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PUBLIC HEALTH

MAGAZINE



AND

LITERARY REVIEW.

Edited by GEO. A. BAYNES, M.D., &c., &c

NOVEMBER, 1876.

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Original Communications.

THE PNEUMATIC SYSTEM OF SEWERAGE AND ITS APPLICATION TO THE CITY OF MONTREAL.

By R. CARR HARRIS, C. E., Associate Member Institute C. E.

This article will deal in general terms with the cost of the Pneumatic System. It has been overstated by persons not possessing the necessary data for making an estimate. It is true that the cost of construction at the outset would exceed that of the water carriage system,—just as any engine of advanced civilization will cost more to build than would the primitive contrivance which it supersedes.

To arrive at clearer ideas as to the real cost of the Liernur Pneumatic System, as compared with that of the Water Carriage System, take the case of the whole or a part of a city which is unprovided with any system of sewerage, and consider the elements of cost, both direct and indirect.

The two systems will compare as follows :

LIERNUR'S SYSTEM INVOLVES :

WATER CARRIAGE SYSTEM INVOLVES :

(1) Closets in the house of a simple nature, not liable to expensive arrangements.

(1) Closets with pans, traps, handles and water valves.

(2) Soil pipes from closet to street pipe.

(2) Soil pipes and drains from closet to street sewer.

(3) Along each branch street to a single line of iron pipe, 5 inches diameter, laid about 5 feet below surface of street.

(4) Along each main street, two lines of 5 inches diameter iron pipes.

(5) Iron boxes at the intersections of the side streets with the main streets.

(6) Air pump engine and station for creating vacuum and receiving *fecale*, and appliances for making poudrette.

(7) Line of drains along each street for conveyance of storm waters and factory waste. This is really the item by which the construction cost of this system exceeds that of the water carriage system.

(8) Sale of manure in a dry powder a source of profit to the city.

(9) Profit to the nation from the return to the soil of the constituents taken from it by agriculture.

(3) A brick or pipe sewer about 4 feet diameter, laid on an average 10 feet below surface of street. *

(4) Along each main street, one large brick sewer, say 6 feet or 8 feet diameter.

(5) Numerous wells and overflows. Also man holes, which should occur about every 100 yards.

(6) Pumping engines for raising water with which to carry the *fecale* and to flush sewers. Also, in many cases, pumping works are required in order to provide outfall for the sewerage, also intercepting sewers.

(7) Diffusion of infection, a fruitful source of expense and suffering.

(8) Total loss of this revenue to the city.

(9) Entire loss to the soil of the nation of the nutritive results of agriculture.

It is a matter of fact that the City of Montreal is now daily pumping by steam power a quantity of water for use in water closets and for flushing sewers a great many times in excess of the quantity of *fecale* which the Liernur system would have to convey by steam power. This indirect item of cost has a considerable influence in swelling the taxes and the general cost of living, and although its expense is always charged to the Department of Water Supply, its cost should more properly be charged to the Department of Sewerage. The water carriage system performs its work by means of a pumped and otherwise expensive water supply, and yet many of its advocates say, "What can be simpler than this method of sewerage—by gravitation of course—so cheap—so easy?" forgetting that this gravitation must be supplied by expensive pumping and other works.

The Liernur system has the merit that all its cost is directly chargeable to itself—it is not complicated with a distinct other system of works, and it can be employed in localities and blocks of cities where the other system, if used, would require double

* Average depths of City Sewers as follows :—Providence, R. I., 10½ feet ; Jersey City, 12 feet ; Philadelphia, 10 feet ; Cleveland, 12 feet ; Chicago, 9 to 12 feet ; Hamburg, Germany, 13 feet ; London, England, 17½ feet ; Rugby, 10½ feet ; Penzance, 9 feet.

pumping—first, to supply the water for carriage—second, a pumping of sewage to obtain an outfall for the sewers.

At Leyden the first cost of the Liernur works was \$9 per head of the population served. For Glasgow, Capt. Liernur's estimate of the first cost is \$9.50 per head. The cost in American cities will of course depend upon the width of the streets, the denseness of the population, and the current price of material and labor. In the judgment of Col. Haywood, the first cost in England would be more than that of the first cost of the water system; but the latter causes a source of heavy indirect expenses from year to year, besides offering no return by the sale of manure; whereas the former contemplates, after its operation is established, a clear paying profit on its first cost, besides covering maintenance.

The sale of the manure in Holland is an established fact, and has paid for the cost of working during three years of its operation in Leyden. The surrounding districts of those towns in Holland where the system has been adopted, are flat,—in fact, only marshes dyked and devoted to pasture, requiring little other manure than the droppings of cattle and sheep. In consequence of the low wet nature of the soil, they are unfavorable absorbents of the fecale. The broad upland country around Montreal, already much depleted by hard croppings, would be more susceptible to its manurial value.

The necessarily limited space of these papers does not admit of full analyses and estimates of value of the poudrette. Professor Voelcker estimates its value at \$42 per ton. Mr. Arthur Angell, Public Analyst for the County of Hants, at \$55 per ton.

The following is an analysis of the poudrette prepared from fecale as given by Alfred Silison, F. C. S., a distinguished English analyst:—

Moisture	15.34
* Nitrogenized organic matter and salts of ammonia.....	64.13
† Phosphates and oxide of iron containing phosphoric acid...	5.40
Alkaline salts, &c.....	11.33
Insoluble matter.....	3.30
	<hr/>
	100.00

* Containing nitrogen, 8.30

† Equal to ammonia, 10.08.

The fecale at Leyden and Amsterdam is not converted into poudrette, as it would be were the system fully carried out. At the time these cities adopted the system, doubts existed as to whether the pneumatic plan would succeed. The authorities, therefore, decided not then to incur the further expense of the poudrette manufacture and works. The data available relate only to the sale of the fecale, not to that of poudrette. The latter would command a much higher price. The price paid at first by the farmers in Holland was 8d. per hectolitre, equal to 50 cents per annum per head of population.

In 1874, the price rose to 66 cents per head per annum; and for that year the figures for that block of the city of Leyden operated by the system are as follows:—

Received for fecale.....	\$8,300
Expended for men, fuel, repairs, &c.....	7,000
Net profit.....	\$1,300

In 1875, the price fell to 13 cents per head, and in 1876 rose again to 17 cents per head.

The Commission for Public Works of the city of Leyden have reported in favor of extending the system to the whole city of 40,000 inhabitants, and in their report designate it as "the system of the future for all large towns." The financial commission have reported on it in similar terms.

Before leaving this subject of expense, we may state that as regards the effect on city taxation, the Liernur System would, in our opinion, be cheaper than that by water carriage if the whole question of cost is taken into consideration, but that its first cost would be higher than the first cost of the other. The money outlay, however, is not the only important consideration in comparing different systems of sewerage. Colonel Haywood, engineer of the city of London sewerage commission, justly remarks *apropos* of the Liernur system, that "If the daily removal of the excreta of a population be of paramount importance—if the absence of effluvium on the public ways and in the interiors of houses be of importance to the public health—if remedy for the pollution of streams must be found, and if in the public in-

terest the excreta of the population ought to be returned to the earth—this question of cost ought surely to be a secondary one."

As regards the city of Montreal, it might be an advantage to have an estimate made, and the prospects of the two systems placed clearly in juxtaposition for the information of the authorities.

The system need not necessarily be applied to the whole town at once. Any part of the town may be selected for a trial, especially those parts which, from their crowded population and lowness of level, offer unusual difficulties to the extension of the ordinary system. Colonel Haywood suggests that in London and most of the great English towns, the system could be tried under favorable conditions. He goes on to say: "There are existing districts in Edinburgh, Glasgow, Birmingham, and other large towns, where the system might at once be tested; and at the small towns and villages where the construction of a system of sewers may now be under consideration, it would be well for the local authorities carefully to consider the advantages of this Pneumatic System before adopting the present Water-carriage System with all its difficulties and objections."

We will now contrast the sanitary results of the Liernur System, as far as ascertained, with those of the Water-carriage System.

It has been shown that the Pneumatic System makes it impossible for the germs of diphtheria, dysentery, cholera, diarrhœa, typhoid, scarlatina and other zymotic diseases, to enter a house or escape into the street from the sewers. There has not yet been time to get statistics of the positive sanitary results caused by its introduction. The great medical journal of England, the *Lancet*, says—"Theoretically, it is perfect."

The Common Council of Amsterdam, 10th April, 1873, discussing its compulsory application to seven new districts of the city, says, among other things:—"The results obtained in a sanitary point of view for Amsterdam are of the utmost importance; and it has been demonstrated that excreta are removed before noxious gases can develop or escape."

In Leyden, that quarter where the system is applied was formerly known for the prevalence of enteric fever and typhus. It has been observed that these maladies have nearly ceased since the introduction of the Liernur System. Its sanitary benefits may also be remarked by examining the sanitary evils which it will prevent, and with this object we now draw attention to the history and results of the Water-carriage System.

Previous to 1847, water-closets were little known in London, and in English towns generally; and not very long before this date it was illegal to pass fecal matter into a stream or river.

The excreta of the whole population were put into cesspools, which were brick pits or wells, the bricks being laid with open joints, without mortar or cement; the intention was to facilitate the escape of the liquids into the soil. The cesspools were directly underneath the privy seats.

These cesspools required to be emptied at intervals. This was gradually changed into our present water-closet system.

In 1847, an Act was passed compelling the houses in London to discharge the excreta directly into the sewers. Other towns copied London, and this led to the general introduction of this system.

It is considered by many high medical and sanitary authorities that the Water-carriage System is the cause of extensive infection, and of a great increase in the death rate of Great Britain and America.

The Report to the Massachusetts State Board of Health for 1875—a large 8vo. volume, and an exhaustive work—contains reports from a very large number of medical authorities and commissions upon epidemics and diseases, and nearly all of them ascribe the evil to sewer gas. In case after case, mention is made of the sewer gas playing over the marble wash-basins and in the baths, finding entrance through the overflow apertures and the discharge pipes which are used in the best houses where these luxuries are used. It also states that the gas is extremely light, and floats its way into the houses on the highest grounds, and into the warmest rooms: and, moreover, much of the most deleterious gas is without odor. Consider the baleful effect of this

state of things in a city where the excreta of many typhoid and small-pox patients are flowing through the sewers.*

The fatal results can also be shown by contrast with other systems besides the Liernur. In some towns of Great Britain they still follow the method of removing the excrement daily in pails by carts from the houses. The writer saw this method in operation in some of the streets of Dundee eighteen months ago. It is also followed in Edinburgh (old town) side by side with the water-closet system which is followed in Edinburgh (new town). The exact result follows which might be expected after examining the foregoing returns of the Registrar General. It is found that in the water-closeted districts of Edinburgh, typhoid and diphtheria steadily mow their swath of victims, while the old part of the town, with its absence of modern conveniences,

* Dr. Stewart, who was one of the first to point out the difference between typhoid and typhus, states that in Edinburgh typhoid fever was unknown (1838 to 1842) before the water-closet system was used. This is confirmed by Dr. Murchison in the second edition of his work on fevers, pages 443 and 444, in which he states that typhoid fever did not exist in Edinburgh "until the introduction of water-carriage." He also says, "It is remarkable that the increase of enteric fever in London has been contemporaneous with the completion of the main drainage scheme."

Dr. Fergus, the President of the Health Section of the Glasgow Philosophical Society, points out the startling fact that, according to the returns of the Registrar General, the death-rate of Britain from cholera, diarrhoea and dysentery, which are recognized as diseases more or less arising from excremental pollution, was nearly four times what it was thirty-five years ago.

The following are the Registrar General's returns:—

	Deaths per million per annum.	
Mean of five years, 1838 to 1842...	298;	at this time water-closets almost unknown.
" " " 1847 " 1852...	1,569;	including cholera epidemic of 1849.
" " " 1852 " 1856...	1,249;	do. do. do. of 1854
" " " 1857 " 1861...	1,192	
" " " 1862 " 1866...	1,246;	including partial cholera epidemic 1866.
" " " 1867 " 1871...	1,282.	

Probably the terrible epidemics included in these figures owed much of their wide spread devastation to the wide spread diffusion of the excrement through the sewers. Dr. Fergus makes the deduction that the cause of the increase was the water-carriage system.

and its primitive customs of 1838 to 1842, is almost free from those and similar diseases.*

The writer of this article a few years back considered the water-carriage system to be one of the triumphs of modern science. It has taken many facts and thoughts to show him its true character. The sewers of a great city are arteries of corruption infecting the busy family of men dwelling over them—making shorter their already short span of life and health, and bringing suffering and misery to the door of every inhabitant. The occupant of a city mansion would do well to plug up the outlets of his marble baths and wash basins, and seal up his water-closets if his object is health. Better the primitive inconveniences of our ancestors than the gilded death-traps of our modern cities.

As Mr. Simon, the medical officer to the Privy Council, in his 9th Report, truly says: "It is to be hoped that as the education of this country advances, this sort of thing will come to an end—that so much preventable death will not always be accepted as a fate—and that for a population to be thus poisoned by its own excrement will some day be deemed ignominious and intolerable." †

* Dr. Henry Littlejohn, Medical Officer of Health for the City of Edinburgh, makes the following statement:—

"The new town is inhabited by the better classes, and is pre-eminently a water-closet town. The old town consists for the most part of strongly built tenements, crowded with very poor people, and to this day they make use of pails for the reception of the excreta of those confined to the house—these pails are brought to the street daily, and emptied into carts provided by the authorities. From this state of things, the low morality of the population, the bad ventilation, the crowding together and the retention of the filth in the living rooms for the greater part of the day, it might naturally have been imagined that *typhoid* fever and *diphtheria* were endemic in the old town. This is not the case, however, for despite the surrounding circumstances *these diseases may practically be said to be unknown.*

"In the new and water-closetted town, however, the case is different—*typhoid and diphtheria are never entirely absent*, and are frequently endemic, and it has been noticed that the ravages of these diseases have been the greatest in the best houses."

† Dr. Fergus, in the opening address session, 1873-74, of the sanitary and social economy section of the Glasgow Philosophical Society, says:—

"But how are we to account for the slight increase in scarlet fever, the striking increase in the diarrhoeal groups, and the addition to the list of a most deadly zymotic previously almost unknown. What changes have been made in the habits of the people which could in any way lead to so sad a result after all the legislation and patriotic efforts to ameliorate the condition of the people and to lessen the enormous amount of preventable death. Certainly the only great change has been the mode by which we get rid of our excreta and refuse.

"If any one had hinted to me ten or a dozen years ago that our present system of water-carriage would prove a source of disease, I would have scouted the idea; and even when I began the study of this great question I had perfect faith in the system, and have only been driven from it step by step as new light gradually dawned on me, and the question was sifted to the bottom."

VACCINATION.

His Worship the Mayor delivered the following lecture on vaccination to the Public Vaccinators and other Physicians and Citizens, on Friday, the 20th October, 1876 :—

Gentlemen : It has been suggested to me by some of your body that, in addition to the directions issued by the Board of Health, for the guidance of vaccinators, something might be said to meet the objections urged by some active but mistaken writers against the practice of vaccination. Had similar articles been written against the practice of setting fractures ; of reducing dislocations ; or of removing dead parts from living bodies, I should have thought it useless to reply : for if surgeons contend that a dislocated bone should be reduced, the profession—I speak of its more experienced members—is almost equally unanimous in favor of the practice which some so persistently, and so unfortunately, denounce. It is something to array oneself against the general belief. To follow quietly in the footsteps of those who, in all things else, medical, are our guides, brings with it, to the mind, less *eclat*, than to take up arms in what may be considered a safe warfare—safe, perhaps, to the combatant, but fraught with terrible mischief to those most interested. To prove to the unprejud'ced, that vaccination exerts a protective influence over the economy, would be an easy task, for the writings of thousands, from the time of Jenner to our own day, are before us for the purpose ; but to attempt to convince those who persistently close their eyes to the overwhelming evidence of almost every country and government in the world, including our own, would be as fruitless as was the effort to convince the disbeliever in matter of the reality of the missile which almost knocked off his too unyielding head. In deference, however, to wishes expressed and suggestions offered at a meeting on Wednesday last, I venture some observations on this disease, now unfortunately too prevalent, and on the means which science has furnished for its prevention. Small-pox has its “ periods of dormancy, and its periods of activity,” at one

moment overspreading a district, and at another disappearing. It is fatal in direct ratio to its epidemic character. Cases occurring sporadically (here and there in spots), are not so fatal. It is the most contagious of all diseases; and this is a point on which I wish to insist, for some industriously endeavor to circulate the belief that small-pox drops upon individuals as rain drops from heaven—touching this one and sparing that! It is communicable in every way; “by inoculation, by breathing a contaminated atmosphere, by the contact or vicinity of fomites.” It is infectious in the early febrile stage; infectious before and during the eruption; and infectious “so long as any of the dry scabs resulting from the original eruption remain adherent to the body.” It may be caught, therefore, from the living body; it may be caught from the dead body; or it may be caught from clothing and furniture near the living or the dead body. So much has this foul disease been dreaded, that different nations in time past endeavored to mitigate the malady by communicating it artificially. The Brahmins in India engrafted the virus; so also did the Turks; and the Chinese were in the habit of putting some of the crusts into the nostrils. The practice of inoculating with small-pox virus became more or less general in Europe, and “its efficacy in mitigating the severity and the danger of the disease” was considered to be very great. While it is estimated that one third of those who take the natural small-pox die, not more than three or four in a thousand are destroyed by the ingrafted disease. Curschmann states it to have been about two per cent. But the time for small-pox inoculation is past, as the law has forbidden it.

Eighty years ago a chance observation was matured into a rational and scientific form by a mind deeply imbued with the best principles of sound philosophy. A disease, mild in form and safe in character, was substituted for the inoculation of the Greeks and Chinese. In 1798 Jenner published his first important paper. In 1799 the first public institution for vaccination was established in London; and in the following year it was introduced into France and Germany; and the practice of vaccination has now become general over the whole educated

world. Here and there, as might be expected, it has met with opposition; but every objection that has been urged by the anti-vaccinator has been answered again and again by the leading minds of the profession. So much is this the case that I feel I owe something like an apology to my medical brethren for writing affirmatively of a practice most of them endorse. I spoke a moment ago of Jenner as a discoverer; but Jenner did not discover vaccine any more than Watt discovered steam. He noticed the prevalent belief among the peasantry in the immunity from small pox enjoyed by farm servants and milk maids; and little by little he drew the conclusion which has been so pregnant with benefit to mankind. The belief in the existence of a vaccine virus was not confined to England. Cow-pox and its relations to small-pox had been noticed long before on the continent of Europe; and in France and Germany numerous experiments had been made prior to the time of Jenner to show that persons affected by the natural vaccine virus were not susceptible to the small-pox influence. Jenner's merit consisted chiefly in *producing* the virus at will, and in diffusing it at pleasure for our advantage. And how slowly and how cautiously he advanced his every statement may be gathered from the fact that twenty-two years elapsed between his first experiment and the promulgation of his theory. He was assailed then, as his memory is to-day, but with more excuse then than now, for no one having the leisure and the disposition to read, and having access to the records of medical observers, has now the shadow of an excuse for rejecting the theory then advanced, the critical acuteness of which, says Curchmann, may serve as a model. But we do things differently now-a-days, and a harangue in a market place or public square, by gentlemen who may, 'tis true, be authorities in law, but cannot be accepted as such in medicine, is deemed sufficient to initiate the uneducated masses into a knowledge of one of the most difficult and abstruse subjects in the whole range of medical science. I shall not allude to the members of my own profession who have chosen to so far forget what is due to their own dignity and the dignity of their calling as to select such an arena for the dis-

semination of their fatal errors. As the times are as pregnant with mischief, as the air is with the disease, I proceed to ask and to answer questions asked and answered a thousand times :

1st. Does vaccination confer a certain degree of protection against small-pox ?

2nd. Are the effects of vaccination permanent ?

3rd. Is there risk of lighting up local and inflammatory action ?

4th. Is there risk, when vaccinating, of inoculating the system with scrofula, or other hereditary disease ?

5th. Is there risk of contaminating the system with syphilis, or other acquired disease ?

The answer to these questions will, I think, cover the ground gone over by the anti-vaccinists.

1st. A simple assertion that vaccination does confer a certain degree of protection against an attack of small-pox would at once be met by a counter assertion that it does not. The question, therefore, will be answered inferentially, and from sources the most reliable, though a desire to economize space prevents me from citing at length.

And first for *England*. In the first thirty years of the last century, when inoculation of small-pox was unknown, the mortality in London from that disease was 7.4, and at the close it was 9.5 per cent., inoculation having been introduced in the interval. A committee of the Epidemiological Society have compiled tables to show the ratio of mortality from small-pox in London before and since vaccination was introduced, and the following are the results:—For the fifty years, from 1750 to 1800, the average number of deaths from small-pox out of every 1,000 deaths from all causes was 96 or nearly ten per cent., while during the first half of the present century (the half century *succeeding* the introduction of vaccination) the mortality was 39. In England, according to official returns, the estimated death-rate from small-pox alone at the end of the last century was 3,000 per million, while from the same returns the present death-rate from the same cause is only 200 per million! An analysis of the latter is most interesting.

Vaccination has, in Great Britain as elsewhere, had its opponents, but the practice has become more and more general, and the opposition to it less and less, till now it is quite general. What is the result? During the first ten years of the present century, the mortality from small-pox in every thousand deaths from all causes was 64; in the second decade, 42; in the third, 32; in the fourth, 23; and in the fifth decade it was 16. Let the anti-vaccinators explain this as best they may. Not only has the average of deaths from small-pox diminished in the above ratio, but epidemics of the disease have become less frequent. Before vaccination it was as 48; during vaccination it was as 14. The inference from all this is thus drawn by Sir Thomas Watson (the ablest medical writer in London): "Where vaccination is, the contagion of small-pox need never come."

How is it in *Wales*? Dr. Hughes, of Mold, states, "No child born in the Mold district, and alive at the date of the registration of its birth, has died of small-pox during fourteen years, yet small-pox has prevailed on various occasions all around it."

How is it in *Ireland*, where vaccination has been compulsory for the last fifteen years? The immunity afforded by vaccination there has been such as to induce a wide-spread belief in its efficacy among the people. Vaccination is practiced generally all over that country, and the children of the soil carrying with them an entire confidence in the practice, are always the most willing to be vaccinated. The results are seen in the following figures, from which it appears, says an official document, that the Irish physicians have banished small-pox from their island, as Saint Patrick is said to have banished the snakes. In the periods 1830-40, 1840-50, and 1850-60, before vaccination was general, the respective annual average mortalities had been 5,800, 3,827, and 1,272. In the years 1864, 5, 6, 7, 8, they were 854, 347, 187, 20 and 19, respectively. In the first half of 1869, the whole number was three! The remarkable immunity from small-pox conferred by vaccination, induced a laxity in the practice, and a few cases occurred subsequently to 1869, but they were supposed to have been imported. In Montreal there are com-

paratively few children of Irish parentage unvaccinated, and our tables of mortality—to which I beg to refer—show how very few of that nationality die of small-pox.

What is thought in *Scotland* of the protective influence of vaccination? I quote again only our medical teachers—those from whom we are content to receive our medical knowledge. One of the most distinguished medical philosophers that Scotland—and Scotland is prolific in medical philosophers—has produced; and one who graced, for a great number of years, the chair of medicine in the University of Edinburgh, writes thus:—“The first question is whether or not we have, at this time, in the matter of cow-pox, a power at our command capable, if duly employed, of depriving the poison of small-pox of all fatal influence over an immense majority of mankind. And on this subject there has been quite sufficient information collected, since the date of the papers which were held decisive of the question fifty years ago, to show that the same inference is still inevitable, and that he who disputes it is equally unreasonable as he who opposes, in like manner, any proposition in Euclid. Of course, when I say there has been ample evidence to decide this question statistically, I mean to refer to cases where we have not only the negative evidence of large numbers of persons duly vaccinated, having been subsequently, most of them repeatedly, or for a long time together, exposed to the contagion of small-pox—*i. e.*, placed in the same circumstances in which unvaccinated people have been generally affected, and many of them died of small-pox; these vaccinated persons have nevertheless escaped, most of them without any indication of disease. To show that this is the light in which I have always regarded such collections of facts, I quote one sentence from my own lectures, written as long ago as 1820-1821, and repeated almost every winter since then:—“You will remember that the question is, not how many vaccinated persons never take small-pox, but how many vaccinated persons are fully exposed to the contagion of small-pox and escape without any disease; and our assertion is that, so far as is yet known, absolute protection of the human constitution is the rule, and the occurrence of any disease is

the exception." Those who have had the advantage, as I have had, of listening to that most profoundly logical and conscientious medical teacher well know the care and thought he gave to his every utterance. Dr. Alison has passed away, and what says Dr. Hughes Bennett, his successor in the professorial chair?—"We have no remedy (for small-pox) but vaccination."

Let us now proceed to the Continent, and what do we find? In Copenhagen the fatality from small-pox is but an eleventh part of what it was before the introduction of vaccination; "in Sweden it is a little over one-thirteenth; in Berlin, in Prussia, and in large parts of Austria, but a twentieth; in Westphalia but a twenty-fifth!!" In Bohemia, Moravia, and Silesia it has been reduced from 4,000 in every million of deaths to 200 per million. Not only is it satisfactorily established that vaccination is an effectual safeguard against small-pox, it is, according to some, more effectual in preventing small-pox than is small-pox itself. This was thoroughly tested in Hanover, where it was found that out of a hundred soldiers re-vaccinated, sixty-two per cent failed altogether in producing a vaccine vesicle; and twenty-seven per cent were only partially successful. Soldiers who had already had small-pox were operated upon in the same way, and with precisely the same result. Such information as I could glean from different sources leads me to the conclusion that an attack of small-pox and vaccination confer the same degree of immunity from an attack of small-pox; but that subsequent *fatal* small-pox follows more frequently after small-pox than after vaccination.

How is the practice of vaccination regarded in the United States? Gentlemen, it would be an endless matter to quote the opinion of every medical observer in the adjoining Union, but I shall introduce the substance of everyone's remarks as furnished to the State. Many of the States of the adjoining Union have their State Board of Health, and each board may be considered to reflect the opinion of the medical minds in the State. The State Board of Health for 1871 says:—"No amount of disinfectants can cope with this dire disease. The only way to thoroughly drive it from the United States is by a national law, as in England, requiring every parent to duly register his child after

having been duly vaccinated." The experience of Massachusetts is summed up in the report from which I quote : that small-pox has appeared here and there, but where it has appeared sporadically it has always been in places where vaccination had been neglected. The town of Holyoke, in the Connecticut valley, was an illustration. One-fifth of all the deaths from small-pox occurring in the whole State took place there. The people in Holyoke had not been vaccinated as elsewhere. Dr. Geo. Darby, of Boston, Secretary of the State Board of Health, summarises for his Board as follows (and his summary receives the sanction of the Board) : Vaccination "invests the human body with an armour which may hardly be penetrated by this subtle poison." A year later (an epidemic of small-pox having passed over the Continent) he writes : The present epidemic is of such intensity, that it is quite common for persons who have had small-pox in former years to now have it again. Such occurrences have been previously rare. Vaccination, whether from the cow or from the human body, "takes" readily, and re-vaccinations prove abundantly the extraordinary susceptibility to the vaccine disease now prevailing, and *never before existing*. In view of these facts, with which physicians and intelligent persons, of whatever calling, are now familiar, let us thank God for Jenner's great discovery, without which our homes would be desolated, and our peace and happiness destroyed. The imagination can hardly picture the horror which would to-day pervade Massachusetts, were the present epidemic unchecked by vaccination." A year later (1874), the epidemic being over, the same authority, and the same Board, report *inter alia* : One year ago * * * * we were in the midst of an epidemic of small-pox of extraordinary intensity * * * the protective power of vaccine has been proved beyond all question, and the absolute need of *careful vaccination* is equally evident." From September 6th to the close of the year, not a single death from small-pox has been reported to us from the cities of the State." I received the last "State Board of Health" report, a few days ago, an interesting document of nearly four hundred pages, and so completely had vaccine done its work that the report contains no

allusion to the dreaded disease. Thankful for the immunity afforded, the reporter from whom I quote writes: "Vaccination needs no defence from us. Nothing, however beneficent, can escape the criticism of the times in which we live. But this criticism of vaccination, often passionate and violent, relates chiefly to points which, however interesting they may be, leave the main question unaffected. Let any one read the history of the ravages of small-pox before Jenner's discovery, and compare it with the mortality of Massachusetts from this cause in the present generation, and ask himself the reason of this change. There can be but one answer. We may speculate about the possibility of the potency of vaccine being exhausted in the human family; we may be surprised to find that people with good vaccine scars sometimes have small-pox; we may dispute as much as we please about the average period when re-vaccination may be considered a prudent safeguard; we may even conjecture (what no man has proved) that other diseases than that of the cow may be communicated by humanized vaccine; we may turn the vaccination question with ingenious skill, so that its many facets shall reflect a multitude of curious lights, and after all we find that we rest in a security against this most horrid pestilence, unknown to former generations. The disease is the same now as then, for we see its effect among barbarous tribes; but because Dr. Jenner lived and made the greatest of all discoveries in preventive medicine we are almost completely safe." I have quoted from a public document which received the sanction of a learned deliberative body—and the approval of the Government of the State—the most generally intelligent State in the adjoining Union. What says the Ohio Board of Health? "While sister cities in Ohio have been recently afflicted with small-pox, Cleveland has enjoyed an exemption far exceeding that of former years. * * * * Our comparative immunity from this loathsome and terrible disease conclusively demonstrates the preventive power of vaccination, and must impress every thoughtful mind with the munificence of the legacy the immortal Jenner left the human race." I have purposely introduced at greater length from American than from British authorities, because it has been asserted by a certain few, who have spoken against vaccination

at public gatherings in this city, that it was an "English remedy, and that Englishmen had a pride in engrafting their 'beastly' virus on the Christian children of fair Canada"—an argument reflecting but little credit upon the heads, and less upon the hearts of those who advanced it. But American authority *quo ad* the vaccine question cannot be suspected of partiality. I have singled out no individual writer on the subject, (I might have quoted a thousand American writers in favour of the practice of vaccination) but have confined myself to State documents containing the deliberate expressions of deliberative bodies, reflecting the condensed thoughts of the best medical minds in the United States. I turn with little pleasure to this, my own country, and especially to this my own city, and I find anti-vaccination views advocated, and disseminated by a small but ceaselessly active section of medical and legal thought. I find from personal knowledge a deep rooted prejudice against what the scientific world generally has sanctioned, and I find disfigurement, disease and death following in the wake of those teachings; teachings to the dissemination of which a portion of the daily press has lent its columns. I readily admit that small-pox has its "periods of dormancy and its periods of activity," and that, "every now and then, at irregular intervals, it overspreads a district or country as an epidemic. But why should it press so heavily on this city; and why should it single out chiefly one nationality? Why should it pass so lightly over Quebec? Dr. Russell, President of the College of Physicians and Surgeons, residing there, gives the reason:—"We have very little small-pox here (Quebec). We are all vaccinated." The table prepared by the skilled House Surgeon of the Marine and Emigrant Hospital, of Quebec, Dr. Catellier, is a crushing and unanswerable argument against the anti-vaccinators. There were 131 cases admitted into the establishment between the months of May, 1874, and July, 1875, and of these the vaccinated numbered 54, *one alone* died. In 69 cases of unvaccinated patients 32 were discharged cured, but somewhat disfigured, and 37 died. In 3 cases where it was doubtful if vaccination had or had not been performed, 6 were cured and 2 died.

These computations afford us the following startling percent-

ages, which every man and woman valuing the healthy future of their progeny ought to carefully note. The death rate in *vaccinated* cases, is only 1.8 per cent.; in *unvaccinated* 53.6 per cent.; in *doubtful* cases 25 per cent. Can anything tend to expose and conform the claims of this practice upon the people better than these dates? Why does it pass so lightly over Three Rivers? Dr. Badeau, the Doyen of the profession there, explains:—“*On n'a pas de Picotte ici. On se fait vacciner.*” The same for Toronto. And why does it visit in Montreal, most severely those of a particular nationality? We nurse it. In Quebec, Three Rivers and Toronto no one writes against or attacks the principle of vaccination—the only prophylactic for small-pox. That the converse is true in Montreal is evident from the circumstance that the mortality is immensely greater among that nationality whose beautiful language has been made to serve as a vehicle for the dissemination of a most fatal error. Dr. Osler—whose every statement has the accuracy of a pathologist—furnishes me with the records of the Small-pox Department of the General Hospital from Dec. 14, 1873, to July 21, 1875, the period during which it was under the charge of Dr. Simpson and himself. There were admitted during that period 261 cases, and there were 73 deaths. But how was those death-rates distributed? In the unvaccinated, 58.8 per cent.; in the vaccinated, 17.09 per cent. We have now two civic hospitals in Montreal for small-pox, one presided over by the Sisters of Providence; the other by Miss Chambers. What is the experience of these ladies? I give the question put to the ladies of both establishments and their answers:—“Have you noticed any difference between the vaccinated and non-vaccinated inmates of the hospital?” Sister Nativity states, in French:—“There is no comparison between the effects of small-pox on the vaccinated and non-vaccinated; the vaccinated, as a rule, are not affected, and when they are they have it slightly; the deaths are among the unvaccinated.” Miss Chambers' is precisely to the same effect. What more convincing evidence than this, coming, as it does, from sources whose reliability is beyond doubt or question. I do not quote from the physicians of the city, who, with a very small exception, have again and again expressed their entire belief in the prophylactic power of vaccine. Volume after volume has

been written to establish the power of vaccine, and my table, as I write, is covered with documentary evidence, the magnitude of which alone prevents my introducing it here. Sufficient, however, has been adduced to warrant an answer to the first question in the affirmative, "that vaccination confers a greater or less degree of protection against small-pox."

2nd. Are the effects of vaccination permanent? As a rule the answer may be yes; but the exceptions are so numerous that I must admit the partial truth of what is claimed by some writers, "that the protection which vaccination affords against small-pox is only of limited duration." During what time is there absolute immunity? This varies in different individuals; but I have long been of opinion, and that opinion is shared by those who have given attention to the matter, that the manner in which vaccination has been done in the first instance has much to do with the degree and period of that immunity. Although ten or twelve years are said to be the average period, the thoroughly vaccinated have an immunity of much greater duration. In a large, a very large number, unfortunately, vaccination is not performed with anything like approximate thoroughness. This has been noticed in the Small-pox Hospital here, where an examination of the arms of the inmates has rarely discovered marks of a true Jennerian vesicle. But if there is doubt as to the continued immunity afforded by vaccination, there can be none when properly performed a second time. Re-vaccination, when successful, affords entire immunity, and in proof of this assertion I shall cite but one proof from among a thousand. It has been an imperative rule for the last thirty-four years at the London Small-pox Hospital that every nurse and other servant of the Hospital should, on entering the service, be vaccinated. In their case it is generally re-vaccination; and it is never afterwards repeated. These nurses live in the closest daily and nightly attendance upon small-pox patients; and the other servants are constantly exposed to the profuse contagion; yet in no single instance, during these thirty-four years, has any one of these servants and nurses been affected with small-pox. Surely no stronger proof than this can be imagined, that re-vaccination in the adult is an absolute protection against small-

pox, and need not be repeated. Up to the age of puberty, a child *properly* vaccinated may be considered safe,—but so many of those vaccinated have cicatrices deficient in number and of a character not strikingly good that re-vaccination should be resorted to where there is more than usual exposure to small-pox. I have instanced the London Small-pox Hospital as evidence of the advantages of re-vaccination, and shall cite from official sources evidence of the immunity conferred by it on some of the continental armies of Europe. In five years, says Seaton, there occurred in 14,384 re-vaccinated soldiers in Wurtemberg only *one* instance of varioloid; and among 30,000 re-vaccinated persons in civil practice only two cases of varioloid (one of which was probably really a case of chicken-pox), though during these years small-pox had prevailed in 344 localities, producing 1,674 cases of modified or unmodified small-pox among the not re-vaccinated, and in part not vaccinated, population of 363,798 persons in those places in which it had prevailed. In the Prussian army, since the introduction of systematic re-vaccination in 1834, the cases reported as “varioloid,” and still more those called “variola,” have been, nearly all of them, among that portion of recruits whose term for re-vaccination had not come, or whose re-vaccinations had not been successful, or who were incubating small-pox when they were re-vaccinated; in the 20 years which immediately succeeded the adoption of this system there occurred altogether but forty deaths from small-pox in this large army—(or an average of two deaths per annum)—only four of the entire forty being in persons who, it is said, had been successfully re-vaccinated. So also in the Bavarian army, in which there had been compulsory re-vaccination since 1843, there had not, from that date up to the time of a report made by the Minister of War in 1855, been a single case of unmodified small-pox; and only a very few cases of modified small-pox, without any deaths. While, therefore, I answer the second question in the negative, as to the permanency of primary vaccination, the statistics quoted from official sources, with the almost universal collateral concurrence of medical practitioners, warrant the statement that “after successful re-vaccination, small-pox, even of the most slight or modified kind, is *rarely* met with, and that

when post-vaccinal small-pox is met with of a somewhat severe character it is due to the want of care in the performance of vaccination in the first instance, or to want of preparedness in the system when primary vaccination had been performed. From what has been said, a question of vast moment to adults necessarily presents itself. As all those who have been vaccinated but once run more or less risk of contracting the disease, and as it is admitted that re-vaccination renews, or adds to, the security against small-pox, common prudence would suggest the course to be pursued by those who wish to guard against this malady.

Although it forms no part of my present subject, yet, as an impression prevails with some that persons exposed to small-pox contagion incur additional risk by being vaccinated, and by having one disease engrafted on another, it is well to state that such a view is entirely erroneous. If vaccination is performed sufficiently early, so that the areola may have time to form, it will prevent small-pox; if later, it will modify that disease. Mr. March illustrates this rule thus:—"Suppose an unvaccinated person to inhale the germ of variola on a Monday, if he be vaccinated as late as on the following Tuesday, the vaccination will be in time to prevent small-pox from being developed. If it be put off till Thursday, the small-pox will appear, but will be modified. If the vaccination be delayed till Friday it will be of no use." Sir John Watson, p. 888, adds:—"Should the person have been formerly vaccinated, revaccination will be effectual two days later than this, because in revaccinated persons the stage of areola is reached two or three days sooner than in persons vaccinated for the first time."

3rd.—*Is there risk of vaccination lighting up local inflammatory action?* When we consider the disposition, the temperament, the condition of health, of those vaccinated, and the period of life at which vaccination is usually—and the period of the year at which it is sometimes—performed, it is a matter of surprise that local irritation, or erysipelatous action, is not more frequently lit up. At certain seasons of certain years any abrasure of the skin, however slight, even without vaccine lymph, is apt to cause erysipelatous inflammation. What medical man has not sometimes seen erysipelas to follow a slight bruise, or the

scratch of a needle or a thorn? The accidents of this kind following vaccination are very few—not by any means as many as I have seen to follow the pulling of a tooth. Yet who ever advised that an aching tooth should be left alone because it had happened sometime, somewhere, and in the hands of some one, that hemorrhage from the tooth socket had taken place; that erysipelas—fatal erysipelas—had sometimes followed; or that the bones of the jaw had been splintered? These are the accidents—and so rare are they that they should not enter into one's calculations. So convinced am I of the safety of vaccination, that I have no hesitation in saying that a vaccinator, who knew his business, would vaccinate a thousand children with fewer unpleasant results than a competent dentist would have in extracting the same number of teeth. There are, 'tis true, precautions to be taken, just as there are common sense precautions to be used by every one in eating, in drinking, in travelling. But these occurrences would be rare indeed if vaccinators exercised care and judgment in the selection of the lymph (which should be pure, taken at the proper time, and without admixture either of decayed epithelium or of pus) and in the selection of their subjects (who should neither be too young, too feeble, nor too sickly); and with these precautions, severe local inflammation would be rare indeed. But it is not to be expected that some degree of irritation will not be produced. To prove this, children, vaccinated with the purest lymph, will manifest, during the few days that the pustules are at the highest development, certain febrile disturbances of the general system, during which the temperature of the body sometimes reaches 104° F. But in certain constitutions, and in certain states of the atmosphere, and especially when the crust is brittle, and with it there happens to be, either through carelessness or ignorance, decayed epithelium or dried pus, or even the purest lymph with an unclean instrument, the constitutional disturbance above alluded to, and which was till now within the range of health, assumes a morbid character, and more or less severe local or constitutional disturbance is the result. The third question, therefore, may be answered thus: Moderate local inflammatory action may sometimes be lit up, but the severer forms are, as a rule, due to want of care in

the selection of the crust; inattention to the age or health of the subject; to carelessness in the use of the scarificator; or to atmospheric influence; or to all combined.

4th.—*Is there risk when vaccinating, of inoculating the system with scrofula, or other hereditary disease?* If my answers to the previous questions were necessarily qualified, this one is not, and I emphatically answer *no*. It would be an utter waste of time to discuss what has already been disposed of, to the satisfaction of every unprejudiced mind. That vaccination induces scrofula or other new disease is an absurdity, notwithstanding the wonderful tales of a *verde de lisle*, that it has caused mental and physical degeneration of the human species, diminishing men's stature, incapacitating them for the fatigues of military service, or even the exercise of dancing." One word as to the first: the tallest, strongest, and heaviest men in Europe, according to Professor G. D. Forbes, are the Irish: yet Ireland is one of the, if not the, most thoroughly vaccinated countries in the world.

5th.—*Is there risk when vaccinating, of inoculating with syphilis or other acquired diseases?* The allegation has been made by some in the affirmative; but when it is borne in mind the strong "temptations to employ false pretexts," it is a matter of surprise that vaccination has not been more generally "pitched upon by persons in search of an apology for their syphilitic children." For my own part, not only have I never seen a case of invaccination of syphilis, but have never met a medical practitioner who had seen a case, either in his own practice or in that of another. We all know how the slightest scratch or cut is apt to develop tractable ulceration in a child having latent syphilis, and the ulceration thus produced requires the local and constitutional treatment of a syphilitic sore. A slight scratch, required for vaccination, with the purest lymph, may assume a specific character, but conjugal infidelity, and not the vaccination, is the true cause. That vaccine lymph does not carry with it the syphilitic virus, even in cases of undoubted syphilis, may be fairly inferred from the experiments which have been performed on a large scale on the continent of

With well attested experiments like the above standing on

on record, we are obliged to doubt whether vaccination (*i.e.* genuine and simple inoculation with vaccine lymph) from however syphilitic a subject can possibly communicate syphilis; or, at the very least, whether some stage of the vaccine vesicle more advanced than vaccination rules allow to be proper for lymph supply, or some admixture, which fastidious vaccinators never permit, of blood with the vaccine lymph, must not be a condition for such possibility. That some ignorant quack salver, pretending to vaccinate, but neither knowing the aspects of a vaccine vesicle, nor caring from what sort of body he draws his supposed lymph, may take as his "healthy source for lymph supply" an infant all maculated or ulcered with syphilitic skin disease, and may from its spots or sores transfer infective material to some victim of his mis-called vaccination, is of course evident; for syphilis does not cease to be syphilis because noodle or knave calls it vaccinia; but facts of this kind cannot in any reasonable sense be counted against vaccination, any more than we should count it a fact against Quinine that some grocer had dispensed Strychnine in mistake for it. Finally, too, I permit myself this general remark: that, in proportion as any alleged fact contradicts an otherwise universal experience, the individual witness must be regarded as making larger and larger demands on us for belief; and that in matters like the present, where sources of fallacy are so abundant, the witness's accuracy of observation requires to be most thoroughly guaranteed.

The cases of supposed inoculation of syphilis with the vaccine virus are not many, and an analysis reduces them to very few—and those few are still further reduced by the fact that the grossest ignorance and misconduct were imputed to the vaccinators. The few cases that have been published in the past seventy years, chiefly from Continental sources, are utterly insignificant in numbers and importance, and lead us to ask the same question as M. Simon: "If our ordinary current vaccination propagates syphilis, where is the syphilis that it propagates? Who sees it?" The experience of the department is an entire blank on the subject. For the last ten years we have been in incessant intimate communication with the different parts of England on details of public vaccination, and during these

years every one of the about 350 vaccination districts into which England is divided has been visited three or four times by an inspector specially charged with the duty of minutely investigating the local practice of vaccination; yet from this systematic and extremely detailed search for all that has to be said on the subject of vaccination in England, no inspector has ever reported any local accusation or suspicion that a vaccinator had communicated syphilis. Again, our national vaccine establishment has been in existence for more than 60 years, vaccinating at its own stations every year several thousands of applicants, and transmitting to other stations supplies of lymph, with which every year very many (at present 50 or 60) other thousands are vaccinated, who in their turn, become sources of vaccination to others; but this vast experience does not, so far as I can ascertain, include knowledge of even one solitary case in which it has been alleged that the lymph has communicated syphilis. Is it conceivable that these negative experiences could be adduced if the vaccine lymph of children with latent hereditary syphilis were an appreciable danger to the public health? Thirteen years ago it devolved upon me (as medical officer of the Board of Health), to make the widest possible enquiries, both of scores of public departments and institutions, and also of many hundreds of individual practitioners, in our own country and on the continent of Europe, with a view to elicit all existing experience on the validity of objections which had been alleged against vaccination; and on that occasion I, of course, gave great prominence to the point which is here raised. One of the four questions which I circulated was the following:—"Have you any reason to believe that lymph from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous or other constitutional affection to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?" The answers which I received on this, as on each of my other points, from 542 members of my profession, are as regards syphilitic inoculation, only just short of being an absolutely uniform "No." The alleged cases (of inoculation) were thrown into real insignificance by their relation to the main

body of testimony. Men of the oldest and largest consulting practice in the United Kingdom, men who were believed to have seen every variety of disease and accident to which the human body is liable, our leaders who had taught medicine and surgery to the mass of the profession, physicians and surgeons of our largest metropolitan and provincial hospitals, in England and Scotland and Ireland, physicians who had specially studied the diseases of infancy, surgeons who had specially studied the inoculative diseases, pathologists of distinguished insight and learning,—men of all these sorts, score on scores of them, had never in their experience “had reason to believe or suspect any such occurrence as my question described.” In the alphabetical series to which I have referred there may be read all the most eminent British names of thirty years ago, certifying to such negative experiences; there may be read too that equally negative in Paris had been the vast experience of Chomel and Moreau, Royer, and Ricord, and Rostan, and Velpeau; equally negative at Vienna that of Hebra and Oppolzer, and Sigmund. And in here recurring to that very remarkable mass of testimony, I may repeat the remark which my former review of it suggested to me: “Obversely one at least of two conclusions is inevitable; either it is that with reprehensible carelessness as to the source of lymph, vaccination (so long as in any sense of the word it is vaccination) cannot be the means of communicating any second infection; or else it is the case that in the world of vaccinators care is almost universally taken to exclude that possibility of danger.” To the public, perhaps, it matters little which of these conclusions is true. Though it would be the merest idleness to take again now the sort of formal census of medical opinion which I took thirteen years ago, I may state that ever since that time I have felt it among my strictest duties to be generally watchful and interrogative on the present subject; all the more so as the period has been one of extraordinary pathological progress, and especially has brought to light very important new knowledge concerning syphilis; and I have every reason to believe that a present census of personal experience in this country would give just the same practical results as those which accrued from the former enquiry. Indeed,

in a few very important directions I am satisfied myself that it does so. I may mention for instance that the Army Medical Department has, during the last eleven years, had cognizance of 151,316 (adult) vaccinations and re-vaccinations performed on the soldiers and recruits of Her Majesty's service, where from the nature of the case the subjects of the proceedings are persons who afterwards permanently remain under medical observation, and in whom, therefore, no syphilitic consequences of vaccination could possibly escape notice; where, moreover, the chances of latent constitutional syphilis in subjects furnishing the lymph must be about the same as among our civil population, but in all this vast and critical experience, so far as is known to Dr. Balfour (the eminent and laborious reporter on the diseases of the British army) no single case has ever been alleged of a soldier syphilized by vaccination. Indisputable certainties, which any one can verify for himself, are:—First, that year by year millions of vaccinations are performed in Europe with scarcely a solitary accusation transpiring that syphilis has been communicated by any of them; and secondly, that physicians and surgeons who could not fail to see such cases in abundance, if such abundance were a reality, concur with the almost absolute uniformity, hundreds of them together, in declaring that they had never in their experience seen even a single case of the kind. One terse observation from the Board of Health Report of Ohio, and I have done: "*When properly vaccinated* by an intelligent physician, no disease could be produced by inoculation other than vaccinia, the one to be desired." Surely, for every practical purpose, certainties like these are our best guides, and with such certainties in our knowledge it would be the merest pedantry to insist on infinitesimal speculative uncertainties. It may be some satisfaction to the learned and laborious writer, from whom I have quoted above, to learn that their views are fully coincided in by most of the leading minds of the profession in Montreal. On Friday of last week I submitted the following questions to the members of the Medico-Chirurgical Society of this city. Doctors are said to differ, and knowing, as I do, the difference of opinion of the members, on almost every medical subject, the unanimity of

opinion on the following was most noteworthy. The meeting was an unusually large one, and the Secretary (Dr. Bell) has kindly furnished me with the accompanying minute, with the permission of the Society for its publication :

Moved by Dr. HINGSTON, seconded by Dr. R. P. HOWARD.
 —1st. That vaccination confers a certain degree of immunity from small-pox, by either preventing or modifying that disease.
 2nd. That that immunity is not always permanent but may be rendered so by re-vaccination.
 3rd. That vaccination may produce in some instances a certain degree of inflammatory action, which may be modified, increased or diminished by the age, constitution or condition of the patient, or by the state of the atmosphere.
 4th. That vaccination does not, in any instance, produce scrofula or other hereditary diseases.
 5th. That neither the evidence hitherto furnished, nor the experience of the members of this Society, is of a character to lead to the conclusion that syphilis is ever inoculated with vaccine lymph.
 Carried.

Members of the Medico-Chirurgical Society, present at the meeting on the 13th of October, 1876, all of whom supported the above resolutions :—

Drs. T. J. Alloway, Wm. E. Bessey, John Bell, A. A. Browne, G. E. Fenwick, Wm. Fuller, R. E. Godfrey, R. T. Godfrey, Wm. H. Hingston, R. P. Howard, H. Howard, Wm. H. Mondelet, J. B. McConnell, Wolfred Nelson, Wm. Osler, Jos Perrigo, Alex. Proudfoot, John Reddy, Thos. G. Roddick, Geo. Ross, G. B. Schmidt, F. J. Shepherd, E. H. Trenholme.

FOREIGN HEALTH STATISTICS.

United Kingdom of Great Britain, during four weeks, ending August 5th, 22,403 births and 15,211 deaths were registered in London and twenty-two other large towns. The natural increase of the population was 4,196. The mortality from all causes was at the average rate of 24.50 deaths annually in every 1,000 persons living. Other foreign cities at most recent dates, annual ratio of mortality per 1,000: Calcutta, 23; Bombay, 28; Paris, 27; Brussels, 30; Amsterdam, 24; Rotterdam, 27; The Hague, 36; Copenhagen, 24; Stockholm, 31; Christiania, 30; Berlin, 46; Hamburg, 21; Breslau, 35; Munich, 36; Vienna, 24; Buda-Pesth, 48; Rome, 25; Naples, 30; Turin, 26; Alexandria, 49.—*The Sanitarian.*

MORTALITY OF THE CITY AND SUBURBS OF MONTREAL, FOR SEPTEMBER, 1876.

CLASS.	ORDER.	DISEASES.	Total by Sex.		Total Both Sexes.	
			Male.	Female.		
I. ZYMOTIC.	I. Miasmatic.	1. Small Pox.....	64	48	112	
		2. Measles.....				
		3. Scarlatina.....				
		4. Diphtheria.....	5	4	9	
		5. Quinsy.....				
		6. Croup.....	4	4	8	
		7. Whooping Cough.....	1	3	4	
		8. Typhoid Fever, (Infantile Remittent Fever)	8	8	16	
		9. Typhus, and Infantile Fever.....				
		10. Relapsing Fever.....				
		11. Fevers.....	3	2	5	
		12. Erysipelas.....				
		13. Metria, (Puerperal Fever).....				
	14. Carbuncle.....					
	15. Influenza.....					
	16. Dysentery.....	3	1	4		
	17. Diarrhoea.....	32	24	56		
	18. Pyæmia.....					
	19. Cholera Infantum.....	8	12	20		
	20. Cholera.....		1	1		
	21. Ague.....					
	22. Remittent Fever.....					
	23. Cerebro-Spinal Meningitis.....	1		1		
II. CONSTITUTIONAL.	II. Diabetic, Emetic	1. Syphilis.....				
		2. Hydrophobia.....				
		3. Glanders.....				
		1. Privation.....				
	III. Diabetic, Emetic	2. Purpura and Scurvy.....				
		3. Delirium Tremens.....				
		4. Intemperance.....	} Alcoholism			
		1. Thrush.....		1		1
	IV.—Parasitic.	2. Worms, &c.....				
		1. Gout.....				
II.—Tubercular.	I. Diabetic.	2. Rheumatism.....				
		3. Dropsy and Anæmia.....	4	2	6	
		4. Cancer.....	3	1	4	
		5. Noma (or Canker).....				
		6. Mortification.....				
		1. Scrofula.....	2		2	
	II.—Tubercular.	2. Tabes Mesenterica.....	1		1	
		3. Phthisis (Cons. of Lungs).....	16	20	36	
		4. Hydrocephalus.....	2	1	3	
		5. Tubercular Meningitis.....	3	1	4	
<i>Carried forward.....</i>			161	132	293	

MORTALITY OF THE CITY AND SUBURBS OF MONTREAL. (Con.)

CLASS.	ORDER.	DISEASE.	Total by Sex.		Total
			Male.	Female.	Both Sexes.
		<i>Brought forward</i>	101	132	293
I. Brain and Nervous System.	1.	Cephalitis.....	4	2	6
	2.	Apoplexy.....	1	4	5
	3.	Paralysis.....		3	3
	4.	Insanity.....			
	5.	Chorea.....			
	6.	Epilepsy.....			
	7.	Tetanus.....	1		1
	8.	Convulsions.....	5		5
	9.	Other Brain diseases, &c.....	8	3	11
II. Of Genitalia.	1.	Chloritis, Pericarditis and Endocarditis.....			
	2.	Aneurism.....	1		1
	3.	Other Heart diseases, &c.....	3	4	7
III. Respiratory Organs.	1.	Epi-staxis.....			
	2.	Laryngitis and Trachitis.....	1	1	2
	3.	Bronchitis.....	4	2	6
	4.	Pleuri-sy.....			
	5.	Pneumonia.....	3	2	5
	6.	Asthma.....	1		1
	7.	Other Lung diseases, &c.....	4	2	6
IV. Organs of Digestion.	1.	Gastritis.....	1	1	2
	2.	Enteritis.....	1	4	5
	3.	Peritonitis.....		2	2
	4.	Ascites.....	4	2	6
	5.	Ulceration of Intestines.....			
	6.	Hernia.....			
	7.	Heus and Intussusception.....			
	8.	Stricture of Intestines.....		1	1
	9.	Fistula.....			
	10.	Diseases of Stomach and Intestines, &c.....	2		2
	11.	Pancreas Diseases, &c.....			
	12.	Hepatitis.....		1	1
	13.	Jaundice.....	2		2
	14.	Liver Disease, &c.....	2		2
	15.	Spleen Disease, &c.....	1		1
V. Urinary Organs.	1.	Nephritis.....			
	2.	Ischuria.....			
	3.	Nephria (Bright's Disease).....	1		1
	4.	Diabetes.....			
	5.	Calculus, (Gravel, &c).....			
	6.	Cystitis and Cystorrhœa.....		1	1
	7.	Stricture.....			
	8.	Kidney Disease, &c.....	1		1
VI. Generative Organs	1.	Ovarian Disease.....			
	2.	Disease of Uterus, &c.....		1	1
VII. Organs of Locomotion.	1.	Arthritis.....			
	2.	Joint Disease, &c.....			
		<i>Carried over</i>	212	168	380

MORTALITY OF THE CITY AND SUBURBS OF MONTREAL.—(Con).

CLASS.	ORDER.	DISEASES.	Total by Sex.		Total both Sexes.
			Male.	Female.	
		<i>Brought over</i>	212	168	380
V. VIOLENT DEATHS, IV. Developmental Diseases	VII. Integumentary System.	1. Abscess.....	8	2	10
		2. Ulcer.....	1	1	2
		3. Skin Diseases, &c.....			
	I. Of Children.	1. Stillborn.....	10	2	12
		2. Premature Birth.....	40	25	65
		3. Infantile Debility.....			
		4. Cyanosis.....		1	1
		5. Spina Bifida and other Malformation....		14	29
		6. During Dentition.....	15		
	II. Of Women	1. Paramenia.....			
		2. Childbirth.....			
	III. Of Old People.	1. Old Age.....	1	4	5
	IV. Of Nutrition.	2. Atrophy and Debility.....	3	3	6
		1. Fractures, Contusions, Wounds.....			
	I. Accident or Negligence.	2. Burns and Scalds.....			
		3. Poison.....			
		4. Drowning.....	1		1
		5. Otherwise.....			
		1. Murder, Manslaughter.....	1		1
	II. Home Accidents.	2. Execution.....			
		1. Wounds.....			
		2. Poison.....			
		3. Drowning.....			
III. Suicide.	4. Otherwise.....				
	1. Chirurgical.....				
IV.	Not known.....	3	2	5	
	Infection purulente.....				
	Emesis.....				
	Lock Jaw.....				
	Total.....	295	222	517	

SYNOPSIS OF METEOROLOGICAL OBSERVATIONS IN SEPTEMBER FROM MCGILL COLLEGE OBSERVATORY.

* Barometer readings reduced to sea-level and temperature of 32° Fahr.
 † Pressure of vapor in inches mercury. ‡ Humidity, relative Saturation, 100
 ° Ten inches of snow is taken as equal to one inch of water.

Mean temperature of month, 55.965. Mean of mean maxima and minima temperatures, 56.38. Greatest heat was 81.7 on the 1st; greatest cold was 40.5 on the 28th, giving a range of temperature for the month of 41.2 degrees. Greatest range of the thermometer in one day was 21.4, on the 3rd and 11th; least range was 4.4 degrees on the 19th. Mean range for the month was 13.01 degrees. Mean height of the baromete was 22.92 4. Highest reading was 30.426 on the 16th; lowest reading was 29.453, on the 27th, giving a range of 0.973 inches. Mean elastic force of vapor in the atmosphere was equal to .3683 inches of mercury. Mean relative humidity was 81.18. Maximum relative humidity was 99 on the 8th. Minimum relative humidity was 50 on the 13th. Mean velocity of the wind was 9.0 miles per hour; greatest mileage in one hour was 25 on the 2nd. Mean direction of the wind, N. Mean of sky clouded was 69 per cent. Rain fell on 13 days. Total rainfall, 5.51 inches.

TOTAL MORTALITY BY AGES.

Under 1 year.....	204
From 1 to 5 years.....	163
“ 5 to 10 “.....	24
“ 10 to 15 “.....	8
“ 15 to 20 “.....	9
“ 20 to 40 “.....	44
“ 40 to 60 “.....	29
“ 60 to 70 “.....	16
“ 70 to 80 “.....	11
“ 80 to 90 “.....	4
“ 90 to 100 “.....	4
100 years and over.....	..
Not known.....	1
Total.....	517

TOTAL MORTALITY BY NATIONALITY.

French Canadians.....	358
British Canadians.....	112
Irish.....	22
English.....	11
Scotch.....	6
Other Countries.....	6
Not known.....	2
Total.....	517

TOTAL BY WARDS.

St. Ann's Ward.....	69
St. Antoine “.....	100
St. Lawrence “.....	53
St. Louis “.....	33
St. James “.....	105
St. Mary “.....	115
West.....	1
Centre.....	11
East.....	6
Not known.....	1
494	

City Hospital.....	2
Hotel Dieu.....	6
Montreal General Hospital.....	11
Other Institutions.....	4
Foundlings.....	..
Outside City Limits.....	..
Total.....	517

N. B.—The foundlings and deaths outside city limits are not included in classification of diseases, ages or nationalities.

Correspondence.

GEO. A. BAYNES, Esq., M.D.,

Editor Public Health Magazine.

DEAR SIR:—My attention has just been directed to an article that appeared in the last number of the PUBLIC HEALTH MAGAZINE, of which you are said to be the Editor, containing impertinent, uncalled for, and very questionable remarks with reference to the Medical Faculty of McGill University, in consequence of which I shall feel thankful if you will remove my name from the list of subscribers, and let me know what I owe for the three numbers of the second volume.

If you, upon reflection, consider that the ill-advised course you have adopted, in endeavoring to injure your "Alma Mater"—which most certainly has not been ungenerous to your family—is creditable, I most certainly do not envy you *all* the honor obtainable from it.

Yours, &c.,

W. E. SCOTT, M.D.

Montreal, Oct. 4th, 1876.

The above letter which has been addressed to the Editor of PUBLIC HEALTH MAGAZINE, calls not only for its insertion in our earliest number, but for a protest against such a misconstruction of our best intentions towards our "Alma Mater" in the article to which it alludes.

In the September number of PUBLIC HEALTH MAGAZINE, we contrasted the Calendars of McGill University and Bishop's College, Lennoxville, in the curriculum given by the two Medical Faculties; and we regretted that such meagre notice was

given to the subjects of such able Professors as McGill possessed, while, on the other hand, Lennoxville had given a full page to each professor in her Medical Faculty, detailing the various branches that each subject treated of, and fully explaining the extent of the course to be lectured upon.

Our attention, then, being drawn to the fact that Hygiene, as a study, in the Bishop's College programme, was brought to the front on equal terms and honor with the other subjects of the Medical course, and was to be a compulsory subject for the degree, we naturally enough pleaded with McGill to give the same prominence in her course, asserting that her friends had every right to expect it, from the fact that she had, in the last year, raised the subject to a chair in the University, and called an eminent man from an important chair in Lennoxville to fill it. We certainly gave a free opinion on optional subjects, based upon our own observation of them; and it was because the importance of the subject for the well-being of the student and his future usefulness is thoroughly acknowledged on all sides, that we pleaded hard to have it made compulsory; and one of these days it assuredly will be. Now we are accused, while urging this most reasonable view, of having used "impertinent, uncalled for, and very questionable remarks with reference to the Medical Faculty of McGill University." We protest against such language as being neither *fair* nor *true*. First; taking the term impertinent as alluding to the subject—for it is scarcely credible that a *gentleman* would use it personally—we maintain that it is exceedingly *pertinent*, and of great weight and importance, and has a full bearing on the subject in hand, and we shall not cease to urge on our Medical Faculty the full adoption of the subject into her required course. Next, as to "uncalled for"; if Hygiene, as the foundation of all sanitary progress, *does not* confessedly stand at the head of curative science, then to urge the University to adopt it with energy and zeal was "uncalled for"; but if, on the contrary, there was a manifest slight shown to the subject by shelving it as optional, when every man of intelligence is studying it in self-defence and for the good of the public at large, then it was not "uncalled for."

Lastly, that they were "very questionable remarks with reference to the Medical Faculty," we utterly deny, and appeal to the article itself, in which, as plainly as language can speak, we spoke in the highest terms of the ability of the Professors, and complained only that they were not as fairly advertised as they ought to have been. That the Professor himself who holds the chair of Hygiene did not think we were using "very questionable remarks," is evident from the fact that the first time we met after the publication of the article, he thanked us for the manner in which the subject had been treated. And here we should drop the matter, but Dr. Scott volunteers a statement which so truly comes under the category of "very questionable," that we are bound to notice it. After bidding us reflect on the ill-advised course adopted in endeavoring to injure our Alma Mater—to which we boldly say "Not Guilty," and call for a verdict of acquittal from every *honest* man—he adds that "our Alma Mater" "most certainly has not been ungenerous to your family." We really do not understand where the generosity of the McGill Medical School has been displayed more to us than to any other students, for in the education of our family, the same fees paid by all students to all Professors were paid by ourselves, and we are therefore at a loss to conceive where the generosity has been exhibited. But enough; the name is removed from the list of subscribers, and we can only add that if an *honest*, friendly article, like the one in question, is a righteous cause to desert our effort for the public good, then the sooner we hand over the publication to a more *time-serving* and *obsequious* editor the better.—(ED. PUBLIC HEALTH MAGAZINE.)

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COMMUNICATION received from N. E. B.—"Muffs *versus* Mitts."

Reviews.

DICTIONARY OF HYGIENE AND PUBLIC HEALTH, comprising Sanitary Chemistry, Engineering, and Legislation, the Dietetic Value of Foods, &c., &c., on the plan of the "Dictionnaire D'Hygiène Publique" of Prof. Ambroise Jardien. By Alex. Wynter Blyth, M.R.C.S., F.C.S., &c., &c. (Chas. Griffin & Co., London).

The work now offered to the public aims at filling a vacant place in English sanitary literature, namely, that of a book of reference, which, in one volume of convenient size, shall contain the information on sanitary topics at present only to be gathered from the perusal of many separate and distinct treatises. It is not intended solely and entirely for any particular class. Sanitation is universal—it concerns every living unit of the State, and is of equal value to all; therefore, although the special wants of the practical hygienist, and medical officer of health and public analyst, have naturally claimed the first place, and received the attention which their importance demands, Dr. Blyth has throughout endeavored to render intelligible to non-professional readers also, every subject susceptible of such treatment. A special feature of the present work is that it contains, in a form admitting of easy and rapid reference, the whole of the Public Health Act of 1875, as well as sections and portions of the sanitary statistics without alteration or abridgement, save in a few unimportant instances. It contains numerous and well executed illustrations, besides charts, and a map of the geographical distribution of health and disease, (by permission from Keith Johnston's Physical Atlas). The value of an undertaking of this kind must always be in exact proportion to its accuracy and completeness, and, bearing these conditions in mind, the author has spared no pains to fulfil both of them. We venture to predict that although there are a few shortcomings, it will prove a useful work. It fills a want long felt, and as such will find a place on the library shelves of those interested in sanitary progress.

MANUAL FOR MEDICAL OFFICERS OF HEALTH. By Edward Smith, M.D., LL.B. (Lond.) F.R.S., Fellow of the Royal College of Physicians, &c., &c. (Knight & Co., London) Second edition.

The absence of any well established scheme of action on the part of our governments, necessitates the action of local corporations. But our Board of Health, having less experience than those in England, we of course naturally look for information abroad; besides, the experience of the English Boards is far before that of any other nation, so we cannot do better than endeavor to follow out the advice given by those who have made Sanitary Science a life long study. We commend to our Health Officers the many new and valuable suggestions to be found in Dr. Smith's manual. The science in some of its aspects will be comparatively new to the *Medical Officers and Inspector*; and newer still to the members of the Board. It embraces much that is not included in medical education, and which can be acquired by special study only. The author has taken a wide range, and offers a variety of information on the most important parts of the subject. It is difficult to lay down special duties to be performed by all health officers, as in every district circumstances alter cases; but there are general principles which must be understood and acted upon at the discretion of the health officer,—these are laid down very distinctly by the author. We would suggest that our Board begin by forming a library of reference upon sanitary science, and supply our officers with all the perfected information that is available. Such money would be well invested, and repay in the end every dollar of outlay a thousand fold. Dr. Smith's work should be one of the first purchases.

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Books and Pamphlets Received.

- "On Personal Care of Health," by E. A. Parkes, M.D., F.R.S.
- "Industrial Canada," by A. Baumgarten, Ph. D.
- "Address of the President of the *Kuklos Club*."
- "Physicians' Combined Book and Tablet," by Ralph Walsh, M.D. (Second Edition).

PUBLIC HEALTH MAGAZINE

AND

LITERARY REVIEW.

NOVEMBER, 1876.

PUBLIC HEALTH IN ST. JEAN BAPTISTE TOWN.

Sometime ago, the Cure of St. Jean Baptiste Town applied to the Board of Health, in this city, for permission to send five patients from the municipality to the Civic hospital. This involved the question of expense, which was promptly met by the kind-hearted priest, who believed the municipality would be only too happy to pay the small sum of half a dollar for each patient; and added, "if they refused, rather than see these poor parishioners of mine suffer, I will pay it myself." Mr. Radford promised to see the Mayor, and upon this understanding the patients were admitted. On Wednesday last, Mr. Radford reported to the Board of Health "that he had, along with Dr. LaRocque, seen his Worship, of St. Jean Baptiste, who informed him that the Corporation had declined paying for such cases, the reason given being that they were too poor. On examining the mortuary returns for the last eight weeks, it was found that sixteen deaths had taken place from *small-pox*. Now, assuming that St. Jean Baptiste had a population of 7,000, and Montreal 125,000, and that in the latter the death-rate from this disease was equal to that in the former, we should have 194 deaths per month, or 54 in excess of what it really is.

"During the same period, three deaths had occurred in the town from Typhoid; if the same ratio existed within the city limits, we should have 348 per annum from this disease, whereas 122 deaths from this cause occurred. It will therefore be seen at a glance that the outlying municipalities cannot be allowed to remain as they are, if St. Jean Baptiste is a true specimen of the rest."

Instead of being a healthy retreat for our citizens, it is clear that this suburb is in a most unsatisfactory condition, and that with all the energy and effort that is being used in Montreal, we can never hope to be in a good hygienic condition, so long as no means exist compelling the authorities to exert themselves in putting down the wide-spread disease which flourishes under their present rule.