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ECONOMICAL ASPECTS OF PUBLIC SANITATION* AND THE
PROBABLE ADVANTAGES OF PROVINCIAL BOARDS
OF HEALTH.

BY EDWARD PLAYTER, M.D.

For the present purpose I may define health as that condition which enables an individual to accomplish most readily and effectually the objects and ends of life. The value of a life depends on its capabilities and accomplishments. Public health is but a general term applying to the health of the masses of the people as distinguished from that of the individual. Good health with powers of action and endurance among the masses gives a basis for prosperity that no nation, especially a new one, can afford to do without. Impaired vitality from whatever cause is certain to limit the power and progress of a people. 'The fate of a nation will ultimately depend upon the health and strength of a population.'

Two factors are commonly used in estimating the value or power of a people or nation, namely: first, the number of the people, and second, the value of their property or estates.

In the first, the people are usually simply counted; men, women, and children, the mature and the infant, the strong and the weak, the healthy and the diseased, all share equally in the enumeration. Thus, numbers having no power in themselves, merely represent things nominally alike, but which may be infinitely various in their degrees of value; which variation is not commonly taken into consideration.

As partly illustrating this, I may refer to an article on the 'Unarmed Strength of England,' in the May number of the *Lancet*. It refers to the number of recruits examined and accepted for the army. According to the statistical year-book of Austria, the proportion of 'fit' to 'unfit,' or accepted to rejected, is as nearly as possible as *three to seven* in that country; while the British army medical report shows

* This part of this paper was prepared for reading before the Canadian Medical Association which met in Montreal last month.

the proportion of 'fit' to 'unfit' of recruits examined as *two to one*. As to the causes of primary unfitness, 'muscular tenuity and debility' in the Austro-Hungarian conscripts prevailed to the extent of 281 per 1,000; while of English recruits only 56 per 1,000 were incapacitated thereby, even with the addition of impaired constitutions. In Austria 'disease of joints,' probably, the *Lancet* suggests, from extensive scrofula, incapacitates 106 per 1,000, while less than 10 per 1,000 are refused in England from this cause. Hence, it is apparent that a wide difference may exist between the value or effectiveness of a certain number of people in one country and the same number in another.

As the nation's wealth consists of the sum of all the estates within its borders, the great and the small, deducting all incumbrances, mortgages, debts, &c. writes Dr. Jarvis, of Massachusetts, (*Fifth An. Rept. St. B'd of Health*), so the strength of the state is the sum of all the efficient people, deducting all the personal incumbrances, sicknesses, disabilities, and imperfections. Thus, he continues, the state that has the largest proportion of its people in the years of maturity or from twenty to seventy [other things being equal] is stronger and wiser than one that has a larger proportion in the immature period of childhood or youth; and one, all of whose members are in fulness of health and strength, is stronger than one, any of whose people are disabled with fever, consumption, lunacy, intemperance, etc. Every increase of individual estate, every dollar earned, and every new value created, is so much addition to the common wealth, and every deduction from the wealth of individuals, every dollar that is expended without return, wasted or squandered, every extinguishment of any value, is so much taken from the public capital; and all incumbrances, debts, mortgages on property of persons, must be deducted from the sum total of the common wealth, in order to obtain a true estimate of its worth.

'So all additions to the physical, moral, or intellectual power of individuals, all strengthening of the arm and increased skillfulness of the hand, all culture of the brain, sharpening of the perceptive faculties, or discipline of the reflective and reasoning powers, in any individual, are, to that extent, additions to the energy and the productive force, the effectiveness and the wisdom of the state; and, on the contrary, all deductions from these forces, whether of mind or body, every sickness, any injury or disability, every impairment of energy, every clouding of the brain from intoxication, all waste of mental discipline, take so much from the mental force, the safe administration of the body politic. Collective personal gain is public gain, and aggregate personal loss is, to the same extent, the suffering of the community.

The period of development and growth in man is put down as from birth to the end of the twentieth year; from twenty to seventy, as the period of maturity and efficiency; and from seventy upwards, as the period of old age, when men rest from their labors, or are incapacitated.

The years of growth and of old age, constitute the dependent periods. The years of maturity from 20 to 70, the sustaining or productive period. The labors of the fifty years, from twenty to seventy, the productive period, produce substance sufficient as well for the workers of that time as for the early years of development and growth and of old age and decrepitude. These are obviously but general averages, and not applicable to every individual.

It may be laid down then, that the effective power of a nation is in the number of its healthy, sound people in the sustaining period, and in the proportion these bear to the dependent classes.

According to the censuses of the following nations, the proportions of the sustaining classes to the dependent, are, in England 52.21 per cent. ; in Sweden 54.51 per cent. ; and in France 60.32 per cent. While in the United States it is 49.64 per cent., and in Ireland 46.50. In other words, in England there are 915 dependent to 1,000 sustaining ; in France there only 657, while in Ireland there are 1201 dependent to 1,000 sustaining. The proportion of the sustaining class in England is 12.9 per cent. and in France 35 per cent. greater than in Ireland. And comparing the sustaining power with the burden laid upon it, the demand is 94 per cent. greater in Ireland than in France. Thus the effective power of a nation is not represented by the total number of the people, but by the number in the productive age ; and this again is qualified by the number in the dependent ages.

Now in what has been called the ideal life, all who are born live to enter the mature or productive period of life, labor through it, and live on to their four score years. In an ideal population of 80,000 there would be 20,000 in the growing period, 50,000 in the productive period, and 10,000 in old age. But this ideal life is far, too far, alas ! from being the common lot of man. In every country, in every age, human life is more or less shortened.

According to the national life tables, in

Norway, of 10,000 born,	7,415	survive 20 years and	3,487	survive 70 years.
Sweden, " " "	6,698	" " "	2,557	" " "
England, " " "	6,627	" " "	2,379	" " "
United States (males) " " "	6,543	" " "	2,559	" " "
France, " " "	5,022	" " "	1,176	" " "
Ireland, " " "	4,855	" " "	861	" " "

It seems then that in Norway, the most favored country, 25 per cent. perish before reaching maturity. In the United States, 35 per cent., of the males, and in Ireland 51 per cent. fail to reach maturity. In Norway, only 34 per cent. ; United States, 24 per cent. ; and in Ireland, less than 9 per cent. enjoy the full period of working years.

'In this economical view,' again quoting Dr. Jarvis, 'man may be considered as a productive machine, which creates property or sustenance for itself and the Commonwealth. Then a child that is born is but a vital machine begun. But it is powerless and ineffective, and must be built up and developed and grown and trained for work. This is a perilous and doubtful process of twenty years.'

'In the ideal state, every twenty years expended in the development of manhood and womanhood, results in the completion of a matured laborer. But in the actual experience of the world, a varied portion of this expenditure is lost by death in this period.

'In the production of dead machinery, the cost of all that are broken in the making is charged to the cost of those which are completed, and the prudent manufacturer charges all that he expends on the failures to those that succeed, as a proper part of the cost. Thus, if two fail, when half finished for every one that is completed, the cost of the finished one is doubled; and this increase of cost is in proportion to the expenditure which has been made or lost on those that broke down in the process.

'So in estimating the cost of raising children to manhood, it is necessary to include the number of years that have been lived by those that fell by the way, with the years of those that pass successfully through the period of development.'

In this view then, as a productive machine, a child at any age is worth the amount that has been expended for its support, training, &c., to that age. The cost of supporting children varies greatly in different countries and in different classes. Political economists in England, Germany and the United States estimate the value of a mature man, at twenty, at \$1,000, or at an average cost of \$50 a year, for the 20 years. This seems to be a low enough estimate, even for Canada.

We have not yet in Canada sufficiently reliable statistics upon which we can estimate the number which die in the country each year under twenty, or at any particular age. I may observe here, however, that the prospects are that it will not be very long ere we shall have such statistics in Ontario at least. Last year, under the new act—that of the Hon. S. C. Wood—which came into force 1st January, 1876, according to the report of that year, which will soon be given to the public, there was an increase in the returns of deaths of over 100 per cent.; probably 60 per cent., or perhaps as is estimated, two-thirds of the whole number.

In an interim report of the first half of last year, the Registrar General of Ontario, after referring to the death-rate of other countries, says, it is only fair to assume that a death-rate of about 18 per 1,000 would be the correct standard for the death-rate of Ontario. In view of the death-rate in Toronto, at least 26 per 1,000, this seems a sufficiently low estimate. In Massachusetts it is about 22½ per 1,000, according to latest returns; in England, 21. However, let us base calculations on a death-rate for the whole of Canada of 18 per 1,000 living, per annum. This, in a population of 4,000,000, would give an annual total of 72,000 deaths; or for Ontario, with 1,500,000 inhabitants, a total of 27,000 deaths per year. If 35 per cent. of these die before reaching the mature age of twenty, which is about the proportion that die before that age in the United States and in England, there would be 25,200 deaths in the Dominion annually, 9,450 in Ontario alone, of those who had never reached the produc-

tive period, who had never contributed to the public capital or estate, but whose support, on the other hand, at \$50 per head per year, would in the aggregate represent a very large sum. By the thirtieth Report of the Mortality of Massachusetts,* it is found that in the seven years, ending 1871, 81,029 died under 20 in that State. Their ages are all given in years to the fifth, and in quin-quennial periods from five to twenty. From these, and from life tables, it appears that the entire sum of their lives amounted to 292,762 years, which at \$50 a year amounted to \$14,638,100, or an annual average of \$2,109,157. Now, it will be observed, that 81,029 dying under 20 in Massachusetts in seven years gives an average of 11,575 per year, or about 20 per cent. higher, according to the population of that State, which is somewhat less, it appears, than that of Ontario, 20 per cent. higher than I have estimated for this country. Assuming that the 25,200 which die under 20 years in this Dominion annually, to die at the same relative ages as the 81,029 which died under that age in Massachusetts in the seven years named, the whole sum of the lives of those 25,200 dying here would amount to 91,048 years. These at \$50 a year would count up to \$4,552,400. This sum then is paid annually from the earnings or estates of the families of Canada for the support of those who die before reaching the productive period, and thus is diminished to that extent the capital or income of the Dominion. Ontario alone, at the same ratio, suffers a loss every year in the same way of over \$1,600,000.

Now as to deaths during the productive or working period. The life tables of different nations show that all fall short of the ideal, in varying degrees, during this period. The average duration of effectiveness, for example, instead of being 50 years, is in Norway, 39.61 years, falling short 20.78 per cent.; in the United States (males) it is 37.46 years, falling short 25.08 per cent. In Massachusetts there died, during the working period, between 20 and 70, during the seven years ending 1871, 72,727. Had these lived out the ideal period, they would have labored in all 3,636,350 years, but their labours amounted to only a total of 1,681,125 years, considerably less than half, leaving a loss by their premature death of 1,925,224 years, or an annual average loss of 276,461 years of service. The total death-rate of Massachusetts, according to the latest reliable returns I have, 1872, was 22.7 per 1000, about 20 per cent. greater than that estimated for Canada. Now if we assume the death-rate during the productive period in Canada to be 20 per cent. less than that of Massachusetts during those 7 years, placing the population of that state at 1,500,000, we have in this Dominion an annual loss of over 590,000 years of service. Supposing each year's service to be worth \$300, less than \$1 per day, this would show a loss to the Dominion of \$177,000,000; and to Ontario alone of over \$66,000,000. Looking upon this loss by death

* Fifth Report of State Board of Health.

during the productive period in another way, we find the burden of life, including the support of those dying *before* the productive period, is thereby increased nearly 100 per cent., or nearly doubled.

But this is not nearly all. The loss by, and the expense of, sickness has not been considered. We have no account whatever of the amount of sickness in this country, but we may approximate it through calculations based on the experience of other countries. In Great Britain there have existed for a very long time many Benefit Societies, which include many hundreds of thousands of members of all ages. A chief object of these associations is to support each other when sick and unable to labor. Each member makes certain contributions weekly or monthly, to a common fund, and receives in return a certain amount when disabled from labor. A full record is therefore made of all the sickness of a very large number of men, women and children, in every part, and in all the employments, of the kingdom. The Government has had these records gathered, analyzed, and combined in order to show the proportion or amount of sickness in males and females, in every age and in the various occupations and conditions of the people. The results of these labors have been published in Parliamentary Reports. And the records it must be borne in mind do not include the lesser ailments, as 'colds,' temporary rheumatism, &c. ; and those only requiring medical attendance. It has been estimated from these records that, in Great Britain, for every death there are two constantly sick. In other words, there are 730 days of sickness for every death. It has been found, however, that these calculations do not quite apply to this side the Atlantic. Health Assurance Companies have been started in the United States, and the amounts they should receive in as premiums, and pay out in times of sickness were fixed according to British rates. But it was found that the premiums paid in were insufficient for allowances promised in times of sickness, and the companies were compelled to close their offices. There was more sickness in the United States than the English records showed there was in England. It is probably, then, safe and fair to assume that the proportion of sickness is at least as large in Canada as it is in Great Britain.

A death-rate of 18 per 1000 living per annum in a population of 4,000,000, about that of Canada, would give 72,000 deaths per year. 72,000 multiplied by 730, the number of sick days to each death, gives a total of 52,560,000 days of sickness; and this number represents the probable number of sick days in Canada in one year, while in Ontario alone there would be about 20,000,000 of sick days. Some statisticians have furnished reasonable estimates for calculating the sickness-rate, and have shown that in Europe every individual loses on an average 19 to 20 days annually by sickness. At this rate there would be in Canada from 76,000,000 to 80,000,000 of days of sickness per year. The actual cost of all these days of sickness—medical attendance, nursing, etc.—would amount to a very large sum ; while the loss of time is a very great consideration indeed.

It appears from census reports that the number of persons engaged in occupations—working persons—is about 40 per cent. of the entire population. At this rate, there would be in Ontario nearly 8,000,000, and in the whole of Canada about 21,000,000, of lost laboring days, through sickness, in one year, taking the lower estimate. These represent a loss in productive capacity equaling in value as many millions of dollars at least.

Finally, there is the loss of stamina, of physical and intellectual vigor,—the ‘muscular tenuity,’ which inevitably flow in a stream greater or less as causes of disease,—insanitary conditions, prevail. These cannot be estimated. While they might be approximated as concerns the present generation, they are too far, far-reaching for us to form conception of as bearing upon, through heredity, the generations of the future. If unchecked, they could only be lumped at last as forming a large part of a great whole, which caused the degeneration, destruction, and final extinction of the race.

Now in arriving at the above conclusions, showing the almost fabulous sums to be actually lost to this country through sickness and death, it cannot, I think, be justly said that I have made the calculations upon too high or too large bases. In every case I have taken the lowest estimates. The following question then becomes truly momentous, viz. : Can any large, or even small, proportion of the cases of sickness prevailing be prevented by any practicable means, and life be materially or appreciably prolonged? It is beyond the shadow of doubt that a large proportion of the cases of sickness and death daily occurring, are due directly and indirectly to causes which are preventable or removable, and, I may add, *easily* preventable or removable. Proof of this springs up in the observation of every intelligent person; while to the physician the truth of it is being continually confirmed by fresh examples. Case upon case comes before him of sickness, of sickness sometimes ending in recovery, sometimes in death, which he knows might have been readily prevented; the cause of which he feels might have been easily avoided, often almost as easily avoided as encountered.

We know that the laws and conditions of life are determined, but we know, too, that the circumstances which surround life,—the essentials of life, and the measure of conformity to the determined conditions, are infinitely various, and the degree to which health and life are developed and sustained is in accordance with them. Men have long studied Nature’s laws in reference to the development of life in vegetables and animals, and hence great improvements have been made in the qualities of foods. Man, himself, too, happily in most countries, has bettered his condition and prolonged his life. By the improvements in food he is better nourished; by the improvements in the arts he is better clothed and housed.

There is less sickness, and that which visits humanity is less destructive than in former times. The record of these most important facts are unfortunately few; yet they all concur in their testimony to the increase at least of man’s longevity.

'In ancient Rome, (5th Ann. Rept. of St. Bd. of Hth. Mas.), in the period two hundred to five hundred years after the Christian era, the average duration of life in the most favored class was thirty years. In the present century, the average longevity of persons of the same class is fifty years. The records of life and death in Geneva, in Switzerland, for the last three hundred years, are more complete than any others now known. These show that the expectation of life from birth, or the average longevity, was,—21.21 years, in the 16th century; 25.67 years, in the 17th century; 33.62 years, in the 18th century; 39.69 years, from 1801 to 1833; 40.68 years, 1814 to 1833.

'In the 16th century, 25.92 per cent. of the children died in their first year. In the 19th century, the deaths at this age were reduced to 15.12 per cent. In the 16th century, 61.11 per cent., in the present century only 33 per cent., perished before they reached maturity at twenty. In the first period, 3.08 per cent. passed their threescore and ten years, and in the latter, 17.94 per cent. had that length of life. As large proportion now live to seventy as lived to forty-three, three hundred years ago.

'In 1693, the British government borrowed money by selling annuities on lives from infancy upwards, on the basis of the average longevity of the people of that century. The treasury received the price and paid the annuities regularly as long as the annuitants lived. The contract was satisfactory to both parties. The government obtained the money at a reasonable cost, and the annuitants received their principal and a fair interest, and no more. Ninety-seven years later, in 1790, Mr. Pitt issued another tontine or scale of annuities, on the basis of the same expectation of life as in the tontine of the previous century. These latter annuitants lived so much longer than their predecessor, that it proved to be a very costly loan for the government. It was found that while 10,000 of each sex, in the first company of annuitants, died under the age of twenty-eight, only 5,772 males and 6,416 females, in the second company, died at the same age one hundred years later. Within the century, included in this history, the longevity of this class of people increased twenty years.'

'A similar diminution of death and prolongation of life has been granted to other nations in the progress of civilization. The marked effect of the improvements in life is seen in the increased proportion that reach maturity, and of the effective population between twenty and seventy. The dependent class is thereby diminished and the sustaining class is increased. According to the Geneva record, the average working period has increased from eight years and five months to twenty-two years and eleven months within three hundred years, and consequently old age is postponed. Those who were formerly old at fifty and decrepit at sixty, are now old at seventy and decrepit at eighty.

It is well known that the death-rate of London, notwithstanding its great and rapid growth, has been greatly and steadily reduced,

even as it has increased in size, to but little over one half what it was less than two centuries ago; and this undoubtedly by improving the physical condition of the people,—by sanitary work.

Much yet, however, remains to be done, every where, but more especially in this country, the most backward of all, in improving the condition of the people in regard to the circumstances and essentials of life.

Mr. Simon, of the Local Government Board, Great Britain, than whom, as every one knows, we can have no better authority, says, 'the deaths which occur in this country are fully a third more numerous than they would be if our existing knowledge of the chief causes of disease were reasonably well applied throughout the country.' This estimate of Mr. Simon is based upon facts. This will be apparent further on. If this is true of England, where much time and labor and money have been expended in sanitary work, it will surely hold true in regard to Canada, to Ontario, where, as yet, nothing comparatively has been done. It may possibly be said that, here, the country being new, insanitary conditions do not so largely prevail as in Great Britain. That our cities are not so large and overcrowded; that there is not the same need of sanitary work. But in this country little, comparatively, has been done in the way of drainage, of water supply for towns, &c., though it has become sufficiently populous to have given rise to large accumulations of filth, whereby the air and water are contaminated. Moreover, it may here be observed, it seems evident that some diseases prevalent in this country, prominent causes of mortality, notably typhoid fever and diphtheria, universally regarded as 'filth diseases,' are diseases of scattered communities, rather than of crowded towns.

This is shown by the following table, from the second report of the State Board of Health of Massachusetts, as regards typhoid.

	Total Population; 1865. (All ages.)	Total deaths from Typhoid in ten years.	Average No. of Persons living each year to one death.	Average No. of deaths each year to 1,000 persons living.
One hundred and forty-seven (147) cities and towns of more than 2,000 inhabi- tants.....	1,044,294	7,888	1,323.90	0.755
One hundred and eighty-four (184) towns of less than 2,000 inhabitants.....	213,468	2,539	840.75	1.189

As to diphtheria being most prevalent in scattered communities, Dr. Wm. Farr, the great Statistician of Great Britain, draws attention to the fact that of 1,000 children born 4.9 die of diphtheria in the

whole of England and Wales, 4.4 in Liverpool, and no less than 10.3 in otherwise healthy rural districts in England and Wales.

It must be evident to any observing thoughtful person, who gives the subject sufficient attention, that the preventable or removable causes of disease and death in this country are fully as numerous and as readily removable, as they are in England.

I will now draw attention to some direct and positive evidence of the great benefits of practical sanitary work.

According to Parkes and Wilson, 'in twenty-five towns, in England, (Sanitary Journal, vol. 1, No. 1,) examined a few years ago by Dr. Buchanan, it was found that the cholera had been 'rendered practically harmless' by the adoption and carrying out of a complete system of sewage, for the removal of excrement; thus purifying both the air and the water. In some of these towns the general death-rate had been lowered over 20 per cent.; while in nine of them, the number of deaths from enteric or typhoid fever was diminished over 50 per cent., and in ten others, from 33 to 50 per cent.'

I have a table here, from Baldwin Latham, C. E., showing the great saving of life following the introduction of works for sewage and water supply in twelve towns in England, as follows:

NAME OF PLACE.	Population in 1861.	Average mortality per 1,000 before Construction of Works.	Average mortality per 1,000 since Completion of Works	Saving of Life, per cent.	Reduction of Typhoid Fever, rate per cent.	Reduction in rate of Phthisis, per cent.
Banbury	10,238	23.4	20.5	12½	48	41
Cardiff.	32,954	33.2	22.6	32	40	17
Croydon.	30,229	23.7	18.0	22	63	17
Dover	23,108	22.6	20.9	7	36	20
Ely.....	7,847	23.9	20.5	14	56	47
Leicester.	68,056	26.4	25.2	4½	48	32
Macclesfield	27,475	29.8	23.7	20	48	31
Merthyr.....	52,778	33.2	26.2	18	60	11
Newport.	24,756	31.8	21.6	32	36	32
Rugby	7,818	19.1	18.6	2½	10	43
Salisbury	9,030	27.5	21.9	20	75	49
Warwick.	10,570	22.7	21.0	7½	52	19

The *Lancet* not long ago drew attention to the fact that the mortality statistics showed a steady decline in the death-rate from fevers during the last seven years, from 80 to 43 per 100,000 persons living, while in the preceding five years it had averaged 93 per 100,000, and says 'this at least may be pointed to as a preliminary triumph of sanitation.'

A recent report of the town of Tottenham, England, shows that while forty years ago the place was healthy, the population increased

rapidly, and sanitary matters, notably in regard to extending water supply and drainage, were neglected, the death rate rose 20 per cent, deaths from zymotics nearly doubled, typhoid fever became epidemic, and the people becoming alarmed, a Sanitary Association was formed, which did effective work, and in about three years Tottenham recovered its reputation for salubrity.

In view of these facts who can doubt that the death-rate and sickness-rate may be largely reduced in Canada; and not only in the cities but in the rural districts. If the death-rate can be reduced, certainly the sickness-rate can be proportionately reduced by the same means. No reasonable person can doubt this. Many believe the sickness-rate can be more largely reduced by practical sanitation than the death-rate.

I have not been able to obtain any figures showing the proportionate cost of Public Sanitary Work, but so far as I can learn, the cost is small in proportion to the gain. It is well known that in Great Britain large sums are borrowed by corporations for expending in improving the sanitary condition of towns. This in a country where they know from experience better than any other country in the world the benefits following improved sanitary conditions, is sufficient evidence that it 'pays,' and that any town can afford to borrow for this purpose.

Now supposing the death-rate in Canada could be reduced just one in every 1,000 living—from 18 per 1,000 to 17 per 1,000, less than six per cent., and the sickness-rate be proportionately reduced at the same time, the amount saved thereby would be represented by one-eighteenth of the total amount of the costs of, and loss through, sickness and death at the present time, as estimated a few pages back, or by many millions of dollars; while there would probably be less muscular tenuity and debility, and more vigor and stamina, among the people.

If in Ontario the death rate instead of being 18 per 1,000 as estimated, were reduced to 17, there would be about 1,500 less deaths in the Province every year. If we allow the half of this number as being of those in the working period, that would give 750 productive lives, or 750 years of labor,—a gain of the labor of 750 adults for one year, worth to the Province a quarter of a million of dollars. Besides this, a large sum would be saved which otherwise would be lost by the deaths of nearly 750 others approaching the productive period. But, furthermore, the greatest saving of all, in an economic point of view, would be the reduction in the amount of sickness. Taking the lowest of the usual estimates, 730 days for each death, there would be a saving of 1,095,000 days of sickness per year, with their attendant direct costs, and loss of time and labor.

In Toronto, a reduction of 10 per cent. in the death and sickness rates would save to the people in costs of sickness, funeral expenses, &c., alone, enough yearly to pay the interest on, and a sinking fund which in a reasonable number of years would pay the principle of, \$1,000,000, supposing the city should borrow that sum for sanitary

purposes, say for clearing the city of every particle of excrement and filth. Besides this, the city would have yearly the constant labor or productive power of 85 or 90 more adult men and women, and as many more children and youths gradually reaching maturity.

What is true of Toronto in this respect is proportionately true of other cities and towns in Ontario or the Dominion..

If a saving of life of from 2½ to 32 per cent. resulted from the introduction of efficient works for sewage and water supply in the towns in England, as shewn in the table above, there is no reason why such results should not follow the introduction of like works, or the carrying out of useful sanitary measures in any part of Canada.

Surely this is a matter demanding the serious consideration and attention, and that at an early day, of those in authority in this Dominion.

In this paper thus far I have endeavoured to show, 1st. The economy of health and its value to the Dominion. 2nd. That health may be promoted, a large proportion of disease prevented and life be prolonged. I shall now, 3rd, briefly notice what special means or machinery may seemingly be best employed for the purpose, *i.e.*, of preventing disease and prolonging life.

In sanitary affairs, England has by a long precedence, taken the lead of other countries. No other country in the world has a public health act which can approach in completeness and comprehensiveness that of England passed in 1875. It contains 340 clauses, and it consolidated and amended over twenty other previously existing laws. The health laws there are administered by a local Government Board, but leading sanitarians are urging the necessity for a State Department of Health, presided over by a health minister. To this, Dr. B. W. Richardson says, they must undoubtedly come sooner or later. That the death rate has been largely reduced there is the best of evidence as to the efficiency and usefulness of the measures adopted. 'Its constitution of sanitary authorities throughout the kingdom; the power it vests in those authorities to appoint learned medical officers of health; the provisions it makes for securing to each locality better sewerage, freedom from nuisances, improved water-supply, regulation of cellar dwellings, governance over offensive trades, and removal of unsound foods; the provisions for prevention or spread of infection, and for the erection of hospitals and mortuaries; and the provisions for the regulations of the streets and highways, lighting of streets, establishment of pleasure-grounds, and regulation of slaughter-houses; these, as well as the general provisions for the carrying out of the Act, are most commendable as practical plans, by the working of which the nation may be tempered into a sanitary mould of thought and character.'

Within the past two years, in Prussia, an Imperial Board of Health has been established and is in vigorous action. In France, Austria, and Russia also like action has been taken, and Boards and Institutes or *Sociétés* have been established to look after, officially, the health

of the people. During the past year, a monthly *Journal de Hygiene* has been established in Paris, and a fortnightly periodical, *Zdorowie*, (*The Health*), in St. Petersburg. In all these countries leading medical men and the state authorities are giving much attention to sanitary matters.

Eight years ago, in 1869, in Massachusetts an act was passed for establishing a State Board of Health. This, consisting of seven members, appointed by the Governor in council, was at once formed and has been in constant active working order from that time to the present. The Act provides that :

‘The Board shall take cognizance of the interests of health and life among the citizens of this Commonwealth. They shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics, and the sources of mortality and the effects of localities, employments, conditions and circumstances of the public health ; and they shall gather such information in respect to those matters as they shall deem proper, for diffusion among the people. They shall advise the government in regard to the location of any public institutions. They shall in the month of January, make report to the legislature of their doings, investigations and discoveries during the year ending December thirty-first, with such suggestions as to legislative action as they may deem necessary.’

The reports of the Massachusetts Board are second only to those, of world-wide reputation, of Mr. Simon, late of the Government Board, Great Britain. I have before me a brief report of seven years’ work of this Board, which shows that it was possessed of a full knowledge of the important work it was appointed to do, and that it went about it with a will and vigor that made itself felt and appreciated, and it is highly appreciated by the State, and is increasing in power and efficiency.

Soon after organization this Board sent circulars to the mayor and board of health of every city, to the selectmen of every town, to every member of the legislature, and to every clergyman and physician in Massachusetts to call the attention of local boards of health to the powers which they possessed and the duties which devolved upon them under existing laws, and to urge upon all those in authority to insist upon an immediate enforcement of those laws and a faithful performance of those duties. It made arrangements for the collection and publication, weekly, in the *Boston Daily Journal*, of the number of deaths, with their prevailing causes, in twenty of the leading cities and towns of the State. It also selected one hundred and fifteen physicians, scattered throughout the State, who consented to make weekly reports of the diseases which might be prevalent in their immediate localities. Arrangements were also made for the publication of the general results obtained from these reports, in connection with the weekly mortality-returns published by the Secretary in the *Boston Daily Journal* each Thursday. The result of all this, and the reports, has been a general awakening of the people throughout the State to the importance of public and individual sanitary work, and to temper them into a ‘sanitary mould of thought and character.’

FIFTEEN OTHER STATES of the Union have since followed the example of Massachusetts and have established a State Board of Health in each of the States. The following is a list of the states which have now such boards in active work: Alabama, California, Colorado, Georgia, Illinois, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, North Carolina, Tennessee, Virginia, and Wisconsin. New York and Pennsylvania have taken action in a like direction, and will, as will no doubt also other states, soon have like Boards. In nature or composition, functions, &c., all the Boards are much like that of Massachusetts.

The cost to the different states is comparatively insignificant. The appropriations for which range from \$1,500 to \$3,000 and \$4,000 per year, excepting Massachusetts. In this State a much larger sum is now appropriated by the legislature for the use of the Board. This affords evidence that the people believe that the earlier and smaller appropriations had been well and profitably invested.

In Michigan, the Board was established in 1873, and in the amount of work done it seems second only to that of Massachusetts. The State appropriation is \$4,000, and with it a vast amount of good work is accomplished.

Recently, in Montreal, since writing the above, I have had the pleasure of conversing with a medical gentleman, a delegate from the American Medical Association to the meeting of the Canadian Medical Association. He was in no way connected with the Michigan Board, but bore witness that it was accomplishing excellent work. The Board has done much toward securing the appointment of local medical officers of health throughout the entire state, and the better organization of the local boards, and there has thus come about a greatly increased attention to sanitary subjects, and much has been accomplished by the local boards.

In view of the above, then, it seems that by means of a Health Board the public health may be most economically, and perhaps directly and effectually, looked after and improved; most countries adopting this sort of body for sanitary management or control.

What then, let us enquire and consider, would a Board of Health or a Sanitary Board do in Ontario?

We have an Act providing for the establishment in every township and municipality in the province of a local board of health. Councilmen, it appears, are to be ex-officio members of the board; to which others may be added. In a few municipalities boards have been organized. These boards have, it is true, considerable powers. Very few, indeed, of them have a medical man on the board. What do ninety-nine in a hundred of the members of such boards know about the simplest elements of the natural laws of health, of sanitary science? How can they be supposed to know? How can such boards be efficient and useful? Can any one point to an instance where one has proved of practical use? But is not the causes of their inactivity, inefficiency, uselessness, apparent? Are

not the boards in the position of a lot of branches without a trunk? Dead branches without a stem. For the most part these remarks do not apply to the cities.

What the local boards require to render them useful, as they might be, is a *Provincial Board*, a centre, a trunk. A properly organized Provincial Board, which would meet, say, once in three months, should at once place itself in direct communication with every local board in the province, awaken each to a knowledge of its powers, objects and duties, and induce it to appoint a medical officer in connection therewith, for obvious reasons, and to report, even briefly, at least once a year, in reference to its work, to the Provincial Board. I could point to many ways in which local boards might thus be induced to do most valuable work in lessening disease in their several localities with trifling trouble and expense.

Besides securing a better organization of local boards, and getting them interested in their work, a provincial board in Ontario could do a vast amount of other good work. It could investigate the prominent causes of disease; investigate the public health acts of other countries, and advise in reference to those most suitable to this country, as this country must soon have a more complete and effectual code of health laws. The action of the Massachusetts State Board has been almost entirely instrumental in having an abattoir established for Boston, and the city and suburbs have been freed from slaughter-houses. The cities of Ontario would be fair fields for the work in this behalf of a Provincial Board. The water supply, drainage, and, in short, a hundred other matters too, would properly interest and give important work for a Provincial Board of Health in Ontario.

SEWER GAS.*

BY R. BARNES AUSTIN, C.E.

I am about to say a few words on that arch enemy of the human race—sewer gas. As I proceed I will endeavour to illustrate my remarks by some simple mechanical experiments, and I hope I shall be able to convince you that by the exercise practically of a little care and common scientific sense the presence of sewer gas and its concomitant evils within any house may be prevented. In the first place, I would remark that 'sewer gas,' as the *Sanitary Record* of July 27 well says, is a popular rather than a scientific term, and is not one definite gas, but several. Indeed there is hardly a gas known to chemists that may not be found in sewer gas at one time or the other. Nor is this complexity of composition at all to be wondered at when we consider the complex character of sewage itself. In sewage may be found in one form or other almost every known chemical element, not even excluding the precious metals

* Read at the meeting of the National Association of Sanitary Surveyors and Inspectors at Northampton, August, 1877.—(From *Sanitary Record*.)

themselves. Another point worthy of note is that, speaking from a strictly chemical standpoint, not one nor all the known gases which singly or unitedly go under the name of sewer gas would ever produce and specific disease, such as small-pox, scarlet fever, diphtheria, etc. In some of our manufacturing districts whole towns have been built on foundations consisting of chemical refuse and waste products, which foundations keep generating sulphuretted hydrogen and hosts of other gases, partially present in sewer gas, and yet while their unpleasantness is admitted, the specific action of each in producing the destructive power of sewer gas is nil. Again, speaking from a strictly chemical stand-point, it may with certainty be said that while undoubtedly certain chemical compounds possess strong life-destroying powers, are in short poisons, no pure chemical product known possesses the property of even blood-poisoning, much less of producing any specific disease. But sewer gas does possess in a most material degree the power or property of producing, or it may be of feeding or developing, that class of disease which is now known as zymotic, and by some as filth disease. The fact is that sewer gas is a chemical compound or series of compounds plus something else. This something else, whatever it may be, is the something that does all the mischief. As to its nature, I have no time, had I the ability, to discuss it on this occasion; suffice it to say that the majority of investigators look upon it as a low form of life, akin to the zyme of yeast in its action, and exceedingly capable of reproduction and development in a favourable soil. Moisture is also thought to be essential to its life and development.

At all events it is a product or a concomitant of the chemical decomposition of filth of all kinds, and especially of that class of filth consisting of human or animal excreta. The gases, etc., are the vehicles in which these respective particles float or are carried about. In all probability we shall discover that certain combinations of decomposing filth produce certain forms or species of infective particles, and that these, in turn, produce certain definite diseases, each after their own kind. But however interesting these investigations or theories may be, I must now put them aside, and accepting the universally acknowledged fact that when a human being comes in contact with sewer gas the health of that person is in danger, I will at once proceed to show how effectually to guard against this danger. Sewer gas is more dangerous in dwellings than out of them. In houses we have it in a concentrated form. Out of doors it is necessarily diluted, and according to the amount of dilution the danger is diminished; on this point I must just digress for a few minutes. It is held by some exceedingly clever investigators, Prof. Wanklyn, for instance, that there is a point of dilution at which all danger ceases. If he and his school are right, I would rather act in the belief that, though the chances of meeting the enemy may be lessened, yet the chance—that is, the danger—remains, and if encountered, no dilution will avail. The enemy is there; and if accidentally met in the road, it will avail nothing that a

thousand and one other roads are free and safe. With the increase of domestic comforts and conveniences the dangers to health from sewer gas have increased *pari passu*, and your practical experiences as surveyors and sanitary inspectors will bear me out in asserting that, as a rule, the mansion is in greater danger from sewer gas than the cottage, and that the greater the mansion the greater the danger.

With regard to sewage, out of sight, out of mind, has been too much the rule. So long as, by the mere lifting a handle, the disagreeable but necessary product of eating and drinking have been removed from sight, we have been satisfied, forgetful altogether of any secondary consequences. What necessarily follows, inevitable decomposition, has been quite overlooked, and all the plainest and simplest laws of pneumatics and hydrostatics ignored. We have turned the solids out of doors (not always quite that), and, being out of sight, have failed to realise the fact that each time we have done so we have taken their predecessors back again into our dwelling in a ten times more insidious and harmful form. We have been sending solids out and taking them back as gases, to be breathed and lived upon. We must have drains—we must also take water-closets as accepted facts, and such being the case, what is now required is to combine safety with convenience and even luxury. Can this be done? I answer emphatically yes! and I know you will forgive my saying that it can best be done by aid of the system and appliances I have the honour to-day of calling your attention to, I need not tell you skilled gentlemen that as drains are generally constructed the house must be the receptacle of much of the sewer gas generated in them. I need not point out how the water-closet is one entrance, the housemaid's slop pipe another, and the kitchen and skullery sinks others. In short that every entrance to a drain or to a sewer is also an exit for sewer gas, accelerated by the natural suction of the rarified atmosphere of the house and its rooms.

Attempts, legion in number, have been made to combat these evils by trapping, but in nine cases out of ten the remedy has been worse than the disease, and in the tenth case useless. The traps themselves have been ineffectual, as well as from their very nature cesspools or gas generators. The mischief caused by imperfect trapping has far exceeded that caused by sewer gas itself. It has been as though trap-makers thought that safety consisted in complication; at last the tyranny, so to speak, of the trappists proved too strong for further endurance, and a dead set was made at all but the simplest of traps. One set of reformers certainly effected an improvement in diminishing the number of traps and removing them to the outside of the house, this certainly was a slight improvement, but only a slight one, and the form of traps used by these gentlemen was peculiarly liable, on the slightest provocation, to be untrapped. This school of reformers endeavoured to break the pressure by carrying the drain pipes to the roof, and somehow or

other convinced themselves that by so doing they ventilated the drains. A little consideration will convince you that this is not to be depended upon, even when you have both an upcast and a downcast pipe, as the air or gas remains in these pipes and merely balances itself, as I will show you. It remained for Mr. Banner to design and complete the true and only perfect system. After many experiments and much thought, Mr. Banner at last hit upon a plan so simple and so effectual, that the wonder now is that it was not discovered and applied long ago, and already we have many would be imitators. Following natural laws, Mr. Banner found that you cannot empty a drain or pipe, but must fill it with something else. To create a vacuum in a drain or pipe in constant use was simply an impossibility. So Mr. Banner emptied his drain of sewage gas, and refilled it immediately and simultaneously with something else, that something else being fresh external air. In other words, we withdraw the sewer gas from the house drain and soil-pipe, and never afterwards allow it to become sewer gas, by constantly replacing the air within all the pipes with fresh external air, not at intervals only, or in any uncertain fashion, but constantly and effectually. To do this, a thing very many had tried at, Mr. Banner found that merely pulling away and drawing at the top of a closed pipe was of no avail whatever, and in that knowledge and the means of overcoming it lies at once the simplicity and yet the very pith and essence of his invention, namely the inlet and cowl.

The cowl really and constantly creates an exhaust, and it is admitted to be at once the most simple yet most powerful ventilator extant, and we claim for it that it acts with perfect effect during all the varying influences of wind and weather, as is so unmistakably demonstrated by the model before me.

As to the traps, they are the only two forms which are traps and yet not cesspools.

One great economy in using the Banner system I have not yet mentioned; by its adoption only one trap is necessary, and all others are at once abolished, and with them all the dangers inseparable from their use.

As far as the traps under closets are concerned, it seems almost as though human ingenuity had been perverted to manufacture evils, for as closets ordinarily exist they cannot be otherwise than impure, and, consequently, dangerous; and I believe I am quite within the fact when I assert that those filth receptacles so generally put below water closets have been the unknown and unsuspected cause of the ill-health of thousands. By adopting the Banner system, at a less expense than any of the existing systems, perfect immunity from sewer-gas is ensured. Fresh external air is always being drawn in at the inlet and along the drain-soil and other pipes while the trapping is perfect, yet so simple that it can be inspected by anyone. I do not wish to be combative, but I must assert that no system is so simple and yet so perfect as the Banner system.

With the Banner combination of cowl-trap and inlet, sewer-gas

and its concomitant evils may be defied. Nothing short of this combination will prove really effective and safe. Other half-way measures are mere palliations, and liable at any moment to a breakdown. To revert again to the SANITARY RECORD of July 27, 'The strength of the whole is the strength of the weakest part.' We have no weak part: each part is calculated to effect treble the work it will ever be called upon to perform.

TUBERCULOSIS (CONSUMPTION) IN MILCH COWS, AND THE
CONTAGIOUSNESS OF TUBERCULOSIS BY THE
DIGESTIVE ORGANS.

BY A. N. BELL, M.D. (*From the Sanitarian*).

It is well known to physicians abreast with the times, that within the last dozen years or so the study of tuberculosis has received a new impetus, chiefly from the revival of the theory of its infectious nature, first promulgated about a hundred years ago by Morgagni. Buhl and Niemeyer may be regarded as the leaders of modern investigation of the subject in its application to mankind; but contemporary with them, among their own countrymen especially, there have been several other diligent investigators of the nature of tuberculosis from a different, equally instructive stand-point, whose labors it is the object of this paper to present. For whatever facility with which I may accomplish this object I am in great measure indebted to my associate in literary work, Dr. T. P. Corbally, of Brooklyn, for his aid in translating several papers and letters into English.

The subject seems to have been first prominently brought forward by Professor A. C. Gerlach, of Berlin, under the inquiry: *Is the flesh of cattle affected with pearl-disease, and especially of animals affected with tubercular disease, to be allowed or to be prohibited, as an article of human food?* Of which inquiry the following is an abstract:

From the time when pearl-disease in animals was supposed to have some relation to the venereal-disease as found in human beings, or, as supposed by some, was identical with it, the use of the flesh of all animals affected with the disease was strictly prohibited. The very natural fear of venereal infection was so great, and the general aversion among the people was such, that official prohibition was demanded to prevent its sale. In tubercle people saw only enucleated or incysted masses of venereal poison, and this idea was most generally associated with tubercles as found in the chest and abdominal walls, but more particularly with the former; all other abnormal conditions might be passed unnoticed; but a couple of nodules found on the walls of the chest, or on the diaphragm, were sufficient to cause the animal to be at once rejected. People feared even to touch the blood or the entrails of such animals, and the butchers knife was thrown away with the worthless carcase, and in many cases, even the axe with which the animal was felled. . . .

The *aversion* to the use of such meat did not disappear so readily, and Viborg states, in his treatise published in 1818, that in 1810 the

aversion to its use had little abated, and even in 1818 it was still prohibited in Norway. . . .

The fact that pearl disease was shown not to be identical with venereal-disease did not throw any light upon its real nature. Many opinions were put forward in regard to it; but all seemed to tend toward the conviction that it was either tubercle or sarcoma, or a substance *sui generis*, holding a place between these two. Twenty years ago I considered pearl-disease to be of the nature of tubercle, and my subsequent experiments have confirmed me in the belief that the two diseases are identical, and this opinion I have uniformly defended, although during much of the time I stood almost alone. There could be nothing more natural, therefore, than that I should experiment with the anatomical products of pearl-disease.

The inoculation with tubercular matter has been followed by the production of tubercles in the lymph glands and in the lungs, and often in the liver and in the kidneys. The experiments on rabbits and Guinea-pigs had apparently the same results. In these animals, disease that could not in any way be distinguished from tubercle was produced in the same organs by the traumatic process of inoculation. I myself have performed all these experiments with care, and extended them by the introduction of tubercular matter taken from cattle. I have inoculated with tubercular matter taken from men and from apes, and with the matter from cattle affected with pearl-disease, many dogs, a few pigs and a goat, and in every instance tubercles were produced in the lungs, and in some of the cases in the kidneys. In rabbits these experiments led to the formation of a thick cheesy matter at the point of inoculation, and of cheesy matter in the vicinity of the neighboring lymph glands, and to nodules in the lungs, which could not be distinguished from tubercle, but they were in small quantity. In all other experiments on animals—as horses, calves, sheep, goats and pigs—no appearance of tubercle was produced. . . .

It occurred to me that the proposition to be resolved experimentally was: Is there in tuberculosis a peculiar virus, or are pearl-disease and tuberculosis identical? and to determine this it seemed desirable to experiment without producing a wound or inducing suppuration. These experiments then led us to a third inquiry: whether the flesh and the milk of tuberculous animals, especially of cattle affected with pearl-disease, were injurious and unfit for food? a question of the gravest importance in a sanitary and industrial point of view. . . .

1. The following animals were fed with uncooked tubercular substance from cattle: five calves (heifers); four sheep; two goats; ten swine; one Guinea-pig; seventeen rabbits; one horse; four dogs. In all forty-four mammalia, and two doves.

Of the animals thus experimented on, thirty-six became more or less tuberculous, the greater number in a very high degree. One calf was attacked with severe diarrhoea in consequence of the feeding, and died from an aphthous condition of the mouth; in the horse the infection was doubtful; four dogs, three rabbits, and two doves were

not infected; the two last hardly deserve to be considered, for it is very doubtful if they ate the infecting matter with the grain, as was intended, and then the mere negative results to be obtained from birds should not be brought into comparison with results obtained from experiments on mammalia. The author considers that dogs are generally exempt from infection.

The author's conclusion is, that tuberculosis matter is in a high degree infectious.

The question in regard to the identity of pearl disease with tuberculosis was a purely scientific one. Now, however, through the results obtained from experiments with infection, it has become a very practical and very important one, because of the possibility of communicating the disease to human beings.

II. Experiments in Feeding with Raw Tubercular Masses from Other Animals and from Men.—Here follow details of eighteen experiments. The experiments on this point are not entirely satisfactory, so that we can draw only general conclusions from them. They justify, however, the conclusion that the tubercle from other animals is infectious. That tubercular matter may possess different degrees of virulence.

Besides these general results, two very important scientific and practical facts were developed.

1. That the fresh tubercle from horses, without any traces of cheesy degeneration, is just as infectious as pearl nodes from tuberculous cattle; that true tuberculosis, as already mentioned, seldom appears in horses, and that the fibrous tubercle found in glanders has nothing in common with true tubercle except the form.

2. That tuberculosis in fowls, especially in the *hen*, is very virulent, and is identical with the tubercles in the mammalia, and sanitary precautions in this respect are very necessary.

III. Experiments in Feeding Raw Flesh of Tuberculous Cattle and other Animals.—Of these experiments in feeding, there were ten small pigs, seventeen rabbits and four dogs. Of these, six small pigs and two rabbits were infected, the latter but slightly, while fifteen rabbits and the four dogs were unaffected. This result shows, what might be inferred from the first and second series of experiments, that the *flesh* of tuberculous cattle may convey the infection, although in a less degree than the tubercular mass. As might naturally be expected, the amount of danger to be anticipated from the use of the flesh of diseased animals is greater than from the degenerate tubercle because of the much greater quantity used.

It is very probable that all parts of the flesh from tuberculous animals is not equally capable of producing the disease. It is pretty certain that flesh containing lymphatic glands, has more virus than pieces having no glands. It is certain that the flesh as well as the milk, contains a greater quantity of the poison in proportion to the extent of the disease; and it is probable that when the disease is local, limited to a particular locality, that neither the flesh nor the milk are capable of propagating the disease. The fact that all the

experiments did not succeed in producing the disease, would seem to depend on this circumstance ; but this in no wise justifies the inference, that the flesh and the milk of tuberculous animals are not capable of producing the disease.

IV. Experiments in Feeding Cooked Tuberculous Matter.—Solid fibrous and brokendown tubercular masses were cooked from one-fourth to one-half an hour, and fed to five small pigs and ten rabbits in considerable quantity ; the result was that the five sucking pigs and five of the rabbits, two-thirds of the whole number, contracted the disease. That one pig, which at the expiration of four weeks died of pleurisy, presenting only considerable swelling of the follicles of the mesenteric glands, can be considered as doubtful. The result, however, is not weakened by this exception.

In all these experiments with cooked substances, the animals were less affected (showed less signs of sickness) than those fed with raw matter. Tuberculous matter, cooked from one-fourth to one half an hour, is undoubtedly infectious, but in a less degree than the same matter given raw.

It is probable that thorough cooking would destroy the virus ; but as flesh is a bad conductor of caloric, the centre of a large piece escapes the action of the heat.

The experiments of feeding six calves, six sheep, three goats, thirty-one pigs and swine, one Guinea-pig, fifty-four rabbits, eight dogs, one horse, and two doves, show that the disease affecting our domestic animals and even hens is exceedingly active, may be communicated to human beings, and that tubercle in these animals is identical with that in man. The inference follows, that the use (ingestion) of tubercular substances, even of the flesh and the milk of tubercular animals, is capable of communicating the disease directly.

This—the effect of the milk—Professor Gerlach has shown, in the Second Annual Report of the Veterinary School of Hanover, November, 1869, and in Kleb's Archives, 1873. If we turn these scientific inquiries to advantage in every day life, we must lay down the general principle that the flesh of tuberculous animals of all kinds, especially of those that are subject to pearl-disease, must be prohibited as food, for man ; and the more so as the flesh of the two species most commonly so used, that of cattle and swine, in which the tuberculous degeneration is most frequently met with, are very frequently, especially in North Germany, used either cooked or but partially cooked. It must be remarked that sometimes the poison, when it enters the system, is very slow, running its course as a chronic disease.

Professor Leisering, of Dresden Veterinary School, with whom we have also been in correspondence, has sent us a report of experiments on the communicability of tuberculosis, made by himself and his colleagues in that school.

'That tuberculosis,' he remarks, 'is transmissible is a fact well determined in late years by direct experiments ; and this has, besides its scientific significance, a practical importance of such weight, that every contribution to the explanation of this, in many respects, ob

scure subject, is certainly most desirable, And of this class are the experiments in this veterinary school in relation to the transmissibility of tuberculosis.'

Tuberculosis has long been known to be a no less universal and fatal disease among domestic animals, especially those of the bovine species, than among mankind, and for the most part the conditions of its prevalence are the same in both. Nobody doubts its hereditary character; and in domestic animals as in the human race, its subjects are characterized by their attenuated figures, long limbs, narrow chests, lymphatic or neuro-lymphatic temperaments, and they are alike the product of cold, damp places, dark, filthy, unventilated dwellings, insufficient food in quantity or quality, and, in adult females especially, prolonged and excessive lactation, or the progeny of those who have been subject to the conditions therein described.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

ON CERTAIN LAWS OF POPULATION. BY DR. FARR. FROM *San. Rec.*

DR. FARR said that the unity of the human family was an accepted scientific truth, and all races and nations were alike endowed in structure, intellect, passions and faculties; and according to the most recent calculations—those of Petermann—the population of the whole world was now 1,424 millions. In the last century some thinkers called in question the account of the origin of mankind as stated in the Book of Genesis, and held that it was impossible that in the period so many could have descended from two ancestors—Adam and Eve. Euler undertook to meet the objection. He showed that by a process of doubling the population from one pair it might amount to any conceivable number. It had been laid down that a population can double itself in twenty-five years. It was true that if the population increased to its present pitch in 5,880 years, it might have doubled itself every 200 years. The inhabitants of the earth would in 200 years approach 3,000 millions; and at the same rate the difference between the birth-rates and the death-rates was nearly constant, although the rates varied widely. To every unit of life in England there was annually $\cdot 03492$ added by birth, and $\cdot 02231$ deducted by death. The rates of increase was $1\cdot 01261$, which implied that at that rate the population would be doubled in 55·3 years. Taking 1,000 as the basis, the birth-rate was 34·92, and the death-rate 12·31, in England and Wales. Carefully prepared statistics showed that at these rates of increase the periods of doubling in eight of the states of Europe would be as follow: England and Wales 53·3; Sweden, 61·1; Prussia, 64·3; Netherlands, 77·1; Austria, 86·0; Spain, 93·9; Italy, 106·5; and France, 361·3 years. And what did we find actually going on in English districts? In fifty-six populous districts the death-rate was $\cdot 0251$, and the birth-rate was $\cdot 381$; and consequently the rate of increase was $1\cdot 0130$. In fifty-four healthier districts the death-rate was $\cdot 0167$; that was $\cdot 0084$ lower than in less healthy districts. The natural increase of popula-

tion in the healthiest districts was 1.0144. If the districts were arranged in four groups the death and birth-rates were '0251 and '0381, '0220 and '0356, '0191 and '0323, '0167 and '0301. These four groups of districts, therefore, would double their population in nearly the same periods, as their rates were 1'0130, 1'0136, 1'130, and 1'0134. Thus within certain limits the reduction of mortality had no absolute tendency to accelerate the natural increase of population. Where the death rate reached a much higher pitch, the birth-rate no longer kept pace with it; but the diminution of the mortality of England by sanitary improvement was in no danger of multiplying by multiplying men beyond the means of subsistence. Experience proved the contrary, and therefore to keep a population stationary or to retard national growth there was needed neither war, pestilence, or famine, nor war between man and man, but between the lowest forms of life and human life. He introduced the term zymotic to characterise the class of epidemic, endemic and contagious diseases. It is from the Greek word *Zume* (leaven), which occurs in 'Hippocrates' and the Greek Testament, and it implies that these diseases have this in common with ferments—that they spread, multiply, and effect transformations of organic matter. Thus the transparent lymph in a small-pox pustule (*variola*) contains a multitude of small microscopic bodies (*variolads*), which, introduced into the body of a single man, multiply into millions, and under certain conditions affect a whole city. They grow, multiply, and die, and in these processes prove fatal to thousands of men. Scarlet fever, measles, whooping-cough, typhoid fever, cattle plague, and cholera are due to bodies. Each specific 'zymad' produces its zymotic disease. Nor can the different species be differentiated in any other way than by their effects on the living body. When were they created? We do not know. We do know when they were first described, and we know that in the sense of Mr. Darwin they give rise to varieties. The small-pox matter is sometimes quiescent. Then varieties of it spring up, and spread rapidly. Summer cholera was for centuries common in London. Suddenly in Asia a new variety sprang into existence and ravaged Europe. We know under what wretched conditions this variety was created, under what conditions typhus that killed judges has been produced in prisons, erysipelas, pyæmia, puerperal fever, scurvy, gangrene, dysentery in hospitals, armies, and fleets. Some varieties, like putrefaction, can be raised at will. Upon the other hand, milder can be substituted for malignant varieties, as in the instance of vaccine substituted by variola. Some forms of pestilence have been extinguished. Thus, plagues that once ravaged London every twenty years have been stayed, and by stopping the supply of infected water Asiatic cholera loses its terrors. By sanitary measures which are known and are at the hands of physician, engineer, and administrator, many zymotic diseases can be subdued, if not extinguished. In striving after this glorious end we cannot now be terrified by the phantom of population increasing in geometrical progression. If the birth-rates could be reduced, would it be wise in this country to accept that policy which has been advocated by Mal-

thus, J. S. Mill, and Dr. Dugdale, and practised by the French peasant? Admirable as was the thrift and industry of the French peasant, he (Dr. Farr) could no more hold that England was called upon to practice his social philosophy than to revolutionize our agriculture by either cutting up the land into infinitesimal parcels, or ceasing to employ in its culture the several capitals of the landlord in acres, the farmer in stock, the labourers in thews, sinews and inherited skill. Many current French statisticians now regarded with apprehension the declining population of France. This policy was put forward to lessen the misery of the working classes and to raise their wages by lessening the supply of labor. Their misery has been diminished and their wages raised. Under the opposition policy of increase, let them, then, go on as heretofore in keeping up their numbers and trusting in God, marrying and giving in marriage, as our returns showed they did, in prosperous times, and waiting in adverse times.

After some remarks by Lord Houghton and Mr. Walford, Mr. W. L. Collier considered that those statisticians who had attacked the doctrines of Malthus, J. S. Mill, endorsed by Cairns and Senior, had failed. Had the working classes been considered with families of seven or fifteen, as the case might be, struggling for existence on 16s. a week. Dr. Farr said marry first and sustenance would come after, but the higher and middle classes reversed the position. They did not marry until their means permitted them to do so with fair prospects of comfort, and yet they preached a doctrine of imprudence and improvidence to the working classes. Those classes, however, would find that J. S. Mill was the best friend they ever had. The doctrine of Malthus was based upon the fact that the poor we always had with us. But Mill held that we ought to have no poor in the sense of abject indigence. In the discussion which followed, Mr. T. R. Bourne said that in those cases where there were families of five and food for two, it would mostly be found that what was wanted had been consumed in drink. As a matter of fact, the large families did the best, and all the greatest men in science and its statesmen were mostly members of large families and younger sons, upon whom early struggles for mental growth had produced brilliant results. Mr. George Hurst thought population had dangerously increased in this country. Mr. Turner said that those who were afraid of the ratio in which the population increased seemed to forget that food was increasing on all sides in even a greater ratio. Mr. Fisher, a Canadian, said that those who thought emigration the proper remedy for over-population should remember that the Colonies did not want the children of rickety paupers. Lord Fortescue must remind the section that Mr. Chadwick had been for years recognised by all Europe as one of the most distinguished economists of our time, and, indeed, as such had had the honor conferred upon him of being made a member of the French Institute; that Dr. Farr had also long been recognised as a high economic authority; and both of these—to whom as an ex-Secretary of the Poor Law Board, he could add, in a much humbler degree, himself—had always strenuously inculcated thrift and prudence. The discussion closed with a vote of thanks to Dr. Farr.

LONGEVITY OF INVALIDS.

Dr. B. Southey in a recent lecture on Personal Hygiene, truly remarked that 'health and longevity are not synonymous; neither are health and great muscularity. . . . Longevity, like height, is a race attribute, but it does not signify health. The three oldest people I ever knew, women who reached 89, 98, and 100, were valetudinarians, and had been so nearly all their lives.'

We (*Med. Press and Circular*), have often thought what a strange sight it would be if all the physical infirmities to which mankind is liable were alike open to public observation; if the damaged lung of a pulmonary cripple were as clearly visible as a broken arm, or the atrophied liver of the habitual tippler as remarkable as his neighbour's club foot. How many who are apparently in the enjoyment of good health, would discover a hideous canker that was slowly sapping the foundations of existence. We should see a man sitting down to a sumptuous dinner who was to all outward appearances in the best of health, while his kidneys were evidently fast succumbing to the influence of gout, indolence, and port wine. One would be seen going about with holes in his lungs, and another with a hole in his stomach, while a cancer on the liver would be the death-warrant of a third. This man would be seen taking a fresh lease of his house, while, in consequence of an aneurism that was just ready to burst, he was on the point of losing the lease of his life. 'The old lady, who, at an advanced age still enjoys tolerable health, has had for years a pulse every beat of which seemed to be the last; while this gentleman who, with portmanteau in hand, is running to catch the train, will probably drop down dead without having had any warning of the fate that is hanging over him. Truly, we neither "know what we are nor what we may be," but although Nature has kindly hid from us secrets of which it is best for us to be ignorant, in some cases perhaps it would be as well if those little mutinies of the flesh which threaten our existence could be discovered before they had become so formidable as to be beyond our control. We might then be able to check them, or entirely put them down, while we took the precaution of removing all those causes of grievances which gave rise to their occurrence. Then again, such a view of their internal economy might be of service to those men whose vices were thickly sowing the seeds from which death was about to reap a full harvest. If drunkards could only have as clear a glimpse of their cirrhused livers as the public have of their "brandy blossoms," or staggering gait, intemperance would receive a severer check than it is ever likely to experience from the passing of the Permissive Bill, or the lectures of Dr. Richardson. And if the habitual glutton were favoured with a similar inspection of his inside, he would probably be inclined to live the life of an anchorite for ever afterwards.

But, to leave this digression, it will be generally admitted that the tenacity of life, under circumstances which would appear to threaten its very existence, is often surprising, and is, as we shall presently

show, not without its lesson to those who, like ourselves, are continually engaged in resisting the ravages of disease. It seems as if life would not, in many cases, give up without a struggle the stronghold of which it has had so long possession, however battered about that stronghold may be, and as if Nature made use of all the resources at her command to fill up the breaches which disease had made in some of her most valuable parts. A few years ago we examined the inside of a woman, who had lived to the age of seventy-five. All her life she had enjoyed pretty good health, and up to the moment of her death (which took place suddenly) she had never made any complaints nor had required any medical advice. Yet the *post-mortem* examination revealed such extensive ossification of the heart and great vessels as not only to show that the disease must have been of long standing, but to make those who were present wonder how the old woman could have lived for a day with a heart in such a condition as hers was found to be in. Not long ago we exposed a large cancerous perforating ulcer of the stomach, which had taken some years to kill the patient, and even then it was evident that Nature had been doing her best to ward off the fatal event by glueing the ulcer to the under surface of the liver.

But the great lesson we should draw from a contemplation of the above facts is this: that whatever may be the case under our care, we should never give up all hope of being able either to cure the disease or prolong the patient's life. We should not merely, as many of us do, take refuge in the common saying, "while there is life there is hope," but act in such a manner as to show that the resources of medicine are alone calculated to strengthen this common belief. We live in an age in which the resources of medical science are greater than at any former time. That medicine which (as Lord Macaulay once said) now enables us to "resist the slow sap of chronic disease" was unknown in former times; and it would ill become us if we did not turn to account the rich legacy of medical knowledge which our predecessors have bequeathed to us. There is a good deal of scepticism at the present day which regard to the value of drugs and other remedies in the treatment of disease, and therefore there is all the more reason for our doing all in our power to assist Nature in the efforts which she is continually making to maintain her offspring—Life; and to study the various conditions under which her efforts prove most successful.

The most approved medicines, the best of food, the purest of air—these and similar gifts we should place at her disposal. Then we shall often have the pleasing satisfaction of finding that our help has been crowned with success, and that the longevity of invalids, as well as the cure of many serious maladies, are in no small degree owing to the resources of medicine and to the manner in which we have availed ourselves of them.

THEY who would be young when they are old, must be old when they are young.

THE ROOF GARDEN.

Mr. Charles Reade, in the *Pall Mall Gazette*, not long ago, published a protest against the present system of conical roofs, and an invitation to embrace what he terms the Rational Roof system. This is merely a flat roof, which will admit a perambulation over it, and of utilization as a drying ground, &c. But, as Mr. Robinson pointed out in *The Garden*, for December, 1871, Mr. Reade overlooked the greatest of the advantages which a flat roof would offer, viz., a splendid site for a garden. Such a garden would necessarily be roofed over.

The case for the roof garden is admirably stated by Mr. Parsons, in the columns of the *American Agriculturist* as follows: 'The superficial area of nearly every good city house is more than twelve hundred square feet. This would contain quite an orchard of fertile little fruit-trees. If one wishes no flowers, but fruit only, he can have forced peaches and nectarines at a season when he cannot buy them for less than a dollar each. But if it be desired to have the house filled with flowers through the winter, we cannot cultivate forced fruit. We can, however, have flowers, stone fruits, and black Hamburg grapes in succession. If the house has been filled with flowering plants in the winter, and there is plenty of yard room, they can be taken out and arranged in groups in the yard as soon as all danger of frost is over. The house can then be filled with peaches, plums, and nectarines in pots, which can be obtained of the nurserymen ready for fruiting, or prepared the previous year by the florist having charge of the house, and kept in the cellar during the winter. These can remain in the house until the fruit has attained sufficient size to be safe, when they also can be grouped in the yard, where they will grow, and ripen early and well. Their place in the house can then be supplied with grapes in pots which have been retarded by being kept in a cool, dark place in the cellar. These will then bear abundantly during the summer, and before the flowering plants require to be taken in the ensuing autumn, will duly respond to the tiller in Black Hamburgs and Muscats. Two pounds off each vine, or four hundred pounds of grapes, would be a moderate estimate for the space mentioned.'

Mr. Parsons proposed to lay upon the roof sufficient earth to form a natural garden, in contradistinction to a garden made up of congregated pots; but on this point I believe that he would meet with strenuous opposition even from those who accept the principle of the roof garden. A sufficiently pleasing *coup d'œil* could be manufactured with the aid of variegated vases, and boxes of enamelled tiles, filled with fruit trees; depending baskets with drooping vegetation, and wired columns covered with climbing flowers. Above all, the not altogether unfounded feeling of dampness which a layer of some feet of moist earth over a sleeping room would be sure to suggest, would by this means be avoided. Mr. Parsons also considers that if the doors of the house were kept open, the ascending waste heat of the house would serve to keep the roof garden house at a sufficiently high temperature.—*Healthy Houses.*

WATER CLOSETS.

Water-closets instead of being regarded as important parts of an establishment, are too often hidden away in improper nooks. For instance, they are placed at the far ends of close corridors, under the staircases on each floor, on the half-space landings—its only door facing the hall; in corners of bath rooms and billiard rooms, and between bedrooms—in fact, in every conceivable improper place. Who that has visited Edinburgh, and domiciled for a night or two at a certain Princess Street hotel, but recollects the small unventilated closets, lighted by gas only, which daily ‘testified of themselves’ in the abominably narrow passages, and also in the very sleeping rooms. Contrary to all this, the closet should be fixed in a place set apart. In designing a house, its site demands careful attention. The best position is an isolated building, built tower fashion, with closets on each floor, and the supply-cistern on the top. This tower can be connected to the house proper by a passage with two or more doors, like an ice-house approach, or there can be an anteroom with double doors. The windows of this divided passage or anteroom should, if possible, range on both sides, reaching to the top of ceiling; and, if this is not convenient, narrow air-bricks should be inserted in the line of cornice. The closet itself should have double hung sashes, extending nearly to the ceiling, the upper panes filled with ventilating or saw-cut glass, and a narrow fanlight surmounting the frame filled with wire gauze or perforated zinc. This treatment would compel a ventilation despite of all carelessness. Air-bricks would serve the same purpose, but the foregoing is, I consider, preferable. Or the upper sash could be drawn down a few inches, and a fillet nailed on the stiles to prevent it being closely shut. The light to the closet should on no account be a borrowed one, as is nearly always the case in railway stations, but the windows should be built in an external wall, the closet seat facing it, and the exchange of air taking place between it and the door.

The above rules may be considered sumptuary, fit only for large mansions, and inapplicable to the majority of dwellings. This may be so for a little longer, but the time is speedily approaching when the arrangement of the house generally, and the position of the closet especially, will be made a matter of scrutiny by the surveyor appointed under some stringent Sanitary Act. To ensure the isolation of the closets by a passage or an anteroom is not so difficult or much more costly than the accommodation which they now receive. In many cases a fourth part of the cost of external meretricious ornamentation would have erected the closet tower and provided the apparatus as well. How often, to hide the anomaly of a water-closet in the hall or staircase, do we find a door rich in stained glass and heraldic arms; the *open sesame* is not, however, as might be supposed, into a conservatory of delights, but into a sanctuary of smells.

It is difficult to advise the occupier of a house in which the atmos-

phere is poisoned by misplaced closets how best to remedy matters ; but the foregoing remarks will, I trust, be of some assistance. If at all possible, project a building out from the house, large enough to form an anteroom, or ventilated vestibule, between the house and the closet. The first cost will speedily be repaid in the increased health of the occupant and his family, and huge interests paid as well, so long as all is kept in perfect order.—*Healthy Houses*.

BACTERIA IN CHARBON AND MALIGNANT PUSTULE.

M. Pasteur recently informed the Académie des Sciences that he is working at the relation of minute organisms to the charbon of cattle and allied diseases. Bacteria were discovered in the splenic blood by M. Davaine in 1850, but lately M. Paul Bert asserted that if the blood containing bacteria were submitted to the action of compressed oxygen, the bacteria would be killed and the blood would still communicate the disease, although it might not contain a single bacterium. M. Paul Bert inferred from this experiment that the contagious power of the blood was destroyed by the action of compressed oxygen. M. Pasteur, however, is not of this opinion, and believes that another explanation can be given of results obtained by M. Bert. Instead of attempting to destroy the bacteria by compressed oxygen, he filters the blood which contains them. The method by which he performs this very delicate operation he proposes to publish hereafter, but he asserts that he succeeds in freeing the blood altogether from the bacteria, and that it may be injected without any injury to the animal. He infers from this that the septic substances are solid and not in solution.

A note on the same subject was communicated by M. Bouillaud, in which were described some experiments by M. Feltz tending to show that the active poisonous principle of putrid blood consists only of formed ferments. The experiments are of three series. In the first, M. Feltz took the blood of a healthy dog, and allowed it to putrefy at a temperature of 113° F. ; large numbers of bacteria were developed in it. He then injected this into four rabbits. The animals died after a few days, all presenting the characteristic symptoms of septic infection. In a second series of experiments, he raised the temperature of some of the putrefied blood to 175°, when coagulation occurred. The clot was then diffused through distilled water, and the infusion thus obtained was found to contain bacteria. It was afterwards injected into four rabbits, which died in seven or eight days with the same symptoms as those into which the undiluted blood had been injected. In a third series of experiments, he enclosed some of the putrefied blood in iron tubes and exposed it to a temperature of 3000°. No trace of bacteria could subsequently be discovered in the blood, and it had no effect on some rabbits into which it was injected.

M. Pasteur, in response to a remark of M. Bouillaud on the necessity of specifying precisely the disease from which the observations

were made, asserted he would take the fact of the presence of bacteria in the blood as the essential anatomical element of the affection which is the splenic fever of the sheep, the charbon of the ox, and the malignant pustule of man. Other maladies presenting similar symptoms, but in which the blood contains no bacteria, he would designate by other names. The same opinion was strongly expressed at the subsequent meeting of the Académie, and M. Pasteur announced his intended investigation of the state of certain farms in which charbon and such diseases were frequent, and in the water or in the dust he hoped to find the germs of bacteria.—*Lancet*.

SANITATION IN BULGARIA.—One of the *Times'* correspondents writes: The first building in the yard is the dwelling-house; the gable end faces the south, and is entirely open, the sides being about 4 ft. and the apex of the roof 7 ft. above the surface of the earth, the width being about 12 ft.; one half of this width forms a bench of hard clay, upon which is spread a mat, woven of reeds, where the whole family sleep, in a row during the warm weather. This open gable is about 10 ft. deep, the other half of the open anti-chamber forms a stairway leading down to the subterranean chambers, generally two or three in number, where the food is cooked, and where the family live in winter; the sides of the hut are built of composite material mixed with straw and plastered over with mud. The roofs are made of interwoven branches of trees, covered with straw and reeds, with a coating of earth on the outside. There is no furniture whatever in these houses—not even a table or bed, and a more wretched looking abode cannot be imagined for civilized human beings. There are generally two families at these huts, all of them dirtier than the others. Recently a Russian prince, who was visiting us, told the Bulgarian woman who was mistress of the establishment, that 'she could not be a Christian unless she kept herself and children cleaner;' the reply was, 'God had made them so, and she could not help it.' A colleague paid this woman half a frank a day to wash her children's faces, but she soon struck for higher wages, and my friend gave up his philanthropic endeavours in disgust.

SUICIDES AND BEER-DRINKING.—Statistics indicate that most of the suicides following inebriety occur among beer-drinkers. The ultimate effect of lager beer, in many cases, is melancholy with a tendency to suicide. This is most prominent among the Germans, whose phlegmatic disposition is favorable to such a result. Dr. Arnot asserts that beer has a peculiar psychological action on the organism, developing a low grade of depression in all cases.—*Quarterly Journal of Inebriety*.

Dr. O. SIMON, from experiments by Dr. R. Voss, from a communication to the *Petersburger Medicinische Wochenschrift*, believes that the milk of syphilitic individuals is as capable of procreating syphilis as the blood.

INFANT MORTALITY AND INFANTS' FOOD.—The summer mortality from diarrhoeal diseases, according to Dr. Baginsky, has quadrupled in Berlin during the past twenty years; no other cause of death has presented such a marked increase. In seeking for the cause of this mortality, Dr. B. made a series of experiments concerning the comparative merits of the articles of diet which are ordinarily allowed to infants. He experimented with human milk, cow's milk, condensed milk (Swiss), two varieties of farinaceous food, and two specimens of 'prepared' infants' food. Each these articles was exposed to a temperature of 67° for a period of twenty-four hours; he found that the human milk and that from the cow remained almost unchanged, but the Swiss milk and the other foods, although still appearing fresh and wholesome, yet exhibited bacteria in active motion. The reaction of the human milk was alkaline; the cow's milk slightly acid; the foods were strongly acid. After a further exposure of eighteen hours, the Swiss and cow's milk were found to be coagulated, while the four foods were in a high state of putrefaction. The human milk, however, still remained alkaline and appeared almost unchanged. These experiments are interesting as vindicating the high estimation in which the human milk is held; but their great lesson is the necessity of guarding the substitute food from the putrefactive changes which are set up so rapidly in our hot season. Our summer mean temperature, in 1874, was fully 7° higher than that chosen by Baginsky for his observations. Nicer tests must be applied to infant's foods, including those for acidity and microzymes. The relations of bacteria to cholera infantum have not yet been demonstrated, but their evil influence is suspected. Their coincidence with diarrhoeal mortality in the tenement-house district is noteworthy, if we can rely upon the statements of those who state that the air of tenements is polluted, not only by causes from without, such as filthy streets and gutters, by the very walls and appurtenances within them, which reek with low forms of life in the hot season. Their collected filth then takes an unseen life and activity, putrefactive germs increase and multiply, float in the air, and, no doubt, attach themselves to, and contaminate the articles of food and drink which lie exposed. So that the increased care with reference to the covering of food, and the keeping it at a low temperature, assumes a new importance to those sections which Dr. Elisha Harris has styled the '*pauvres saubourgs*' of our cities.—*The Proceedings*, Brooklyn, N. Y.

COMPOSITION OF QUACK MEDICINES.—This is not a secret with regard to most of these, thousands of analysis by competent chemists having supplied revelations that would fill volumes. This is, however, of no avail, for neither the chemists nor governments are disposed to incur the expenses which would be required to make known the deceptions of these widely advertised compounds. Richter states that among 938 secret remedies analysed by him, he found (1) 22 per cent. contained substances of violent or poisonous

action ; and (2) 25 per cent, which, although less active, yet were possessed of medicinal power ; while (3) 52 per cent. were of no importance, or quite inoffensive. The first category especially comprises violent and poisonous agents for the skin and hair ; opiates for children, capable of inducing chronic cerebral disease, or even death ; 'purifiers of the blood,' composed of arsenic or mercury ; and a whole legion of violent purgatives capable of doing in inappropriate cases an immense amount of mischief. The third category comprises preparations which have nothing in common with the noxious and poisonous effects produced by those of the first and second, but yet agree with them in being sold at from five to a hundred times their proper value, and thus constituting robberies. All these attacks on the public health and morals take place with the full cognizance of the public authorities.—*Lyon Med.*, Sept. 2.

AN AGED OPIUM-EATER.—Dr. Mattison, of Brooklyn, gives (*New York Medical Record* for April 14) an account of a very extraordinary case occurring in the person of a Captain Lahrbush, a Londoner, now more than 111 years of age—a fact said to be well authenticated,—who, after some half-century of adventures in all parts of the world, settled down in New York. Becoming the subject of diarrhoea in India in 1807, on the relief of this by opium he took to the habit of eating this substance—a habit persisted in for *seventy years* ! Beginning with only occasional half-grain doses, the amount he consumed up to the tenth year was only limited. From then the quantity taken was progressively increased until 1856, when the amount taken was *ninety grains per diem*. Placing himself then under medical care, the quantity was gradually decreased, so that by 1858 he took only thirty grains daily. Reduction was persevered in, so that for the last five years he has been content with a four-grain pill at bedtime. Alvine torpor has been a very constant accompaniment of the habit. Abstinence from opium has never been carried beyond forty-eight hours, and then has always been attended with diarrhoea and "profound malaise." No other ill effects have been produced by the opium, and up to quite lately the health of the Captain has been sufficiently good to allow of his passing several hours daily out of doors.

CHINESE LEGISLATION AGAINST OPIUM.—It is announced that the Chinese Government, in view of the evils resulting from the use of opium, has prohibited its importation. The chief and almost only source of foreign supply is India, from which country the annual importation has cost the Chinese forty millions of dollars. As India is under Christian rule and China is pagan, it may be doubted whether the latter nation will be able to protect itself from that peculiar style of Christianity which controls the commercial policy of Christian nations. Past experience on the opium question increases the doubt. Should England, being a representative Christian commonwealth, resist the defensive legislation of the disciples of Confucius and force on them the noxious traffic, there will still be one way left for China to gain her purpose, viz. : to organize a regular mission

enterprise and send missionaries into the Christian world, and convert the Christians (!) to the pagan idea of international rights, international justice, and the moral obligation of governments to their subjects.—*Pacific Med. & Surg. Four.*

VALUE OF TREATMENT IN INEBRIETY.—In either sex, it is the physical craving produced by the continued action of the stimulant upon the nutrition of the nervous system, which renders the condition of the habitual drunkard one with which it is peculiarly difficult to deal by purely moral means. Vain is it to recall the motives for a better course of conduct, to one who is already familiar with them all, but is destitute of the will to act upon them; the seclusion of such persons from the reach of alcoholic liquors, for a sufficient length of time to free the blood from its contamination, to restore the healthful nutrition of the brain, and to enable the recovered mental vigor to be wisely directed, seems to afford the only prospect of reformation; and this cannot be expected to be permanent, unless the patient determinately adopts and steadily acts on the resolution to abstain from that which, if again indulged in, will be poison, alike to his body and to his mind, and will transport this pernicious influence to his offspring.

CARPENTER.

SANITARY INFLUENCE OF THE EUCALYPTUS.—The *Meteorological Magazine* states that at the Eastern re-union at the Sorbonne, some information was given by Dr. de Pietra Santra, a delegate from the Climatological Society of Algiers, as to the results of an investigation made in Algeria to ascertain the importance and value of the *Eucalyptus globulus* in relation to public health. It appears that reports were received from fifty localities where the aggregate number of blue-gum trees is nearly one million, and from these reports the following conclusions have been drawn: (1) It is incontestably proved that the *Eucalyptus* possesses sanitary influence; for (2) wherever it has been cultivated, intermittent fever has considerably decreased, both in intensity and in frequency; and (3) marshy and uncultivated lands have thus been rendered healthy and quite transformed. Similar results have been obtained in Corsica, where it is computed that at the end of the present year there will be upwards of 600,000 plants of the *Eucalyptus* in full growth.—*Medical Press and Circular.*

THE TERM 'census,' originated at Rome, where the first took place B. C. 566, when the city was found to contain 84,700 citizens. After, B.C. 432, it was held in the Camps Martius, and was generally taken every five years in Rome. The first census of Great Britain was made in 1801. The Act of Parliament, ordering a census to be taken every ten years, 41 George III., c. 15, passed December 31, 1800. Ireland was not included in this return, and the census for that portion of the United Kingdom was first taken in 1813.—*Med. Times & Gazette.*

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SHALL WE HAVE A PROVINCIAL BOARD OF HEALTH IN ONTARIO?

Since publishing the first number of the SANITARY JOURNAL over three years ago, (July 1874), we have many times in its pages endeavored to draw attention to, and awaken public interest in, the necessity existing for some sort of Sanitary Legislation in this country; some provision for an organized body to look after the public health. We have received some highly encouraging letters in reference to the matter from gentlemen taking an interest in the public health and the general well-being of the people, and have reason to believe that some good has resulted, and that more will follow from the efforts put forth in this direction.

In the first part of this number we give a lengthy paper showing the value of health as represented by the great loss arising from sickness and early death; showing that the usual sickness-rate and death-rate may be reduced; and the methods which may be adopted, and which have been adopted in other countries, in order to effect a reduction in sickness and death.

Now, in view of all the facts which are set forth in that paper, may not questions like the following be pertinently asked? Why did not our legislators, especially in Ontario, with a large surplus, *years ago* follow the example long set by those of Great Britain in regard to public health matters? Why be so far behind, and not, rather, in advance of those of Massachusetts and the other United States in this important matter? And how much more time must elapse before some attempt is made by them to provide for reducing the sickness and death-rate?

As regards Ontario, the largest and wealthiest Province of the Dominion, the one which it is to be hoped will lead in all matters concerning the public health, few probably will be disposed to doubt that her legislators would delay in taking some action and providing some measure by means of which the general sanitary condition of the

country and the public health might be improved if they were once satisfied that such a measure would prove valuable to the people,—or valuable in proportion to the cost of carrying it out, etc. We leave it to our readers to judge whether we have or have not furnished in the paper alluded to sufficient evidence to show that something ought to be done by our Government, as has been done by the governments of almost all other countries, tending more directly and effectually to improve the public health.

The facts referred to on the first page of this paper, in reference to recruits for the armies in England and Austria is very suggestive. England has been many years actively engaged in practical sanitary work among the masses, through its Government Board; Austria is only just now, almost, commencing to act in public health matters. And the fact that the governments of most civilized countries, including the Shah of Persia since his visit to England (see p. 228), have recently been following the example so long set by that of Great Britain in this matter of a Government Health Board, is very good evidence that the example is worthy of being followed. The powers of the Local Government Board too, in Great Britain, have been gradually extended from time to time. It must really be supposed that our legislators have not heretofore, with their multitudinous duties, given that thought and attention to this subject, to which, by reason of its importance, it is entitled. With others, we hope something will be done, and soon, by the Government for the public health, and we cannot conceive of any more simple or economical way in which something may be done, or one likely to be more effectual as a commencement, than that of providing for the establishment of a Provincial Board of Health, somewhat resembling in construction, &c., those in the sixteen United States, on account of their simplicity and inexpensiveness, and the good they seem capable of accomplishing.

LEAD POISONING.

The remarkable prevalence of lead in cooking utensils, in wearing apparel, in wall paper, in cloths used for various purposes, and in so many sorts of things in common use, makes it very probable that the poisonous effects of lead in the human body is often an unsuspected cause of symptoms of chronic disease, while it not unfrequently gives rise to well marked symptoms of lead poisoning. A knowledge of the sources of the lead may often help in the detection of the cause of the symptoms. The *Moniteur de l'Hygiene* asserts that as much

as 23 per cent. of sulphate of lead has been observed in some specimens of silk. The thread is soaked in a solution of acetate of lead (sugar of lead) and is afterward exposed to sulphurous vapors, in order to increase its weight.

An epidemic of lead-poisoning recently occurred at Paris which filled a whole *quartier* of the city with alarm. (*Révue Méd.*) It had a most singular and unexpected source. Investigation showed that it arose from large numbers of the customers of a baker at Batignolle becoming the subjects of the poisoning, owing to the oven having been heated with painted wood derived from the demolition of houses. One practitioner of the *quartier* had under his care no less than sixty patients suffering from lead-colic, while some thirty others were under treatment at Beaujon and other hospitals. A curious circumstance is said to have occurred regarding two *concierges*, husband and wife—one of whom, only eating the crumb of the bread, owing to bad teeth, suffered no injury; while the other, who consumed all the crust, had violent colic. Lead was detected by Professor Carnot in the bread sold by this baker.

A material known as "American cloth" has been used extensively in parts of Europe for covering arm chairs, lining carriages, etc. We do not know whether it has been much used in Canada or no, but the public may be on their guard. Recently a number of cases of lead poisoning occurring in young children attracted much attention in Germany, the source of the lead being the tops, or coverings of the children's carriages, which coverings were made of "American cloth." On the authority of the *Medical Times and Gazette* during the last three years a kind of perambulator with a collapsible head of 'American cloth' has been in great favour with the German public, both in Berlin and elsewhere. From the fact of a number of healthy children having suffered from symptoms of lead poisoning, attention became directed to the American cloth as the source of the lead, more especially as there was a unanimous agreement in the reports, from a number of widely separated places, that the cases of poisoning had been almost all observed since the beginning of the hot weather, and that there was a distinct connection between their number and the intensity of the sun's rays. The German Health Office, at once had a number of samples of the cloth analysed, and in all an extraordinary amount of lead was detected. In one specimen as much as 42.7 per cent. of metallic lead was found. From a small piece of the cloth lighted and allowed to smoulder away like tinder, globules of metallic lead, reduced by the ignited carbon,

could be seen to run out. Further examination showed that exposure of the cloth to direct sunlight for six hours rendered its coating friable, and made it scale off.

Truly the sources and causes of disease are numerous, and constant vigilance is required to avoid them.

Annotations.

CANADA MEDICAL ASSOCIATION.

At the tenth annual meeting of this association, held on the 12th and 13th September in Montreal, there was a very fair attendance of members from various parts of the Dominion, and quite a number of delegates from Medical Societies in the United States. Many new members were elected. The Right Hon. Lyon Playfair, C.B., L.L.D., M.P. for Edinburgh University, a gentleman who has taken very much interest in Sanitary matters, visited the meeting and was elected an Honorary member of the association. Many valuable papers were read and discussed.

As relating to Public Health; during the session, the President, Dr. Hingston, in his address, treated at considerable length on the importance of State medicine, which should investigate the air we breathe, the water we drink and all that pertains to our habits as communities—to protect the public health was the duty of State medicine. There could be no more important work than this. The work of educating communities and States was to be done through the people, and to the physician fell the philanthropic though perhaps somewhat thankless task. The conviction was gaining ground that a Central Board of Health should be established for the Dominion, Boards of Health in the Provinces, and in the Municipalities. He enforced earnestly upon his hearers their duty and that of their successors in the education of public opinion to a better knowledge of the principles of health as the means for achieving a proper position for State medicine.

Dr. Canniff, seconded by Dr. Leprohon, moved that this Association reiterates the opinion expressed at last year's meeting in Toronto. "That a committee be appointed to prepare a memorial to present to the Dominion Government, relating to the subjects of Vital Statistics and Public Hygiene," and that the following gentlemen compose this committee: Drs. Hodder, Hingston, Workman, D. Clarke, Playter and the mover and seconder, which motion was agreed to.

Dr. Thayer, seconded by Dr. Larocque, gave notice that he would move at the next meeting of the association, "That application be made to the Local Governments to keep three or four heifers in a convenient place, for the purpose of supplying medical men with vaccine virus derived directly from the cow."

Dr. Workman, Toronto, was unanimously elected President for the ensuing year. The next meeting will be in Hamilton.

ABUSE OF DRUGS.

It was Montaigne we believe who implored that he might get no medicine until he was well and strong enough to bear it. Montaigne might have been pleased to hear the following on this important subject of the abuse of drugs, from the well-known and somewhat celebrated Prof. Frank H. Hamilton, M.A., M.D., LL.D., of New York, who speaks strongly and plainly, and just about as we like to hear one speak in his position. Recently in an address at the annual meeting of the Association of Alumni and Officers of the Medical Department of the University of Buffalo, Dr. Hamilton said: That same Dr. Holmes, whose head is as full of wit and sense as an egg is of meat, has said that it would be well for the world if most medicines were thrown into the sea; that it might be bad for the fishes, but it would be better for mankind. For this unasked for and impertinent suggestion he has received a good deal of orthodox censure, which I am here now to share with him, for I am of the same opinion as Dr. Holmes, and this opinion has long been part of my Christian faith. That the major part of the world does not agree with us is plain. Indeed most people seem to think that the chief end of man is to take medicine. Babies take it in their mother's milk; children cry for it; men and women unceasingly ask for it, and no one dies without it. Shrewd men have taken advantage of this instinct, and in most civilised nations it is to-day one of the chief articles of manufacture and of commerce. It is one of those things which is never permitted to be out of sight—but is thrust upon you in the nursery, in the streets, upon the lamp-posts, and upon the curbstones, along the highway, from the rocks which border the rivers; the medicine-chest follows you at sea, as if the sea itself, a vast gallipot of nauseants, were not enough. In this model city, a drug store sends its blue and green lights from every business corner not occupied as a liquor store, giving a ghastly and ominous complexion to the faces of all who pass or enter. Jennie Deans, stopping at "the great city" of York, on her sad journey to London, to implore the clemency of Queen Caroline in behalf of her poor sister, wrote back to Butler, as the first token of comfort she had derived from her long foot-toil, 'they hae mair medicines in this town of York than wad cure a' Scotland, and surely some of them wad be gude for your complaints.' With what an increase of comfort and acceleration of hopes, had this great city been in her way, might she have looked upon the prodigious stores of medicine displayed from the shelves of its drug stores. Enough, one would say, to cure not only all Scotland, but all the world besides. One might naturally suppose that the supply would equal the demand; but it does not. Everywhere the people are stretching out their arms, and begging for medicine, blessing him who gives and cursing him who withholds. They believe in their simplicity, that if medicines can do no good they can at least do no harm. They imagine also, that there is a medicine which may be regarded as a specific for every

human malady, and that these are known to science, and that therefore we have the means of curing all diseases ; but the people imagine a vain thing. Whatever medicine is capable, when properly administered, of doing good, the same medicine is equally capable, when improperly administered, of doing harm ; and drugs often substitute a malady more serious than that which they were intended to cure. The Irishman said his physician stuffed him so with medicine that he was sick a long time after he got well.

‘ Patent medicines are especially to be classed among those drugs which destroy so many valuable lives. Advertised as ‘ sure cures,’ they are well known to kill more than they cure.

‘ There is no taint of treason in these remarks, gentlemen ; I have always been loyal to my profession and shall remain so until death. I know the value of certain drugs, when properly administered, and can testify to the great improvements in therapeutics within the last quarter of a century. It is the monstrous abuse of medicines that I am denouncing, and all really intelligent physicians join in this denunciation. We believe that there are many other medicines than those found in the drug shops, which are cheaper and safer and less nauseous—air, light, exercise, a light heart and a clear conscience, are all good medicines. Do you also think with me ? If you do, I ask of you that, making all diligence, you add to your faith courage ; and that on all proper occasions you declare your opinions openly.’

Dr. Samuel Wilkes, of Guy’s Hospital, says the idea *cure* is low born and commonplace and is the basis of all quackery.

ANTISEPTIC MIDWIFERY.

Starting from the stand-point that the febrile affections which follow parturition, comprehended in the expression “ puerperal fever,” are due to the introduction of septic matter from without, Dr. Heinrich Fritsch, of Halle, recommends the systematic adoption of certain antiseptic measures, not only with a view to prevent infection by the hand of the accoucheur, but also to remove and destroy any decomposing secretions which may develop in the uterus itself. Before any examination, the hands are to be well washed with soap and then scrubbed with a nail-brush and a solution of carbolic acid. Any instruments to be applied must be previously disinfected. Instead of ordinary oil, carbolic oil must alone be employed to grease the hands and instruments. The patient is, if possible, prepared by a sitz-bath, in which the parts are carefully cleansed with soap, and are then washed out with carbolic acid solution. In the ordinary position of the patient, with the buttocks slightly depressed, the lowest part of the hollow of the sacrum is lower than the posterior commissure, so that liquid collects, and a greater or smaller quantity will always remain behind if nature be left to herself, and may thus fill up decomposition in the secretions. Dr. Fritsch makes vaginal, and in certain cases uterine, irrigation several times a day, with 20

per cent. solution of carbolic acid a *sine qua non* in the after management of every parturient woman. In referring to this treatment, the *Medical Times & Gazette* says: It seems to us to mark a distinct advance in obstetric surgery, and to hold out a real hope of success by taking advantage of a rational indication for the prevention, and even the cure, of puerperal fever. If the great 'peril of child-birth' can be lessened by means so simple, the introduction of antiseptic midwifery will be a boon indeed. The need is pressing, for every year many a young wife and mother is snatched away, the victim of puerperal infection.

VITAL STATISTICS.—The following births, marriages and deaths have been registered in Toronto and London during the last quarter of 1877, ending 30th September:

TORONTO—Totals births, 564; marriages, 180; deaths, 444; still-births, 11. Causes of deaths: Old age, 12; debility, 16; dropsy, 7; cerebral apoplexy, 3; congestion of lungs, 7; cholera infantum, 48; senile decay, 3; asthma, 2; diphtheria, 10; phthisis, 36; diarrhoea, 57; puerperal fever, 2; intussusception, 1; convulsions, 9; typhoid fever, 19; congestion of brain, 14; cancer, 11; exhaustion of mania, 2; tabes mesenterica, 1; found dead, 2; hæmoptisis, 1; inflammation of bowels, 11; meningitis, 11; teething, 7; paresis, 3; endocarditis, 2; hydrocephalus, 2; hip joint disease, 3; tuberculosis, 1; croup, 3; premature birth, 24; cyanosis, 1; peritonitis, 6; pelvic cellulitis, 1; marasmus, 18; dysentery, 7; enteritis, 3; inanition, 4; disease of heart, 14; thrush, 5; measles, 1; pneumonia, 4; metritis, 1; scarlet fever, 6; Bright's disease, 7; jaundice, 4; ulceration of bowels, 1; epileptic fit, 1; small pox, 1; cardiac disease, 1; paralysis, 3; bronchitis, 4; accident, 4; drowned, 6; erysipelas, 2; empyemia, 1; pleurisy, 2; intestinal hæmorrhage, 2; diabetes, 1; tonsillitis, 1; asphyxia, 1; rheumatism, 1; syphilis, 1; sunstroke, 1; softening of brain, 1; apoplexy, 2.

LONDON, ONT., July, births 34, marriages 12, deaths 37; August, births 36, marriages 42, deaths 40; September, births 26, marriages 7, deaths 30.

IN THE CITY OF LANSING, Michigan, the headquarters of the State Board of Health, the mortality at annual rate in 1,000 for April was 5.32; for May, 10.24; for June, 1.32; for July, 2.53.

THE Royal College of Physicians, London, was founded in 1518. The reason for forming the incorporation, as set forth in the original charter is 'to check men who profess physic rather from avarice than in good faith, to the damage of the credulous people' and the King following the examples of other nations, founds 'a college of learned men who practise physic in London and within seven miles, in hope that the ignorant and rash practisers be restrained or punished.' The charter further declares that 'no one shall exercise the faculty of physic in the said city or within seven miles without the College licence, under a penalty of £5.

HEALTH AND SEWAGE OF TOWNS.

In view of the fact that there is in Toronto not less probably than 10,000 privies, and a like proportion in most other cities and towns in Canada, the following may prove interesting, especially the 8th resolution. We have long urged the necessity for the abolition of these pests.

The Executive Committee on the Health and Sewage of Towns (Great Britain), report that the Conference applied itself specially this year to the dry systems, as distinguished from the water-carried systems discussed last year, and have passed the following resolutions thereon :—(*Sanitary Record*.)

1. That the pail system, under proper regulations for early and frequent removal, is greatly superior to all privies, cesspools, ashpits, and middens, and possesses manifold advantages in regard to health and cleanliness, whilst its results in economy and facility of utilisation often compare favourably with those of water-carried sewage.
2. That hitherto no mode of utilising the excreta had been brought into operation which repays the costs of collection.
3. That the almost universal practice of mixing ashes with the pail products, though it applies these as a convenient absorbent, and possibly to some extent as a deodorant, is injurious to the value of the excreta as manure.
4. That, for use within the house, no system has been found in practice to take the place of the water-closet.
5. That, although there are appliances and arrangements by means of which the sewer-gases may be effectually prevented from entering houses, they still do so in the great majority of dwellings, both in town and country, including the metropolis.
6. That it is of the highest importance, in a sanitary point of view, that the metropolitan and local authorities should exercise great vigilance with respect to this matter, and that it should be made by law the duties of these bodies to enforce efficient measures for the exclusion of sewer-gases from dwellings, and to watch over their being efficiently carried out under such a system of payment as shall not press too heavily on those at whose charge the work is done.
7. That in every large town plans of its drainage should be deposited with the local authorities, and be accessible to the public.
8. That all middens, privies, and cesspools in towns should be abolished by law, due regard in point of time being had to the condition of each locality.
9. That the annual accounts of the sanitary authorities especially in great towns, should be prepared and published in sufficient detail.

(Signed by) THE RIGHT HON. JAMES STANSFIELD, M.P.,
Chairman of the Conference.

Committee.—Lord Alfred Churchill ; Sir H. Cole, K.C.B. ; Lieut.-Col. Sir E. F. Du Cane, R.E., K.C.B. ; F. A. Abel, F.R.S. ; General F. C. Cotton, R.E., C.S.I. ; Capt. Douglas Galton, R.E., C.B. ; F.R.S.

A NEW SANITARY INSTITUTE IN FRANCE.—The French have formed a society, independent alike of State control and patronage, for the purpose of encouraging sanitary reform throughout France. This new body will be called the Société Française d'Hygiène, and, in its general organization, is not unlike the Sanitary Institute of Great Britain. The support of many eminent men has been secured. Professor A. Chevellier, was elected president. Dr. de Pietra Santa, to whose energetic advocacy the formation of this society is in part due, has been appointed one of the secretaries. The administrative council is composed of several eminent medical men, and also includes three civil engineers, and a well-known dispensing chemist. The object of the society will be 'vulgarise in the most extensive manner, possible' all that appertains to public health. For this purpose meetings will be held, correspondence opened with all similar societies existing in other countries, documents collected and a library formed. A laboratory will also be opened, analytic researches instituted, and prizes accorded for the best results attained.

HOW FEVER IS SPREAD.—A woman living in a cottage near a railway station received the visit of a friend, who came from London with her child. After a few days stay in the country, the London child was seized with scarlet fever, and its mother, anxious to be at home during the illness, did not scruple to travel back to town though the child was covered with eruption. She had, however, remained long enough in the village to sow the seeds of an epidemic. The children of the woman with whom she had been staying were the first to show signs of the fever; but this person, nevertheless, took them to a school feast. The vicar of the parish, however, discerned the true character of the rash, and at once ordered both mother and children off the premises. But the precaution was taken too late. Several of the school children contracted the fever, and the school had to be closed until the epidemic was over.

MOVEMENT OF THE POPULATION IN THE CHIEF EUROPEAN STATES.—The *Gazette Medicale* (No. 38) extracts the following figures from a table recently published by the *Journal Officiel* relating to the period 1872-75:—1. *Births*: These were 16·27 per 1000 inhabitants in France; 34·23 in Great Britain; 36·65 in Italy; 39·71 in Germany; 40 in Austro-Hungary; and 47·20 in Russia. 2. *Mortality*: There were 21·35 deaths per 1000 in Great Britain; 22·46 in France; 27·72 in Germany; 30·40 in Italy; 34 in Russia; and 38·96 in Austro-Hungary. 3. *Proposition of Excess of Births*: By the two tables given above, we find that the excess of births over deaths per 1000 is 13·20 in Russia; 12·88 in Great Britain; 11·90 in Germany; 6·25 in Italy; 3·81 in France; and 1·04 in Austro-Hungary. Thus, although France occupies the second rank with respect to her slight mortality, she is last but one among the great Powers as regards the excess of births over deaths.

SANITATION IN PERSIA.—Amongst other reforms which the Shah of Persia has introduced into his kingdom since his visit to England, is the establishment of a Council of Health, which entertains the idea of instituting a sort of sanitary service all over the dominion. The importance of this step cannot be over estimated, for Persia enjoys the distinction of serving as one of the nearest stages for the periodical cholera invasion from India. The Persians have begun to publish mortality statistics for Teheran, which in accuracy are said to be decidedly superior to those of Constantinople. The information is obtained by means of the licensed and sworn deadwashers, who, as in all Persian towns, have the sole right to perform the ritualistic washing of corpses. The statistics take no account of Jews, Gebers, and Armenians in Teheran.

SIR THOMAS WATSON, looking on the insular position of Great Britain, is sanguine enough to hope that although he—now as he reminds us in his eighty-sixth year—may not see the abolition of zymotic diseases, yet that it will be witnessed in the next generation, or at least by his grand-children. If such a desired result be attained, (says the *Lancet*,) we are sure that the general public will owe a great debt of gratitude to Sir Thomas Watson himself. ‘Prevention is better than cure,’ is a maxim so frequently reiterated that it would almost seem to have lost its value through familiarity, but the profession and the public have yet to learn and appreciate that ‘prevention is also more easy than cure.’ The discovery of the several producing causes of zymotic diseases has been made with an approach to accuracy, and their arrest can therefore be carried out efficiently and certainly.

DUBLIN SANITARY ASSOCIATION.—The fifth annual meeting of this useful public body was held on Thursday, June 14th inst., (*Medical Times & Gaz.*) the chair being occupied by Dr. Gordon, President of the King and Queen’s College of Physicians in Ireland. The report stated that the number of members of the Association was now 263. The income of the year ending May 31, 1877, had been £157 7s., which exceeded the amount received in any previous year. The expenditure, including £21 due to the Assistant-Secretary from the previous year, was £163 14s. 5d. The report concluded by expressing the conviction of the Committee that the Association has done and is doing a most useful work, and that the fruits of its labours are already apparent in the increased interest taken by the public in sanitary administration in the city which have taken place since the formation of the Association.

It is alleged that the children of skilled artisans are, as a rule, more apt at petty manipulations than the children of ordinary laborers, and that hence the population of certain towns—Birmingham for example—has a great advantage over that of other towns in point of manufacturing industry.

SPONGY IRON AS A FILTER.—In the Sixth Report of the Rivers Commissioners it is stated that the best results with artificial filtration were obtained from a spongy-metallic iron. During continuous filtration through this medium for eight months the Commissioner obtained most satisfactory results. Thames water assumes, under the influence of spongy iron, the chemical character of deep well water, that is to say, water 'which contains the smallest proportion of organic matter, and is almost always bright, sparkling, palatable, and wholesome.

THE WAR AND CHARITY.—An exchange gives a long list of the large sums contributed in Russia by municipalities, societies and individuals, in aid of the sick and wounded soldiers, and can hardly help thinking, with the 'pious editor' of the 'Biglow Papers,' 'that bombshells, grape, an' powder 'n' ball air goodwill's strongest magnets,' and 'that peace, to make it stick at all, must be druv in with bagnets.'

The race of mankind would perish did they cease to aid each other. From the time that the mother binds the child's head, till the moment that some kind assistant wipes the death-damp from the brow of the dying, we cannot exist without mutual help. All, therefore, that need aid, have a right to ask it of their fellow mortals; no one who holds the power of granting can refuse it without guilt.

BOOK NOTICES.

THE CANADIAN MONTHLY AND NATIONAL REVIEW. Toronto: Hart & Rawlinson.

The October number of this Magazine, is, as usual, full of good things. We are given a large instalment of William Black's 'Green Pastures and Piccadilly,' also, 'Titles in Canada,' a short but very good poem, 'De Profundis,' 'Fidelis' concluding rejoinder on 'The Temperance Question' and several other articles. 'Current Events' in the Monthly we have always regarded as one of its most valuable parts. The unbiassed, independent remarks and criticisms on political matters in Canada in it, afford utter relief, often a month of 'Daily' prejudiced extremes from the two political 'sides.' 'Round the Table' is proving an agreeable, refreshing part, and in this number, 'Is the World getting Better or Worse?' the 'Telephone,' and 'Making and Eating Jam,' are well 'served.'

BELFORD'S MONTHLY MAGAZINE. Toronto: Belford Bros.

In the October number of this periodical we find the continuation of 'Up the Thames' profusely illustrated. This forms a very pleasing feature, which we hope will be continued in the Magazine. The concluding chapters are given of 'Nichols as Minturn,'—a very good story, with a moral; though the author rather strains real life in making Benson so plain for, and succeed in, misleading the public as to the cause of his death. Where were the detectives and experts in *post mortems* and toxicology? Any man might get hanged. Another interesting fragment of the war of 1812, by Dr. Canniff; an 'Evening in the Library,' with Whittier; a nice little Canadian 'Story of a Flirt,' and considerable other matter make up a good number.

THE FORTNIGHTLY REVIEW, edited by John Morley, for September. Toronto : Belford Bros.

This number contains, among other papers, the 'Policy of Aggrandisement,' by Prof. Goldwin Smith, who seems to think this policy weakens England, and he apparently sees, in the future, disintegration ; 'Heine on Religion and Politics ;' 'Art in Community,' and 'Cicero as a Man of Letters,' by Trollope ; with 'Home and Foreign Affairs.'

PRACTICAL HINTS ON THE SELECTION OF AND HOW TO USE THE MICROSCOPE, for beginners, by John Phin, editor of the American Journal of Microscopy. Second edition, fully illustrated and greatly enlarged. New York : Industrial Publication Company.

This is a very useful and practical little book of 181 pages, intended for beginners. It gives a full and lucid description of the various parts of the microscope, and their uses, together with information in regard to the preparation and mounting of dry and moist specimens. It is just such a work as should be in the hands of all who are commencing and prosecuting microscopical studies.

REPORT OF THE SANITARY STATE OF THE CITY OF MONTREAL FOR THE YEAR 1876, by A. B. LaRocque, M.D., Health Officer.

This is quite a large volume (66 pages), with a large classified table, containing much useful and interesting matter. It gives the mean temperature of each month, with the number of deaths, and their causes, and at the different ages, and is the result of much careful work. It also gives remarks on district physicians, construction of houses and drainage, slaughter houses, street cleaning, milk, climate of Montreal, etc., etc.

THE PROPHYLACTIC TREATMENT OF PLACENTA PRÆVIA, by T. Gailard Thomas, M.D., Professor of Obstetrics and Diseases of Women and Children, College of Physicians and Surgeons, New-York. Indianapolis, Ind. : Journal Company.

DEFECTS OF HEARING AND OTHER EVILS : THE RESULT OF ENLARGED OR HYPERTROPHIED TONSILS, AND THE URGENT NECESSITY OF IMMEDIATE AND PROPER TREATMENT, ETC., by A. W. Calhoun, M.D., Professor of Diseases of the Ear and Eye, and Clinical Ophthalmology and Otology, in the Atlanta Medical College. Atlanta, Ga. : H. H. Dickson.

AIKEN AS A HEALTH STATION, by W. H. Geddings, M.D., Aiken South Carolina, : Walker, Evans & Cogswell.

BOUDON, a surgeon of some eminence, was sent for by the Cardinal Du Bois, Prime Minister of France, to perform a serious operation upon him. The Cardinal, on seeing him enter the room said, "You must not expect to treat me in the same rough manner as you treat your poor miserable wretches at your hospital of the Hôtel-Dieu." "My lord," replied M. Boudon with great dignity, "every one of these miserable wretches, as your Eminence is pleased to call them, is a Prime Minister in my eyes."