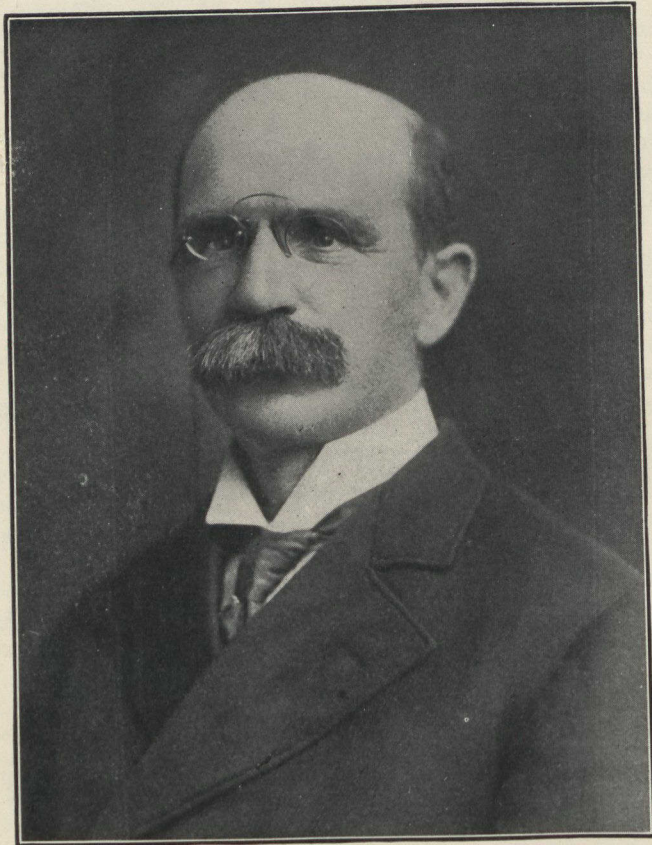


**PAGES**

**MISSING**

Public Health Administration rests upon a  
wide range of sciences, almost  
all of which are in a pro-  
gressive Stage.

*Whitelegge and Newman.*



CHARLES H. RUST

*President of the Canadian Society of Civil Engineers, 1911, who protests against the exclusively medical complexion of certain Boards of Health.—See Page 134.*

# The Public Health Journal

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## Special Articles

### EVOLUTION OF LOCAL PUBLIC HEALTH: COUNTY OFFICERS

By P. H. BRYCE, M.A., M.D.

The study of the evolution of local self-government, whether in England or in Canada, forms one of the most attractive fields of study, whether in the field of legislation or sociology. How it developed rapidly in England in the decades succeeding the first Reform Bill of 1832, and how Lord Durham's report in 1839, as worked out by Lord Sydenham, in 1841, became the foundation of our splendid system in Canada, are now matters of history. As has been pointed out in a previous article in the *PUBLIC HEALTH JOURNAL*, the evolution of public health in Canada, as in other countries, had in the pre-scientific period of modern medicine, to depend upon the occurrence of some epidemic, during which spasmodic, and often temporary, progress was made, whether in legislation or in the enforcement of health regulations.

In this Canada has not been different from other countries; but it may not be without interest to point out to the readers of the *JOURNAL* how existing legislation in Ontario has been brought about. A provision existed in the statutes of Upper and

Lower Canada for the establishment of a central Board of Health, by Order-in-Council; but this provision was repealed when the Provincial Board of Health was established under the Act of 1882. Its duties were to educate the public and advise municipal authorities on matters of health; while the latter were supposed to have a health committee of the municipal council, engaged in carrying out the laws regarding nuisances, etc, found in the Municipal Act. After two years' serious effort, the Provincial Board of Health had to report at the end of 1883 that there were but 50 local Boards of Health in 40 counties, and that there were 12 counties with no boards; that there were in all Ontario but four medical health officers, and but two sanitary inspectors (one of whom was paid).

As executive officer of the Provincial Board, I felt that unless some compulsory law were passed requiring municipal councils to appoint Local Boards, progress in local health work would be practically impossible.

Hence, an appointment was arranged

with Sir Oliver Mowat, then Premier, to discuss the situation, and I well recall that the late Dr. F. Rae, a member of the Provincial Board, and an old experienced municipal politician, at the time Mayor of Ottawa, was delegated with myself to discuss the matter. After presenting the facts and figures to Mr. Mowat, we waited for his reply. In that careful manner so peculiar to him, he said: "Well, gentlemen, it appears to me that there are two points to consider: 1st, Is there a necessity for such legislation; and, 2nd, Are the people prepared for it? After fuller discussion he instructed us to have the Board prepare a Public Health Act and he would consider it. The whole winter was spent by the committee on legislation, Dr. William Oldright, then Professor of Hygiene, being chairman of the Board and most active in preparing the legislation. The Consolidated Public Health Act of England and Wales of 1875 was our model, and it is this which has become the basis of all legislation in Canada. The Act was passed, and I find in the Annual Report of the next year that although the Act went into force only on July 1st, 1884, there had been established within six months 400 Local Boards, or two-thirds of the total municipalities had Boards of Health. Of the 203 cities, towns and villages, 180 had Boards; while there were 184 Boards in 447 townships, and there were 107 medical officers appointed and 136 sanitary inspectors. These facts were the best proof that the people of Ontario were prepared for the forward step.

That the province was saved untold disaster may be judged from the following, which I find in my report to the Board in 1885: "Never since its organization has the Board seen the new year begin with a dawn so ominous of coming evil, and its rising sun so obscured with dark and gloomy clouds as did 1885." "America had escaped cholera in 1884, but its European progress had caused all the people of the American continent to dread the advent of 1885, with its hot season which must certainly come; while in our own province an outbreak of smallpox, which at that time had spread over one township and had extended into several neighboring ones, was being fought with no certain knowledge as to how far its ravages might extend before the disease could be arrested." "With marked success the local organizations, en-

couraged and directed by their Board in these townships of Hastings, Addington and Northumberland, were completed and outbreak after outbreak, which early had spread from the Hungerford centre, was quickly stamped out."

In the Act of 1884 the powers of the Provincial Board as regards enforcing local health regulations were purely advisory; and it was the advantage taken of what had occurred in the epidemic referred to on the quotation that enabled the Board to have the Act amended; providing that whenever contagious disease existed in a municipality the Board had not only to investigate and advise with Local Boards, but had to see that the measures suggested for stamping out disease were carried out by the Local Board, and, if not, then the Provincial Board was empowered to carry them out at the expense of the municipality. The chairman's report in November, 1885, states "that there were in Ontario 563 organized Local Boards, 283 medical health officials, and 160 sanitary inspectors. These assisted by the work of the Provincial Board of Health, which had had a staff of eight medical officers for several months examining every passenger who took train or boat for Ontario out of Montreal, resulted in the year 1885 closing, with the secretary being able to report to the Provincial Board that only 21 deaths had occurred in Ontario during the year, and that these were confined to 7 counties. It will be remembered that over 3,000 deaths had occurred in Montreal, and probably as many more throughout the Province of Quebec during 1885. The lesson had been learned, and until 1900-1901, when the type of smallpox had changed, Local Boards in Ontario were always found ready to act promptly in outbreaks of smallpox and the other more fatal contagious diseases.

But it had early been found with the annual appointment of ratepayers to the Board of Health by the municipal council, that anything like the progressive work of school boards became impossible, because the appointments were annual and the Local Board had no power under the statute to levy any assessments for its work, it being, except when an epidemic occurred, wholly at the option of the council as to whether the Board of Health had any money to work with or not.

In 1891 the Act was changed, providing

for the members of the Local Board being appointed for three years, one-third retiring annually. This, perhaps, assisted somewhat; but so long as the Local Board had no power to definitely levy an assessment for its own work, just so long its members, who came to be mostly a committee of the municipal council, failed to develop any new lines of health work for lack of funds, and it was only in the larger cities that annual grants were placed in the estimates for

public health purposes. The remedy became apparent, and in different years at the annual meetings of the executive health officers of Ontario, the necessity for enlarging the unit of Local Health organizations in Ontario, as had been done for the public schools by Dr. Egerton Ryerson, from township inspectors to county inspectors, was debated and generally coincided in. Along what lines this proposal was worked out will be dealt with again.

## TRANSMISSION OF PLAGUE

By L. W. SAMBON, M.D., F.Z.S.

Long immunity has made us forget the horrors of the "black death," and Defoe's "Journal of the Plague" is to-day read with no more concern than his "Robinson Crusoe." But it should not be forgotten that long periods of quiescence are not by any means a new feature in the history of the disease. For instance, Bombay, after nearly two centuries of immunity, was attacked by plague in epidemic form in September, 1896.

Another cause of public indifference is the erroneous notion that, owing to modern sanitation, we are no longer susceptible to plague. That sanitation has improved in recent times is shown by the greater general healthiness as compared with the conditions obtaining two or three centuries ago; but so-called "ordinary sanitation" is of no greater protection against plague than against other insect-borne diseases such as malaria, yellow fever, relapsing fever, typhus fever, or filariasis. The vehicles of the plague germ are not sewage nor drinking water, but rats and fleas; wherever rats and fleas are to be found, there the conditions necessary for a plague epidemic exist. Indeed, within recent years plague outbreaks have occurred at Oporto, Glasgow, Naples, Cape Town, Sydney, San Francisco, Buenos Ayres, East Anglio and other places, some of which may well boast of their systems of sanitation, systems, nevertheless, inferior to those of Imperial Rome; yet Rome was desolated by a fearful epidemic of plague in the year 291 B.C.

Recent investigation concerning the epi-

demology of plague has shown that in order to prevent the introduction of the disease into any previously immune place we must prevent the introduction of plague-infected rats.

The fact that rats are the main carriers of plague from place to place, though only recently established by the modern sanitarian, was well known to the ancients. Of this we have irrefutable proof. I need but mention the golden images of plague buboes and rats which the plague-afflicted Philistines presented as a trespass offering in returning the Ark, and the colonial coin of Lucius Verus struck at Pergamum at the time of a plague epidemic. On this medallion *Æsculapius*, god of medicine, is represented with a rat at his feet. He takes the place and attributes of a local deity—*Apollo Smintheus*, the destroyer of rats, "whose arrows spread the plague."

Both archæologists and zoologists have long entertained the belief that rats were unknown in Europe during the classic period, that the black rat (*Mus rattus*) was first introduced into Europe in the early Middle Ages, and that the brown rat (*Mus norvegicus v. decumanus*) did not arrive until the 18th century). With regard to the brown rat, we know that large hordes crossed the Volga in 1727, but this fact does not prove that the brown rat first migrated to Europe at that date. Indeed, *Ælian*, in his "De Natura Animalium," probably refers to this species when he relates that the "Caspian rat" at times migrates in numberless swarms and fearlessly swims across rivers, whilst holding on by

its teeth to the tail of the rat in front. However, although I do not think we can assign any date to the first advent of the brown rat into Europe, yet there seems to be sufficient evidence to prove that, in several parts of Europe, it did not establish itself and oust the older occupant until within the last two or three hundred years. The black rat, on the other hand, must have been in Europe from the remotest antiquity of which we have any record. The innumerable figures of rats on Etruscan, Greek, and Roman monuments have invariably been interpreted as representations of the smaller murid, the mouse, or *Mus domesticus minor*; but by a study of the actions in which they are represented, such as feeding on the sea-mussel (*Mytilus edulis*), as seen on the coins of Cuma, I have been able to show that, in many instances, rats, and not mice, are portrayed. Moreover, now that we know that rats are the necessary carriers of plague, it follows that rats must have existed in Europe at least three centuries before our era, since Rome was attacked by the plague at that time.

Considering that the black rat is the chief source of plague in India, China, Persia and Africa, at the present day, and that until comparatively recent times it was the only, or at any rate the one most prevalent, species in Europe, this rodent may reasonably be looked upon as the true plague rat. It is true that both the black rat and the brown rat are equally susceptible to plague, but on account of differences in their habits it is the black rat which comes more closely in contact with man and therefore is the more dangerous. Whilst the brown rat is practically confined to drains, sewers, cellars, and stables, the black rat lives chiefly in the ceilings, up-floors, and wainscots of houses. It is possible for this reason, and not on account of lesser susceptibility, that the ousting of the black rat by the more powerful brown rat may have reduced our liability to those fearful epidemics which desolated Europe during the Middle Ages.

The pneumonic form of plague may occur in any country and in any outbreak. In the recent outbreak on the West African coast about fifty per cent. of cases were of the pneumonic type. In Sydney, this form was not encountered until the sixth outbreak in 1906. The four recent Freston, England, cases were all pneumonic. They probably contracted the disease from the

same source, because pneumonic plague generally reproduces the same form. According to Professor Simpson the history of most pneumonic cases is that the persons attacked have been dealing with infected animals and the disease has most probably been contracted from the animals. The first Freston case was that of a little girl of nine who contracted the disease from a cat which she was in the habit of fondling. The cat died the very same day the child was taken ill.

However valuable cats and dogs may be in keeping down the rat population during ordinary times, when plague breaks out they become, for this very reason, exceedingly dangerous to man. That cats do contract the plague there is no doubt whatever. In India this was noted in Bombay, Karachi, Bandra, and in particular at Ahmednagar, which was overrun with cats having open buboes in their necks. Dr. Hunter records an outbreak of plague among cats in a warehouse in Kowloon, Hong Kong, in which rats had been previously dying of the disease. Dr. Ashburton Thompson saw spontaneous plague in cats in Sydney. In the South African epidemics at Port Elizabeth, East London, and King William's Town, numbers of cats were proved to be suffering from plague. Professor Simpson in his admirable treatise on plague (1905) mentions an interesting case of direct infection, communicated by the cat, which occurred in the Cape Town outbreak of 1901. The Rev. Mr. Gressley, who took up his residence in the Health Camp and voluntarily performed the duties of chaplain, was attacked with plague under the following circumstances: A cat of his became sick and after a few days died; examination proved its illness and death to be due to plague. One peculiarity of the bacillus, however, was its staining with Gram's method. A few days afterwards Mr. Gressley was attacked with plague, his infection being attributed to the cat. Curiously enough the bacillus in Mr. Gressley's bubo also possessed the character of staining with Gram's method.

Dogs are less susceptible than cats, but the danger lies not only in the fact that dogs and cats may contract the disease, but that even without falling sick themselves they may convey infected fleas from rats, other lower animals, or man. The famous Jesuit, Athanasius Kircher, who examined the blood and pus of plague patients under

the low-power microscope of his day to look for an animate causative agent of the disease, writing in 1658, says:

"Cats, dogs, pigeons, fowls, and the like dwelling within the precincts of an infected house, at the very first contact with the things infected take the contagiousness which breeds contagion; and even if, by a kind of contrariety of nature, they are not affected internally by it, they nevertheless do carry it into the neighboring houses and spread the plague they have caught throughout the city. Therefore, in time of plague the slaying and extermination of dogs and cats and suchlike domestic animals is prescribed. Examples beyond all count show how great is the danger from such animals when a house is stricken by plague."

The reality and gravity of this danger was so fully recognized in bygone days that from the remotest antiquity, both in the Levant and in Europe, on the outbreak of plague all cats and dogs were either shut up in cages or destroyed. In Palermo in the year 1576 upwards of 20,000 dogs were killed and buried within two days, and all cats, dogs, fowls, and pigeons were destroyed, not only in the town, but for a radius of four miles all round it. A like extermination of cats and dogs was enforced by the magistrates in Padua during the epidemic of 1630, and in Turin the year after. The Turin edict orders that, "having killed all cats, dogs, fowls, and pigeons, arsenic be prepared for the rats." In the same year, in Bologna, Cardinal Spada issued the following order:

"Seeing that dogs and cats easily contract the prevailing sickness and may infect persons and houses, His Eminence orders that these animals be either killed or placed under confinement, and he gives permission to any one to kill other people's dogs and cats found wandering about the town or entering other people's houses, and for every dog killed in the streets, provided the animal belong to others, the killer shall receive three *scudi*, the reward to be paid by the owner of the dog."

Also in England, on the outbreak of plague cats and dogs were destroyed. In the London epidemic of 1543 the plague order enjoins:—

"That all persons having any dogs in their house other than hounds, spaniels, or mastiffs necessary for the custody or safe keeping of their houses, should forthwith

convey them out of the city or cause them to be killed and carried out of the city and burned at the common lay-stall, and that such as kept hounds, spaniels, or mastiffs should not suffer them to go abroad, but closely confine them."

Again, in 1665, we read in Hodge's "Loimologia":—

"That all occasion of propagating the Pest might be cut off; the Magistrates did not unadvisedly command Dogs, Cats, and likewise Pigeons, to be killed; Least, perchance, these animals wandering here and there, in all places, and birds flying about on all sides, should carry with them the pestilential seed, and become Conveyors of the Contagion."

At the present day the almost universal belief is that plague is conveyed by rat fleas from rat to man, and that, with the exception of the highly-contagious pneumonic cases, man plays no part in the spread of the disease. Basing myself on the history of numerous epidemics, on well-ascertained facts in the epidemiology of plague, and on analogies supplied by other diseases with a similarly wide zoological distribution such as tuberculosis, diphtheritis, smallpox and pneumonia. I hold that in epidemic plague transmission, from man to man is probably more frequent than transmission from rat to man.

We know that plague may prevail for months and even years among rats and other animals without extending to man, or only giving rise to a few sporadic cases; we have an example of it in Suffolk, England. But we also know that, given favorable conditions, such as suitable temperature and moisture, great overcrowding, and an abundance of fleas, a true epidemic may suddenly develop. Then, I believe, new factors come into play; the rat-strain of *Bacillus pestis* is replaced, in many cases, by a human strain, and the rat fleas are replaced by the fleas of man (*Pulex irritans*) and by those of the cat (*Ctenocephalus felis*) and dog (*Ctenocephalus canis*), which attack man almost as frequently as the true human flea, so called. Indeed, in certain countries, as in Canada and the United States, for instance, the dog and cat fleas are the common fleas which infest houses, *Pulex irritans* being very rare. That these fleas are capable of inoculating the plague germ we already know from actual experiment.

Simond, who brilliantly exposed the part



played by fleas in the dissemination of the infection, based his theory firmly on epidemiological, clinical and experimental facts, but, owing to Professor Nuttall's negative experiments, and to the unqualified statement made by Galli Valerio and others that fleas from rats will not bite human beings, it did not at once receive the favor it deserved. Indeed, the Indian Plague Commission stated that "Simond's proposition that suctorial insects play an important part in the transmission of plague from sick to healthy animals is so weak as to be hardly deserving of consideration." Now, however, chiefly owing to the careful experiments of the Plague Commission of the Advisory Committee for Plague Investigation in India, the rat-flea theory of plague has been proved beyond every possible doubt.

The rat-flea theory of plague does not only explain the peculiar seasonal incidence of the disease, but also its greater prevalence among the poor, the sudden loss of contagiousness at the end of the epidemic period, and every other epidemiological feature.

An important fact to which I must draw particular attention is the remarkable impunity with which a plague-infected rat may be handled as soon as deprived of its fleas. Laboratory experience has shown that plague rats are practically harmless, provided their juices are not inoculated into those who dissect them.

The role of the flea is paramount in plague epidemics, as it is in plague epizootics. Therefore our preventive measures should be directed not only against rats, but also against fleas. The most efficient prophylactic measures employed by the ancients against the plague were those which affected more or less directly these insects. In a pamphlet on the plague published in Rome in 1743 we read that "in time of plague we should not suffer in our houses the slightest dirt, but keep them scrupulously clean on account of the grave danger that insects born of filth bring with them."

Every effort should be made to abolish fleas not only because of their great danger in time of plague, but because they may play an important part in the transmission of many of our more common diseases, not excluding tuberculosis in that form known by the name of scrofula, which is limited to the neck glands, and is so fearfully pre-

valent amongst the children of all poor districts.

On several occasions I have endeavored to draw attention to the part played by blood-sucking insects and other body—or household—vermin in the transmission of such diseases as measles, smallpox, typhus fever, scarlet fever, and mumps, our knowledge of which is far less complete than could be desired. With regard to one of these — typhus fever — several years ago I pointed out that its epidemiology showed unmistakably that it must be an insect-borne disease. My contention is now strongly supported by the discovery that Rocky Mountain fever, a form of typhus fever peculiar to the Western United States, is transmitted by a tick, and that in Africa a tick also is the carrier of the local form of relapsing fever, a disease which in Europe frequently co-exists with typhus fever, and is no doubt propagated by the same vermin—the body louse and the bed-bug.

The wonderful progress made within recent years in our knowledge of tropical diseases is based principally on the discovery that the causative agents of most of these diseases are spread by blood-sucking arthropods, that convey them from the sick to the healthy just as pollen is conveyed from flower to flower by pollinating insects. It was Manson who laid the foundations of modern scientific prophylaxis by discovering the exact role played by the mosquito in fostering and disseminating filariasis, a round-worm disease very widely distributed throughout tropical and sub-tropical countries.

The discovery of the role played by the mosquito in the transmission of filariasis led to the discovery of the agency of mosquitoes and other blood-sucking arthropods in propagating malaria, yellow fever, sleeping sickness, and other tropical diseases. It also led to the employment of far more efficient preventive measures directed against the disease carriers.

It is remarkable that, whilst so much progress has been achieved in the comparatively new field of tropical pathology, little or nothing has been attempted towards the elucidation of the many grave infectious diseases which decimate our own populations. Three years ago, whilst endeavoring to gain some information on the epidemiology of diphtheria, I turned to the reports of the British Local Government

Board, but I was greatly disappointed. With the exception of one or two, these reports were based upon the faulty-drain theory, which must now be regarded as exploded.

Although it is only within the last few years that we have begun to adopt measures directed against animal disease-carriers, it is of the utmost interest to find that this method of prophylaxis was practised long ago by the ancients. The consecration of the cat, the hawk, and the snake amongst the ancient Egyptians was obviously a means of protecting the natural enemies of the plague-conveying rat. Even a beetle, the dung-beetle (*Scaraboeus sacer*), was consecrated because by rolling dung into pellets almost as soon as dropped, and burying it in the soil together with its dung-eating larva, this insect prevents the spread of the *aaa* disease, the grave endemic anæmia which the writer of the Papyrus Ebers 3,460 years ago rightly ascribed to the Heltu worm rediscovered in 1838 by Dubini, who named it *Agchylostoma duodenale*. And the ancient Egyptians, like the Hebrews and other Eastern people, protected themselves also against the malaria-inoculating anophelines by mosquito curtains, which the ancient Greeks and Romans borrowed from them and the latter called *canopeum*, from a Greek term which means mosquito. Juvenal informs us that the *canopeum* was a net of cotton with very close mesh, and from Horace we learn that it was used also by soldiers in the field. By means of the Romans the use of the mosquito-net became widely spread throughout Europe, and we still find it used in the England of Shakespeare's time, "the bedstead with a net for knattes" being mentioned in an inventory of the goods of the Abbey of Sawtre, taken in 1537.

A very interesting measure adopted by the ancient Romans to fight the plague was the introduction of rat-eating snakes. In the year 291 B.C. Rome was devastated by the plague. The Sibylline books were consulted, and it was decided to despatch ten ambassadors to Epidauros to confer with the Æsculapian priests. Valerius Maximus tells us how the tribune Quintus Ogulnius, chief of the embassy, returned with the snake sacred to the god of healing, and how a temple to Æsculapius was subsequently erected on the Tiberine island. A beautiful medallion of Antonius

commemorates this event. A galley is represented passing beneath a bridge, and from its prow a snake moves towards the figure of the Tiber-god, who stretches out his right hand in sign of welcome. This legend, I have no doubt, refers to the introduction of rat-snakes in Rome for the purpose of destroying rats and thus stamping out the plague. In fact, Pliny clearly states that "the Æsculapian serpent was imported in Rome from Epidauros; it was kept in the public edifices, and also in private houses"; and we know from Ælian and other authors that the Egyptians kept domestic snakes in their houses and looked upon them as tutelar gods. Indeed, from the remotest antiquity, throughout the East, snakes were kept in houses for the purpose of destroying rats and preventing rat-conveyed diseases. Certainly non-venomous rat-snakes are a far better protection against plague than cats or dogs, because they are not likely to harbor fleas. For years I have thought that the guardian snakes painted on the walls of Roman houses might be a vestige of the long-forgotten introduction of rat-snakes to save Rome from the plague. Only a short time ago, in looking through Dyer's book on Pompeii, published in 1871, I came across the figure of a painting found in a baker's shop of the Via Consularis. In this *fresco* are represented the two guardian serpents, moving, as usual, towards an altar placed between them, on which is placed the incense-yielding pine cone sacred to Æsculapius, but above each snake is a bird darting after a fly. The tail, considerably shorter than the wing, the peculiar marking, and the very action in which they are represented of hawking flies on the wing, show that these birds are the common spotted flycatcher. The association of the snake with the flycatcher, a bird even at the present day kept in the houses of Southern Italy for the purpose of destroying flies, proves beyond doubt that also the tutelar reptile is here depicted as an emblem of a house-pest destroying animal. The information just given explains, I believe, in a satisfactory manner why Æsculapius was represented leaning on a snake-entwined staff. The snake and the pine cone were the emblems of man's conquest over the most formidable of disease scourges.

I have little faith in the success of a general crusade against the rat. Experience has shown again and again that rat

extermination is practically impossible. It may have been otherwise at the time when, according to the distinguished Spanish canonist Azpilcueta of Navarre, rats exorcised and ordered to depart for foreign countries would obediently march down in large bodies to the sea-coast, and thence set off swimming in search of desert islands where they could live and enjoy themselves without annoyance to man. Unfortunately, the days are over when rats could be exorcised or rhymed to death. In India there are now as many rats as ever, notwithstanding the enormous destruction carried out since the plague broke out. No better results were obtained in Japan. The slaughter only renders conditions more favorable for the multiplication of the survivors. The high death-rate is met by an increase in the birth-rate, and, as every one knows, the rat's powers of multiplication are incredible.

What we can do, and what we should do, is to render all wharves, quays, and buildings rat-proof. The rat must be entirely excluded from occupied buildings. He must be de-domesticated, if I may use the expression. Attracted by food and cover, he has imposed himself upon man as an effronted and most dangerous commensal. The proper storage of food, the immediate removal and burning of all food-wastes, garbage, or rubbish, the destruction of places in which he may find harborage, and the contrivance of architectural modifications apt to cut off his approach will certainly discourage him.

The modern sanitarian need not be unnecessarily sanguinary in his methods. Hygeia is no Moloch, and I do not hold with those who would exterminate the whole of the African fauna to stamp out sleeping sickness. Many a species has gradually died out without a struggle owing to changes in its environment. A change in the construction of roofs has banished from many a town the swifts which used to build their nests under the old projecting eaves. To choose an example from amongst disease-carrying species, I might point out that engineering changes in the large seaports of the Atlantic coast of the United States, by abolishing the breeding grounds of the *Stegomyia* mosquito, prevented those fearful epidemics of yellow fever which re-

curred so frequently in the latter part of the 18th century and the beginning of the 19th, long before any one suspected the mosquito of being the carrier of the deadly scourge.

What we need above all is knowledge, and, I would add, the judicious application of knowledge. With regard to plague invasion, we require, in the first place, an exact knowledge of the limits of the area over which the epizootic has extended, and we need a permanent rat-intelligence staff to closely follow its future course. Man, in the affected area, must also be closely watched, and physicians should be on the look-out particularly for cases of glandular enlargements, the so-called *pestis minor*. Instructions concerning the disease, its symptoms, the way in which it is acquired, the means of prevention, should be widely distributed. Prompt and open denunciation must be insisted upon; it is the best policy in the interest of both the patient and the community. The patient suffering from ordinary bubonic plague is of no greater danger than a case of malaria or yellow fever, provided he be efficiently screened from fleas. Pneumonic cases need the most careful isolation.

Wherever plague-infected rats are found every effort should be made to destroy them forthwith.

I am not dictating rules for the prevention of plague. That would necessitate a very careful consideration of many other questions, such as the agency of house flies and other insects, mice, farm animals, contaminated objects, food, etc., on which I have not touched. I am only endeavoring to give a rough idea of the enormous amount of work of a highly difficult and supremely important nature which it behoves governments to carry out.

In closing, I wish once more to dwell upon the great importance of fleas. Without fleas plague rats and plague patients would be harmless. The flea is the all-important agent in the causation of plague outbreaks, and this knowledge, only recently acquired to science through the researches of Simond, Ogata, Loir, Zirolia, Lamb, Liston, and other noble workers who set their lives at naught to conquer the most formidable of disease scourges, has brought plague within the pale of prevention.

# TUBERCULOSIS MORTALITY IN ONTARIO

By GEORGE D. PORTER, M.B.\*

Although a report of the births, marriages and deaths published in our daily papers are read at the breakfast table for their personal interest, very few people ever think of wading through such returns when they embrace a whole county, province or a nation; for mortality tables do not make popular reading. A glance, however, at the accompanying chart will show how the death rate from tuberculosis—"of all diseases the most dangerous and fatal to the greatest number of mankind"—is declining in Ontario.

In the decade preceding 1899 the death

in the province and others projected, five dispensaries and an increasing number of visiting nurses while a general campaign of education is being constantly carried on. In 1908 the deaths from tuberculosis were 2,511 (a rate of 1.1 per 1,000, or 7.6 per cent. of the total deaths).

Is it not fair to assume then that this decline (a decline not shown in the total general death rate) is due in a large measure to the combined efforts already put forth? If not, why is the death rate in some of the other provinces where apathy prevails showing no improvement?

## TUBERCULOSIS MORTALITY

Chart showing the Death Rate from Tuberculosis in Ontario for 10 years.

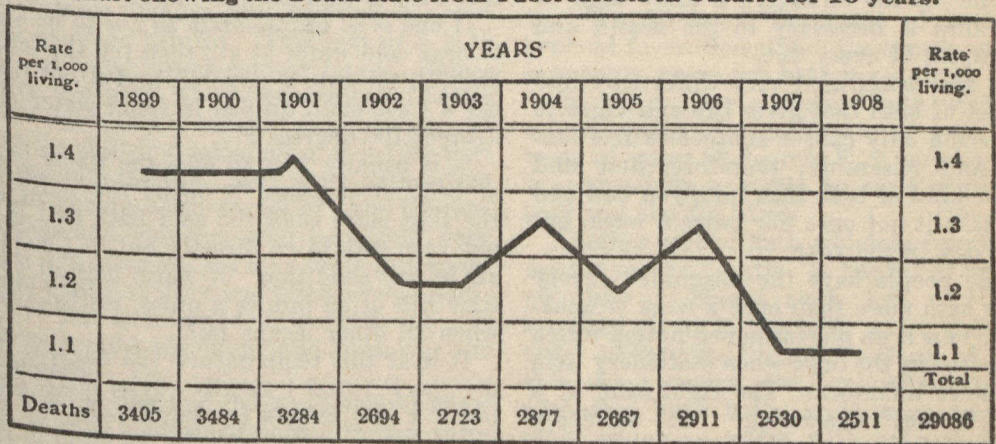


CHART I.

rate from this disease was on the increase until in that year the figures amounted to 3,405 (a rate of 1.4 per 1,000 living estimated population, or, in other words, 11.8 per cent. of the total deaths.)

During that time there were no institutions for the tuberculous in the province; no dispensaries; no special visiting nurses; no educational agencies at work; no general information regarding the prevention of this disease. In 1899 there was only one institution; now there are twelve of them

Assuming therefore (as they have done in other countries in regard to their vital statistics), that this decrease in the death rate from tuberculosis, which means a saving of life, money and much happiness, is due to such efforts, are we not justified in looking for a much greater decrease in the future if we provide more accommodation, especially for the advanced cases, and continue to enlighten the public regarding the methods of preventing this terribly widespread but controllable disease?

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# HYGIENE IN THE HOME

By EMELYN LINCOLN COOLIDGE, M.D.

Physicians of to-day are giving much thought to preventive medicine. We are all beginning to realize how true is the old saying, "An ounce of prevention is better than a pound of cure." In order to prevent illness we must know how to live correctly, day by day making the most of our opportunities and building up a strong body and mind to fight disease.

Water is one of our greatest blessings, and since its various uses are innumerable, we shall first consider its employment externally. This naturally leads us to the daily bath.

The President of Bryn Mawr College said in one of her opening addresses to the students: "In our generation a great gulf is fixed that no democracy nor socialistic theories can bridge over, between men and women that take a bath every day and men and women that do not." She did not put this one bit too strongly; a daily bath of some kind is necessary to the health and self-respect of every one.

We are constituted very differently and the sort of bath that gives life and vigor to one person only causes another to feel languid and miserable; therefore, first find out the kind of bath that suits you best and then take it not once nor twice a week, but every day in the year.

Some people have the misguided theory that a bath more than once a week is weakening. This is an old-fashioned notion which originated in the days when stationery bath tubs were unknown. The right kind of a bath is not weakening, but decidedly strengthening.

Mothers often ask me when they may stop giving their babies a daily bath, and my reply is always the same, "Never."

If you have to let other things go take time somehow for a daily bath. If you are too rushed in the morning, then take it in the evening or whenever you can snatch a few minutes from a busy day.

The cold bath in the morning is the best for some people, but by no means for all; in fact, it is very harmful to many. If you do not feel in a warm-glow and decidedly invigorated after a cold bath followed by a brisk rub with a coarse towel, then do not

repeat the experiment, since it is demonstrated that you are not constituted so that you can stand this sort of treatment.

Sometimes a person can take a rapid cold sponge bath when a cold tub bath or even a cold shower bath at the end of a warm tub bath can not be borne. It is often a good plan to stand in a tub of warm water and very quickly sponge the upper part of the body with a wet cloth wrung out of cold water. Sponge one part at a time, dry it by a brisk rubbing, then go on to the next part. The whole body can then be gone over thoroughly in a short space of time and without chilling a large surface. Before the lower extremities are bathed, some of the upper garments may be put on. This plan of procedure is often very successful with delicate, thin, nervous children and young girls and women who have not enough vitality to warm up the body surface after a cold plunge bath.

If one is so unfortunate as not to be able to bear cold water at all, then try the tepid bath, in the tub, if possible, and if not then use a wash-cloth dipped in tepid water (98 degrees-100 degrees F.).

It is usually wise to take the warm bath at bedtime, because it opens the pores of the skin more than the cold bath and it is not very safe to go directly out in the cold air in this condition. A warm bath at bedtime will often induce a quiet, restful sleep when all other means fail.

It is at this temperature (98 degrees-100 degrees F.) that I usually advise mothers to begin a new baby's tub bath, reducing the temperature of the water as the child grows more vigorous until it can stand a cold bath or at least a cold douche directly after the warm bath.

Tired school girls or those that go to business, often find this tepid bath at night wonderfully restful.

As for the hot bath (105 deg. F. or over), I think as a rule it is not very advisable, unless ordered by a physician for some special purpose. It is this kind of a bath without the cold douche, at the end, that is more apt to be "weakening" than any other kind.

Russian and Turkish baths each have

their uses, but they should not be overdone nor taken without some good reason. Those who take them "just for fun" and every day or two, in my experience, lose much more than they gain.

Various kinds of hot baths are often very helpful for rheumatic disorders; also for liver and kidney trouble, but like all other medicinal treatment they should be ordered by the attending doctor and suited for the exact individual needs of the patient.

Salt water baths are often very healthful as well as enjoyable, but there are some constitutions that cannot stand them. The best kind of a salt water bath is that taken in the ocean surf. The reaction from the massage given by the waves, combined with the stimulating properties of the salt water produces a delightful sensation given by nothing else. It is exceedingly foolish to remain in the water long enough to become chilled and blue, however. Go in quickly, get wet all over at once and stay in only while you are warm and comfortable; 15 or 20 minutes, half an hour at the most.

When it is impossible to get the salt water, some find sea salt dissolved in a tub bath at home helpful. This sort of a bath may be taken either cold or tepid. Babies under two years of age generally do better if the salt water is brought to the house and have the chill just taken off of it before they are put into the tub. Salt water baths often aid in curing some forms of skin trouble. Women and children who take cold very easily are often helped by a brisk salt water sponge bath of neck and chest every morning, if this is followed by a brisk rub. It acts as a mild stimulant and improves the circulation.

Every mother and daughter should know how to give a mustard bath. It is a valuable household remedy. For a heavy cold a mustard foot bath is still often used. One point should be kept in mind in giving all kinds of mustard baths, i.e., see that your mustard is well dissolved and is not floating around in the water in lumps. To insure this the mustard should first be mixed with a little cold water until a perfectly smooth paste is formed; this paste may then be thoroughly stirred into the tub or basin of water being 100 deg. to 105 deg. F. The proportions are one-half a teacupful to each gallon of water, the temperature of the water being 100 degrees-105 degrees F. The mustard foot bath should be given in a deep

foot tub and a blanket should be wrapped around the legs of the person taking it, so that tub and all are covered. This should be continued until the skin on the feet and legs is quite red; they should then be well dried and wrapped in a warm blanket and the person put at once to bed.

A full bath in mustard water is often prescribed for convulsions in which the proportions of mustard and water are the same as that for the foot bath. The temperature of the water should be about 105 degrees F. The object of this bath is to bring the blood away from the brain and to the surface of the body; therefore, when the skin is red it is best to stop the bath, and wrap the patient in a towel and a warm blanket. While the mustard bath is being given, an ice cap or else cold cloths should be kept on the patient's head.

Tepid (98 degrees F.) sponge baths with one tablespoonful of alcohol to a small basin of water are very valuable for reducing fever and quieting a restless sick person. This method of treatment should always be tried before "fever medicines" are resorted to. We all know the value of baths in typhoid fever. Sometimes the simple sponge is enough; again tub bath is required.

On warm days a sponge bath with one tablespoonful of bicarbonate of soda to a basin of water 98 degrees F. is very cooling. It is especially valuable for cases of prickly heat and also for hives.

Another sort of bath which is frequently used is the bran bath. A cupful of bran is put into a cheese cloth bag and then squeezed about in the bath water until the latter looks quite "soapy." Cases of irritable skin, eezema, etc., are often treated with this bran bath, as in such troubles plain water or water with soap is badly borne.

A word as to soaps:

Strong soap with a lot of alkali should not be used in any sort of a bath. White Castile soap, or if one prefers, a kind that is very delicately scented, like one of the pure French soaps, may be used, and is really necessary to most people, but the soap should be well rinsed off the body at the close of the bath.

As for sponges, I can only say, do not employ them. They are simply a nest of germs. Use a washcloth, keeping two in constant use, one for the face and neck and another for the lower part of the body,

ave them boiled, then hang out in the sun two or three times weekly. See also that the nail brush used in the bath is thoroughly rinsed, sometimes boiled and always sunned and aired every day. A good deal of waste skin and matter are thrown off during the bath and unless the toilet articles are carefully attended to they will soon be unfit for use.

Water is used externally in various other ways, both as hot and cold applications. For many forms of bladder and kidney

troubles hot compresses of cloth wrung out of water as hot as can be borne are invaluable. Everyone knows how many are the uses of the household hot water bag. From baby with an attack of colic to grandma with a pain almost anywhere, the hot water bag is a comfort. Water is used cold for many kinds of sprains, bruises and inflammations. A cold compress around a sore throat is often a great relief. Very cold water on the nape of the neck will sometimes stop a nose-bleed or even help a headache.

## THE PURIFICATION OF PUBLIC WATER SUPPLIES

By T. AIRD MURRAY, M.Can.Soc.C.E.

Professor Hyde, in a recent report upon a water supply for Sacramento, assumed that the question of quantity was of much more importance than the question of quality in the first instance. It is taken for granted that, no matter what the quality may be in the raw state, as long as the quantity is sufficient to meet all future wants, the eventual quality can be guaranteed by the adoption of purification methods.

Now this assumption as a basis for a report on a probable water supply has only been made possible of late years. Custom was at one time to insist upon an analysis of any probable water supply, and on the strength of that analysis to either accept or disregard it. This custom, however, is now subject to certain qualifications.

We know that no community can grow beyond its available pure water supply. Pure water is an absolute necessity to a community. If we have an island containing no potable water, no man can exist on that island. If there is only water for one man, then one man only can exist, and so on. No matter what latent wealth that island may contain, without potable water

or the means of delivering potable water, that wealth is useless.

So in Canada, where we have great areas of land wealthy almost beyond measure in productive fertility, the realization of such wealth is subject to the supply of potable water. There are town sites on the prairie which can never become practically more than town sites, there are villages which cannot become towns, towns which cannot become cities, and cities which cannot grow beyond a limited population, because of the fixed quantity of available pure water.

At the present day the amount of available pure water is much greater than it was say ten years ago, because we now know of efficient means by which impurities, either inorganic or organic, can be removed from water, and so water which at one time would, on analysis, have remained condemned, may now be classed as potable. This is the meaning of Professor Hyde's assumption. We can now go straight for quantity, leaving the question of quality to be taken care of as an after thought. This does not mean that quality has no bearing on the choice in the first instance. It only means, as it did at Sacramento, that although a pure ground water supply existed in territory to the southeast of the

city, estimated at twenty million gallons per day, that Hyde advised the city to pump from a polluted river source with an unlimited supply which would meet the probable growth of the city. In fact, the original pure water supply would have limited the city growth, whereas the abundant originally impure supply, satisfied an unlimited city growth. A few years ago the growth of Sacramento was limited, by means of our newer knowledge of treating impure waters, its growth is now unlimited.

As to the modern requirements of a pure water supply, allow me to quote from Hyde's report above referred to:

(a) The supply must be abundant and unfailling.

(b) The water must be free from pathogenic germs.

(c) The water must be free from those allied organic forms which may not as yet be recognized as accompanying disease, but which may, nevertheless, not be conducive to health.

(d) The water must not be discolored.

(e) The water must at all times be free from taste and odors.

(f) The water must be uniformly clear and free from turbidity, both that which may be produced by suspended mineral matters, and also that which may be due to suspended organic impurities.

To the above may also be added that water should not contain more than 15 degrees of total hardness and 5 of permanent.

It is very difficult and rare to obtain water which meets all of the above requirements. Settled large basins of water present the nearest approach to the ideal. Almost all rivers, whether pathogenically polluted or otherwise, are apt to present turbidity at times. Spring waters, though free from turbidity and generally pathogenically pure, are apt to contain the salts peculiar to the strata in which they are found, and are hence generally excessively hard, and at times even unfit for domestic use unless artificially softened.

Filtration has been and remains the most generally accepted method of purifying water. We know that water in passing through the surface layers of the earth very quickly loses all trace of original organic impurities, and the only impurities it may contain must be new ones picked up by contact with the earth. It is, therefore, apparent that if we can artificially repro-

duce and improve upon the best conditions which exist in earth surface layers, we shall produce a method of water purification. That method had been evolved in the system called "Slow Sand Filtration." There is nothing of a mysterious nature, nothing of a complicated chemical character, take place with slow sand filtration. The whole process simply amounts to a method of straining. There are certain engineering features connected with the regulation of the water as applied; but beyond these, the filter is simply a bed of sand of a given area and thickness capable of allowing a given quantity of water to percolate from the surface to the underdrains. The filters are subject to constant saturation and are worked with a depth of water covering the whole surface sufficient to overcome the friction produced by the sand. The quantity of water which can be dealt with daily varies from  $1\frac{3}{4}$  million gallons to  $6\frac{3}{4}$  per acre, depending upon the quality and character of the raw water and the size of the sand grains used.

We have said that the whole process is simply one of straining. Thus it differs almost entirely from the sewage filter, the object of which is not only to strain or hold back, but also to bring about certain chemical changes in the filtrate. Sand filtration does its most important work on and in the surface layer to a depth of about one quarter of an inch. The sand pores are not sufficiently fine in themselves to effectually keep back bacteria. The first few days' working of a sand filter are practically useless as a means of removal of pathogenic impurities; but as a scum of matter, deposited from the water, forms a carpet over the whole surface, bacterial removal efficiency increases to almost 10 per cent. This scum formation is the peculiar feature which gives to slow sand filtration its unassailable position as the best mechanical method of removing pathogenicity from water. Like all human contrivances, however, it has its drawbacks. Chief of these is that the surface scum continues to thicken until it becomes almost impervious and must be removed. Covered in sand filters average in cost on this continent from fifty to sixty thousand dollars an acre and to this must be added cost of pumps, pipe connections, and all the other necessary appurtenances. The cost of operation ranges considerable, from two dollars per million gallons at Mt. Vernon



N.Y., to almost six dollars at Lawrence, Mass.

Slow sand filtration has been termed the English system of treating water, it has been adopted largely in Europe, and latterly in the United States, and is now being installed in connection with the water supply of the city of Toronto.

It may here be said that the introduction of water filtration has universally been followed by a marked reduction in the so-called water-borne diseases, especially in the typhoid rate. At Hamburg, the typhoid death rate averages 47 per 100,000 for the five years previous to the installation of filters, and only 7 for the five years following. At Zurich, before the introduction of filters the typhoid death rate was 69, and after filtration 10. At Lawrence, Mass., the figures were 113 and 25 under similar circumstances. At the present time over 30,000,000 people throughout the world are being supplied with filtered water, more than one-third of this number being in Great Britain. London, Liverpool, Birmingham, Leeds, Sheffield, Dublin, Leicester, Newcastle and Edinburgh are among some of the large cities in Great Britain using sand filters. In Europe, we have Hamburg, Berlin, Breslau, Magdenburg, Chemnitz, Altona, St. Petersburg, Warsaw and Antwerp where such filters have been in successful operation for many years. There are also similar plants at Calcutta, Bombay, Agra, Shanghai, Hong Kong, Tokyo, Yokohama, Osako and other cities. In the United States there are slow sand filters at Philadelphia, Pittsburg, Washington, Albany and many other places. In Canada there is one plant at Victoria, B.C. The typhoid death rate for Canada is 35 per 100,000, for European countries, 16.

Slow sand filtration is an effective method of purifying water. It is costly both in construction and operating expenses. It requires exact and careful management; this applies to all methods of water purification. A bacteriological laboratory should be run in connection with the plant. It is in every sense more suited to wealthy and large communities than to small.

There is another form of filtration more distinctly American, called "mechanical" or "rapid filtration." This system at once appeals to the layman because of the small space it occupies. Whereas slow sand filters will treat on the average 120 million gallons per day, rapid filters average 120

million gallons per day. The sand used is coarse grained, and efficiency in purification depends not so much upon the filter itself, as upon preliminary sedimentation accompanied by the use of a coagulant. The filters are generally installed in units equal to about a hundredth part of an acre. High purification efficiencies are obtained by technical care in regard to proper working and the scientific application of the coagulant. Generally speaking the bacterial removal efficiency is below that of slow sand filters. The makers, and there are many, do not as a rule guarantee a removal of more than 97 per cent. of total bacteria, whereas 99 per cent., and over, removals are looked for with slow sand filters. The temptation to use mechanical filters in this country is very great, as they can be installed easily in a building in connection with the pump plant and so guarded from severe frost.

With reference to the use of a coagulant I will quote from a report of the "Joint Special Committee to examine and report relative to the pollution of Water Supply, and the Best Method of Filtration," City Document No. 15 of the city of Providence, R.I., as follows:

"If the diameter of matter floating about in water is much less than that of the interstices between the grains of sand composing the filter bed, such matter, except as much as is caught upon the sharp edges of the quartz, will go right through the filter with the water."

Now, if a substance could be introduced, drop by drop, into the water before it comes to the filter bed, which would have the effect of curdling the matter altogether, so that every one hundred or so of the smaller particles were made to join together, and become one large particle, much as vapor or steam is condensed into drops, it would follow that they would be caught and held from going through the filter. This is accomplished by adding alumina (alum) to the water as it flows to the filter.

"The amount required is from almost none at all to about three-quarters of a grain, according to the state of the water, say, an average of from one-quarter to one-half grain per gallon in the ordinary condition of the Pawtucket river water."

"The action is the same as when coffee is cleaned by means of the white of an egg. No white of the egg goes to the drinker of the coffee—it is all drained off with the

grounds; and so no alum goes to the drinker of the water, it unites with the impurities in the water and settles in feathery flakes of insoluble hydrate on the top of the filter, and is washed out with its accumulation of impurities when the filter is cleaned."

"The analysis of the purified water shows no trace of the alumina used while the analysis of the wash water shows that the alumina is all washed out with other impurities. This feathery bed of precipitate flakes produced by the alum forms a filtering media of insoluble mineral matter which is well nigh perfect in its character. Bacteria are like the very fine particles of clay of some water, so small as to pass the sand or quartz, but they are caught by the feathery precipitate or alumina hydrate, much as the bacteria contained in air are prevented from entering a phial closed with sterilized wool."

So we see that, first, as in the case with the slow sand filter, so with the mechanical, bacterial removal efficiency does not so much depend upon the filtering material itself as upon an artificial surface or blanket being formed.

One of the most successful installations of mechanical filtration is that at Harrisburg, Pa. The average bacterial removal is above 99 per cent., being 99.62 per cent. for the year 1908.

Now the assertion may be made that these methods of filtering water are not perfect. Efficiencies are given of something over 99 per cent., but, what about the remaining bacteria, the percentage number of which remaining must depend upon the original number to start with.

For instance, there were days last year when the Harrisburg water presented as many as 85,250 bacteria colonies per C.C. Now, a 99 per cent. removal would yet leave over 800 bacteria per C.C. in the water.

The answer to the above assertion is contained in the one word "sterilization." If a water is so impure from a pathogenic point of view that it requires to be filtered and it is necessary to guarantee it at all times, then "disinfection" or "sterilization," as it is sometimes called, must form a final adjunct to any filtration process. This principal has been recognized for some time in Europe as illustrated by the number of ozone treatment plants which have been added to filtration plants. In

many of the European rivers the bacterial counts run so high, that it is impossible to obtain by any method of filtration results which come anyway near the recognized standard for filtered water, viz.: not more than 100 bacteria per C.C.

The principle is also being recognized on this continent. Nashville, Minneapolis, Quincy, New Jersey, and many other towns, even including Harrisburg, have adopted methods of disinfecting the water. While in Canada we have several temporary plants installed, including Toronto, Montreal, Pembroke and several in Western Canada.

Disinfection by ozone has not yet found much favor on this continent, the disinfectant chiefly used being chlorine obtained from chloride of lime. With the Siemens, Halske & De Fries system, efficient disinfecting results can be obtained with ozone. The process, however, of forcing contact between the ozone and the water is expensive, and even in some cases, as at St. Maur, Paris, costs more than the production of the gas. The difficulty arises owing to the fact that ozone is practically an insoluble gas in water, hence the difficulty of obtaining contact with every drop of water. In the case of chlorine in the form of hypochlorite we have a salt which is soluble in water, and which if properly mixed, reaches every particle of water. The well known disinfecting action of chlorine depends upon its power of combining with the hydrogen of water and liberating the oxygen; thus  $Cl_2 + H_2O = HCl + O$ .

This atom of oxygen is said to be nascent at the time of liberation and in this form acts as a most powerful disinfectant. The bleaching power of chloride of lime is due to the same reaction. As long as the lime is kept dry it has no bleaching action, but when in contact with moisture the reaction at once takes place.

The high disinfecting efficiencies obtained by mixing chlorine with water has, of late, brought it into great favor as a temporary expedient in cases of typhoid outbreaks due to impure water. The plant necessary for treatment can be fixed up, practically, in one day. The cost is a mere bagatelle, and the operating expenses run about 50 cents per 1,000,000 gallons of water treated.

The plant need not consist of any more elaborate detail than two or three 60-gal-

lon casks with a small tank supplied with a ball cock to maintain a constant head, fitted with a regulating tap at the orifice.

Hypochlorite is most economically and readily obtained from chloride of lime, the lime containing on the average about 33 per cent. of available chlorine. It is usual to mix in the barrels a one per cent. solution of the lime with water, viz., at the rate of one pound of chloride of lime to 100 pounds, or 10 gallons, of water. The lime settles out as calcium hydrate, and the liquid is led to the orifice tank from which it is dosed into the water supply in the necessary proportion.

The proportions of available chlorine to the amount of water requiring disinfection varies with the character of the water. Turbid water, and water containing considerable amounts of vegetable matter, require much more chlorine than waters which are practically free from these conditions. Lake Ontario water as normally represented by the quality at the city intake, is efficiently disinfected by the addition of .33 parts of available chlorine to 1,000,000 parts of water. Some waters require not more than .15, while others will practically eat up chlorine before it has any chance to act as a germicide. The reason for this variation is the affinity of organic matter to oxygen. No hard and fast rule can, therefore, be laid down for its application. Where a water may vary in condition, relative to turbidity and organic content, so the amount of chlorine must also be varied. The application is not dependent upon any hard and fast rule, but must be based upon a scientific knowledge of degrees of cause and effect.

A water which can be most efficiently treated with any disinfectant which relies upon nascent oxygen, should present constant conditions. If these constant conditions are not peculiar to a raw water, then they should be assured by some preliminary treatment before the disinfectant is applied. The preliminary treatment may take the form of sedimentation, slow sand filtration, mechanical filtration, or a combination of sedimentation and filtration, depending upon local conditions. This practically means that in the majority of cases disinfection is not likely to supersede the accepted general methods of purifying water, but that it will merely form an adjunct or final process, by which any water can be absolutely guaranteed as free from

disease germs.

The introduction of disinfecting processes will probably in the future tend to a more favorable acceptance of rapid filter methods rather than slow methods. The main reason, as we have seen, for a preference for slow sand filtration as against mechanical filtration, has existed in the higher efficiency of the former as a germ remover. Our newer knowledge that water of a constant character, as turned out by a mechanical filter, can be sterilized at a small cost, has caused many of the advocates of slow sand filtration to reconsider their former conclusions.

The question has been asked, whether the addition of hypochlorite, deleteriously affects water for purposes of domestic use. The answer is, that the small amounts of chlorine required, do not in any way affect the water. Where it might be necessary to use large amounts of chlorine, the water must of a necessity receive preliminary treatment to allow of only reasonable amounts being used. The author is of opinion that our present knowledge of the subject limits the permissible amount of chlorine to about .50 parts in 1,000,000.

At the above rate of application it would require with chloride of lime containing 33 per cent. of available chlorine, as follows:

1.5 pounds of chloride of lime to 1,000,000 pounds of water equals 1.5 pounds of chloride of lime to 100,000 gallons of water, equals 15 pounds of chloride of lime to 1,000,000 gallons of water.

In order to make a 1 per cent. solution sufficient for 1,000,000 gallons of water, it would require the 15 pounds of chloride of lime to be mixed with 1,500 pounds of water, or 15 pounds of lime to 150 gallons of water.

There is no doubt that disinfecting processes of water treatment have come to stay, just what form their exact relation will take up relative to older methods is yet somewhat undecided. However, I have as far as possible endeavored to point out the present situation relative to purification of water as far as the removal of pathogenity is concerned. Space will not allow of entering into the hundred and one other impurities which it may at times be necessary to treat. We have algæ growths, vegetable iron growths, such as ferruginous slime, spongidæ, all kinds of complications caused by inorganic matters in solution,

all of which are interesting and capable of remedy.

Sufficient is it, if I have shown you that waters which at one time would have re-

mained condemned as possible sources of water supply, may now be brought into general use.

## ORAL HYGIENE

By ALEXANDER SCOTT, L.D.S., R.C.S.I.

Is life worth living? The answer I should give would be: That depends upon the condition of the mouth and teeth; for life with a clean, healthy mouth and good teeth usually means good health and spirits. But a septic mouth full of bad teeth and diseased gums must bring in its trail not only pain and suffering, but many serious forms of illnesses, making life anything but joyful, and one's daily work a task.

The meaning of the word septic is foul. When I speak of a septic mouth I mean a mouth which has badly decayed teeth—a mouth full of disease germs which poison the blood, caused by being neglected. It is generally accompanied by a foul and fetid breath. It has been stated on good authority that 90 per cent. of the population suffer more or less from defective teeth. Fifty per cent. of the population have more than half their teeth either decayed, filled, or extracted. During the last 50 years the medical profession has gradually come to perceive very clearly that there subsists an intimate relation between the well-being of the teeth and that of the body as a whole. On the other hand, bodily disease and bad health may exercise a considerable influence upon the condition of the teeth. Much has been done for the common weal by the giving of instruction either publicly or in schools in the important art of cooking. Obviously increased assimilability of food is even more important than a mere increase in the supply. But food of the best quality and cooked to perfection may, like poorly-invested capital, yield very small returns to the individual who, possessing functionally faulty teeth, can only imperfectly masticate it, and who, therefore, suffers from disordered digestion and consequent mal-assimilation. His undigested food is as much lost as if it were cast into the drains. Further, it

may be remarked that the purity of food or of drinking water can be of small avail to the person who pollutes all that he eats or drinks by taking it into a mouth swarming with septic germs. It is quite evident that what has not yet been at all effectually impressed upon the community at large is the inter-dependence of the state of the mouth and teeth and that of the other organs of the body. Many persons suffer more or less for years before, to their surprise they learn, either from their medical man or their dentist, that the sole cause of their suffering is the condition of their mouth and teeth. The pale, emaciated man or woman one so often meets in manufacturing centres is almost reduced to a complete wreck from mal-nutrition, due to indigestion and defective assimilation of improperly masticated food, his or her teeth having long ceased to be more than vestiges of their original selves. A type of patient too often met with is the pale anæmic girl, ill-nourished and unable to benefit by her food because of a chronic gastritis: such a patient will be found to be suffering from the ravages of dental caries to such an extent that scarcely a whole tooth remains in the mouth. Moreover, the cavities in her teeth are serving as centres for the propagation of harmful organisms. How often, again, do we come upon people suffering from chronic malaise, in which oral sepsis—and not, perhaps, deficiency of teeth—is the crying evil. Among such is the spare, debilitated, sallow-faced female who complains of headache, languor, loss of appetite, flatulence, indigestion, depression of spirits, etc., symptoms that prove to be wholly due to fermentative and putrefactive processes set up in the gastro-intestinal tract by the continual swallowing of pus proceeding from inflamed gums, and setting up toxic infection, producing all sorts of evils, which frequently end in septicæmia,

or blood poisoning. And few, if any, will be inclined to question the statements of an eminent authority like Dr. William Hunter, who states that oral sepsis as a potential disease factor is more important than any other source of sepsis in the body.

In our general hospitals we find ophthalmic doctors attributing localized inflammation and other diseases of the eye due to pyorrhœa alveolaria—a very common disease in the tooth sockets; laryngologists ascribing laryngitis, pharyngitis, and tonsillitis to organisms born and bred in the mouth; aural surgeons attributing inflammation of the middle of the ear to similar inflammatory processes in the mouth; dermatologists ascribing eruptive affections of the skin to the swallowing of organisms found in an unhealthy mouth; and general surgeons associating oral sepsis and appendicitis as cause and effect.

I have endeavored to show how close is the relationship between dental surgery and other departments of medicine, and how absolutely dependent the health of the body is upon the condition of the mouth. I am not exaggerating or over stating the value and importance of possessing a healthy mouth and a sound set of teeth. It is said only 10 per cent. of the population possess a sound set of teeth. It is hardly necessary for me to say the most potent cause of caries is absolute neglect of cleaning the teeth and keeping the mouth antiseptic. Children who are illnourished from infancy are usually delicate, and this is one great cause of poor teeth. Taking iron tonics is also bad for the teeth, and unless the teeth are cleaned immediately afterwards it is very destructive to the enamel, as they contain mineral acids. All mineral acid tonics should be taken through a glass tube, and even then the teeth should be well brushed after each dose. The strongest and best teeth need attention to keep them sound. An indifferent and poor set of teeth need infinitely more care and attention. Some people bestow far more thought and care on their boots and general appearance, but absolutely neglect their teeth. When the enamel breaks away or decays into a small hole we see a discolored spot, and if we put a pointed instrument into that spot we find it quite soft and possibly painful to the touch. That brown spot is

the soft dentine which is just under the enamel. If the tooth be neglected that hole will rapidly get larger and deeper until it penetrates into the nerve cavity. Now, most of us have had symptoms of a carious tooth, which is known as toothache. There are two kinds of toothache — one which proceeds from an exposed nerve in the tooth in which caries or decay has penetrated to the nerve or pulp cavity, and that which proceeds from a dead tooth. A dead tooth is one in which the nerve has died. If you get a pain in a dead tooth it is caused by a putrefactive nerve being shut up in the tooth cavity. In that condition a bad gas is given off, which, if it cannot escape through the cavity, owing to the pressure of decomposed food in the tooth, the foul gas forces its way through the canal in the fang, causing great pain, and swelling of the gum takes place, and results in an alveolar abscess, and pus is formed, and this sort of thing often ends with sending for the physician instead of the dentist. Some people suffer very much from neuralgia, which generally can be traced to some local cause such as a badly decayed tooth. It is possible to have neuralgia without a decayed tooth; that proceeds from a debilitated condition of health. Symptoms of caries also may be known by a fœtid breath.

This brings me to the important consideration of the prevention of caries. Preventive measures may be considered under two heads. First, and by far the most important, is to build up the constitution in childhood with suitable food; food and environment have much to do with making good or bad teeth. See that all food is properly masticated and the teeth kept thoroughly clean. A child must be kept in good health to have good teeth. Secondly, to have the mouth examined periodically, say every six months, by a dentist, and if there be any teeth needing attention have them put right without delay, and so prevent the ravages of caries spreading, which if neglected must result in a septic mouth, and possibly serious constitutional disturbance. It is not economy to neglect your mouth; a neglected mouth might lead not only to serious illnesses, but in the long run the expenditure of a great deal of money and great pain and discomfort in the bargain.

### The Campaign Against Sleeping Sickness.

The British South Africa Company has decided upon the despatch of a Special Commission, Reuter's Agency understands, to investigate the sleeping sickness in Rhodesia.

The Commission will consist of Dr. Aylmer May, Principal Medical Officer of Northern Rhodesia; Dr. A. Kinghorn, of the Liverpool School of Tropical Medicine; Dr. Leach, of the Northern Rhodesian Medical Service; Mr. O. Silverlock, entomologist; and Mr. Jollyman, bacteriologist. All the Commissioners, with the exception of Dr. May and Dr. Kinghorn, are already in Africa. Dr. Kinghorn sailed from England on February 18, and will be followed later by Dr. May.

An expedition sent out by the Liverpool School of Tropical Medicine is already on its way to the Congo under Professor Todd, well known in connection with sleeping sickness research, and two assistants, and it is proposed that a further Commission shall go from England to conduct separate investigation in another part of the Congo.

Dr. Aylmer May states that the sleeping sickness in the Luangwe Valley of Northeastern Rhodesia, where the Chartered Company's Commission is about to work, is of an entirely different type from that of ordinary sleeping sickness, inasmuch as it is evident that it is not transmitted by the *glossina palpalis*. This insect does not exist within three hundred miles of the valley, and the majority of those attacked have never been in the *Palpalis* area. It is suggested that this disease is carried by the *Morsitans* fly, an insect which, unlike the *Palpalis*, is not confined to well-defined and limited areas in the neighborhood of water, but is distributed over large areas. It does not, however, seem to follow that because the *Morsitans* is a disease-carrier at one altitude, it is necessarily equally dangerous under other climatic conditions. Five Europeans have been stricken with this form of the sleeping sickness, of whom three are dead and two under treatment. Dr. Ayl-

mer May expresses the opinion that if the conditions agreed to by the Conference recently held at the British Foreign Office are carried out, there is not much danger of the disease spreading from the Congo southwards with the extension of the railway. With proper precautions there is no cause for alarm, as the conditions in Northern Rhodesia are entirely unsuitable to the spread of the malady.

### Shuttle-Kissing in England.

The London Lancet calls attention to the possible substitution of a mechanical device for the process called "shuttle-kissing," from which there comes without doubt more or less tuberculosis infection or some predisposition to the disease. The article calls attention to the diseases of occupation among weavers, noting first the case of the ugly fairy god-mother of Grimm's fairy tales, who was afflicted with acromegaly. When asked why her lip is so large, she replies that it is from licking the thread. In "shuttle-kissing" the thread is drawn through a little hole in the shuttle by sucking, an unhygienic process. For, in the first place, several persons use the same shuttle and any infection of the mouth is likely to be disseminated among the other users in the mill. Then, again, much dust accumulates about the hole. It may be the fine line of thread or yarn or sizen, clay or coloring matter. This is drawn into the respiratory tract and can hardly fail to induce pulmonary disease, or at least irritation of the air passages. It is believed that a mechanical threader has been invented which will do away with this objectionable and disease-producing process.

### Effect of Pure Water on Public Health.

One of the most interesting and widely important papers for a season or two is that by Professor W. T. Sedgwick and J. Scott MacNutt, on the general improvement in mortality rates due to the use of purified or better water supplies for public consumption. The article is published

in a recently issued number of the *Journal of Infectious Diseases*. Consideration of water supplies in its modern close relations to the public health seems to have had its impetus from certain observations made independently but almost simultaneously in 1893 by Dr. J. J. Reincke, of Hamburg, and Hiram F. Mills, of Lawrence. Hamburg was taking the water of the Elbe, and Lawrence that of the Mirrimac river. Serious outbreaks of disease had called attention of the authorities to the necessity of a better water supply, and its introduction was watched with extreme closeness. Both Mills, who is a member of the Massachusetts State Board of Health, and Dr. Reincke were struck by the fact that the general health conditions, as manifested by the mortality rates, were improved. At about the same time Allen Hazen, of New York, who ranks high as a water engineer, gave attention to the same subject. Some years elapsed before he published his results, the International Congress of Engineers at St. Louis in 1904 being the important setting forth of his studies, and here he formulated a numerical expression for the comparative effect of the purification of the water supply upon typhoid fever mortality and total mortality. To the first-named discovery, sanitarians have given the name Mills-Reincke phenomenon, and for convenience in nomenclature Sedgwick and MacNutt have called the suggestion of comparative relationship the "Hazen Theorem."

Few health propositions have more popularity than the relationship between water supply and typhoid fever, but the other one, that between water supply and general health of the community, has not attracted the attention that it merits. Hazen's statement at St. Louis in 1904, had for its central fact, that "where one death from typhoid fever has been avoided by the use of better water, a certain number of deaths, probably two or three, from other causes have been avoided." It had been natural to expect a decline in typhoid, but both Mills and Reincke noted other betterments in the general rate than the decrease in the fever could not account for. Reincke, for example, noted the large decrease in infant mortality—under one year of age—that was at once evident in Hamburg. Here the rate had been very high, when the figures of the

leading cities of the world of to-day are considered, being 277 per 1,000 births in 1885; 369 in 1886; 347 in 1887; no time less than 275 and rising to 405 in 1892. In 1893, with filtered water it fell to 240. He saw also diminution in tuberculosis and other infectious diseases. Mills in Lawrence noted a drop of from 52 deaths a year to 12 with the filtered water, and less general deaths, which is equivalent, of course, to an increase in population. A contemporary statement puts the matter thus: "The decrease in deaths has not been limited to deaths caused by diseases which are known to be conveyed by water, nor to infectious diseases, but includes so broad a range of diseases that we must conclude that the general health of the people has been improved and their ability to resist and overcome disease has increased." Hazen, in his consideration states that he believes the whole of the decrease in typhoid to be due to improved water and applied quantitative tests, concluding that the general improvement was seven times as great as could be credited to typhoid alone. His line of argument was that in 18 eastern cities between the years 1890 and 1900, cities that had made no radical change in the water supply, the average lessening of the death rate was 2.28 per 1,000 of population, while in those cities where there had been a marked improvement in the water, the decrease was 4.4 per 1,000.

Education and the better understanding of the elementary laws of hygiene and sanitation are, of course, responsible for a decrease in the general rate, but above this amount the credit has been given to the water. Hazen stated that it might not be easy to show how the water is related to deaths other than those by typhoid, but says, "It may be that a good water supply, used freely and with confidence, results in a better tone in the systems of the population, and so indirectly to a lower death rate, and that a part of the reduction is represented by diseases having no recognized connection with the quality of the water supply." This conclusion is important and far-reaching and is without doubt the key to further betterment of the public health, but it has not heretofore attracted the attention that it should receive. Sedgwick and MacNutt have sought to remedy, so far as may be possible at the present moment this neg-

lect by carrying forward the investigation some steps and bringing the results of their investigations to the attention of the sanitary world. Hazen applied to the problem quantitative methods; he essayed to answer the question, "To what extent is the general death rate reduced?" Sedgwick and his collaborator take up a review of the evidence and consider the question, "In what particular diseases does this reduction take place?" The former portion of the work is based on the knowledge that comparatively few students of public health are aware of the extent of the studies of Reincke and Mills and no one had hitherto attempted to secure any thorough confirmation of their results. The paper therefore reviews the evidence already presented by the three sanitarians connected with the research together with a discussion of fresh material.

Reviewing the Hamburg and the Lawrence figures, the authors have tabulated and put into graphic form the death rates from 1872 to 1900 under certain divisions, typhoid fever, inflammatory diseases of the respiratory organs, pulmonary tuberculosis, diarrhoea, and gastro-intestinal diseases, deaths under five years of age and the total rate minus the typhoid component. The charts give the strongest confirmation to the statements of Dr. Reincke, showing in every instance the large improvement due to the introduction of the filtered water in 1893. Not only have there been large decreases, but there is absence of great fluctuations, in diarrhoeal diseases, for example, in place of the former jumps about from 170 or 180 per 100,000 to 250, 350 and even 530, there has been a comparatively steady rate, 110 to 170; the former jumpings of as much as 300 per cent. are not now more than 70 per cent. The quieting down of a curve in this manner is evidence of the control that sanitarians have been able to effect upon disease. While natural causes may effect it and lower it at times for a year or two, the sudden large fluctuations show it to be uncontrolled by man. The maintenance of such a curve with reasonable steadiness is therefore evidence of progress. All of the other Hamburg curves show during the same period the same kind of controlling influence. The new discussion is a close and critical analysis by disease and by age periods, the result of which shows a sudden and permanent

drop in the total death rate minus the typhoid component and other diseases, and the improvement that Dr. Reincke attributed to the purification of the public water supply is much less than its true share in the remarkable reduction in the total and specific death rates of Hamburg. In a similar way the Lawrence statistics are considered and analyzed, with the same results. Following this portion of the investigation attention is paid to five other cities, Lowell, Albany, Binghamton and Watertown, with Manchester, N.H., as a check upon the work, for Manchester always has had a good water supply. A larger number of cities might have been taken, but these were places for which accurate statistics were available. It is a failing of most American cities that it is difficult to secure reliable figures, on account of inaccurate estimates of population, deficiency of registration and lack of uniform system in collecting and digesting statistics, which uncertainties put too great a burden upon the investigator. Then, again, it is more satisfactory to work with places at no great distance, and again, local statisticians may more easily have access to the data necessary and can study and report on the local problems. The whole matter is one with many causes of variation. It will be interesting, for example, to know what is the position of Washington, in which the filtration of the water supply was not followed by any material decline in the death rate from typhoid fever, and in other places where the pollution of the supply has been varied, with much typhoidal infection, for example mixed with little sewage or little infectious material in a great quantity of sewage. In Hamburg the saving in typhoid mortality was slight in comparison with the reduction in the general death rate (1 to 16), while in other cities, there was a different ratio to each one, Binghamton being the lowest with the ratio 1 to 1.5.

A most surprising result of the study of Sedgwick and MacNutt is the disclosure of the remarkable relation subsisting between polluted water and infant mortality. The graphical charts of these authors bring out the principal facts most strikingly of important decreases following purification of supply. This is a matter that students of preventive medicine will find an interesting one to follow, and



they can doubtless shed much light on the solution of one of the most serious sanitary problems of the time. Diarrhoeal and gastro-intestinal disorders have a relation to polluted water second only to that to contaminated milk. In tuberculosis the evidence though less striking, is interesting and suggestive. There can be little doubt that a considerable portion of the decline in mortality from this disease in Lawrence and Lowell was due to the change in the water supply. For pneumonia, and the remaining infections, the decline is evident on the improvement in the supply. With reference to pneumonia an interesting by-product of the charts is the upward tendency constantly of this disease in the American cities. Although the purer water affected and lowered the rate, it still seems to have the same kind of upward tendency that it had before.

#### To Prevent Typhoid.

The menace of typhoid fever in country districts, a menace arising from polluted drinking water — is thoroughly considered in a report by Myron L. Fuller, of the United States Geological Survey, in which the various sources of pollution are indicated, and suggestions are given for means of protection.

Typhoid fever rates are usually greater in the country than in cities, despite the prevailing belief that farms, isolated as they are from areas of congested population, are ideally situated for obtaining pure and wholesome water.

Failure to protect adequately the wells in farming districts is given in the survey's report as to the most common reason for their pollution, and ignorance of the manner in which ground water circulates is the cause of the faulty protection. Chemical analysis is not rated high by Mr. Fuller as a means of detecting polluted water, for he asserts that a careful common-sense inspection of the district is usually much more to the point.

Sources of pollution in the vicinity of a well or spring should be noted wherever possible, and drinking water should not be drawn except at a safe distance from them. The distance required for absolute safety varies greatly with the character of the rock. For wells sunk in sandstone, slate and shale, 100 feet may be sufficient; where the surface stratum is composed of fine sand, 200 feet should be allowed, and

where it is limestone or granite, much greater distances will be necessary. Water may run polluted in limestone for miles, so that wells in regions where limestone makes up the greater part of the surface rock should be carefully examined after rains for mud and floating particles, for these are pretty sure signs of pollution.

For protecting wells, springs and cisterns, Mr. Fuller advocates, first of all, a water-tight lining to keep out surface water. Wells and springs should always be located a safe distance away, though the custom prevails in country districts of having well and trough side by side.

Considering the same subject of typhoid the United States War Department has issued a bulletin according to which one-seventh of the soldiers in the United States army have been rendered immune to typhoid by vaccination; and to show the need of more effective dealing with the disease which has been the scourge of armies in past years, a few statistics are quoted: During the Spanish-American war there occurred 20,738 cases of typhoid among 107,973 men, with 1,580 deaths. In the Boer war the English had 31,000 cases, with 5,877 deaths, and during the Franco-Prussian war the Germans had 73,396 cases, with 8,789 deaths.

As further evidence of the effectiveness of inoculation some facts are quoted in the bulletin from the experience gained last summer during the army manoeuvres at Gettysburg:

"Ten days previous to leaving Washington barracks," says the bulletin, "92 members of Company A, First Battalion of Engineers, received the first anti-typhoid inoculation, and after arriving at Gettysburg they were given the second and third inoculations. Two other members of the command had already had typhoid fever and were, therefore, immune. There were 24 members of the company who were not immune and who were not inoculated. Some of them objected to the vaccination and others were absent when the treatment was initiated. Five days after the troops returned from Gettysburg, two of the uninoculated men developed typhoid fever, and within the next twelve days four secondary cases of the fever occurred, also among the uninoculated. Not a single case occurred among those who had been vaccinated, while 25 per cent. of the non-immune, liv-

ing under exactly the same conditions in camp and in the barracks at Washington, succumbed to infection."

It is further claimed that the experience of this company has been duplicated in other commands, and that no bad results have followed over 31,000 inoculations in the United States army, which, it is affirmed, affords conclusive proof of the safety of the serum used. This serum is prepared at the United States Army Medical School at Washington, with the greatest care, and medical experts of the army who have studied the matter carefully express the conviction that the immunity granted by inoculation will last for a period of at least three years, and they make the recommendation that in the event of hostilities the vaccination of the militia and volunteers composing the reserve army be made compulsory before mobilization.

#### Social Poison Centres.

A writer in a magazine devoted to the consideration of social and economic questions, makes the suggestion that the wage-earners of this continent be protected against the competition of the pauper labor of Europe.

It might be supposed that after so many years of practical statesmanship applied to the subject, our wage earners might feel reasonably secure from those paupers.

But when the paupers come rushing into America at the rate of over a million a year it is difficult for the highest schedule to assure the American wage earner that he is free from the competition which has been his political bogie man for two generations.

Now comes the Survey Magazine with the proposition that the principle of protection be applied directly for the benefit of the wage earner by passing laws that no alien, during a period of five years next following his arrival on this continent, shall be permitted to work for less than \$2.50 a day.

Of course, no one doubts for a minute that this proposition will be hailed with delight by the men who have made the framing of tariff schedules to protect the American wage earner their chief business in life. One can hear the chorus of welcome swelling in all our large cities. The contention of the free trader that the tariff protects only the employer will at

once be refuted by this new application of the principle. The pauper labor of Europe will be eliminated as a competitive force in industrial life. The struggling American wage earner will then have nothing to compete with but the pauper labor of his own continent.

For a graphic picture of that pauper labor one may recall Ida M. Tarbell's article on Rhode Island. It was printed in a recent number of the American Magazine. The things which this gifted woman saw in the textile communities of a typical United States industrial state test the credulity of the reader. The insanitary conditions in the factories, the polluted air, the lack of even sufficient drinking water or of decent toilet facilities, the high pressure of the work tending to nervous breakdown, the early old age—all these are elements in the picture.

But the most striking feature is the little cemeteries with the rows and rows of tiny graves, telling of the fearful mortality among the children of these industrial communities.

The reason for this harvest of death is plain. The wages earned by an operative in the mills are insufficient for the support of a family. The work of the husband at the machine must be supplemented by that of the wife. There is no home. There are a place to sleep, a hurried bolting of quickly and badly cooked food in the morning, a dash to the mills, ceaseless toil in foul air, a cold lunch at noon, the grind of the machines until night, a dash to living quarters, a hastily concocted meal, then for the wife what mending and cleaning and other things may be required in this substitute for a home.

The wife leaves her loom for a couple of weeks to bring another human into the world. The baby is given over to the care of an "old woman," or, if more fortunate, to a day nursery. The mother goes back to the machine. It is all the more necessary for her to do so now, for she has more mouths to feed.

This is the normal process of family life. It takes no account of long illness nor disabling accidents. The children come into the world weak and anemic, for it is not in the nature of things that mothers under such strain and living such lives should have healthy babies. The children fall easy prey to disease, and are still

further weakened by lack of mother's care and by unwholesome food and surroundings. The cemetery population is appalling, but logical.

Some of the children survive. Perhaps before the parents break down or are disabled the older children are big enough, so that perjury can get them past the inadequate child labor laws and into the mills. And the process begins all over again in a new generation.

What is going to protect the wage earner against this kind of competition? And even more important, what is going to protect America from the poison that is sure to flow from the innumerable social ulcers of which these Rhode Island sores are a type?

#### Hygiene and Missionary Work.

Few people outside the churches, and, as a matter of fact, only a small proportion within them, realize the change which has come over missionary work and effort during the last quarter of a century, according to the Sanitary Record. The days when the natives were simply looked upon as heathens have long since passed away, and the old methods of missionary work have gone with the old ideas. Workers in the mission field to-day realize that if the people are to be brought out of darkness, other things than theological dogma must be brought to their notice. At the recent great Missionary Conference at Edinburgh, in the report on the "Preparation of Missionaries," this point was emphasized. The foremost qualification needed in one going to the mission field is good health. Special arrangements are now made for would-be missionaries to obtain this desired knowledge, and the Livingstone College, England, does this work effectively. The students who go from it take with them a knowledge which helps them greatly in their work, and which as much as anything else helps to make their efforts effective among the native races. It is the part of effective preparation to see that he both knows how to keep himself so, and has formed a habit of paying reasonable attention to the subject. This involves that a man going to a new climate, especially if he is likely to be some distance from medical attention, should know enough of normal physiological action to be able to watch over his own body with

as much intelligence as a typewriter does over his machine, and he should know enough of the actions of drugs not to play rash experiments. Missionaries go abroad to do mission work, not for the good of their health. On the other hand, there is a morbid pride in being overworked and run down, in being too busy to keep well, and an uncalled for carelessness in such matters is also a great evil. The life of a missionary is of so much value that whatever can be done to preserve it should be a matter of moment to all mission boards. Much of the loss of health in the past, and many deaths, have been produced by what we now regard as preventable causes. Malaria, dysentery, typhoid, yellow fever, cholera, sleeping sickness, plague, are diseases prevalent in regions in which the missionary must live and work, but to a very large extent the possession of a readily acquired knowledge will enable the missionary to escape them. It is not enough to say that the medical missionary on the spot can look after the health of his colleagues. It requires that the non-medical missionaries themselves should understand the dangers with which they are surrounded in tropical climates, or they will not escape.

#### Inaccurate Ventilation.

There appears to be considerable difference of opinion among real estate men, as there is among builders, relative to the "fresh air" proposition in homes. While some of the owners are striving to plan for all kinds of ventilation, others are striving to tighten unnecessary leaks in the houses, so that they may be cheaply heated, contending that cheap heat and inaccurate ventilation do not go hand in hand. One of our builders thus writes upon the question:

The air leakage at windows which interferes with proper ventilation is evident enough at this season to those who have to sit near the walls of high buildings exposed to the wind, but probably few recognize that from a fifth to a sixth of the coal burned for heating purposes is spent in raising the temperature of the cold air that enters the buildings through the openings around the windows. When this assertion was first made a few years ago by Mr. H. W. Whitten, few heating specialists would agree to it, but experiments and tests which he has been con-

ducting every winter have convinced many of his former critics of the truth of his claim that about nine-tenths of the total exposure loss was due to this leakage. Since then, heating and ventilating engineers have shown a tendency to urge the adoption of some of the special devices for stopping the drafts around windows, the best of which will shut off over 90 per cent. of the leakage.

Mr. Whitten recently found in a Pittsburgh building that the aggregate clear opening for 150 windows was between 45 and 50 square feet, an amount that seems startling when it is considered that the intake of a fan for heating this structure would have a cross-section of not over 20 square feet. If the windows are fitted with tongued and corrugated weather stripping and interlocking stripping for the meeting rails, Mr. Whitten states that from the heat-unit requirements calculated in the standard manner, from 35 to 40 units may be deducted for every linear foot of sash so protected, and 85 per cent. of the radiation added for exposure of glass surfaces may be omitted. This will enable the heating plant to be reduced from 15 to 25 per cent.

This subject has been discussed several times by the American Society of Heating and Ventilating Engineers, and will be brought up, it is understood, at the next meeting. It deserves to be thoroughly threshed out, particularly methods of checking leakage where metal sash is used, because the coal bills for warming buildings are growing constantly larger as fuel becomes more scarce, and anything that will reduce them without adding equal expense in other ways will be welcome.

#### Mind and Body.

The London Lancet reports a very remarkable example of the possibilities of mind-influence in controlling bodily functions which has recently been brought before the medical fraternity in Vienna. It is stated that a man who lately came under the observation of an Austrian physician possesses "such an extraordinary control over his physical organization that he was even capable of voluntarily changing the position and size of his heart." Also that "He could reduce the frequency of its beats from 80 to 50 each minute, and he could bring it either into the right half

of the thorax (chest), or into the middle line by suggesting to himself (1) that it was going too fast, or (2) that his left lung was collapsed. He could produce at will hyperæmia (congestion with blood), and swelling of any small area of the skin by auto-suggestion, merely by impressing on his mind the belief that he had burnt himself at that spot." It is also reported that this remarkable individual is able voluntarily to contract and dilate the pupils of his eyes either together or separately.

#### The Fight Against Consumption in Many Countries.

The National Association for the Study and Prevention of Tuberculosis tells us that other associations for the prevention of tuberculosis have been formed in Cuba, Porto Rico and Trinidad. In Cuba there are over 40,000 deaths from tuberculosis every year, and the death rate from this disease is nearly three times as high as in the United States. In Porto Rico there are over 6,000 deaths every year out of 1,000,000 inhabitants. In Trinidad, the death rate from tuberculosis in Port-of-Spain, the only place where figures are available, was 4.75 per 1,000 in 1909, nearly three times the rate in New York City. Conditions in the other islands of the West Indies, where no active campaign against tuberculosis has been undertaken, are even worse. The chief reason for this high mortality is found in the unsanitary, dark, and poorly ventilated houses of the natives of the islands.

In Denmark, the campaign against tuberculosis has been carried on systematically since 1895. The reporting of living cases of tuberculosis in Denmark has been more successful than in almost any other country of the world. The death rate from pulmonary tuberculosis has fallen from 19.32 to 13.33 per 10,000 from 1895 to 1908. There is now one sanatorium for every 1,244 inhabitants, and every tuberculosis patient is assured of treatment at a cost within reach of anyone. The state pays three-fourths of the expense of treatment and the patient or his community the remaining fourth.

The Italian Government, on account of the number of tuberculosis cases among the Italian emigrants sent back from America, has appointed boards of examiners in the seaports, whose duty it is to

report the arrival of tuberculous persons. These are then kept under observation in those places where they settle, to prevent further spread of the disease. The erection of new sanatoria and other tuberculosis institutions is being urged in Italy, and the number of beds for consumptives has been considerably increased in different places.

Consumptives in Syria are treated to-day much in the same way as the lepers have been for the last 2000 years. Tuberculosis is a comparatively recent disease among the Arabs and Syrians, but so rapidly has it spread that the natives are in great fear of it. Consequently when a member of a family is known to have the disease, he is frequently cast out and compelled to die of exposure and want. A small hospital for consumptives has been opened at Beyrout under the direction of Dr. Mary P. Eddy.

The Anti-Tuberculosis movement was started in Hungary in 1894, and in 1898 there were five institutions for the treatment of consumption. To-day the campaign is encouraged and financed by the government, and over 200 different agencies are engaged in the fight. A permanent tuberculosis museum has been established at Budapest and a carefully conducted campaign of education is being carried on.

According to a recent report by Dr. Conrad Biesalski, of Berlin, there are 75,000 cripples in the German Empire out of a population of 60,500,000. Over 50,000 of the cripples are in need of proper treatment. Dr. Biesalski states that in 15 per cent. of the cripples examined their deformity was due to tuberculosis of the bones and joints, and that there were 10,000 such children in great need of medical treatment. He advocates the establishment of seaside sanatoria for this latter class of cripples.

Japan is not lagging behind in the fight against tuberculosis. The Japan Health Association has over 200,000 local members and carries on a campaign of lectures in the cities and towns of the country. Tuberculosis is increasing in Japan, due chiefly, Prof. S. Kitasato, of Tokyo, says, to the rapid development of the factory system of industry, the introduction of modern methods and manners of civilization, and the increasing acuteness of the struggle for existence.

When the International Congress on Tuberculosis meets at Rome next September, representatives of over thirty national and provincial associations organized to fight tuberculosis will be present. Among the associations which will be represented are the United States, Canada, Cuba, Trinidad, England, Wales, Ireland, Norway, Sweden, Denmark, Russia, Germany, Belgium, Holland, France, Switzerland, Portugal, Italy, Greece, Bulgaria, Hungary, Austria, New Zealand, Japan, Cape Colony, Argentina, Brazil, Chile, Newfoundland, Roumania, Uruguay and Venezuela.

Tuberculosis is being fought in Northern Korea, according to a report from Dr. Edwin M. Kent, received by the Methodist Board of Foreign Missions. Dr. Kent, who is a medical missionary stationed at Haiju, says that since he established a dispensary at the little hospital in that city, the people of the entire community are leaving their doors open at night, for few of the houses have windows. The native attendants at the hospital are now so accustomed to the regular instructions about fresh air that they will call this sort of advice "yeggy," and at a sign from the doctor will dispense volumes of it to the unsuspecting sufferer. Such has become the hospital's reputation for fresh air advice that a native living in Haiju expressed himself as only waiting for warm weather before going to the hospital, "for," said he, "the doctor will urge me to leave the door open and that is very hard in cold weather."

An important report in regard to Canada, on preventive measures to be taken to stop the ravages of consumption in the Province of Quebec, as prepared by the royal commission on tuberculosis, was brought down in Quebec's lower house last month by Hon. Mr. Decarie, Provincial Secretary.

The commission, which had among its members several of the leading medical authorities of the province, draws attention to the need of combatting the disease by medical inspection of schools and shops and factories, by the opening of dispensaries, isolation hospitals and sanatoria. It is also recommended that an inquiry should be made into the hours worked in different industries, and if the hours are excessive, the same should be remedied by legislation.

It is further recommended that a veteri-

ary surgeon should be appointed to be advisor to municipal inspectors and farmers who are engaged in the milk industry, and who shall have charge of the distribution of tuberculin for cattle infected with tuberculosis.

#### Vital Statistics.

Dr. W. H. Guilfooy, Registrar of Records in the Department of Health of New York, defined vital statistics, at the last meeting of the American Public Health Association, as "the numerical registration and tabulation of population, marriages, births, diseases, and deaths, coupled with analyses of the resulting numerical phenomena with the end in view of 'search-lighting' the path of sanitary progress." In the course of his paper he said:

"Marriage statistics form an interesting part of the subject by reason of their bearing upon the increase of the population and their use as an index of worldly prosperity. The full registration of births occurring in the community is of great value from the viewpoint of the vital statistician, and yet it must be admitted that very few of the cities, not to speak of the States in the United States, are in receipt of 90 per cent. of reports of births occurring within their limits; in Great Britain and Europe the ordinary measure of the mortality among infants under one year of age is the number dying per 1,000 births, reported during the year; in the United States at the present time such a standard could not be set up in any one State, and in very few cities; the birth rate of a community has a far-reaching influence upon the increase of population, age, and sex constitution thereof.

"The chief and noblest aim of the vital statistician is to point out how, when, and where the best efforts of the health officer and hygienist may be directed to conserve health; his analysis of returns will show what forces have been at work in the past tending toward the suppression of all the various forms of destructive disease, at what psychological moment these forces should be put into operation, and in what spot action should be begun.

"Improved vital statistics is the demand of the hour, and in so far as further progress is made in this direction, then so far will corresponding advance be made in preventive medicine; the day of comparing the salubrity of a town, city, state,

or nation with that of another by the use of the crude death rate is passed; the constant repetition of the warnings given in the past that the crude death rate should not be used in this manner is bearing fruit.

"It has been repeatedly shown that given two cities with varying age groupings of the populations, but with exactly the same death rates of these age groups, that one city will possess a much lower general death rate than the other, due not to healthier environment, but to the more favorable distribution of ages of the inhabitants; sex distribution modifies the death rate, the presence of a large proportion of females than males in a population always tending to lower the rate."

#### Rag Flock and Public Health.

No doubt a large trade is done in rag flock in the making of bedding, mattresses, chairs, etc. Recently, says an English journal, the use and condition of flock was inquired into by the British Local Government Board, partly with the object of seeing what were the best means of rendering the material free from germs of disease. In the event of legislation following upon the Department inquiry, a deputation has waited upon the President of the Local Government Board to request that manufacturers should be compelled to sterilize the raw material by steam. A petition to this end has been signed by 780 representatives of all sections of the trade, including a number of medical men.

Manufacturers, however, are rather divided in regard to the most efficient process for rendering the flock innocuous. Some prefer washing, others sterilization by steam. Mr. John Burns, with his customary penchant to find things out for himself, has visited several manufactories, and he now advises both sections of the trade to put their heads together with the object of agreeing upon what would be the most practicable and efficacious method. He has informed the trade that clean and wholesome textile material for bedding and all other classes of upholstery is a matter of actual importance to public health. He also asserts that he has seen material converted into flock that no amount of sterilization could make altogether harmless from a health point of view. On the other hand, he expressed the opinion that washing would have re-

moved nine-tenths of the objectionable elements.

### Child Mortality.

In his lecture before the last meeting of the Royal Sanitary Congress on "The National Importance of Child Mortality," Dr. Arthur Newsholme said that a careful study of infant mortality made it clear that it was greatest under urban conditions of life. Urban life was even more destructive under ordinary circumstances for children than for adults. The high infantile mortality in the counties of Glamorgan, Durham, Lancashire, the West Riding, and Staffordshire, and the low infant mortality in the counties of Oxford, Hereford, Berkshire, Dorset, etc., were ascribable chiefly to the fact that in the former the population lived in houses which closely massed to a preponderant extent in large villages or in small or large towns, while in the latter the houses were largely scattered in lonely homesteads, hamlets, and small villages. It was not that any special virtue appertained to the sanitary authorities of these rural counties. It was rather that the sanitary authorities of the counties having high infant mortality had not realized that the risks of urbanization could only be obviated by strenuous and continued effort on their part. The responsibility for a large proportion of the total infant mortality from infantile diarrhoea must be borne by sanitary authorities. To some extent it was in the power of sanitary authorities to make domestic sanitation easy instead of extremely difficult. The responsibility for the terribly inferior housing which prevailed, particularly in the mining counties, was divided between the sanitary authorities, the colliery owners, and the miners themselves. The colliery owners who allowed the continuance of insanitary houses, grossly overcrowded under their "tied-house" systems, should be taught by the pressure of public opinion that the public were not contented to continue to purchase coal at a price which appeared to imply that the miners' families should live under conditions so unsatisfactory as to involve the sacrifice of the lives of a larger proportion of their children. The miners received relatively high wages, but contented themselves with the grossly inferior homes which in a large proportion of the mining districts of England were

supplied to them under the "tied house" system. Until they were willing to spend considerably larger proportions of their weekly earnings in higher rentals and less in pleasure-seeking and oftentimes dissipation, the sins of the parents would continue to be visited upon the children.

### Another Word on Panama Canal Zone Sanitation.

All the world is aware, in a general way, that sanitary conditions in the Panama canal zone have been vastly improved since American methods, applied by Americans, were introduced in that region. Indeed, it is quite generally understood that the former conditions down that way could not properly be designated as "sanitary" at all.

From time to time have come reports, official and otherwise, of the advancement that has been made, and the public has been kept fairly well informed in that respect. Many there are who have not forgotten the waggish and rather unkind intimation of a few years ago that the first health officers who went from the United States to take up the work of sanitation in Panama anchored their ship at a very safe distance from the shore and remained on board the ship. There is no occasion for staying outside the three-mile limit now for fear of encountering a pestilence. The mortality rate among residents of the canal zone shows a definite reduction from year to year.

A correspondent of the Boston Medical and Surgical Journal states that in 1904, when the population was small, there was a death rate per 1,000 of 15; the following year a somewhat higher rate, about 65 per 1,000, and in 1908 it had dropped to 24 per 1,000; last year, 22 per 1,000, corresponding favorably with the mortality in any of the large American cities.

### Experimenting for Health in Washington Schools.

The schools often appear to be selected by those who have any sort of a fad it is desired to put into circulation as the proper place for giving the matter a try-out, and altogether too often have authorities permitted the schools to be partially diverted from their purposes in order to give opportunity to some person or some coterie to project into public observation a proposition of slight if any practical

use; but in Washington, D.C.—not hastily, but after much thoughtful discussion—the schools have been taken into partnership with the municipality in an effort to attain more beneficial health conditions. There are 60,000 children attending the Washington schools, says a contemporary, and into the hands of each of these pupils there has been given a set of printed health rules which the pupil is told to take home and, in conjunction with the parents, to put into practice. The rules are practical, intelligent and abound in common sense. They could be used anywhere by any people and be productive of good. Here they are:

Food should be taken no oftener than once in four hours. If a child is allowed to go to school without a wholesome, warm breakfast, it is done a positive injury. Food, if it is to be properly swallowed, should be thoroughly and slowly chewed. Most children are inclined to eat too much meat. If sweets are allowed only at the close of meals, and only in limited amounts, and are forbidden altogether between meals, there will be much less sickness from disordered digestion.

The growing child should not be allowed to drink tea or coffee. Children should drink water freely between meals, rather than at meal time. The more a child can be out of doors the better for health. If a child be warmly clothed and does not sit nor stand around a direct draft, there is no danger from fresh air. The best temperature in a living room is 70 degrees, and for a sleeping room 55 degrees. There is no danger from a cold bedroom.

For a child's health, nothing is more important than cleanliness. House flies and mosquitoes are active agents in the transmission of disease. The hands should be frequently washed. The entire body should be carefully washed at least two or three times a week. The teeth should never be used to crack nuts nor to break any hard substance. Food should be near the temperature of the body. The teeth should be carefully cleansed at least twice a day—after breakfast and before going to bed.

Defective eyesight increases as the children go on in school. This handicaps the child in his studies and causes many headaches. Defective lighting should be avoided in schoolrooms and home; there should

be so much natural light that the eye should not be strained even on cloudy days.

Keep the ears clean by the use of soft cloths. Do not thrust any hard substances into them. If anything gets lodged in the ears consult a physician. Children who breathe through the mouth are peculiarly liable to disease.

Clothing should interfere as little as possible with the free, natural movements of the body, or with free, full breathing. Protection from dampness and wet feet is very important. Good wholesome work, bodily or mental, seldom hurts a person. But for children, especially young children, work should be broken by intervals of play. If a child worries about his work, the cause for worry should be found and removed. No child under 12 years of age should sleep less than 10 hours out of the 24, and those who are over 12 need nine hours sleep. A healthy child sleeps quietly through the night. Dreams and restlessness indicate that there is something wrong.

#### The Law and the Bathtub.

Harper's Weekly says that with a population of some 31,000, largely made up of Hungarians, Roumanians, Lithuanians, Slavs, and Mexicans, huddled together in small frame huts, insanitary and without any provisions for baths or running water, or even for any water at all; with as many as twenty persons sleeping in one room no more than 20 feet long 15 feet wide and 6 feet high, in a city with no public baths, public health hung in the balance in Aurora, Illinois. And these atrocious conditions existed among the foreign population through no fault of their own, but because of the unclean quarters provided for them.

With an outbreak of disease threatening in consequence of these conditions, upon taking office Doctor Reder, Health Commissioner, issued an order that everyone should take a bath at least once a week, under pain of imprisonment.

Then he framed a set of rules and regulations for the promotion of public health and had them printed on cards in the various languages of the people living in Aurora. These were posted everywhere—in every room of every house or hut occupied by the poorer classes; ; and the people were notified that city officers



would visit their homes each week to see that the rules were enforced. This was not all. Doctor Reder compelled the property owners to provide water basins and, in many cases, bathtubs for their poor and ignorant tenants.

When Dr. Reder issued the now famous "take-a-bath-once-a-week" order Chief of Police Frank Michels started in to make room in the jail for an overflow of prisoners, but, to his astonishment, not a single arrest for failing to take a bath was necessary. So far there has not been a single prosecution and it is not likely that there will be for failure to comply with the health orders.

#### Towns vs. Cities.

The Boston, Mass., Globe has been looking into health statistics of towns vs. cities and finds that it is comparatively easy to collate mortality statistics for large cities, but these do not show the ratio of deaths to population in rural communities.

The supposition that towns are freer from deaths than cities, according to population, is probably erroneous. The trouble is that the returns of deaths in towns are not gathered so fully by the census agents as in more populous places.

It is generally supposed, because many very aged people can be found in a town, that the locality must be extraordinarily healthful for the residents. Cities have old people, too, but that does not alter the fact that preventable diseases are working havoc in them just as they are in towns. Until the census figures cover larger areas of population, including rural communities, it will never be known how susceptible towns are to the ravages of contagious and other disorders.

As a rule the sanitation of cities is better than that of towns. The problem, therefore, for towns is how to improve the health of the inhabitants by improved sanitation, especially in the matter of water supply and sewerage.

#### Notification of Syphilis and Gonorrhœa.

The California State Board of Health is taking action in regard to reporting venereal infections by the following resolution:

"Be it resolved, That the California

State Board of Health declares that beginning January 1, 1911, syphilis and gonococcus infections shall be reportable and shall be placed on the list of communicable diseases which local boards of health and health officers are required to report to the secretary, it being provided, however, that until further action by this board, physicians may report the facts concerning these diseases by office numbers instead of names of patients.

"Be it further resolved, That this board officially calls the attention of the citizens of California to the contagious and infectious nature of these diseases and requests their co-operation in combating them by every available means — educational, sanitary, medical, social and moral."

We wish them success and we wonder how soon other health boards will follow their example.

#### Sewage Shore Pollution.

Dr. Edward Newton, of the Royal Sanitary Institute, England, argues that sewage poured into the sea results in contamination of the shellfish and the depletion of fish about the coast. The sewage, he claims, is brought back to the shore after being carried out on the ebb tide. The sewage is slightly lighter than the salt water and often warmer, so that it floats, and when the action of the waves breaks it up the heavier portions sink. The flow of the bottom water is towards the shore, and this carries back sewage material sunk in deep water. The set of the tide is shoreward and the sewage sludge is thus driven in. Dr. Newton has made certain tests, and notes that bodies thrown into the sea off the English coast at a distance of two miles have come ashore. A test of the sea water was made by Dr. Newton to determine the presence of certain bacilli indicative of sewage, and it was necessary to go at least 25 miles from both the English coast and that of France to find water free from these forms. No quantitative measures, however, are given by him. His experiment is an indication of the trend of the times and suggests that one of the important, imminent considerations that tidewater cities must take up is the treatment of their sewage before discharging it into harbors or even at the shore of the ocean.

## Editorial

### The President of the Canadian Society of Civil Engineers.

Charles H. Rust, city engineer of Toronto, is the president-elect of the Canadian Society of Civil Engineers for the current year. This is among the most honorable distinctions in engineering circles. Mr. Rust is also a member of the American Society of Civil Engineers, the American Water-Works Association, and the American Society of Municipal Improvement.

Mr. Rust joined the engineering staff of the city of Toronto thirty-four years ago, and in 1898 was appointed city engineer, which position he has held to the present day.

In municipal engineering, the position of city engineer of Toronto is one of the important continental posts; the work calls for high administrative ability, deals with large expenditures, and implies the necessity of deciding upon an almost unlimited variety of problems.

From a public health point of view, Mr. Rust's endeavors to settle Toronto's vital question of sewage disposal and of water supply have been pronounced. For years Toronto's engineer has brought before his city council the necessity of concentrating municipal sewage at one point, instead of continuing the obnoxious practice in vogue of discharging raw sewage into Bay and Lake at various points; and in this he has at least been partly successful. Two years ago Mr. Rust managed to get a money vote for the construction of trunk sewers and a water filtration plant. At the present time the former work is being brought to so successful a completion that the whole of Toronto's sewage may eventually be concentrated at a point east of the city, where it can then be dealt with by modern methods of purification, and thus save Lake Ontario and Toronto Bay from what has been and is an unnecessary amount of pollution. The sand filtration scheme for purifying Toronto's water supply is also nearing completion: a scheme that is based upon the Hamburg system, considered by many experts the most efficient filtration method known to

science.

To those who know Toronto conditions, Mr. Rust's official position in that city does not appear a sinecure; and, it is generally recognized that the engineer of Ontario's queen city has guided his municipal department with credit and honor to himself and to the satisfaction of the community whose confidence he undoubtedly enjoys.

### The Typhoid Epidemic in Ottawa.

The typhoid epidemic in Ottawa is another result of sewage pollution, of drinking water. The epidemic is one of the severest that has occurred in Canada during recent years, demanding the services of Dr. Chas. A. Hodgetts, of the Commission of Conservation; Dr. J. W. S. McCullough, Chief Health Officer for Ontario, and Mr. J. O. Meadows, sanitary engineer for the Province of Quebec, to assist the local health commissioner, Dr. Law, in view of an exhaustive inquiry as to the direct source of the outbreak and the remedying of the careless conditions which probably exist in Ottawa's neighborhood. The inquiry involves a sanitary survey of the Ottawa River and it is to be hoped that the citizens of Canada's capital, and, in fact, of the country at large, as a result of this work will be relieved as far as possible from further risk of contracting a disease which social cleanliness, clearly makes avoidable.

Typhoid is the least excusable of all diseases, but reckoned by mortality, it long has laid a heavy burden upon our communities. Not only is it a long, tedious illness, often leaving in its wake lifelong disabilities, but it is also one of the most expensive of ailments. The average city of 100,000 inhabitants wastes perhaps \$500,000 a year on the luxury of having it, and probably \$100,000 more in efforts to avoid it. That amount of money properly spent would practically eradicate the disease. It has been done in the principal European cities, yet only of late are cities on this continent beginning to cease to poison themselves and each other.

**Inter Alia.**

At the recent annual meeting of the *Adrian Society of Civil Engineers*, President Rust commented somewhat adversely upon the make-up of Canadian Provincial Boards of Health, saying that the Boards are in nearly every case composed almost entirely of medical men, not representative at all of engineers, and engineers have to go before these boards with plans of which they perhaps understand nothing.

Mr. Rust's remarks are apt, in regard to the Ontario Board of Health, which is at present composed entirely of medical men. A number of other Canadian provinces, however, have, we believe, representative engineers on their boards of health, or at least officially in such a position as to be easily brought into consultation therewith. And just here there seems to be no doubt from the standpoint of utility that while of necessity public hygiene finds its chief supporters among the trained medical men, each health board, as Mr. Rust points out, should be constituted on lines broad enough to include among its members those having other than medical qualifications, and more especially perhaps qualifications enabling the giving of expert advice on problems of engineering construction.

The interests involved in public health or state medicine in the present day are wider than those concerned only with the control of some communicable disease. They are concerned with the condition of workers in factories, and the condition of dwellers at home, and they take account of all influences affecting injuriously the bodily, or even the mental, condition of the population. They are particularly concerned with the daily life and work of those classes least able to protect themselves and most exposed by necessity of occupation or social condition to injurious influences. This modern development of state medicine came into being during the hundred years preceding the reign of Queen Victoria, and was made possible by three causes—the awakening of medical interest in questions affecting the public health, the development of the altruistic spirit in public policy, and the rise of and assumption of a position of numerical and political importance by the artisan classes.

Saving human life and the great health questions in general are being recognized as economic as well as medical problems. Pure water and food, plenty of fresh air and clean houses and stores and workrooms check disease. Streets easily cleaned and adequate sewer facilities are also great factors. It is only a question of money spent in prevention. In 1909 about \$10,000,000 was expended on this continent in the fight against tuberculosis. Last year double that amount was spent, and during the present year even more will be raised by private subscriptions and appropriated by cities for this purpose. As a result this dread disease is yielding and is growing less prevalent. Half a century hence it probably will be completely eradicated from this country. The more money that is spent in the fight, the more quickly it will vanish. Typhoid, that was an even greater scourge than tuberculosis, does not cause half as many deaths as it did. The same is true of almost every other disease that has exacted heavy toll of humanity.

Improved health conditions in many cities, resulting in a decreased death rate and greater longevity, are the result of greater cleanliness, of better paved streets, sewer systems extensive enough to meet the needs of the people, and parks and breathing places where fresh air may be had in abundance. People living in such an environment come to take a pride in their surroundings. Civic cleanliness often leads to personal cleanliness. The man whose property abuts on a well-paved street is apt to keep that property in better condition than if it faced a street that was a mud hole in winter and a dust pile in summer. So with the person. Living in a clean city tends to breed a desire for personal cleanliness and physical well-being, and with these things come a mental and moral uplift. Disease and crime both thrive in dark places. Light and cleanliness are the greatest weapons with which we may arm ourselves in our battle with these long-time enemies of the race. This being the case, there should be no want of argument for public improvements that will result in more cleanliness, more light, more fresh air—public works that, in a word, will improve immeasurably the conditions under which we live.

Condemning a building usually means

a long fight in the courts. It is better for authorities to tell the owners of the property to keep up to a certain standard. If they refuse then simply prevent the occupation of the building. That results in stopping the rent. It won't take long before the landlords will make necessary alterations.

The wealthy man, who has surrounded himself with every hygienic and luxurious environment, but who is indifferent to the environments of the homeless and penniless man, may find that his home is next to be visited by the disease contracted in the unsanitary and unhygienic lodging house.

Medical inspection of schools means the co-operation of the school teacher and the school physician, and its object is to protect the children and the community by detecting and excluding cases of contagious disease. It aims to bring about such conditions of hygiene, cleanliness, and ventilation in the school room as will enhance the physical vigor and conserve the health of pupils and teachers. Sixteen years ago Boston inaugurated the first system of medical inspection in America. To-day about 400 cities throughout the continent have organized systems, many of which include dental inspection and special instruction on health habits.

Turning to local application, what are the steps that can be taken in any town or city or in any school to make sure that the children shall have the best advantages in these lines that our present knowledge permits? The question cannot be given a universal answer for conditions in different places are too variable. We can, however, outline half a dozen steps which may be taken by school authorities, by teachers, or by parents' associations or women's clubs to ensure that the children in their particular school shall have at least as good a chance as have school children anywhere.

The first step consists in finding out what conditions are in the schools in which you are particularly interested, and comparing them with conditions elsewhere. In order to make this comparison you need exact information as to what is being done elsewhere. This you can secure by writing to the Bureau of Municipal Research or to

the Russel Sage Foundation in New York City.

After finding out what needs to be done, the next question is how to do it. The best instructions for school teachers and school doctors may be obtained from the Massachusetts State Board of Education in Boston.

The third step is to explain to pupils, to parents and to taxpayers just what these different sorts of physical defects are and why they are important. If you want to get for those purposes clear, forceful statements, telling just what enlarged tonsils, adenoids, and bad teeth are, and what they do, secure a little book entitled, "The Health Index of Children."

The fourth step consists in getting public support and co-operation. This can be done through the local newspapers. For such newspaper material, address the Department of Child Hygiene of the Russel Sage Foundation, New York City.

The fifth step is to produce real evidence from your own school, showing the importance of these matters. If all the teachers will put together at the end of the year the figures showing the difference between the promoted and the non-promoted children in regard to physical condition no further argument will be necessary to show the economic as well as the human importance of the problem.

The practicability of sex instruction has been demonstrated in certain private schools. In the State of Washington sex instruction has been made mandatory by the Board of Education. The question of its introduction into the schools is also up in several other states. School instruction is included in the courses of the high schools of Germany and France.

Hygienic lectures in our universities have caused a notable reduction of immorality among college men in the last five years. The education in the schools should be supplemented by education at home. It is either education in the home or education in the streets.

The ethical side of sex hygiene should be inculcated. The lower moral standard

among men cannot but drive out the high standard among women.

Medical factory inspection as a means of preventing the spread of communicable disease is the next great step in health work that should be taken by municipalities. In view of the fact that medical school inspection now is recognized as one of the most important features of public health work, we believe that a similar service with regard to factories, when properly organized and carried out with the right sort of co-operation between inspectors and the boards of health, would be of incalculable value to the public.

Medical inspection of factories would mean not only better sanitary conditions for the workers themselves, but better protection of their health. Such inspection would include supervision and control of the temperature, humidity, quantity and quality of air supply, the protection of all employees, especially minors, from overcrowding; protection from the known contagious diseases and also from those diseases such as lead, mercurial poisoning, naphtha intoxication and other diseases peculiar to certain occupations.

For example, in one factory in Massachusetts a medical inspector recently found signs of beginning pulmonary consumption in eleven minors. These cases were promptly reported and arrangements made for the placing of the patients under immediate treatment. The result was the restoration to health and working capacity of the afflicted ones, the protection to the employes of the factory and to the entire community from infection.

According to old time methods, the dairy was a factory for the production of disease germs. The farmer seemed to look at sunlight and air as enemies. In a dusty, musty atmosphere, germs and microbes laughed, grew fat, and multiplied after the manner of their prolific infinity.

The hide and hair of the cows would remain matted with dirt from one season to another. Stables were a hog trough, the milkman wore overalls stiff with filth. He would laugh at the effeminate farmer who should wash his hands before touching the cow's udder.

Of course, all progressive farmers have radically improved this situation. But there are others whose milk looks white enough when delivered at the door, but with whom the reign of dirt is not over.

The great trouble is that cleanliness costs time and money. Removal of filth from cattle and their quarters, the necessary laundering of the duck suits that should be worn, adds to the dairyman's toil and to his expense bill.

The great majority of families would be willing, or ought to be willing, to pay a cent or so a quart more to get the dirt out of the milk pail. And the wide awake dairy man is acquiring such a personal fastidiousness, that he feels that dirty milk is an affront to his business honor.

He need not curtain his cow stable windows like the Dutch. But light and airy well-swept barns, and the purifying force of scalding water for his milk bottles, have become an essential to his mental satisfaction as well as a business asset.

The country is not healthier than the city in many ways, notwithstanding the prevailing impression to that effect. The production of disease is due to sanitary inactivity in the rural districts. Typhoid, dysentery and malaria are greater in the country than in the city.

Ventilation was formely of less importance in the old crack-filled houses. Now too frequently there is no system of ventilation in the farm house, though the barn may possess one.

Upon visiting a farm, the owner proudly showed us the "king" system of ventilation, and the well constructed for watering stock. But referring to the house, he said: "I have not been giving much attention to the house yet. I am just getting started." The wife got her water from near the barn.

Were we to ask the women of the country what is of most importance to them, they would reply, an adequate supply of water.

Civilization is measured, says some one, by the amount of soap used. It seems to us that it should be measured by the amount

of water used. When the measure is the kitchen pail filled once or twice a day, civilization is not far advanced.

Woman should not confine herself to her home, or her knowledge to the culinary arts. She should know all about plumbing and house construction.

Within the last few years women have rightly come to take an increasing activity in public affairs, particularly in those that relate to schools, and the general betterment of civic conditions. Under our system of franchise, the women have been confined in their efforts largely to the effect their activities may have upon the moral side of municipal and state affairs. Those of them who are convinced that this influence for good would be enhanced by the extension to them of the right of voters are fairly asking the privilege of wider franchise.

There are four factors in the fight for pure milk: the producer, the consumer, the state, and the municipality. No one of these can accomplish the object alone without the other three, and no two or three can be successful in securing pure milk without the co-operation of the others.

In prosecuting dairymen, the state officials always try to co-operate with municipal authorities, as it is difficult to accomplish results in any other way.

The consumers are largely responsible for the kind of milk, and the purity of the milk which they receive. You cannot always visit your dairyman's place, but you can see how clean his wagon is, how clean he is personally and how clean his boots are, or whether there is any manure where it should not be. By these things you can judge, at least to some extent, the kind of dairy farm which he keeps.

If it is possible to do so, you ought to take a drive sometime when you are out driving, to the dairy farm and notice whether or not the conditions are sanitary.

Often consumers want pure milk, but they are not willing to pay the higher price for it. They consider the low price of the milk and do not stop to consider whether or not it is pure or free from

manure and dirt which drop into the pail during the milking.

Impure milk annually leads to the death of more children than all other causes of infantile mortality combined. The average adult has some milk or cream in his tea and coffee and as an ingredient of his food. However, it constitutes a small part of his food. On the other hand, milk is about the baby's only food, and when it is impure, unclean, laden with virulent disease-germs—or even diluted and unnourishing—it is full of danger.

All this, of course, has already been said many times. In many large American cities there are now charitable organizations to inspect the milk and provide pure and clean and hygienic milk to the infants of the poor. We have city and territorial inspection of dairies and cows and retail milk dealers, and laws to protect the consumers and the babies, and courts to enforce the laws. Society in the last decade has erected an elaborate and, in the main, effective protection against the dairyman whose ignorance or greed constitutes a public menace. Confiscation of their business—for that is what it means to order the dairyman to discontinue the sale of milk—may seem a summary way to punish them for violations of the law. And yet, in what other way are the lives of thousands of children to be protected? The police and the law and the courts would make short shrift of a merchant found selling poisoned candy or loaded pistols to little children. Why should the vendor of poisonous milk receive more clemency? Such dairyman, whether ignorant or criminally avaricious, have demonstrated their unfitness and untrustworthiness.

Recent advances in scientific cattle and hog raising have been much more rapid than in scientific child raising. The situation should be reversed to give the child a square deal. There is a crying need for education along these lines, and especially urgent is the need for such a reform in the great cities. To do this a systematic educational campaign must be started under the leadership of the medical men of the great cities.

For some time past there have been

many persons, and amongst them medical men of experience, who have felt confident that there is some connection between diet and cancer. Their researches have led them to try and find out, firstly, if a wrong diet can actually lead to the production of cancer, and secondly, if any system of diet can cure the disease once it has become established. Unfortunately, diet forms one of those subjects about which people are wont to adopt the most extreme views and the most violent attitudes towards the adherents of dietetic methods other than their own, so that up to the present much argument has taken place around this matter of diet and cancer, whilst every little really scientific research has been carried out in regard to it. There are some who say that all meat foods tend to produce cancer or conditions predisposing to it, whilst others say that a vegetarian diet neither prevents it nor has ever cured a case.

As a matter of fact, this seems to be just one of those discussions which could be quite definitely settled by a series of practical observations. Every hospital has, unfortunately, to deal with numbers of sufferers from advanced cancer for whom surgery and radium can do nothing, and who would willingly try any system of diet prescribed by the hospital physicians. So far even the most enthusiastic supporters of vegetarian and similar systems of diet, although claiming that in this direction lies the cure of cancer, have never produced a series of cases in which the diet advocated has brought about any such marvellous result. However, it is now proposed to make a definite attempt to investigate the connection between diet and cancer at two well-known hospitals, the Metropolitan and the Royal Waterloo Hospital for Children and Women in the Waterloo road, S.E., London, England. If this proposal is carried out a number of patients afflicted with cancer in an advanced stage—so called "inoperable cancer"—will be placed on a special dietary at each of these institutions, and the results carefully noted. These results will, of course, be awaited with the greatest interest.

It has been scientifically demonstrated

that rats spread the plague, but a plague is peculiar, in the fact that in nearly all cases the spread is largely a matter of cleanliness. The close packing of people in communities and the ignorance of hygienic laws are the cause of plagues.

There is a profound lesson in the plague which is ravaging vast provinces of the Chinese Empire and it is a lesson which the most advanced peoples must constantly have in mind. Time was when pestilence was thought to be a punitive decree of God, against which it were impious to contend. But science has meanwhile taught us that pestilence is the inevitable punishment which follows upon neglect of hygiene and that the punishment may be stopped by removing the cause. According to the old view, the sole hope of a stricken populace lay in prayer; according to the new knowledge, the sole salvation lies in the perfect cleanliness which is the threshold of godliness.

The Chinese officials could get no help from the masses in this crisis, even if the officials were themselves enlightened enough to fight the plague in the scientific way. The government of British India is the most intelligent and philanthropic despotism the world ever saw. Yet the government of British India has more than once seen millions perish, despite a most lavish expenditure of energy and cash. For those fatalistic hordes, to whom life is at best a fierce misery, death has no terrors and sanitation runs counter to some of their most cherished beliefs. But has the Occidental a right to laugh at these childish superstitions which the most unlettered Occidental child will soon be too learned to accept? How few are the years that have passed since yellow fever was a mysterious curse, against which we could find no better safeguard than the "shot-gun quarantine." Is not the land still full of people who doubt the "mosquito theory," though that theory has been demonstrated with quite as much clearness as the binomial theorem? Have not the Occidental populations been fearfully slow to learn the lesson as to smallpox, diphtheria and similar maladies? It is easier to pray than to keep clean, and men move along the line of least resistance while they can.

## Library, Laboratory & Clinic

*"The Elizabeth McCormick Eskimos."*—

For we have—

Cold sprays that give us

Cheeks like the rose,

Temperatures that are normal,

This our record shows.

Appetites so hearty

Our weight grows and grows.

We're the Elizabeth McCormick

Cold-air Eskimos.

That goes.

We have no doubt it "goes," especially when it is re-enforced with pictures of the "Eskimos" in their warm blanket suits in their schoolroom on the snow-covered roof of the Mary Crane Nursery, Chicago. The PUBLIC HEALTH JOURNAL has received and read with pleasure the attractive little volume on "Open-Air Crusaders," which tells of the year's work of the children in the Elizabeth McCormick Open-Air School in that city.

Most of the children whose stories are recounted in this little volume had — to put it euphemistically—a tendency to tuberculosis. But the regimen of the open-air school checked the progress of that disease, increased the weight of the children and greatly improved their school standing. The story of the "Open-Air Crusaders" of Chicago will go all over the continent to boost one of the sanest movements in school hygiene.

*Sanitary Law in Question and Answer.*

—For the use of Students of Public Health.

By Charles Porter, M.D., B.Sc., M.R.C.P.

(Ed.), of the Middle Temple, Barrister-at-Law,

Medical Officer of Health, Marylebone,

etc. Longmans, Green and Co., 39 Paternoster Row, London; New York, Bombay,

and Calcutta: It would be an immense advantage to have the bewildering number of

acts relating, casually or specifically, to

sanitary law consolidated or codified, so as

to afford those who have to obey them a reasonable chance of becoming aware of their

existence, if not of understanding them.

Dr. Porter, who has a twofold qualification

for the task, being at once a medical officer

of health and a barrister-at-law, has pro-

duced for the use of students of public health a handbook that at least indicates a narrow pathway through the morass, and will probably serve other uses besides those to which it is professedly dedicated. It is thrown into the form of question and answer, a method that has much to recommend it, and was at one time in universal use in educational books — as our grandparents, with reminiscences of "Mangnall's Questions," "Pinnock's Catechism," and of sundry little books on architecture, could testify. The method, though long ago discarded, seems to be educationally sound, a printed question being an unrivalled means of stimulating attention and concentrating the mind upon specific points, and Dr. Porter employs it with excellent effect. The book, although of slender proportions and low price, must have involved an immense amount of labor in the preparation; whereby Dr. Porter has earned the gratitude of all whom he thus absolves from the heart-breaking task of digesting the law for themselves. The book is of equal value to public officials entrusted with the administration of the sanitary laws, and those persons who, like architects and builders, are compelled to meet official requirements.

*Brochure on American Life-Waste:* A very timely and telling compilation has been prepared by E. E. Rittenhouse, of New York, devoted to "American Life Waste," showing how and where it is increasing. In the United States, it is estimated that there are more than 600,000 deaths a year that are due to preventable causes, and although it is true that these persons must die some time, still it is equally true that they might remain for a number of years longer, producing, and valuable members of the community and an asset to the state and country. On the whole, it is to be noted that in that country there is in progress a very satisfactory decline in the general death rate, which now averages, for the registration area, about 15 per thousand inhabitants. This is a decline of nearly one-quarter



since 1880, but should not be overrated in its importance. There is always the difficulty in the United States, as well as in Canada, of the lack of accurate statistics for large areas in non-census years. This is a matter that in a country priding itself on its advance in civilization, should demand popular attention and be remedied. The statistics available show that the decline in the death rate has occurred chiefly in diseases of the communicable class and the ailments of children. This, argues Mr. Rittenhouse, whose interest in the matter comes in that he is president of a life assurance company, and desirous of making the chances of living better, is due to the fact that the advances in the knowledge of disease and the education of the public have been very largely in the contagious diseases. But among the diseases of adults, including cancer, kidney and heart troubles and similar non-communicable diseases, against which no warfare has been waged, the death rate is not only very high, but in most instances is on the increase. For some of these increases, it should be borne in mind, the modern strenuous life is responsible—the greater segregation of people in crowded cities and the unhealthful conditions that attend this congested life.

"Is not the high mortality from cancer chiefly a reflection of the conditions responsible for the increasing life-waste from other degenerative diseases of middle life and old age," writes Dr. Eugene L. Fisk, who is responsible for tables and technical portions of the brochure, and he further brings forth the idea that evidence of the strongest character forces the belief that a lowered bodily resistance which invites pneumonia, apoplexy, kidney and heart disease, etc., accounts for the facility with which cancer invades and conquers the human system.

Some of the tables that are presented by Mr. Rittenhouse are of great educational value, and from such a source may be considered as bearing authority. The general death rate in the registration area of the United States, since 1880, has decreased 18 per cent. in the age period below twenty years, 12 per cent. in the period between twenty and thirty, and 2.3 per cent. between thirty and forty, while in later life there has been an increase in all of the periods, that from fifty to sixty showing 29 per cent., and above sixty, 26

per cent. It is not quite true that what has been saved in infant mortality has been lost in the adults, for there has been on the whole a gain; but the statement makes it very evident that having well under way a campaign to save the babies, the adults should now give thought to saving themselves.

In answer to the question, "What is being done to check loss of national vitality?" Mr. Rittenhouse sets forth the indifference of political representatives, the slight consideration paid to man as an asset as compared with the hog, and the attention paid to remote dangers like Asiatic cholera and yellow fever, and indifference towards the vital home questions, and urges that "something be done upon this subject more substantial than merely giving moral support."

"*The Dawn of the Health Age*," by Benjamin Moore: J. and A. Churchill, London, etc.: Members of the teaching staff of Liverpool University, England, are in the way of acquiring quite a vogue for attacking public questions in an independent spirit and from fresh and original points of view. Some time ago attention was drawn to an interesting study of bureaucracy by the professor of modern history, Mr. Ramsay Muir. Now there comes from Dr. Benjamin Moore, the professor of biochemistry, a destructive criticism of the existing public health service in "*The Dawn of the Health Age*," the object of the book being "to demonstrate on clear, broad lines the necessity for entirely remodelling the present system of medical science in the interests of the whole community." The lines of the demonstration may be gathered when we mention that the chapters discuss respectively how we tinker with disease instead of stopping it; the follies of our present public health service; the doctor and his patient in private practice and in state practice; our hospital systems, their evils and abuses; the warfare with the great white plague; and the evolution of the national medical service. There is, we take it, no indictment against medical men in general or medical officers of health in particular—rather they are represented as the victims of a bad system, which they have striven their best to render workable, but which they cannot alter. That is for the statesman, and in this connection the author points out that all politi-

cal parties are agreed that social legislation, including sickness insurance and English poor-law reform, cannot long be delayed, and argues that if such reforms are carried out on truly national lines, they will lead to the evolution of a national medical service which would save money and eradicate disease. Opinions may differ as to whether the state of affairs advocated is so easy of attainment as the author seems to think, but the book is decidedly interesting, and we may have another opportunity of referring to some of the main contentions.

*New Serological Test:* The new "serological test for blood," of which much has been heard recently, was lately made the subject of a very interesting demonstration at the new serological laboratories which have been opened by the Royal Institute of Public Health in London, England. By means of the new test, in medico-legal inquiries for murder and cognate crimes, positive testimony can now be given as to the human origin of blood, while a secondary, but hardly less important, value of the test is to be found in its application for the determination of the nature of the meat used in various foodstuffs. Until quite recently it has been only possible for analysts to say whether or not blood submitted to them for inspection was mammalian; and the mere layman in this sphere of human knowledge will readily see that by carrying a medico-legal inquiry one step further, and deciding in any given instance that the mammalian blood submitted to analysis had a human origin, a powerful new factor is rendered available in the resolution of problems of crimes, or in questions affecting the adulteration of food.

Simply expressed, the new serological test is as follows. Anti-human serum is first obtained in the ordinary way by the injection, or a number of injections extending over a conditional period, of human blood serum in a rabbit until a positive reaction is obtained in a dilution of 1 in 20,000. A specimen of the article imputed with a stain suspected of being blood is then subjected to the usual microscopical, spectrascopical, and chemical examination, and this having been determined, it is allowed to soak for twelve hours or so in a .85 solution of salts. The clear extract of saline is then removed, and 1

cubic centimetre of anti-human serum added. If the "stain" be human blood, a precipitate of albumen rapidly forms. The phenomenon does not occur in the case of horse, pig, ox, or any other mammalian blood.

The recent demonstrations were successfully carried out at the direction of Prof. William R. Smith, M.D., D.Sc., F.R.S. (Edin.), by Dr. Rajchman, assisted by Mr. E. Garratt, and it was stated by Dr. Rajchman in the course of his experiments that even "mummified blood" had been successfully submitted to the new serological test.

It should be added that the London serological laboratories are an extension of the work which the Royal Institute of Public Health decided to establish in 1905, when, in view of the great importance which had come to be attributed to bacteriology in connection with the administration of the English Public Health Acts, and the necessity which, in the opinion of many medical men, existed for establishing a central institution in London, not only for the training of medical practitioners desirous of obtaining a Public Health Diploma, but where researches of a chemical and bacteriological nature could be undertaken for municipal and other authorities, the council of the Royal Institute of Public Health determined to create laboratories for these purposes. The new rooms are most admirably fitted up for the purpose.

In other directions, such as instruction in and inquiry into practical sanitation, domestic and army hygiene, the Royal Institute of Public Health continues its useful career.

*Expired Air in the School Room:* Our own breath is one of our greatest enemies. The problem of the school room may be to a large extent solved by the application of measures for removing the products of breathing and furnishing an abundance of pure air without the production of perceptible drafts.

A detailed and minute explanation of the air and its component parts is not necessary. We know that oxygen and nitrogen, in the proportion of one to four, are the principal gases, while nitrogen is considered an inert gas, oxygen is absolutely essential for the continuance of all forms of animal life. Expired air differs from inspired air in several particu-

lars. It is warmer, has more moisture, and contains four per cent. less oxygen and four per cent. more carbonic acid. While carbonic acid is harmful, it is not nearly so much so as the organic matter that accumulates where several children are together.

Children are especially susceptible to the dangers resulting from impure air. They are necessarily somewhat closely massed, and organic matters hanging about the room furnish favorable soil for the propagation of infectious diseases which in a purer air would soon lose their vitality. In this way diphtheria, scarlet fever and other infectious diseases are not infrequently propagated at school. Tuberculosis is often encouraged by bad ventilation and sanitation in our schools.

The evil effects of expired air in a concentrated condition have been unhappily proved in a few well known instances. In the Black Hole at Calcutta 146 persons were confined in a space 18 feet every way with two small windows on one side. Next morning 123 were dead and the remaining 23 were quite sick. Ill results are not always apparent, but it must not be supposed that they do not follow a comparatively small degree of pollution. A general lowering of strength and vigor is produced and a greater proneness to fall a victim to respiratory and other diseases.

The drowsiness and languor so frequently noticed in school children, are to the intelligent teacher indications of the need of purer air.

Yawning is a cry of the nervous system for purer blood, that is blood containing more oxygen and less effete matter. It is in the highest degree unfair to expect the brains of children to be active in their functions while they are provided with blood which is vitiated by respiratory impurities and are thus kept in a species of mental fog.

*Disinfecting the Streets:* Poughkeepsie, N.Y., so far as we know, is the first city to disinfect its streets by use of antiseptic water. Sanitation has made good strides in all civilized countries these past few years, but it seems to have remained for this little United States city to formulate such a plan for disinfecting its highways.

According to reports, the water used upon the streets, for sprinkling, is charged

with a chloride mixture by which it is believed germ life may be destroyed. It is claimed that the solution will put an end to such germs as perpetuate infections and contagious diseases, and that it will be so greatly in the interest of health that other municipalities will take it up.

Poughkeepsie is probably not aware of the antiseptic, economic and other benefits to be derived from the use of a good road oil instead of water.

*Fumigating School Pencils:* A fumigating box may be used in disinfecting all school pencils and similar articles that are used by the children and yet are the property of the school. Heretofore the pencils in some schools have been disinfected by dipping them in a disinfecting solution, but a thorough fumigation with formaldehyde gas is better.

The pencils are collected each day by the teacher, put into a wire basket provided for the purpose, and the basket put into the fumigating box. In the box, which is practically airtight, is a receptacle in which is placed a few spoonfuls of permanganate of potash. At the close of each school day, after the baskets containing the pencils have been put into the box, a half gill or more of formaldehyde is poured into the vessel containing the potash. The potash causes the liquid formaldehyde to pass into a gaseous state. The box is closed tight and the pencils and other articles are thus subjected to a strong bath in formaldehyde. The pencils remain within the box until some time next day, when they are taken out and used in the schoolroom.

*Barn Ventilation:* We receive many letters asking for information about ventilating stables and barns.

One correspondent writes that he wants to put in sheet iron outtake flues 4 by 10 inches with an opening near the floor of the stable, such flue running up the wall of the stable to the floor overhead, then by means of an elbow pass through the wall under the sill with an opening on the outside. He asks if such flues will work.

We replied by letter asking him if his basement were full of smoke, if he thought he could get it out with such ventilators? He couldn't do it. Now, what is the difference between smoke and foul air, so far as removing it from a stable is concerned?

None at all. One will go where the other will. Both require a chimney that will draw well or neither one will be removed from the stable. The only difference is that one is visible, while the other is not.

A chimney must be high enough above the roof to get the influence of the wind from all directions, otherwise the stove will smoke with the wind in certain directions. This same principle applies to a ventilating flue. And unless such flue be raised high enough above the roof it will not draw at times and the foul air will remain in the barn.

*Rodents and Gasoline:* Comparatively few of us realize that the gasoline so freely used around the garage is a good disinfectant. If one stops to think of it, one never sees rats nor mice around the garage, while nearly every one knows that these rodents are the bane of every stable. It is only in recent years that we have come to understand the great danger that lurks in the spread of contagious disease through rats and mice. San Francisco not long ago eliminated rats from the stables and sewers of the city, a feat only accomplished at an enormous expense, whereas had there been no stables and only garages probably San Francisco would have had no rats.

From time immemorial London, England, has been known as infested with rats and the ridding of the city of these pests was considered impossible. Not long ago, however, the health authorities discovered that a portion of the city where automobile sales agencies, liveries and delivery departments have their garages, was entirely rid of rats and mice, and it was discovered that the gasoline dripping from the cleanrooms was sufficient to rid the entire sewer district of these pests.

Of course, in the private stable it is possible by vigilance to avoid trouble with rats, but among the large delivery departments probably there is scarcely a stable in the country in which there are not a certain number of rats, whereas motor trucks would eliminate them.

The coming of the garage for delivery plants also means the cleaning up of the unsightly and insanitary alleys so common in many cities.

*How to Eliminate the Nuisance of the Garbage Can:* The garbage receptacle is

one of the commonest forms of nuisance to be found in any city. But there is a way to reduce the annoyance to a minimum.

It requires no very extensive analysis to show that the sanitary condition of the garbage can is the principal factor in determining the cost of collecting garbage. The cost of collection increases with the frequency of service. The ability of a man to collect is not the amount he collects, but the number of stops, the distance of travel and the number of cans he is obliged to handle.

The demand for frequent collections of garbage arises because of the sanitary, or rather unsanitary, condition of the garbage can. The appearance and condition of the unsanitary garbage receptacle has had more to do with making the mere mention of the word "garbage" an offense than any other one thing. When some one says "garbage" immediately there comes to your mind that same noisome garbage you can see in the back yards of so many homes throughout the country.

Garbage is almost universally described in the ordinances of cities as the animal and vegetable waste that comes from the preparation of food.

The first step in the elimination of the garbage nuisance is, of course, to provide a clean, sanitary can and then keep it in sanitary condition. The garbage should first be drained of all moisture and then wrapped in paper before it is put in the can. If this be done it will neither smell badly in hot weather, nor freeze and stick to the can in cold weather. Do this and you have a clean can at all times, instead of a fly-breeding mess of putrefaction, which you have if precautions of this kind are not taken.

It is safe to assume that if proper methods of handling garbage were adopted by housewives, the garbage nuisance would soon be entirely eliminated; the most prolific breeding place of the fly would be done away with, and garbage would not have to be collected more than once a week, even in warm weather, thus greatly reducing the cost of collection. The garbage can should be kept water tight at all times, and when not so, a new one should be provided. If the can is kept clean and sanitary it naturally follows that the garbage will not be foul in the waggon or cart, and thus the nuisance of the waggon will also be done away with.

## Open Mail

To the Editor *The Public Health Journal*:  
**School Hygiene.**

Sir: In studying the hygiene of schools the consideration of several questions is involved. Among these questions are the amount of time to be devoted to study at different ages, the special diseases of school children, their causes and means of prevention.

Young children should not be kept at the same study or in the same position for long at a time. The exercise should be frequently varied. Especially with children in the primary grades care should be taken not to overburden their minds with too many hours of study or too long continuance at the same exercise. Children should not be placed in school much, if at all, before the completion of their seventh year. From 7 to 9 years they should be kept at their studies not longer than three hours daily; from 9 to 12, four hours may be allotted them, and from 12 to 16 years, they may be kept at mental work five or six hours daily.

Excess of time expended in study is almost certainly followed by physical deterioration. "A little less brain, a little more muscle," is a legitimate demand that we may make of our school boards.

Gymnastic exercises should form part of the daily routine in all schools, and these exercises should take place, when practicable, in the open air. Playing, romping, laughing and singing should be encouraged rather than the natural tendency to boisterous play unrestrained.

It is especially desirable that female children should be encouraged to take part in these diversions. The desire on the part of many parents to see little girls deport themselves as "young ladies" before the time even when they write their ages in two figures, is very reprehensible and deserves condemnation.

The principal diseases incident to school life are near-sightedness, spinal deformities, nervous and digestive disorders, pulmonary and contagious diseases. By judicious sanitary measures these can all be very much diminished and some entirely

prevented.

The principal causes of near-sightedness in schools are badly arranged or insufficient light, desks that compel children to lean forward while reading or writing and badly printed textbooks.

Spinal curvature is present in quite a proportion of children attending schools. Girls are affected more often than boys, the percentage being 90 to 10. The especial causes of spinal deformities are badly constructed seats and desks and an improper position of the body. Many pupils assume a twisted position, which is very liable to produce spinal distortion in children of weak muscular development.

Nervous disorders are very frequent among school children. Headaches are often due to faulty ventilation, improper food, bad digestion, and excessive mental strain.

Derangements of the digestive organs are exceedingly frequent among school children. They can generally be traced to the use of improper food. The eating of cold lunches should be discouraged as much as possible. Nuts, candies, pies, fruit, cakes and, above all, pickles, are most fruitful sources of digestive disturbances.

The germs of pulmonary consumption are frequently implanted during school life. A neglected cough, bad ventilation, polluted air, mental strain and underfeeding may be the starting point of this fatal disease.

In order to promote the proper hygienic management of schools, all teachers should be required to acquaint themselves as to the principles and practice of school hygiene. This is a demand that our school boards could reasonably insist upon, and there can be no question that the improvement in the health of pupils would amply justify the innovation.

Hygiene and physical culture should replace senseless fads and frills. Important facts concerning the common-sense care of the health of our school children are what we need.

W. A.

### Plague Victims' Hair.

Sir:—The popular movement in favor

of doing away with the "rats" and other hideous contraptions worn on the heads of some ultra-fashionable women is likely to be accentuated by some recent news from Manchuria.

Manchuria, as all the world knows, is afflicted by the horrors of the plague. The death rate is something terrible. Stark, stiff, repulsive bodies of victims lie about in public places awaiting burial or cremation.

One special feature of interest in this connection is the report that the queues of the plague-killed Chinamen are cut off in almost every case.

The one and only explanation of the removal of the hair ropes from the heads of the dead is that the appendages are shipped to Europe and this continent, for use in "stuffing" the monstrosities worn on the heads of fashion's devotees.

Some of the authorities in regard to plague infection are quoted as asserting that there can be no danger of contagion from those queues, as it is held that the disease can be communicated by living bodies alone.

All the same, very few women in this country would be likely to buy and "adorn" their heads with the dirty stuff known to be cut from the dead bodies of the pestilence victims. And few will be disposed to take chances. Hence, added hope for the abolition of the ghastly, deforming headgear.

M. A. A.

### **Tuberculosis and the Workshop.**

Sir:—We hear a good deal now about tuberculosis hospitals, fresh air treatment, sleeping out of doors in winter, the open bedroom window, and the open-air school-room, etc., but we have yet to hear of the open-air workshop. Here is the breeding place of the dread disease; manufacturers and capitalists are donating large sums of money towards the cure of consumption when they are at the same time turning him (or her) out by the hundreds yearly. Factories, in general, are over-heated and improperly ventilated. The factory law asks that each workroom shall have proper and sufficient means of ventilation and shall at all times be properly ventilated. Show me a steam-heated plant that is properly ventilated. There is no means provided except by opening a window, and when this is done some one is bound to close it.

If the health officer and doctors would like to walk around some of the factories in winter and see the conditions and the temperature in which men work, I think they would find that there is room for prevention as well as cure of tuberculosis.

In the majority of factories, particularly machine shops, the temperature is usually kept at 70 to 80 degrees (which is 20 degrees too high for winter), the atmosphere is dusty and smoky and every means of ventilation closed up tight. Now, if all the windows were open on the lee side, the temperature at 50 or 60 degrees, would not conditions be healthier? But there must be some one to regulate it. The foreman wants it hot, the majority of the men want it hot, yet at the same time they are sickly all the winter and wonder why.

The factory inspector comes round, and passes on; yet the law demands "a proper and sufficient means of ventilation." Cannot the law be enforced? Manufacturers will burn coal to produce steam, which costs money, and not provide ventilation, which costs nothing after once installed. They build fresh-air hospitals, which cost money, and do not look for fresh air in their factories, which costs nothing. They donate money to cure a consumptive by the very means which they could prevent with.

### **PRIVATE PRACTICE.**

#### **Sleeping Out of Doors.**

Sir:—I have been sleeping outdoors on my back porch some six years and do not come in for zero temperatures or snow or rain. I use a sanitary folding couch and have a waterproof canvas cover which keeps the mattress dry in the day time and serves as an excellent top cover tucked in over all clothing and mattress at night. I use an extra mattress over the thin one which came with the couch. For covers, I use four heavy all-wool blankets and one comforter and over all this the waterproof cover acts as a protection from rain, snow and wind.

About ten minutes before retiring I put in two or three quart water bags. The water should be steaming hot when put into the bags. The bags of hot water keep the bed nice and warm all night. I use a wool stocking cap pulled down to the end of my nose, covering and protecting the eyes.

I was weak and sickly when I started

this game and have gained fifty pounds and am as strong as Sandow. I sleep like a child and get up in the morning with a ravenous appetite. Nothing can induce me to sleep indoors again.

A. M.

#### House Quarantine a Necessity.

Sir:—We have neither sense enough to protect ourselves," says the chief of the health bureau of one of our cities, speaking of the public and home quarantine, "nor conscience enough to protect our neighbors."

When a case of scarlet fever, diphtheria or other serious contagious disease appears in a family, by far the best step is to send the case to a suitable hospital if one is available. Most cities have special and splendidly equipped wards for these diseases. But it is too often the case that a suitable hospital is not available. In that event, the only thing to do is to isolate the patient and a nurse, absolutely allowing no one to enter or leave the sick room except the attending physician and the health officer. Any door connecting the sick room with other parts of the house must be locked and sealed. If this is not possible because of the arrangement of the rooms, then the rest of the family should vacate and turn over the whole place to the patient and nurse. Except in instances where the arrangement of rooms and doors permits the absolute shutting off of the sick room, no inmate of the house should go to and from business or school. All clothing and excretions leaving the sick room must be absolutely sterilized before they are passed out. No sweeping should take place in a sick room; and any left over food should be burned. Patient and nurse must be equipped with cooking facilities solely for themselves; and groceries and supplies should not be delivered through the door, but deposited where the nurse can conveniently get them.

In scarlet fever the quarantine is not to be raised until the patient has ceased to "peel," and in diphtheria not until examination of the throat secretions fails to show the germs. Both diseases are very contagious during convalescence. When quarantine is lifted, the patient is given an antiseptic bath, supplied with new clothes and the room and all things in it are thoroughly fumigated, preferably with formal-

dehyde, which does not damage fabrics.

All this may seem extreme or unreasonable to the uninitiated, but without isolation we have no security against epidemics, and without absolute rigidity to the smallest detail we have no isolation. No good citizen can for a moment afford to oppose the enforcement of the quarantine laws, however much inconvenience it may put him to. If we all did what is possible for us to do in this regard the occasion for house quarantine would practically cease to arise.

The diseases usually quarantineable are scarlet fever, diphtheria, smallpox, infantile paralysis, yellow fever, epidemic meningitis, cholera, plague and leprosy. But in some cases even typhoid and other contagions are included.

G. S.

#### Trade Education.

Sir:—More attention should be given to trade education. Thousands are working in mills, factories and railroads and stores, yet very little is being done to provide an education for the children of those humble workers. Of necessity those boys and girls must have a trade education. They cannot go to high school or college. The quicker they learn a trade the better.

A health department should be the conservator of the most precious asset of a city—the health of its inhabitants. Its sleepless vigilance should detect the outbreak of an epidemic and prevent its spread. It should prevent the slaughter of the innocents through the ignorance of mothers. The plea of the Visiting Nurses' associations for more school nurses is unquestionably founded on a great public need, and it ought to be granted if it be possible.

From a mere material point of view no money is more profitably expended than that entrusted to a capable health department. Its activity lessens the annual taxes levied by druggists, doctors, and undertakers—taxes the bulk of which are paid by those least able to afford them. The worker, guarded against preventable diseases, is able to use his skill to the full for the good of himself and those who depend on him. The more liberal the health department appropriations, the greater are the gross and net earnings of the community.

C. K.

## Meetings and Reports

*Canadian Association for the Prevention of Tuberculosis:* The eleventh annual meeting of the Canadian Association for the Prevention of Tuberculosis will be held in London, Ontario, on May 18th and 19th next.

*The Dresden Exhibition:* The promoters and organizers of the International Hygiene Exhibition, Dresden, 1911, have kept their objects strictly before them, and in May of this year will open to the world a vast collection of exhibits of all kinds, sub-divided, grouped and arranged in such a way as to teach the public—the masses—elementary lessons on how to avoid noxious influences which can be avoided, and how to improve the health of the individual by the adoption of common-sense, practical measures and habits. At the same time, the achievements in hygiene in all its numerous branches will be recorded, in order that the experts attending the exhibition and the conferences may study the latest movements and may be stimulated to further advance. In brief, the exhibition will be educational and scientific, and the industrial element will only be utilized for the purpose of illustrating those subjects which cannot be exhibited in any other manner. There will be a comparatively small Industrial Section of the exhibition, at which the usual rules of exhibitions will apply.

The idea rose years ago at a meeting of hygienists in Dresden, and that city was chosen of all others because it lent itself best to the purpose. Every hygienist of note in the German Empire is extending his active co-operation by serving on one or more of the numerous committees. The work has been carried on with a lavish expenditure of money, and the German Government has instructed the *Kaiserliche Gesundheitsamt* to take an official part, and is receiving the co-operation of most of the leading countries of the world.

*Sanitary Conference:* In view of the plague in Northern China, it has been decided to advance the date of the proposed international sanitary conference, and

France is inviting all nations to send delegates to Paris in May, 1911, to study means of fighting epidemics.

*Royal College of Physicians and Surgeons of England:* It was proposed at last month's meeting of conjoint board of the Royal College of Physicians and Surgeons of England, to grant a diploma in Tropical Medicine, the conditions to resemble very nearly those which apply to the conjoint diploma in Public Health of the two Colleges. At the same meeting it was announced that among those receiving the qualification of M.R.C.S. were Pearle Jane Sproule, University of Toronto; J. E. Dewar, McGill University; H. C. Jamieson, Roy Kenney, and G. C. Kirkpatrick, of the University of Toronto.

*The International Plague Commission:* The International Plague Commission which is going to China at an early date at the request of the Government of that country, will be called upon, we understand, to devise measures to prevent the spread of the disease.

None of its members will be required to enter the novels where the plague exists, and, therefore, they will not be under the necessity, unless they personally desire to study intimately individual cases, to wear masks and special plague-proof clothing. The plague mask is necessary only as a protection for the physicians who are actually engaged in fighting the disease.

The Commission will probably assemble in Peking this month. It will have to start at zero, and build up from nothing the entire framework for an efficient sanitary service.

China is very much behind the modern world in sanitation. It has no system at all. It can do nothing better, in fact, to prevent the spread of the disease to the teeming millions that live in the heart of the country than station soldiers along the Great Wall to prevent the coolies who are deserting in thousands their homes in Manchuria and the corpses of their friends, possibly carrying the contagion with them



in their flight, from gaining an entrance.

The International Commission, for the appointment of which Russian pressure on the Chinese Government is largely responsible, will therefore advise China what to do and how to act. A sanitary service has to be built up in China, as it has been in India. Hospitals and stations for dealing with the plague will have to be organized, and it will be the duty of the Commission to show China how the organization is to be built up, with efficient staffs of doctors and nurses.

A system will also have to be organized for inoculating the population in infected districts; a staff will be needed to disinfect houses and clothing; and a special sanitary staff must be appointed to prevent the accumulation of dirt and to preach the laws of health.

At present the plague is being fostered by the foul air and the filth of the hovels of the people. There is no system of ventilation in these poor dwellings, and there are no open windows in these months of winter to let in fresh air. Nor is there any system of medicine, the only medicine the majority of the coolies have any faith in being in the form of beating gongs and letting off fireworks to keep away the evil spirits.

So the Commission will have to do its best to set aside the superstitions of the people as well as to show the way to the organization of the staffs and services we have mentioned. They will also have to deal with the spread of the infection by rats, mice, and other rodents, and by the fleas of these rodents that bite human beings, and so inoculate them with the disease.

Plague is a word which, by reason of its very vagueness, causes alarm. One thinks of the plague of Athens, or the plague of London, when it is reported that thousands of people are dying day by day in Manchuria, and that modern science and missionary enterprise have up till now been able to do little to arrest the progress of a ravaging disease that must burn itself out. Harbin, the dividing line between Russian and Japanese ambitions, the point at which their "spheres of influence" in Manchuria are by treaty determined, appears to be the main centre of an epidemic which is claiming a terrible toll of victims. It is not the plague in Harbin which spe-

cially concerns the world at large. It is the danger that in these days of railway communication it may spread south into China, or north into Russia. Both Governments are deeply concerned over the problem, and are taking steps—tardy as it may seem—to limit the area of the ravages of the existent epidemic. Plague, which may be taken to mean the specific malignant and infectious disease caused by the *bacillus pestis* of Yersin, feeds upon the uncleanness which is traditional in Eastern people. It came to Bombay in 1896 and wrought a terrible disaster. It carried off thousands of victims in India, simply because the people did not know or would not follow the ordinary laws of sanitation. The London Lancet thus summarizes the situation:—

"Every circumstance unfortunately seems in favor of the spread of plague, especially if introduced in the pneumonic form. Like other countries, China has more than its share of rats and other rodents, so that there is a distinct probability if plague penetrates into the interior of China, that it will make a long stay and leave its mark on that country for years to come. . . . We have grave fears that if the epidemic goes on increasing at its present rate we may have to witness in China a sacrifice of human life compared with which even the Indian experiences may sink into comparative insignificance."

The plague in Manchuria has taken the form of malignant pneumonia. When the bubonic plague invaded Bombay the pestilence spread through the whole Presidency. In four years, 1896 to 1899, it carried off 200,000 people, representing 75 per cent. of the subjects submitted to medical treatment. The present Manchurian plague is pulmonary, rather than bubonic. We read, of Harbin, that "one hundred bodies are picked up in the street every day." "Thousands," it is added, "are fleeing from the stricken centres." Dr. Graham Ashland, of the Church of England Mission, has sent to a leading New York newspaper a story of what is going on:

"The virulence of the disease is simply incredible. Men walk about and declare themselves to be in perfect health. Suddenly they develop a temperature as high as 40 deg. Cent., and in two or three hours are dead. The fatalities in the native city average 150 a day despite the decimated

population. Of these deaths, from 40 to 60 occur in isolation hospitals. The remainder are people picked up in the streets by the sanitary force."

The plague enters the body either through the skin, in which case the result is large bubonic swellings of the glands, or through the air passages, when acute pneumonia supervenes. It was the bubonic aspect of the disease which alarmed the world—and in these days of universal trading and intercommunication it is most difficult to control disease—when the Bombay plague gathered head in 1896. To-day it is the lungs which are attacked. The *bacillus pestis* seems to have secured a strong foothold in the regions in which, only a few years ago, the armies of Russia and Japan lay over against one another. The checking of contagion in a country which is infested with vermin—and rats have the reputation of being the chief agents in conveying such diseases—is obviously difficult; because the medical and missionary influence is comparatively to the population infinitesimal, and the people are by tradition neglectful and fatalistic. The danger in these times is that a plague may not be localized, and that by reason of the spread of normal communications infectious diseases of the most virulent and dangerous type may be conveyed from one part of the world to another. But every aid will be no doubt given to the natives of Manchuria by the International Plague Commission to root out a pestilence which has again and again ravaged the countries of the East, and of which Western civilization is anxious to steer clear.

*Tuberculosis Day*: April 30th has been set aside this year as "Tuberculosis Day," and will be observed in over 200,000 churches on this continent. The movement was started by the United States National Association for the Study and Prevention of Tuberculosis and its leaders state that they hope to enlist all of the 33,000,000 church members of that country.

The annual statistical report of the health of the British Navy for the year 1909 has been issued as a Parliamentary paper (302).

The Director-General of the Medical Department of the Navy states in his report that the returns for the total force show a continuous improvement in the general

health of the Fleet as compared with the preceding five years. Not only are the case, invaliding, and death ratios for the year under review lower than the average ratios for the last five years, but the average loss of service for each person has again dropped, from 10.8 to 9.76 days. The final invaliding ratio also shows a small decrease in comparison with the previous five years' average. The total force, corrected for time, in the year 1909, was 112,700, and the total number of cases of disease and injury entered on the sick list was 72,540, which gives a ratio of 643.65 per 1,000, a decrease of 75.34 as compared with the average ratio for the preceding five years. The average loss of service for each person worked out at 10.36 days for the year represents a decrease of 1.04 in comparison with the average for the preceding five years. The ratio per 1,000 of men sick daily on the various stations was 26.75. The Cape of Good Hope showed the lowest sick rate, and as in the preceding four years, the Irregular List shows the highest. The total number invalided was 2,007, which gives a ratio per 1,000 of 17.8, a decrease of 4.3 per 1,000 in comparison with the average ratio for the preceding five years. Of the 2,007 invalids, 1,851 were for disease, and 156 for injury.

The total number of deaths was 362, giving a ratio of 3.21 per 1,000, a decrease of .54 in comparison with the average ratio for the last five years. Of this number 258 were due to disease and 104 to injury. The total number of days' loss of service from venereal diseases was 325,889, while the average daily number of men ineffective from these diseases was 892.84, as compared with 889.15 in 1908 and 903.9 in 1907.

In addition to the usual statistical tables there are appendices dealing with cases of caisson disease, tests for color vision, the examination of eyesight at gunnery schools, the outbreak of beri-beri on board the Sphinx, and other matters.

Staff-Surgeon A. J. Laurie, in dealing with the outbreak of beri-beri, suggests, from certain facts which have come under his observation, that copper poisoning, due to the tinning being allowed to wear off copper vessels, may be the cause of the disease.

The annual meeting of King Edward's Hospital Fund for London, England, was

held last month in St. James' Palace, under the chairmanship of the Duke of Teck. The object of the fund is the attainment of uniformity in benevolent activity and the checking of waste and overlapping in the administration of hospital charity. The amount on hand for distribution was announced as £155,000, over half a million dollars, a sum exceeding by £5,000 the largest amount ever previously available.

Commenting upon the object of this fund a contemporary remarks that it is perhaps admissible, after all, to utter a word of caution lest the desire to organize and to control should be carried to an undue extreme. A hospital is, or should be, a living structure, with some definite individuality of its own; and it might well happen that an absolute uniformity of administration might only be attainable by the sacrifice of characteristics which it might be well to preserve. A great London hospital is not a hospital merely; it is St. George's, or Guy's, or St. Bartholomew's, and as such has characteristics which have endeared it to many generations of supporters, and which wise administration would spare no pains to preserve. It seems that some of the incidents of the working of this fund have occasionally tended to strain the loyalty towards it of the institutions which it was established to strengthen and to support.

*British Columbia proposes to provide for inspection of logging, railway and other similar camps, sawmills, etc., and other places where labor finds employment, and to deal with the necessity of providing medical attendance for those engaged in such isolated works as advancing railway construction, and with supervision of the construction of camps by the government's inspectors, so as to assure sanitation from the outset of camp establishment. The measure will add this additional work to the duties of the Provincial Board of Health.*

*An Antitoxin Trial:* According to report, some cures of certain forms of tuberculosis and pneumonia have been made during the last month at the Southern Pacific Hospital in San Francisco, where a serum treatment has been applied. This report, how-

ever, is not sufficiently in detail for an intelligent discussion.

There are two kinds of specific treatment which have been recognized in tuberculosis. One is the use of tuberculin, which was intended as a toxin to stimulate the production of protective substances.

The other treatment proceeded upon the principle of the antitoxin treatment for diphtheria, a serum being obtained from immunized animals to combat the disease. The Maragliano serum belongs to the second class, but has not yet demonstrated its efficiency, though it has its defenders as well as its critics.

Apparently the treatment used at the Southern Pacific Hospital belongs to the second class.

*The Rev. John Williams Cavanaugh*, president of the Notre Dame University, of Notre Dame, Ind., tells some amusing stories in his talk on "The Educational Philosophy of an Ironmaster." The Rev. Mr. Cavanaugh relates an incident that happened to some little birds whose mother had deserted them. An elephant came along and happened to see the nest. The birds, being young, were unable to fly and told the elephant of their plight, saying they were hungry. The elephant told them not to worry, that he would look after them. Then clumsily sat down on the nest.

"That," says Rev. Cavanaugh, "is what we will do to the unfortunates if we do not wake up to the realization of the fact and help them to become self made."

He also asserts that a father is inhuman when he tells his son that what was good for the father is good enough for the son, and says that possibilities for great men often are shattered with just such advice. He cites the cases of Harry Thaw and his counsel, Martin W. Littleton. Thaw was raised in the lap of luxury. Every thing he desired was his and he was not allowed to broaden his mind on the greater problems of life and naturally fell into a life of crime. Littleton was raised on a farm. Everything he got he worked for. He did not know the pleasures of life until he was a grown man and his mind developed into one of great activity.