain disorders and their concomitants. I submit the conditions under which brain work is performed are of great moment. The fact that the children in a given school shew symptoms of brain and nervous exhaustion calls for inquiry; but it does not seem to me that we have done much when we have made a catalogue of the studies performed, and expressed our dissent from the amount of work required of these children, the teachers and school authorities. Would it not be scientific to institute an inquiry as to the nature of the food, air, and exercise to which these children are habituated? Suppose it should be found that some of them sleep in 5 x 6 rooms with door and window closed, or that they have food poor in quality or insufficient in quantity, or that they are irregular in their hours, and have insufficient or excessive exercise. Suppose it should be found that they have cheerless and loveless homes. Suppose careful investigation should show that the school-room in which these children spend five hours a day, is poorly ventilated, and thus poison is every moment taken into the blood. Suppose it should be found that the teacher was harsh and unsympathetic, and that the children worked under the restraint of fear. Any and all of these conditions would contribute powerfully to the derangement of the physical, mental, and emotional nature of the children, and in many cases would result in mental collapse. It seems to me to be unscientific in such cases—and these are the every day cases—to say that it is over-study that is doing the mischief. Dr. Clarke would say cut off half the studies, but the other half might go, under the unfavourable conditions specified, with very bad results. It seems to me that what is wanted is to secure thoroughly healthful conditions for study—pure air and plenty of it, suitable exercise, good food, and orderly and quiet habits of life. If the profession were to address itself all along the line to the securing of these conditions, I am of the opinion that we should hear little about brain troubles from over-study. Any study at all is over-study under unpropitious conditions. Little children are over-stimulated socially. They have their fine dresses, their evening parties, and thus are unconditioned for their normal duties of child life. It is no wonder that such children break down early, but is it a fair way to put it to say that their school

studies are the cause of the mischief? It ought to be recognized by the medical profession that many teachers and educators are very much alive to the intimate relation subsisting between the mind and the body, and apply, as far as possible, the ascertained principles of mental physiology to every department of their work. Great progress has been made, and much remains to be done. I may be permitted to point out that in addition to what has been said in reference to providing suitable conditions for brain work, a great reform is possible in connection with the methods of instruction. Two children of the same physical and mental endowments may be pursuing the same course of study. Owing to the natural methods employed by one teacher one of these children may do his work heartily and be made stronger in every way thereby, while the other, owing to the unphilosophical methods adopted, may worry and fret and actually be harmed for life. If this be so—and it is so—it will be both scientific and wise to labour earnestly for the application of sound psychological, as well as physiological, principles in the school-room by way of preserving the health and vigour of our children. From a daily and wide observation of schools for twenty-seven years, I am impressed with the idea that nervous and cerebral troubles seldom arise from study as the real cause. Study may be, and often no doubt is, the occasion of revealing the results of other causes which have been undermining the vigour of the child. But from my observation I feel warranted in saying that vigorous study, under proper sanitary conditions, is the occasion of really less harm than inanity and mental idleness. I have no doubt that much harm is being done by one-sided presentations of this subject of over-study. Dr. Hammond's article in the April number of the *Popular Science* is, I think, a case in point. He presents a thin, tall, nervous, pale girl, having St. Vitus' dance, as a specimen apparently of the ten millions of American school children, and then proceeds, after a mere inspection of her satchel, to discuss the direful effects of the eight or nine studies imposed on this child. That one of these studies (the "Youth's Companion") should be, in fact, only a pencil and ruler holder, indicates the care which should be used in really getting facts to work upon. Teachers and physicians can co-operate in bringing into application the many principles now known for the regulation of human activities in harmony with the laws of life. The coming man will not be the one who can do the least mental work and show the greatest physical development. He will rather be one who has so availed himself

of the known laws of physical, mental, moral, and social life, as to be full of an all-sided vigour in meeting the duties of our highly organized civilization.

Rev. W. T. McMullen, Woodstock, said: I am in accord with the views advocated by Dr. Clarke in his admirable paper, and also with the contention of Dr. Rand, conflicting as these may seem to be. A specialist, once giving evidence in court in a case in which the issue turned on the sanity or insanity of the prisoner, having refused to answer under cross-examination except in very cautious and qualified terms, assured the judge and jury that the question was one of degree in the case of any man, for every one of us is a little off the true balance. That theory, it appears to me, is strongly supported by some of the facts brought out in this discussion. If one out of every six hundred and twenty of our population is sent to the asylum, the six hundred and nineteen who remain outside are not above suspicion, if they are persisting in a method of education which is one of the principal factors in the production of such a state of things. The teachers are not, I believe, chiefly to blame. But the time has evidently come when the public voice should be lifted up in emphatic protest against the unreasonable amount of brain-work exacted in our schools, the multiplicity of subjects simultaneously taught, and the straining effort required to get over the ground within the allotted time. Yet we must educate, even as we must eat and drink, though at the peril of swallowing the germs of disease and death. Here, I am with Dr. Rand in his defence of a broad, comprehensive education. But we must see that our method of educating is conducive to the health of both body and mind.

Prof. Wolverton, Woodstock, said: He had never in his experience known of a pupil to be injured by overwork; if he takes eight hours of sleep, plenty of exercise, and sufficient fresh air, he can study to any extent with impunity.

Dr. Griffin, Brantford, said: He occupied a position on both sides of this question, but on the whole agreed with Dr. Clarke's ideas.

Dr. Burrows, Lindsay, thought that there are altogether too many subjects on our school curriculums. He thought that half of them could be advantageously erased.

Dr. Kellogg, Michigan, said: He hoped that Dr. Clarke's paper would be published and widely read. But at the same time he did not think

educationalists are quite so much to blame as some seem to think. In the hospital under his charge he had yet to meet with a case in which healthy study, however severe, has broken a person down. Imbecility is as often caused by physical as by mental strain.

G. R. Pattullo, Esq., Woodstock, agreed with Dr. Clarke in drawing attention to brain-forcing among the children.

PAPER VI.—VENTILATION OF SCHOOLS, AND A NEW METHOD OF ESTIMATING THE PROPORTION OF CARBON DIOXIDE IN AIR.

By Dr. J. J. Cassidy, Member Provincial Board of Health.

Ladies and Gentlemen:

That school-rooms in Ontario are badly ventilated, is a proposition easy to prove. In most of them, during the winter season, the air shortly after recess becomes close, then extremely close, and, in some instances, extremely close and unpleasant. Visitors entering the rooms, after coming from the open air, are thus enabled to make an examination of the contained air by the senses, which gives tolerably reliable results. The reasons for this censurable condition of the air are overcrowding and bad ventilation. In city schools overcrowding is the rule, and as natural ventilation, which is accomplished through doors and windows, is almost universal, our school-rooms may properly be said to be overcrowded and badly ventilated. But so great is the overcrowding of these city schools, that, even if artificial ventilation were adopted, it would not be possible, with the present number of occupants, to produce a result perfectly satisfactory to the sanitarian. It is true, that school-rooms are not crowded, in the sense that the occupants are closely packed together after the manner seen in large public assemblies; but they are overcrowded, because more pupils are present, on the floor of the school-room, than can be supplied with a suitable amount of fresh air. In order to make my meaning clear I shall lay before you the dimensions of an uncrowded and well-ventilated school-room.

Length of room	40 feet.
Width	30 feet.
Floor space	1,200 square feet.
Height of ceiling	12 feet.
Cubic air space	14,400 cubic feet.
Number of occupants	48
Cubic air space per head	300 cubic feet.
Air of room changed seven times per hour.	2,100 cub. ft. per head.

The length, width, and height of such a room would enable the teacher to observe the scholars with ease, and to speak to them without unduly

raising the voice. The floor space per pupil, 25 square feet, would allow ample room for single desks, passages and the teacher's rostrum. The cubic air space, *i.e.*, 300 cubic feet, is sufficient for the purpose of ventilation, if the air of the room is changed seven times in an hour. To accomplish this result, artificial ventilation is necessary. By good natural ventilation through doors and windows, the air of the school-room would be changed two or three times in an hour, according to the wind. Each pupil would, therefore, by the natural method secure from 600 to 900 cubic feet of fresh air per hour, whereas, in order to dilute the air he breathes in such a fashion as to keep it at a normal standard of purity, he should receive 2,000 cubic feet per hour. I have been thus particular in giving the dimensions and ventilation of this model school-room, because I believe there is a crying necessity for such an improvement all over this Province. In the Toronto schools, where you would naturally expect, that the best results would be obtained, from a large outlay of money by the Public School Board, overcrowding and bad ventilation are generally noticeable. As a proof of this assertion I will read you some notes, which I made recently on the ventilation of some of the largest and best conducted schools of our city. April 4th, 1887, 3 p.m., Examination of the ventilation of the Church Street School. Room, on second floor (girls), cubic measurment, 11,400 cubic feet; usual number of occupants, pupils and teacher, 65; cubic air space per head, 175 cubic feet; present to-day, 50; test of air by the senses, extremely close and unpleasant; temperature, 79°; heating apparatus, jacketed stove with pure air inlet; outlet, door and six windows, but one window was slightly open at the top. There were outlets at the base of the room, but there was no draught in them.

April 5th, 1887, 2.30 p.m. Examination of the ventilation of the Wellesley Street School. Room on the ground floor (boys): cubic measurement, 10,500 cubic feet; usual number present, 51; cubic air space per head, 206; test of air by the senses, very close; temperature, 64°; heating apparatus, hot air; inlets, two 13 by 18 registers; outlets, two registers near ceiling, six windows, one of which was lowered from the top. N.B.—The teacher remarked that after recess, the air soon became foul.

April 18th, 2.20 p.m. Examination of the ventilation of school-rooms in De La Salle Institute. Room on ground floor (boys): cubic space, 8,680 cubic feet; persons usually present, 31; cubic space per head, 280 cubic feet; heating apparatus, stove; temperature, 66°; hygrometer, D.B.

66°, W.B. 56½°, R.H. 54; inlets and outlets, one door and two windows, all closed; test of air by the senses, close.

Upper room (girls): cubic measurement, 7,533; persons usually present, 28; cubic air space per head, 269; heating apparatus, stove; temperature, 66°; hygrometer, D.B. 66°, W.B. 55° R.H. 56; inlets and outlets, one door and two windows, the latter both lowered at top; test of air by the senses, not very close.

From these figures we can draw certain conclusions:

1. The room in the Church Street school was overcrowded (175 cubic feet per head). The heating was excessive (79°). The ventilation almost *nil*, one window out of six being slightly open at the top, and as a natural consequence the air of the room was extremely close and unpleasant.

2. In the Wellesley Street school, the cubic air space (206 cubic feet) is somewhat larger; the temperature is excellent (64°); but the hot air apparatus does not introduce a sufficiency of pure air, or carry away, even with the assistance of an open window, the foul air, because the air tested by the senses is very close, and, according to the teacher, is rapidly spoiled after recess.

3. In both the rooms at the De La Salle Institute, the temperature 66°, and the relative humidity, 56, were good. The cubic air space in the girls' room (269 cubic feet) was an improvement on that allowed in the Public Schools, and as two windows were kept open, the air was not close. In the boys' room, though the cubic measurement was larger (280 cubic feet), owing to the doors and the windows being closed, the air was close.

I may here remark, that in ventilating a school-room by the natural method, much depends on the teacher, and something, also, on the pupils. If the teacher, owing to recent illness, tendency to rheumatism, poverty of the blood, or some other cause, objects to draughts, soon after recess the air of the room becomes close, and some of the pupils will complain of headache, or become listless and unfit for study. In other instances, the teacher recognizes the necessity of fresh air for himself and pupils, and lowers the windows. This causes a down draught, to avoid which, pupils near the windows have to be removed to other and more crowded portions of the room. According to my observations, girls do not complain of down draughts as much as boys, and I think, that this evidence of greater hardiness may arise from the fact, that girls being accustomed to wear their hair long, and generally wearing a lighter head-dress than boys, are not so susceptible to cold about the head and neck.

I would not have you suppose, however, that all our Toronto schools are badly ventilated.

A public school recently erected on Brock Avenue is ventilated after the Smead-Dowd system. This plan was originally invented by the Hon. Mr. Ruttan, of Cobourg, Ontario. In winter, the outside air heated by passing through tubes situated around a furnace, is distributed to the several rooms by ample inlets, and, after warming them, is removed at the base line through outlets of nearly the same capacity. Good distribution is thus secured as the fresh air passes in its downward flight by the breathing line of the pupils. On leaving the rooms by these outlets, the foul air passes beneath the floor, which it warms, is collected in the basement in receiving chambers, and thence discharged into the outer air by a flue, which is heated by the smoke stack of the furnace. In calm weather in summer, instead of a furnace a small heater is used, in which a few pounds of coal are burned to keep up a good draught of air in the exit flue.

January 26th, 1887, 3.45 p.m. Examination of the ventilation of Brock Avenue School. Upper room (girls): cubic measurement, 10,786 feet; persons usually present, 59 cubic space per head, 183 feet; temperature, 67°; hygrometer, D.B. 67°, W.B. 53½°, R.H. 41½; anemometer; size of inlet, 4 square feet; air entering per minute, 276 linear feet; air entering per hour, 16,560 linear feet; cubic feet of air entering per hour, 66,240; number of changes per hour, 6·1; door closed, and four windows closed; test of air by the senses, not close.

May 13th, 3 p.m. I again examined the ventilation of the same room, my principal object being to test the air for carbon dioxide. The door was closed; one window was open at the top. There was no fire in the heater, but the cold air inlet in the basement being open, the fresh air flowed into the room with sufficient rapidity to change the air about twice in an hour. As long as the window remained open at the top there was a good current in the outlets; on closing the window the outgoing current ceased. The wind was S.E., and very light; temperature in room, 70°; persons present, 52; test of air by the senses, not close; tested by Blockmann's apparatus, ·806 carbon dioxide per 1,000 vols.; average age of the pupils, ten years.

The head master, Mr. Muir, informed me that, in an experience of eighteen years in city schools, the Brock Ave. School was the only one in which he could teach with perfect satisfaction, both his pupils and

himself being as bright and cheerful at 4 p.m. as they were at 9 a.m. And this result he attributed largely to the fact that the school-rooms were well ventilated.

I do not consider the ventilation of the Brock Ave. school perfect. The rooms are overcrowded, but I feel quite satisfied, that, with an air space of 300 cubic feet per head, and the Smead-Dowd system of ventilation, the air of a school-room would be reasonably pure.

The estimation of the volume of carbon dioxide gas it contains is at present the only experimental method of judging of the condition of the air in enclosed areas, and therefore it is important from a sanitary point of view, to possess an easy and rapid means of ascertaining the amount of this gas present in the atmosphere. Several plans have been proposed for this purpose, all of which are based on the milkiness produced by carbon dioxide in a colorless solution of lime or baryta, and therefore on a qualitative appearance, which is not directly connected with the amount of gas actually present. The new apparatus devised by Dr. R. Blockmann possesses the merit of giving quantitative results, and of being so simple in its action that no chemical knowledge is required in order to use it. It is also very cheap. The process is based on the employment of a sufficient volume of the air under trial to saturate by means of the carbon dioxide gas present in it, a given amount of lime water of a certain strength. In order to recognize the fact of this saturation a few drops of a solution of phenol-phthalein are added to the lime water until it assumes a visibly red tint. The color remains as long as the liquid continues alkaline, but directly the caustic lime is all converted into the carbonate a very small excess of carbon dioxide is sufficient entirely to destroy all trace of the red tint.

The apparatus consists of a glass bottle capable of holding 500 c. c. or half a litre,—a hollow bent glass tube used in sucking the air out of the bottle—a solution of phenol-phthalein, and a solution of lime water 1-10 the strength of the volumetric solution, or one in which 1 c. c. of lime water is equal to one-tenth of a milligram of carbon dioxide.

The mode of using it is as follows: The bottle is filled with the air to be tested by sucking out the air contained in it through the bent glass tube; ½ oz. of lime water is poured into the bottle, together with three drops of the solution of phenol-phthalein, and the bottle is then corked and shaken for three or four minutes; if the liquid is still red the bottle is filled a second time with air, corked and shaken as before, and the process is

repeated until the color in the liquid vanishes. If the color does not completely fade after any particular filling, but fades immediately on making another filling, we may take the one before the last as the correct reading. Thus in testing the air at the Brock Ave. school, I found that the red tint had nearly vanished at the second filling, and that it disappeared completely on filling the bottle the third time. The amount of carbon dioxide was therefore not more than for two fillings, and but little less, or in round numbers ·806. If the color remains for four fillings the air is very good, if it remains for three it is good, if it disappears on the second filling it is on the borders of what sanitarians call bad air, if the color goes on the first filling, the air is so impure as to render it wholly unfit to be breathed.

A table has been prepared, showing the exact quantities of carbon dioxide gas present. in 1,000 volumes of air, as indicated by the results of each filling—from the first to the fourth. Thus—1 filling, 1.61 carbon dioxide per mille; 2 fillings, .806 carbon dioxide per mille; 3 fillings, .537 carbon dioxide per mille; 4 fillings, .400 at 60° Fahrenheit. A correction is not necessary for a temperature over or under 60°, as it would involve no greater difference than a factor in the third decimal place. By increasing the quantity of lime water the presence of much larger volumes of the gas can be ascertained; thus, with 1 oz. of lime water a discoloration at the first filling would imply the existence of 3.22 volumes per mille. Professor Heys, of the Ontario School of Chemistry and Pharmacy, writing to me of this method, says, in a letter written May 12th, 1886: "The examination of air in the room on Tuesday last gave 1.205 vols. per mille, by Pettenkofer's method; 1.16 vols. per mille by Blockmann's. I think this is very good as an approximation, and it may be considered near enough for practical purposes."

In concluding this paper, I desire to say that I have felt much pleasure in being instrumental in introducing Blockmann's apparatus into Ontario, because I am satisfied that a cheap, simple, and withal accurate method of determining the carbon dioxide in air should be in the hands of all school teachers, so that they and their pupils may learn not from the senses only, but by an accurate scientific method what the character of the air of the school-room really is. And, as ocular demonstration is the most potent means of teaching truth, even to unwilling minds, school ventilation will improve rapidly when teachers are able to prove to trustees and other interested parties that the air our children are compelled to breathe is really impure.

PAPER VII.—By Rev. Prof. N. Wolverton, M.A.

Mr. President, Ladies and Gentlemen:

Ventilation and heating are so intimately connected that we cannot practically consider one without the other. During the last few months I have been compelled to study these questions most carefully. We are now constructing additional buildings to accommodate the Arts College of the new McMaster University, and for these have been investigating almost every known system of heating and ventilating.

The following systems have been under consideration: Steam heating, both high and low pressure; hot water heating; heating by means of hot air, and by warm air.

Our attention was first directed to steam heating. In common with most thoughtful men we soon dismissed the high pressure system as being expensive, dangerous and unsatisfactory. Our first objection to low pressure steam was the impossibility of getting as moderate a degree of heat in the spring and fall as we desired. Steam will not circulate through the pipes until the water in the boiler has been raised to 212 degrees; hence the pipes in the room are of that degree of heat or nothing, rendering the introduction of a very moderate degree of heat impossible. Our second objection was the entire absence of ventilation, except the system of indirect radiation as well as of direct, be introduced. This would, in our judgment, largely increase both the original cost of the apparatus and the consumption of fuel, as two complete and distinct systems must be provided and maintained. Our third objection was a fear lest in our very severe weather the cold air coming in contact with the pipes in the indirect system would cause them to freeze and burst.

These many objections led us to consider hot water heating. With this system we were delighted, and we heard most excellent reports of its working in many places. We were led, however, to investigate some other system, by the very large outlay necessary for its introduction and by the fact that we could find no firm willing to undertake the heating of such large buildings by this system, their fear being that the water would freeze before it could be conveyed to the farthest points.

At last we were driven to reconsider the hot air system. With this, and all its defects and its danger and expensiveness, we were very familiar, as for years it has been the bane of our existence.

Cannot the defects be largely eliminated? To this question we addressed ourselves. Experience had pointed out the following as the most serious defects: (1) The air as it enters the rooms is too hot, too dry and parched. (2) It is all but impossible to lead the hot air to the windward side of a large and high building. (3) We have found it very expensive and somewhat dangerous in very cold weather. While investigating these questions, our architects brought to our notice the Smead-Dowd system of warming and ventilating buildings. I need not describe this system, as the last speaker has ably done so. I shall, however, note some points in which I believe it is an improvement on all other systems of hot or warm air with which I am acquainted. (1) It introduces a very large supply of air, brings it into contact with furnaces of unusually great capacity, thus *warming* the air by bringing it into contact with a moderately heated surface. (2) This warm air is then conveyed to the rooms, where it at once *displaces* the cold and foul air, thus securing ample ventilation. (3) At the furnace there is a *valve*, regulated from the room above, by means of which warm air from the furnace, or cold air from outside, or partly warm and partly cold air can be brought into the room, thus regulating perfectly the degree of warmth, but never cutting off the supply of fresh air. (4) From the rooms the foul and colder and heavier air is drawn away from the base and conducted *down* to the basement, a natural and easy process, where it is collected and carried away by a great ventilating shaft. In this ventilating shaft there is a small furnace to give an upward draft when there is no fire in the furnaces in the summer.

This system is not perfect, yet it seems to us to be nearer perfection as a system of heating and ventilation than any other, and hence we have adopted it, and are now having it introduced in a building.

A dry-closet system is connected with it, but that will probably come up for discussion at a later hour.

Discussion.

T. J. Lennox, Esq., B.A., said:—There is urgent need of directing peoples' attention to the matter of ventilation. School houses, especially in rural sections, and in winter are notoriously ill provided with means of ventilation. The same remark applies to sleeping rooms. Many people, to escape the imagined dangers of "night air," shut themselves

into small sleeping rooms, and are slowly poisoned. In most bedrooms ventilation may be had by opening the windows. There is but little danger of catching cold if a direct draught be avoided.

In schools and other public buildings the difficulty is to secure good ventilation and a sufficiency of warmth. Coal stoves and hot-air furnaces permit the escape of carbon dioxide and sulphur dioxide, both poisonous. A thoroughly good method of ventilation and heating is yet to be discovered. The Smead-Dowd system, described by Professor Wolverton, appears to fulfil most but not quite all of the requirements. Cold air has but little capacity for moisture, but the capacity rises with rise of temperature. Winter air taken into our houses and heated ought to be supplied with sufficient moisture to maintain its relative humidity. Otherwise it extracts it from the lungs and air passages, and feels dry and unpleasant. No adequate provision for a supply of moisture to the air is made in the Smead-Dowd system.

J. A. Fowler, C. E., said:—I was architect for Brock Avenue School, the first of the schools of Canada in which the Smead-Dowd system of heating, ventilation and dessicating closet was adopted. I had had considerable previous experience in school matters, and knew that thousands of dollars had been spent in endeavouring to obtain thorough ventilation and sufficient heating in school-rooms. From experience I find that the Smead-Dowd system fills all reasonable requirements and has stood tests well. The rooms at Brock Avenue school are 14 feet high, 35 feet long and 25 feet wide, and contain 12,250 cubic feet of air, an allowance of 245 feet of air per pupil. This volume was changed seven times per hour, and when the thermometer outside stood below zero the temperature was easily maintained at 68° and 70°, and this by the consumption of 95 lbs. of coal per room per day—in this four-roomed school 380 lbs. of coal (soft or gas coal) per day added, to which we must credit the apparatus with having warmed two corridors each 10 feet by 45 feet, same height as rooms. The apparatus was put in whilst the building was in progress and I availed myself of the opportunity of using this heat for drying out the plaster, which it did effectually. Mr. Fisher, the practical man of Smead, Dowd & Co., raised the heat to 138° and 140° Fahren., or so much so that I had to cause the fires to be damped because it started wood work to shrink which had been most thoroughly kiln dried. The great success of this system appears to be the means of easily raising a very large body of air to any desired temperature, a copious

supply of fresh air being needed to ensure the ventilation of any building. The peculiar form of furnace easily effects the warming. The sizes of inlet and outlet openings are matters of calculation and not hap-hazard.

Another great advantage of this system is the ease with which closet arrangements can be perfected, free from unhealthy emanations. As used in our schools these are placed in the basement, and the warmed vitiated airs are collected into a fair-sized room, thence passing over the top of the excreta, absorbing any volatile matter and gas and dessicating the solids completely, so that it is a matter of perfect astonishment in how short a time not only solids but liquids are conveyed away.

I might mention that the draught is maintained in summer by auxiliary stoves, placed at the foot of the upcast shafts; and these stoves can be maintained at a trifling cost and little trouble.

The cost of the apparatus at Brock Avenue School was $800 to Smead, Dowd & Co. In building a new school, structural work would not cost any more than ordinarily is the case.

Setting the furnace, etc., would cost about $150 additional, so that for less than $1,000 four rooms can be not only comfortably heated but air can be supplied with so small a proportion of carbon dioxide that the headaches of teachers and pupils in school can be entirely avoided, and greater attention to the studies must result. Add to which the undoubted sanitary conditions which result from the use of the dessicating closets, and I think that I am right in pressing upon the attention of the educationalists and sanitarians the merits of the Smead-Dowd system.

The meeting thereafter adjourned.

ANNUAL MEETING OF THE ASSOCIATION OF EXECUTIVE HEALTH OFFICERS.

The third session of the Conference, set apart as the Annual Meeting of the Association of Executive Health Officers of Ontario, with the Vice-President, Dr. Coventry in the chair, was opened with a service of prayer, conducted by Rev. Robert Sherwin, of Dundas Street Methodist Church.

The chairman, Dr. Coventry, thereafter called upon the Secretary to read the minutes of the last meeting.

The following is a copy of the Minutes of the first meeting, which, on motion, were confirmed :—

On Tuesday, Oct. 5th, 1886, an informal meeting was held in Shaftesbury Hall at 4 p.m. Dr. Wm. Canniff, Medical Health Officer of Toronto, was called to the chair, after Dr. P. H. Bryce, Secretary of the Provincial Board of Health, had in a few words stated how and why the meeting had been called.

The following are the gentlemen who were present:—Chairman *pro tem.*, Wm. Canniff, M.D., Toronto, Medical Health Officer; Secretary *pro tem.*, Peter H. Bryce, M.B., Toronto, Secretary Provincial Board of Health; James McLean, Esq., Durham, Cavan Township, Chairman Local Board of Health; Colonel Deacon, Lindsay, Mayor; P. P. Burrows, M.D., Lindsay, Medical Health Officer; J. Coventry, M.D., Windsor, Medical Health Officer; J. P. Rutherford, M. D., Chatham, Chairman Local Board of Health; D. Marquis, M.D., Brantford Township, Medical Health Officer; S. A. King, M.D., Kingsville, Essex, Medical Health Officer; Captain Hughes, Lindsay, Sanitary Inspector; William Oldright, M.D., Toronto, Member Provincial Board of Health; Geo. Carlisle, Esq., St. Catharines, Chairman Local Board of Health; S. G. Dalson, Esq., St. Catharines, Member Local Board of Health; S. H. Fee, M.D., Kingston Medical Health Officer; J. A. Grant, M.D., Ottawa; William Roy, Esq., Owen Sound; F. Rae, M.D., Oshawa, Mayor.

Copies of a proposed Constitution having been previously in the hands of delegates, its consideration was, after a few remarks from Dr. Canniff, commendatory of the proposed objects of the meeting, proceeded with.

Motion.—It was then moved by Dr. Rae, Oshawa, and seconded by Dr. Rutherford, Chatham: "That the Association be called 'The Association of Executive Health Officers of Ontario.'"—Carried.

The new Association, in Committee of the Whole, thereafter revised and amended the proposed Constitution.

After considerable discussion, and the emendation of several clauses, the Constitution as a whole was adopted on motion of Dr. Bryce, seconded by Dr. Burrows, Lindsay.

On motion, the meeting then adjourned till 3.30 p.m., Wednesday, the 6th, for the election of officers and the further transaction of business.

Approved as correct.

WILLIAM CANNIFF,
Chairman.

Second Meeting for Election of Officers.

Dr. Wm. Canniff having again been called to the chair. Dr. Bryce, the *pro tem.* Secretary, read the minutes of the preliminary meeting, which were on motion approved.

The following gentlemen were present and became members :—

Dr. Elliott, Orillia,
Dr. Ross, Woodstock,
Dr. Fee, Kingston,
Dr. McLellan, Trenton,
Dr. Cameron, Owen Sound,
Dr. Tracey, Belleville,
Walter Clarke, Guelph,
Dr. Sweetland, Ottawa,
Captain Hughes, Lindsay,
Dr. Powell, Toronto,
S. G. Dolson, St. Catharines,
Wm. Duffus, Lindsay,
Dr. Marquis, Mt. Pleasant,
Dr. Griffin, Brantford,
Dr. Burrows, Lindsay,
Dr. King, Kingsville,
Dr. Robillard, Ottawa,
Dr. Coventry, Windsor,
Mr. Whillans, Ottawa,
Dr. Cassidy, Toronto,
Dr. Rae, Oshawa,
Col. Deacon, Lindsay,
Dr. Canniff, Toronto,
Mr. Dean, Lindsay,
Jas. McLean, Cavan Tp.
Dr. Ryall, Hamilton,
Dr. Howland, Huntsville.
Dr. Bryce, Toronto,

The Chairman then stated that the first order of business was the election of officers, and called for nominations for the office of President and, subsequently, for the other offices.

The following gentlemen were elected officers by acclamation or by ballot :—

President, - - - - Dr. J. Sweetland, Ottawa.
First Vice-President, - - Dr. J. Coventry, Windsor.
Second Vice-President, - - Dr. P. P. Burrows, Lindsay.
Secretary-Treasurer, - - Dr. P. H. Bryce, Toronto.

The following gentlemen were then elected, by ballot, Members of Council :—

Colonel Deacon, Lindsay.
Dr. Rae, Oshawa.
Dr. Robillard, Ottawa.
Captain Clarke, Guelph.
Dr. Cameron, Owen Sound.

Motion —The following resolution was thereafter carried unanimously: —Moved by Dr. Burrows, seconded by Dr. McRae, "That the thanks of the meeting are due to Dr. Canniff for his kindness and dignity in acting as Chairman *pro tem.*

Dr. Sweetland, in thanking the Association for electing him, further spoke regarding the necessity for new regulations on many important points coming up in executive local health work.

Dr. Coventry, in thanking the Association for electing him, also urged the necessity for work by an Association such as the one just organized.

Colonel Deacon then made some remarks, suggesting that each member bring new members to the next meeting, after which he moved the following resolution :—

Motion.—Moved by Colonel Deacon, Mayor of Lindsay, and seconded by Dr. Tracey, Belleville, "That this meeting of Executive Sanitary Officers now in session, avail themselves of such a representative meeting from the different sections of the Province, to place on record a cordial expression of their appreciation of the prompt, kind and courteous manner in which Dr. Bryce, Secretary of the Provincial Board of Health, has invariably performed the onerous duties of the position he so worthily occupies."—Carried.

Dr. Bryce briefly thanked the meeting.

Motion.—It was then moved by Dr. Rae, and seconded by Dr. Burrows, "That the Constitution as amended be adopted." Carried.

Motion.—Moved by Dr. Burrows, and seconded by Dr. Cassidy, "That the Executive be instructed to formulate such amendments to the Health Acts as may be deemed desirable; and that copies thereof be distributed to members, and returned with such amendments to the proposed changes, as may be by them thought proper."

Some discussion then took place regarding the place of the next meeting, after which the meeting adjourned on the general understanding that the Executive would fix the meeting at such time and place as would be likely to best serve the objects of the Association.

Approved.

J. COVENTRY,
Chairman.

Various communications, as from Dr. Tracey, Belleville; Dr. King, Kingsville, were read, regretting that circumstances made it impossible for them to be present.

The report of the Executive Committee was then read, and on motion of Dr. Bryce, seconded by Dr. Burrows, Lindsay, was adopted.

The following is a copy of the Report of the Executive :—

To the President and Members of the Association :

GENTLEMEN,—Your Executive Committee appointed to review the various Public Health Acts of the Province and to urge the introduction of such further legislative amendments thereto as they might deem necessary, beg leave to report, that the various members forwarded to the Secretary such alterations and additions as they had thought necessary and desirable, and that a number of these were incorporated in the proposed Health Bill, drafted by the Provincial Board of Health.

The greater portion of these were adopted, with amendments in the Health Bill as it finally passed the Legislature.

While there is still much room in many ways for improvement in the definiteness of certain clauses of the Health Acts, for their consolidation and for the elimination of certain obsolete or redundant sections, nevertheless your Committee begs leave to report that, in its opinion, the Province can congratulate itself on the possession of Health Acts such as do not exist elsewhere in Canada, or probably upon this continent.

All of which is respectfully submitted.

(Signed) P. H. BRYCE,
Secretary.

The Secretary-Treasurer's annual report having been read, was adopted.

The report showed that, as given in the minutes of the last meeting (first) twenty-six ordinary members had been elected and one associate member, and that their annual fees paid amounted to $26.50, now deposited in Ontario Bank, Toronto, in trust for the Association.

The annual election was then proceeded with, the following officers and members of Council being elected :—

President, - - -	Dr. J. Coventry, Windsor.
First Vice-President, -	Dr. P. P. Burrows, Lindsay.
Second Vice-President, -	Dr. E. Griffin, Brantford.
Secretary-Treasurer, -	Dr. P. H. Bryce, Toronto.

Elect Members of Council :—

Dr. C. McLellan, Trenton. Dr. H. P. Yeomans, Mount Forest.
Dr. A. Cameron, Owen Sound. Capt. W. Clarke, Guelph.
Dr. J. B. Lundy, Galt.

By a unanimous vote, Dr. J. A. Kellogg, Battle Creek, Michigan, and Col. Deacon, Lindsay, were elected honorary members of the Association.

Under the heading of new business, Dr. Coventry introduced a proposition for the formation of Committees of the Association, to deal with special subjects, said special committees to be composed of members of the Association, situated in contiguous localities.

After a considerable discussion on the present advisability and practicability of the proposed plan, the following motion was adopted.

Moved by Dr. Cassidy, seconded by Dr. Griffin—That the appointment of committees for practical work, their names, duties and extent, be left in the hands of the Executive.

Succeeding this, the following motion was carried:—

Moved by Dr. McLellan, seconded by Dr. Cassidy—That the Executive be directed to take measures for obtaining the incorporation of the Association.

It was thereafter moved by Dr. Burrows, seconded by Dr. McLellan—That this meeting desires to express its appreciation of the services rendered the Association since its organization by Dr. Sweetland, its past President, and further that the Secretary be instructed to convey to Dr. Sweetland its regret at his absence, and its sympathy for him in the circumstances which have made it impossible for him to be present.

Dr. Yeomans moved, seconded by Dr. Cameron—That the thanks of the Association be tendered to the Mayor, Local Committee, and citizens of Woodstock, for their practical interest shown in public health work, and for the many courtesies extended to its members during their presence in Woodstock.

The thanks of the meeting, on motion of Dr. McLellan, seconded by Dr. Ross, were expressed to the Chairman for his able and courteous discharge of the duties of the Chair in the absence of the President.

The following members were elected during the session, or through application became members:—

Dr. D. W. Clement,	Medical Health Officer, Innerkip.
Dr. McKid, -	Medical Health Officer, Seaforth.
Dr. A. B. Welford,	Member Local Board of Health, Woodstock.
Dr. H. P. Yeomans,	Provincial Board of Health, Mount Forest.
Dr. J. B. Tweedale,	Medical Health Officer, St. Thomas.
Mr. S. C. Martin,	Member Local Board of Health, Beachville.
Dr. W. Burt, -	Medical Health Officer, Paris.
Dr. J. B. Lundy,	" " Galt.
Dr. A. McLay, -	" " Woodstock.
Dr. J. McWilliams,	" " Thamesford.
Dr. D. Clarke, -	Superintendent Toronto Asylum, Toronto.
Dr. J. McIntosh,	Medical Health Officer, Vankleek Hill.
Dr. H. M. McKay,	Member Local Board of Health, Woodstock.
Dr. King, - -	Medical Health Officer, Kingsville.

The following old members attended the meetings of the Association :—

Dr. E. Griffin, -	Medical Health Officer, Brantford.
Dr. C. McLellan,	" " Trenton.
Dr. J. J. Cassidy,	Member Provincial Board of Health, Toronto.
Dr. P. P. Burrows,	Medical Health Officer, Lindsay.
Dr. Allan Cameron,	" " Owen Sound.
Dr. J. Coventry,	" " Windsor.
Dr. P. H. Bryce,	Provincial Board of Health, Toronto.
Dr. G. W. A. Ross,	Member Local Board of Health, Woodstock.

The business of the Association was continued by the consideration of questions of practical importance, and the reading and discussion of papers.

PAPER VIII.—METHOD OF APPOINTMENT, DUTIES AND COMPENSATION OF HEALTH OFFICERS.

By Dr. P. Palmer Burrows, 2nd Vice-President,
Medical Health Officer, Lindsay.

Mr. Chairman, Ladies and Gentlemen :

It gives me great pleasure to be present at this, the first annual meeting of the Association of Executive Health Officers of Ontario, and the second sanitary convention held in the Town of Woodstock. My feelings are largely in favor of such gatherings and, although but a humble member, unable to add much to the general fund of information, still, I hope to carry away thoughts and ideas useful to the town in which I reside. I shall certainly return with feelings of sincere respect for the good people of Woodstock, and a full appreciation of the kindness experienced during my brief visit.

The subject which I am requested to present this forenoon, "The Method of Appointment, Duties and Compensation of Health Officers," will not try your patience to any severe degree, as I intend that my remarks shall be brief, although the question is of great interest and should secure a fair share of consideration and provoke discussion.

To my mind no duty entirely in the hands of municipal councils is more important than the selection of competent Health Officers and the formation of efficient Local Boards. It is but fair to add that, taken as a whole, the trust has not been misplaced; especially is this true with regard to Medical Health Officers, the chief advisory officials. I am sure you will quite agree with me that those in your immediate neighborhood with whom you are acquainted, as well as those present from a distance whom you have had occasion to hear and see, reflect every credit on their official positions. I am pleased, indeed, to pay this deserved compliment to our municipal corporations and their appointees, the Medical Health Officers; still I am not prepared to recede from my personal conviction, that to fully serve the wise purposes intended by the Public Health Act, Health Officers should be elected by the popular vote, and directly and only responsible to the people. They should have control of municipal funds for such sanitary work as in their judgement is wise and proper, and in as

complete a manner as is accorded Boards of Education and even Municipal Councils. They should be entirely independent of and not subsidiary to Municipal Councils. In too many instances the opinion that "corporations have no souls" is verified in this connection. They fail to extend that generous support necessary to carry on sanitary work, and the bond of friendship and aympathetic coöperation which may have existed early in the history of the Local Boards, becomes strained, the moment the *pabulum vitae* is required, and from this time we mark a tendency to inertia and decay in our Local Boards. I speak from personal knowledge. The Lindsay Board at its formation was a good one, every individual member anxious to do his duty. They were men of nerve and spirit and at once proposed putting the town in improved shape; wells, streets and sewers were cleaned by their orders; strict isolation in cases of contagious diseases insisted upon; premises in which such diseases had appeared fumigated and sweetened, and by their prompt action and energy, an epidemic of diphtheria which threatened to assume formidable proportions was effectually stamped out. They carefully considered the question of water supply and efficient drainage, and advised immediate action towards improvement; but when they reached this important point, when they had the temerity to ask necessary funds, the councillors metaphorically bid them a very good morning and promised to consider their proposal another day. From this time they became discouraged, their influence for good destroyed, and all that remains is a mere name, and the record of their good intentions. It is now a matter of singular good fortune to get together even a quorum for the transaction of routine business. This description I take to be the common experience. Knowing this, as I do, you will thoroughly realize that if Local Boards are to exist, a change is called for. Once placed in such a position that they can use public money without being dependent upon soulless corporations, a great point will be gained. The matter or manner of their selection, whether by the councils or by electoral vote, is a secondary consideration, although I think the latter a better choice.

It is somewhat difficult to define the duties of health officers—not what should be their special work, but as laid down by legislative enactment. Indeed, on considering the several Health Acts we find their powers wonderfully circumscribed, cramped and ill defined, an example, I presume, of the wisdom of our legislators, who are apt to regard with suspicion

advanced public measures and improve by such emendations as make the law almost inoperative. I am quite sure the several Health Acts do not appear on the Statute Books as originally drafted by my friend, Dr. Bryce, the worthy Secretary of the Provincial Board. I need not quote particulars to exemplify this, as these Acts in all their minutae are familiar to you. I will merely say that the authority given Boards of Health and especially the Medical Officers, is not sufficiently arbitrary, the words "or other medical practitioner" too often dividing the responsibility and the little word "may" qualifying his duties and powers, as well as that of the Board; and I am sorry to say the Act of 1887 is open to similar objections. Throughout all is the one weakness that Local Boards cannot successfully finance, even in the smallest particular. All their accounts go before the municipal fathers and are of course passed with that cheery nonchalance so characteristic of those benevolent christians. Outside and beyond these troubles the live Health Officer will find plenty to engage his attention. It is his first duty to be vigilant and active, to anticipate the advent of epidemic and other diseases, to remove and remedy such unsanitary conditions as provoke disease, study the character of the locality over which he has supervision, strenuously advocate improved and effectual drainage, and insist upon a bountiful supply of pure water for domestic purposes; see to the cleansing of wells, cellars, highways and byways, and have his inspector regularly visit every house and suspected locality, and regularly report. In his hands is placed most sacred interests, which he should properly realize and faithfully serve. He should be prepared for every emergency and should not allow the enemy to gain an entrance before he defends the citadel—he must not awake to find the plague-stricken corpse at his feet.

The Local Health Officer has important, but not very onerous duties to perform. He does not require to devote very largely of his time, not certainly more than any intelligent citizen would willingly contribute, but with the Medical Health Officer it is different. He is required to reflect and mature his views and to direct by wise counsel, and is open to severe comment, sometimes unkind criticism; the correctness of his suggestions questioned, and even his *confreres* in Medicine will not at all times extend that sympathy which is his due. For these reasons I think his position should be permanent, so long as he proves himself a qualified and efficient officer, and his services remunerated by stated salary. The amount need

not be princely, but it should be commensurate with his duties and calls upon his time, awarded by parliamentary enactment if practicable, and not left to the judgment of municipal councillors—in country districts merely nominal, in cities and towns in proportion to population.

There remains but one more thought—the necessity of proper sanitary supervision of our schools. It appears to me that in no other department of the public service is there such wanton carelessness and neglect. A perfect school building, properly heated, lighted, ventilated and drained, carefully kept grounds and well appointed outbuildings, with the comforts of an ordinary home, is indeed a *rara avis*. In country districts, villages and smaller towns, they are objectionable in every particular. I do not say that in more progressive places, the larger and more prosperous towns and cities for example, new schools are not being erected on improved hygienic and sanitary principles—that a certain degree of pride is not evidenced in their construction and the introduction of modern comforts and conveniences. There are such exceptions, still I maintain they are somewhat rare; and rarer still, even such that do not very soon develope evidences of official carelessness; dust, cobwebs and neglect sooner or later indelibly leave their mark, clearly discernable, internally and externally. This is not as it should be. There are confined within these walls some 500,000, living, growing, active mischievous protests to the contrary—arguments that appeal to our every senses, that follow us to our fire-sides and in smiles, in tears, in words, demand thoughtful consideration. The Public Health Act leaves it to the judgment of trustee Boards whether the Medical Health Officer shall act as medical inspector of schools or not. As a rule the advisability of the appointment is not even considered, and very seldom is the authority extended. While I hold that in every district a Medical Health Officer should act as Sanitary Inspector of schools, I think that even more than the law allows is required. There should be a Provincial Sanitary Inspector, who would enquire into existing grievances that interfere with the robust, mental and physical growth of our scholars; visit all sections and schools in which there may be neglect or complaint; see that district inspectors, and trustee Boards are fully alive to hygienic and sanitary requirements and that they are practically enforced. When we consider the large proportion of sickness and death that could be prevented by strict observance of sanitary laws, and that the developing period is the most susceptible to disease, that of the twenty-four

hours six are spent in school-rooms, and that this continues ten, twelve, or fifteen years; that the evil effects of our system of teaching do not stop with school hours, but follow the child with its load of books (mostly trash, as far as sound useful knowledge, social position and future prospects of the child are concerned), we fully realize the importance of better supervision. Dr. Oldright, at your convention last year said: "He could not understand why trustees did not endeavour to bring about a better state of affairs." We need not question. The Registrar General's Report gives the reply in letters that one who runs may read. Of the three professions—Divinity, Law and Medicine—the death rate was fifty-eight years; teachers below fifty (males, fifty; females, thirty-eight). There is nothing *per se* in the occupation of teaching that should place it equal with such callings as are recognized as extra hazardous. That you may be satisfied that there is something very wrong, I refer to the British Registrar General's report, in which clergymen are given first place, school-masters rank only fourth on the list and physicians far below either. The fact that in this Province the position is largely reversed to the disadvantage of teachers, satisfies me that your attention should be directed towards the sanitary improvement of our public schools, and that if such officer as I suggest is not thought advisable, stated authority should be given Medical Health Officers that such evils as produce these disastrous results be remedied. Let us see to it that our little men and women are developing in mind and body, and that the true equilibrium be maintained; let us see that they grow strong and good, physically, morally, spiritually, and that those who, in the course of nature, will soon fill our places, shall be men and women in truth and in deed.

I thank you for your considerate hearing.

The consideration of the subject was continued by Dr. William Burt, Paris, Medical Health Officer, reading the following paper:—

PAPER IX.—By Dr. William Burt, Paris, Medical Health Officer.

Mr. President and Gentlemen:

I quite approve of the present method of appointment of Health Officers. I do not know that it could be improved on. From the mere fact that the method has not been changed, after a searching inquiry

by our Provincial Board, by means of circulars to correspondents and Health Officers, goes far to show that no better alternative has been recommended—at least I know of none. In Paris the Municipal Council, in making appointments to the Board of Health, have always appointed a physician one of the members. At the first meeting of the Board of Health for the year, a report has always been drawn up recommending to the Municipal Council names for Medical Health Officer and Sanitary Inspector. In accordance with the wishes of the Local Board the physician thereon has always been recommended as Medical Health Officer. Heretofore the council have always adopted the report of the Board. I have quite fallen in with this way of electing Health Officers although I am only an ex-officer. There are a good many satisfactory reasons why a physician on the Board should be appointed Medical Health Officer. Harmony is more likely to be insured, although, as a rule, I believe medical men are working every day more in harmony. In this case the Health Officer is more familiar and more in sympathy with the work of the Board. I cannot entertain the idea at present of electing Health Officers by the popular vote, the method would bring medical men into unseemly contest with each other. I believe Municipal Councils are beginning to think too much of themselves to mix up politics with the appointment of Health Officers. Their desire, I believe, is to sustain their reputation for candor by appointing officers, regardless of any political leanings, who will give satisfaction to the majority of any municipality. The method at present in vogue is somewhat similar to the appointment of High School Trustees and the election of their chairman; and I think few will dispute that the office of chairman of High School Boards is filled by a class of men that leave little to be desired.

In regard to the duties of the Medical Health Officer the first, and it is one of paramount importance, is to acquaint himself with sanitary science. The second duty, as a matter of course, is to apply his knowledge to the prevention of disease in a public way. The duties that devolve upon the Health Officer are many. It is his duty to advise the public on all matters that come under the heading of public hygiene. To use the words of another, "it is his province to enlighten the public with regard to drainage, water supply, ventilation, and sanitation generally, and in respect to measures for the prevention and mitigation of epidemic and contagious diseases."

I can only touch upon a few of the duties in the short time at my disposal, and here I might just mention that the people are, as a rule, glad there is such a person as a Medical Health Officer, to whom they can go with their complaints regarding unsanitary conditions. The majority of the people are so much interested in sanitary work that they will compel the minority, as far as it lies in their power, to interest themselves also. There is no difference of opinion among the people in regard to the aim of the sanitary scientist—that of promoting the public health. All alike wish to see disease eradicated as far as possible; all alike wish to see the public health at its best; all alike agree that "cleanliness is next to godliness." If cleanliness does not exist it is because of either ignorance, carelessness, want of funds, or self-interest. In the first case it is the duty of the Health Officer to instruct, and where carelessness and self-interest exist to enforce, and he has the power. It is when funds are required to accomplish what is desired that the Health Officer will be often sorely tried. In some cases, it is true, sanitary work is delayed by the aggrandizement of individuals. Sanitary improvements here would interfere with the accumulation of wealth. One of the most important duties of Health Officers is the inspection of schools. Although the recent amendment to the Health Law, anent the report of contagious diseases to teachers, etc., is a considerable advance in legislation, yet I believe it is still left to the trustees to appoint the Health Officer Inspector of Schools. This matter should not be left in this permissive way, but should be made compulsory. There is no more effective way for the spread of contagious diseases than our public schools. The Health Officer should be required to report to the School Board semi-annually, or annually at least, which report should be included in the one sent to the Municipal Council. There should be printed forms, for the use of schools, containing all the rules which should be enforced. Among these should be one stating the time that should elapse before a child should return to school after having had or been exposed to one of the contagious diseases; at present it is left to the physician in attendance, which occasionally causes a little confusion. A time should be set so that it could be said that all reasonable precaution has been taken to protect the public health.

What should be done with schools should also be done with the factories. Were this matter attended to a difficulty would be gotten over which would relieve the physician in attendance very much. It frequently

happens that scarlet fever or diphtheria breaks out in some member of a poor family. Other members of the family desire to continue work, not wishing to have their every means of support taken away. A patient in these poor families can scarcely be isolated sufficiently. A set of rules should be made to meet the requirements of these cases, and I feel sure the families as a rule will abide by them. There being at present no rules the physician and the families are oftentimes too lax in the matter. I feel sure that the other factory hands would willingly contribute to the support of those who have been exposed to some dire contagious disease rather than be exposed themselves. A very important duty of the Health Officer is to assist the general practitioner in checking and mitigating epidemics, and to insist on the report to the Local Board of those sick from contagious diseases by the householder or physician in attendance. The general practitioner, on the other hand, should do all in his power to help the officer in enforcing the rules. It has occurred to me more than once to find where I had left strict orders in reference to returning to school after recovery from scarlatina, that it was thought during the prohibited time no harm to attend Sunday school. The Health Officer's attention should be especially turned towards our milk supply, and that samples should be obtained at random from the consumers and tested at least twice a year. I shall not continue this subject further, except to state that the Health Officer should work in harmony with the architect and the engineer. Not many practitioners have, or can become, the sanitarian, the architect and the engineer combined. It is as easy, if not more so, for the architect and the engineer to inbibe sanitary knowledge as it is for the sanitarian to become possessed of all the intricacies of architecture and engineering. The sanitarian who is a master in these other departments is seldom to be found. He can no more do without these other qualified men than the surgeon can do without the skilled instrument maker. You will all doubtless remember some instance in which the surgeon has asked the instrument maker to make an instrument for a certain purpose, and the instrument has been forthcoming. So it is with the architect and engineer—they are willing to supply the wants of the sanitarian, at least in that direction.

In regard to the compensation of Health Officers, it is now beginning to be generally admitted and acted upon that it is less costly to prevent disease than to cure it. It applies to sanitary as well as other matters that "a stitch in time saves nine." It is a good investment for the people to have the country well equipped with Health Officers who will perform

their duties faithfully and well. It is like a good insurance society, for money saved is money gained. Every Health Officer is an officer of the State, works directly in the interest of the State, and as such should receive State recognition—be paid by the State. The State already recognizes the indispensable services of the physician to the public by exempting him from serving as a juror, a municipal councillor, or a combatant officer. No class of people have their time more taken up by urgent necessities than the physician. No other profession has its time so disarranged as the medical. The physician's time, in a great measure, is not his own. Cases of emergency come weekly if not daily, and there is no set hour of the day for them to appear. The physician in the interests of humanity responds to the call of the sick and the injured. I should say $3,000 for a large city like Toronto, is a very moderate estimate for a competent Health Officer like the one they now possess. The lowest salary given by any municipality, rural or village, should not be under $50. Salaries of places between these two extremes should be in proportion to the size and the amount of work required. The medical man as a rule is not an extravagant man. His life is devoted to scientific pursuits, and this, Sir, is quite incompatible with much social or wealthy display. If wealth comes to the medical man, he of all others is safest with it, for if any enjoyment of the purse takes place it is very apt to build a hospital or go to some other beneficent purpose. To be paid for one's services by corporation and private individuals who are well able to do it, is a great incentive to perform our duties. A medical man's zeal for the deserving poor never relaxes. Gratitude and a happy state of conscience are his reward. The physician feels that the poor are entitled to and will freely get his professional skill as well as the rich, and much more cheerfully than to the niggardly wealthy or the grumbling one. A medical man's zeal is apt to lessen at all, if it ever does, when he is extending, as bountifully as he can, his services to the poor and it is asked for on the same terms by rich corporation and miserly individuals.

DISCUSSION.

Dr. Burrows, Lindsay, advocated the separate education of males and females, the present system in many cases necessitating the erection of ladies' colleges.

Dr. Ross, Embro, said: The Medical Health Officers should have a sufficiently large salary to render it unnecessary to engage in general practice, say $1,500 or $2,000.

PAPER X.—NOTIFICATION, ISOLATION AND DISINFECTION IN CONTAGIOUS DISEASES.

By Dr. J. Coventry, Windsor, Medical Health Officer.

Mr. Chairman, Ladies and Gentlemen:

The Gospel of Sanitation, as embodied in recent legislation, has been well received in some parts of Ontario, whilst other parts seem slow to adopt its teachings; but the good work begun in 1882, has been, indeed, "glad tidings" to those who availed themselves of the organized system of controlling contagious diseases.

Where the modern methods of dealing with these diseases are not understood, people are apt to be prejudiced against them, but a short trial makes converts of all unprejudiced doubters.

The sanitarian who is constantly reminding the public that they are careless, that they are negligent, that they are dirty, that they are culpably criminal, is voted one of those bores that afflict the community with new-fangled notions, and is placed in the same mental category with book agents, lightening-rod peddlers, and other disturbers of minds content. But a noble work is in hand, and though the Health Officer knows that he is regarded by many as a greater nuisance than a reeking heap of garbage, he proceeds on his life-saving rounds, conscious that he is the trusted guardian of the public weal.

The circumvention of contagious disease is the keystone of the sanitary arch, whether viewed from a social, financial, or humane standpoint, and this fact should sink deep into the minds of everybody. To do it successfully, requires more acumen than it does to command an army. Not only can we see a formidable army in full view, but the greater part lies in ambush, and the battle is not won until every precaution has been exhausted, every microbe and every spore annihilated.

The contagious diseases with which I have had to deal mostly, are small-pox, scarlet fever, and diphtheria. When the public are as much impressed with the danger of the two latter, as they are of the former, there will be no more of one, than there is of the other.

Having applied the regulations laid down in the Health Act of 1882, and found them all that could be desired when strictly adhered to, I have very little to suggest in the way of improvement. For the sake of

being fully understood, let me briefly outline the procedure. When any of these three diseases occurs it is reported immediately by the medical attendant or house-holder to the Health Officer. The Inspector then puts a card up with the name of the disease, in a conspicuous place near the main entrance, and leaves a circular giving general directions of a precautionary nature. Visitors likely to spread the disease are not allowed to come and go. If help is wanted, and the circumstances of the family will not afford it, nurses are provided. The head of the house is allowed to go to work if it does not bring him in contact with children. This permission is not given in the case of small-pox, nor in scarlet fever, or diphtheria, if the Board thinks parties are careless. The Secretary of the Board at once notifies the school authorities of the disease, and other members of the family are excluded from school till the medical attendant certifies the complete recovery. Physicians are urgently requested not to certify to recovery till exfoliation has been completed in scarlet fever cases, and all discharges ceased in cases of diphtheria. On receipt of this certificate the Inspector disinfects the house, and in proportion to the thoroughness with which this is done depends the stamping out of the disease. The slightest oversight will render all precautions worthless. Having securely fastened all doors, windows, fire-places, ventilators and stove-pipe holes, all closet doors, wardrobes, bureau drawers, trunks and band-boxes are opened up. Clothes lines are strung across the rooms and from these are suspended clothing that cannot be washed. Mattrasses are removed from the beds and placed over the backs of chairs grouped together. Curtains and carpets, if they have not previously been removed, are allowed to remain as they were. House plants, pets—such as dogs, cats and birds—should not be allowed in a sick room, as they convey the disease. Books are the most dangerous receptacle for disease germs, and are most difficult to disenfect, so that the rule should be observed to open no books but those that can be burned afterwards. All clothing that can be so treated, should be plunged into boiling water—not put into a boiler and allowed to boil, but the water should be boiling before immersion. We have depended on boiling water and the free use of sulphur, for disinfection after small-pox, scarlet fever and diphtheria, and have no reason to be disappointed with the results. Rubbed up with saltpetre, in proportion of a pound of sulphur to two ounces of saltpetre, it burns readily after being ignited and gives off sulphurous acid gas, which does not destroy fabrics or

diseases is constantly urged on the notice of nurses and attendants, giving decorations of any kind. Silver plate should be removed, and musical instruments well closed up. From half a pound to two pounds of this mixture should be burned in open pans in each room, according to size, and the room kept closed not less than five hours—eight hours is better. By this time the fumes are all settled, when the doors and windows may be thrown open, and the odour soon passes off. While we have had the most gratifying results follow this procedure in the way of preventing these diseases spreading from the points of attack, we have not been successful in isolating members of the family under the same roof. If the disease is detected early, we have urged, where it could be accomplished, that the other members of the family be sent away till all danger is past. Not the least advantage of this plan is that you secure the most active and thorough assistance of the parents in trying to eradicate the disease before the rest of the family are brought back.

Concerning the management of small-pox, I think we may safely assume that in future, Health Officers will have their own way in dealing with it in Ontario. It cannot be successfully isolated at a shorter distance than 400 feet, and even at that, under favourable conditions, it will spread. Immediate removal of the patient to a safe distance from others, and the prompt application of all the safeguards recommended in scarlet-fever and diphtheria, together with vaccination and re-vaccination of everyone that there is the remotest suspicion of having been contaminated, are the only sure means of repression to be adopted with this terrible scourge. If the public will hold Boards of Health responsible for their management of this disease and give a cordial support to their efforts in crushing it out, a speedy termination of it will always crown their efforts.

Modern investigation into the genesis and extention of typhoid fever, favours the belief that its propagation is not accomplished in the same manner as that of the diseases mentioned, but rather is acquired from a common source of food or drinking water, or long continued exposure to an atmosphere surcharged with foul air, bearing the germs or spores of the disease. If this theory is correct, its prevention and isolation would be accomplished by an entire change of food and drink, and the thorough disinfection of discharges from the body. For this latter purpose, a solution of the bicloride of mercury, in the proportion of one part to a thousand of water, is by far the most effective and inoffensive disinfectant for vessels and closets used by patients, and its free use during and after all infectious

of course, the usual precaution that it is very poisonous. Funerals after death, from any of the diseases mentioned, are conducted privately, and as soon after death as arrangements can be made with the undertaker. This official, if he is abreast with the times, is well armed with powerful disinfectants, and should see to it that the hearse and carriages occupied by members of the family are thoroughly fumigated afterwards. We have not placarded typhoid fever, measles, nor whooping cough, fearing that too much placarding would defeat the object we have in view. It would become too common, and cease to be recognized as a danger signal.

The system of reporting, without delay, the presence of a contagious disease to the Health Officer, being once thoroughly established, that officer should, if possible, ascertain the source of the contagion. If no other cases are known in the municipality, a searching effort should be made to find where it came from. If it spreads, and he is well acquainted with his consistency, he can generally group his cases. Does it prevail in a neighbourhood, or on the line of a sewer? Do they use the same well, or is the milk supply the same? Do they attend the same day or Sunday school, or church? Are they relatives? Have they been at the same parties, picnics or excursions together? Does it prevail among visiting friends? Has any friend visited lately from a distance? Have new clothing or articles likely to convey disease, been lately brought to the house? These are only a few of the many hints which may be derived from a close study of the reports and other sources of information, and if the Health Officer is a good detective, he will generally be able to circumvent the disease.

The reluctance on the part of an insignificent number of the medical profession, and a few "kickers," having no other means of letting the world know they are in existence than by opposing all improvements, may give but a passive approval to the systematic placarding, isolation and disinfection of contagious disease, and they may even bluster about resisting it, but their threats are easily overcome.

By impartially dealing with all, we have impressed the public with the idea that we are no respecters of persons, that we have the same law for all, no matter what their station or influence may be. We apply the maxim of *suaviter in modo et fortiter in re*, especially the latter part of the quotation, and the result is a united community and a unanimous profession at our back, ready to raise the "hue and cry" if it were necessary, against any one that attempts to defy or evade our humane regulations.

Such is the experience of the town of Windsor, after five years application of the foregoing methods.

A discussion, taken part in by various other members, brought out still further the practical points of the paper.

The last subject of the programme, "Dry-Earth Disposal and Sewerage," was discussed at some length.

Dr. E. Griffin, Brantford, said: He regretted that the time at his disposal had prevented him from preparing a set paper on the subject, but spoke at some length on the practical advantages Brantford was deriving from the daily increasing adoption of dry-earth closets. He stated that no new houses were allowed to sink privy-pits, and many householders in the business centres were required to replace existing pits by dry-earth closets. What is required to complete the system is, in his opinion, a system of small sewers, for removing house slops and such sewage from water-closets as may have a good supply of flushing water.

Dr. Thrall, Woodstock, stated: That serious illness would prevent him from doing more than show his interest in the Convention and its objects. He wished, however, to indicate the extreme importance that the dry-earth disposal of excreta must be to every town without a public water supply or a system of sewerage. The growth, enterprise and health of Woodstock, as well as its geological conformation, all alike demanded that the old-time preventive methods of a *pit in the ground* be at once done away with in the interests of public health and public decency.

Others present discussed the subject until the hour of adjournment arrived.

The lunch provided by the Local Committee, representing the citizens, was a most enjoyable affair. The Chairman and Vice-Chairman, in well-chosen remarks, expressed their sense of the importance of the study of State Medicine and of the gratitude due to the promoters of the Convention from the people of the town. From the financial standpoint alone, the sanitary affairs of the town demand constant care and watchful supervision, and they trusted that ere long they would see such improvements, as indicated by the prominent sanitarians who had spoken, carried out by the Local Board and Town Council. The health of the visitors was proposed and briefly responded to by the President of the Association and several other gentlemen, after which the final adjournment of the several most successful sessions of the Convention took place.