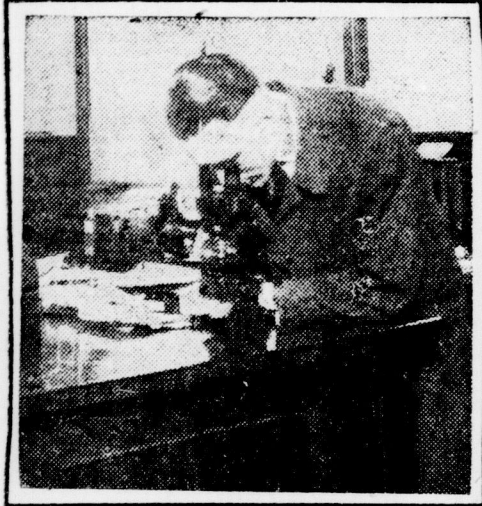


GERMS—Arch Enemy of Mankind.



TOYING WITH DEATH.
AN EXPERIMENTER AT
THE INSTITUTE WATCHES
DEADLY GERMS WIGGLE
UNDER THE MICROSCOPE.

By "REX"

What is mankind's greatest enemy?
Not poverty. Not crime. Not war. It is something much more ruthless and a thousand times more malignant than all these scourges combined. It cannot be seen with the naked eye, yet it is the cause of 86 per cent of all deaths.

It is the infectious germ.

The infinitesimal parasite that breeds at a tremendous rate, invades the human body and makes nerve-shattered wrecks of strong men. The terrible little creature which destroys lives, ruins homes and wipes out nations.

"You can take a germ," a London physician told the writer, "and under proper conditions it would reproduce itself so many times in five days that the size of the mass of germs it propagates would exceed the size of this whole earth."

This is a horrifying thought, but it is the thought which the French people probably had when they voted Pasteur the greatest of all their national heroes, taking precedence over Napoleon, Victor Hugo and Danton. Pasteur, the greatest scientist the world has known, was a pioneer exterminator of germs.

KILLING GERMS IS THEIR WORK.

Exterminating and controlling germs is the function of public health doctors, nurses and institutions. If there were no germs there would be no need for public health. That is why public health is the most vital municipal activity in every and any community.

This is the point of view which Dr. H. W. Hill, dean of the Institute of Public Health, has been trying to inculcate into the civic conscience of 172 municipalities. For twelve years he and his associates have fought the battle against disease and ignorance. On his side the cold, unromantic facts of science and public health are aligned against skepticism, prejudice and intolerance—the three most tenacious opponents of public health.

Gradually, however, these obstacles have fallen before the march of progress. What are the results? Well, for one thing the death rate from tuberculosis in London is lower than that of any other Canadian city. Other maladies have been substantially reduced. But the great, outstanding achievement is that people have begun to appreciate this fact—that every infectious disease, whether it be as rare as leprosy or as common as measles, is, with public health facilities at our very door, as unnecessary as it is inexcusable.

Gradually public health propaganda is breaking down the fortifications of indifference which envelops the so-called intelligent, modern citizen. People are being awakened to the anomaly of knowing all about the mechanism of a motor car without knowing anything about the mechanism of their own bodies.

The mysteries of elementary physiology, of medicine, of health, are no longer mysterious. They should not be. Health articles, explaining all that curious citizen wants to know, may be had for the asking. Yet the majority of people are still more concerned with the action of their liver than they are with the action of their lungs. They can tell you when the differential goes wrong, but they can't tell you when the kidney goes wrong, until, sometimes, it is too late.

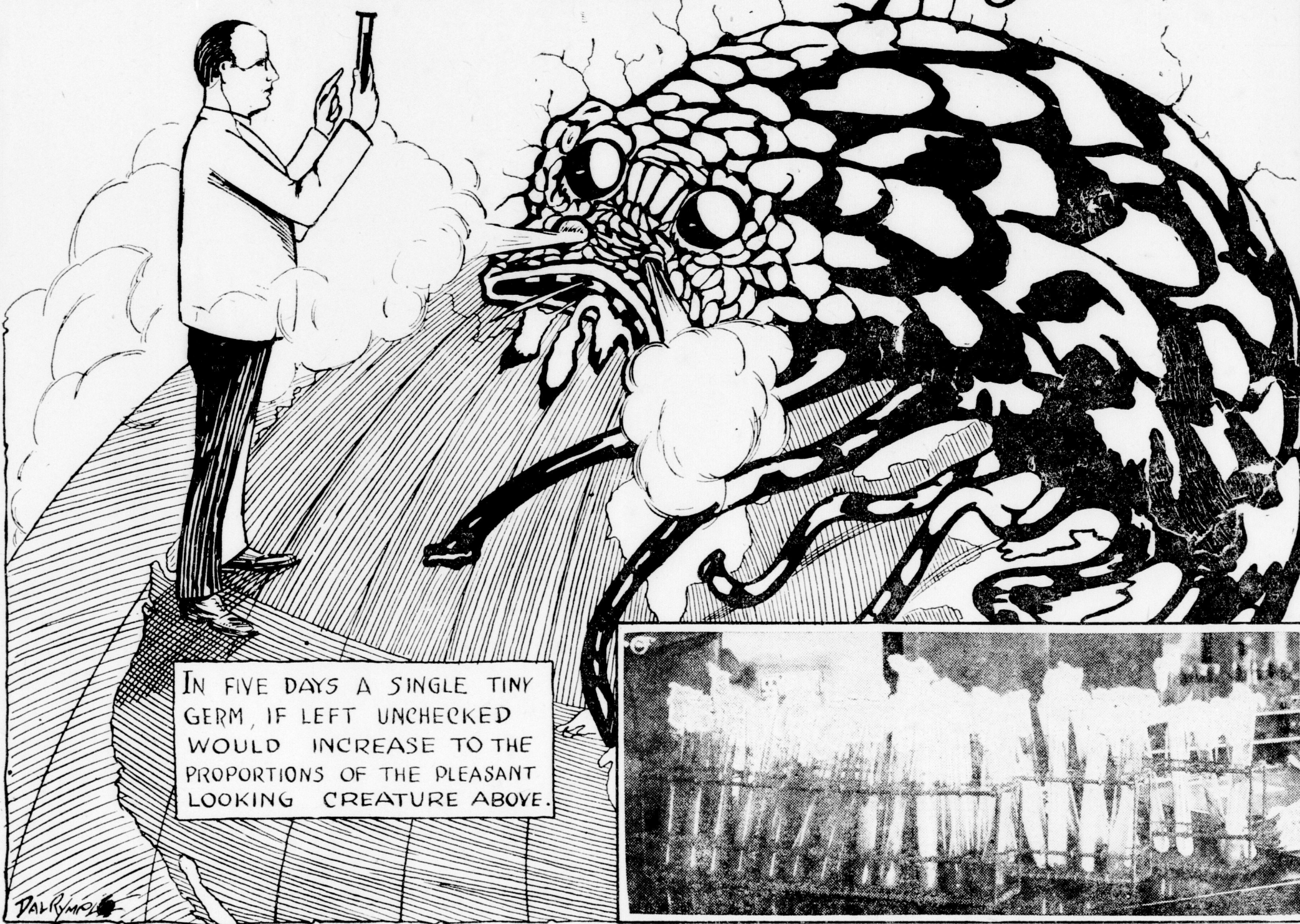
INSTITUTE SERVES 172 MUNICIPALITIES.

Serving 172 municipalities, the Institute of Public Health is not only headquarters for the distribution of propaganda which has done so much to overcome this condition of indifference to the welfare of one's own body. It is also a great analytical clearing house in which drama, tense and profound, is silently being enacted each day.

Here chemists and analysts daily render their verdicts of life and death. Here, throughout the year, thousands of blood tests, throat cultures and other examinations are made. Often, as a result of these analyses, men and women are subjected to treatment and regain health and vigor. Often, too, these tests constitute the final court of appeal, and the verdict is frequently—death.

Yet scientific and statistical data in the possession of the institute indicate that 90 per cent of such deaths are preventable. Ninety per cent, in other words, are the direct result of neglect and the parent of neglect, ignorance.

London's Institute of Public Health is an organization of manifold activities. Health headquarters for 172 towns and cities, it is also one of the most important pedagogic institutions in Western Ontario, producing public health post-graduate doctors and nurses each year and teaching medical and art students the intricacies of scientific dieting, chemistry, bacteriology and kindred subjects. It also functions as a great laboratory for industrial and organic chemical research. Specimens of alcohol, milk, water, foods of all descriptions and substances of every



IN FIVE DAYS A SINGLE TINY
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WOULD INCREASE TO THE
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LOOKING CREATURE ABOVE.

REFRIGERATOR FOR ANTI-TOXINS.

First there are the departments occupied by the Child Welfare Society, the Victorian Order of Nurses and those who attend to the clerical work of the institute. In the latter room stands a refrigerator containing anti-toxins of all kinds anti-toxins or vaccines for tetanus (lockjaw), smallpox, whooping-cough, typhoid, and diphtheria. These are distributed to physicians daily. In this connection it is significant that more than 20,000 tubes of vaccine have been given to doctors of Western Ontario by the institute since the first of the year.

In another room special cooking is carried on to prepare food for germs kept by the institute. Germs, by the way, are voracious, squirmy things and their appetite is something to wonder at.

"It requires 500 pounds of meat a year to feed them," Dr. Hill explains.

In the next room you find the cultures (germs from human beings) going full blast, if anything so apparently still, yet so insidious, so deadly as cultures in which disease-bacilli are reproducing, may be said to go full blast.

On the shelves you see an innocent-looking array of little test-tubes, each plugged with a bit of white batting, each containing about a tablespoonful of jelly-like substance in the bottom.

Dr. Hill lifts one out of the rack.

"These tubes contain the cultures in which living disease germs are working," he says. "This one, for instance, contains cholera spirilla. You look at it, fascinated by the horror of it, but he goes on taking out test-tube after test-tube."

"This one contains tuberculosis germs, this one anthrax, this one typhoid, this pneumonia, and this—leprosy."

Yes, literally, bottled death. Someone put these first germs, that have multiplied so, in that culture, someone must take them out, someone must experiment with them. And so you catch a flash of light of the work that these men, and such as these, are doing the world over. Quietly they carry on their investigations, buried in their laboratories, and perhaps you seldom hear of them. But when you do, you are glad that they have left the old days behind—the savage old days that glorified an Alexander, a Hannibal, or a Napoleon—that we are arriving at those which consider it more glorious to save life than to kill.

WORKING WITH BOTTLED DEATH.

Working with bottled death for the saving of human life! Yet an everyday bit of routine for men such as these.

Out again into a smaller apartment you see a no less imposing group of cultures. A young woman is bending over a desk, heating an instrument, and before her lie bits of glass covered with a red substance that looks like cochineal dye. It is sputum covered with a material that colors tuberculosis germs red. Each of these bits of glass is labeled and beside them you see slips of paper containing such stories as:

"Tissue—Cancer suspected."

"Sputum."

"Throat culture—Dr. A."

And so on, sadly suggestive stories that tell of anxious fears and scarcely less fearful waiting.

If you are curious, you will want to see just what these microbes look like. —d Dr. Hill will sit you down to a microscope to get an intimate glimpse of these deadly little creatures. If it is

tuberculosis sputum you will observe infinitesimal germs, lying like sticks of red wood in the sample. If it is typhoid you will see millions upon millions of germs, all darting here and there and very much alive, looking like tiny white sausages congregated in an immense arena. Yet the actual size of the sample in which these countless bacteria live is, to the naked eye, hardly discernible.

"They are magnified about 150,000 times," Dr. Hill says.

Small as they are, however, these germs are subjected to a sort of poetic justice for their invasion of the human body. They, too, may be attacked by parasites infinitely smaller than themselves, and these parasites may be attacked by other parasites, and so on, ad infinitum.

"In Johns Hopkins Hospital a tuberculosis patient excreted 24,000,000,000 tuberculosis germs every day," Dr. Hill explains in answer to a question. "But this is extraordinary. The average for such cases is only about 6,000,000,000 germs."

The next department visited is occupied by doctors and nurses testing and experimenting with cultures and parts of organisms. Many blood tests for syphilis are conducted here each day. A special germ-producing oven is maintained which breeds all varieties of bacteria. The institute received a leprosy culture 13 years ago from the United States, and the germs have been reproduced and reproduced as one generation is about to die off to be succeeded by another.

"In three days," Dr. Hill observes, "a single germ can reproduce itself to such an extent that it would fill up all the oceans after the water had been drained out. Before this can happen, however, they die from their own excreta."

HOW GERMS ARE EXAMINED.

For years, scientists, in watching germs reproduce themselves through the microscope, were confronted with a baffling problem. They did not know how to keep the germs still during the process of reproduction. Finally, Dr. Hill invented a very simple system which is now used universally. He placed the culture on a sticky substance, so the germs could not move. Thus, scientists could see plainly the reproducing process. This is particularly interesting. Typhoid germs, for instance, like all unicellular bacteria, breed simply by dividing into two halves, which immediately take on the aspect of an individual bacterium. First the germ grows larger. As its size increases a line is seen to appear right in the center. The microbe finally separates itself and two microbes exist where one did before.

An adjoining department contains an array of stills for distilling water, and here you are told something of the process of analyzing water to determine its purity. In yet another are thousands of cards which have been sent out to mothers and filled in by them, in the course of an investigation into the diseases of children.

"Do children really have to have measles and whooping-cough?" someone asks, and the doctor smiles.

"Emphatically, no," he replies. "The day will come when it will be considered just as disgraceful for a child to have measles or whooping-cough as it is now to have vermin in the head."

Disgraceful, you see, because so avoidable, if public and domestic conditions are as they should be. Carelessness in regard to disease germs will, in that day, be looked upon with as much disapproval as is today carelessness in regard to cockroaches.

"MENAGERIE" FOR TESTING.

Finally you come to the "menagerie," filled with boxes of guinea pigs and rabbits, some of which bear markings of red or blue to show that they have been inoculated with the germs of vari-

ous diseases. Guinea pigs, you are told, are especially susceptible to tuberculosis, their inoculations being, indeed, the finest test of that disease.

Here, too, were you to visit this department today, you would see rabbits, quivering, hysterical creatures, who, because of their extraordinary susceptibility, must pay the penalty of death for the advancement of science and the happiness of mankind.

All these departments of which the visitor gets a bird's-eye view are really one department. There are many others that cannot be more than mentioned here, yet the scope of their work and the extraordinary results accruing from it could be adequately explained only in a large book. There is, for instance, the laboratory under the supervision of Dr. Albert Slack, in which thousands of analyses are made each year.

Again, there is the section devoted to distribution of insulin for indigent diabetics, and finally there is a room where students study bacteriology. On the walls are large food charts, showing the water, protein, salt and starch content of staple edibles. Some facts revealed by these charts are, to the layman, nothing less than astonishing.

One of the things they show, for instance, is that beefsteak is about 60 per cent water. Another, that the amount of protein in fish is virtually the same as that in meat—which illustrates the fallacy of persons "giving up meat" and substituting fish under the illusion that the protein content in the latter is much smaller and consequently less harmful for certain organic conditions.

TWELVE POUNDS OF CELERY FOR A MEAL.

"To get a square meal from celery you would have to eat almost twelve pounds," Dr. Hill observes. "Celery is more than 90 per cent water."

In addition to being health headquarters for 14 counties, one of the institute's most important functions is as an educational center, which seeks to teach more than a million human beings the gospel of disease prevention. Pamphlets covering every phase of public health may be procured gratuitously from the institute's library, for it is only by saturating the public with health doctrine and propaganda that premature death and unnecessary disease can be abolished.

Immunity from and evasion of infection are two vital elements in the educational and practical work of the institute. To deal even superficially with these prime factors would require more ample space than is allotted in this article. But it is interesting and eminently desirable for people to become acquainted with some of the basic rules. Here are a few of them from Dr. Hill:

"Whenever you have fever go to bed. It is estimated that failure of people to carry out this simple rule costs Canadians \$30,000,000 annually, besides all kinds of sickness, sorrow, loss of time, wages and death."

"Never try to 'fight off' a fever. And when you go to bed be sure you isolate yourself and call a doctor."

"Undergo a thorough physical examination at least once a year and preferably every six months. A short time ago a man boasted to me that he had not been to a doctor since he was insured 14 years ago. If he had gone to a doctor he would have been alive today because he would

have received treatment for an insidious organic disease which he did not know he had. When pain and swelling assailed him he visited a medical man, but it was then too late."

"Have all superfluous growths, tumors, warts, cysts, warts, etc., removed. Frequently innocent-looking growths develop into fatal cancer."

"Get rid of goitre before you grow up by taking a little iodine salts from time to time. Make your children take it and they will never develop this widespread disease."

"Be up to date. Don't object to vaccination or anti-toxins. If they were not beneficial they would not be used. Fifty per cent of people who refuse to take anti-toxin for diphtheria die. If it is taken as soon as diphtheritic infection is diagnosed the possibility of death is very remote."

"We have discovered about proteins not only that animal proteins (from meat, eggs, milk, fish, etc.) are better than vegetable proteins for building up bodies, particularly children's bodies, but also that the best of all animal proteins for building up infants' bodies are human proteins. Young babies should eat human proteins only, they should literally be young cannibals if they are to be successful in after-life. No human baby should be anything else than a cannibal in the first nine months of his life. That is the length of time he should have human milk, not cow's milk if it can possibly be avoided. The penalty we pay for using cow's milk instead of human milk for babies is the death of four to five cow-fed babies for every one of human-fed babies."

THE NEED FOR VITAMINES.

"Refined foods and many carefully preserved foods are apt to lack vitamins—a substance we cannot do without any more than a fisherman can do without hooks. A fisherman may starve on the banks of a stream which is full of fish if he has nothing with which to catch the fish. So no amount of protein, fat, starch, sugar, etc., circulating in your blood stream will nourish you unless vitamins are present. While there are vitamins in many of our foods, leafy vegetables, like lettuce, celery, spinach, etc., are good, and lemon juice, orange juice and tomatoes. These are best when eaten raw."

"Only abolition of infection can rid the world of disease. Unless we rid ourselves, as a race, of infection we must continue to pay the price of human intercourse, meetings, parties, teas, dances, church, etc., in heavy tolls of sickness and death. Handshaking alone in Canada costs at least \$3,000,000 annually merely in loss by sickness transmitted by handclaps."

"The advantages of ventilation as an aid to health have been grossly exaggerated. Most of us die from germs and the invasion of germs on body tissues. We contract the majority of diseases from our fellows and from pollution of the things we eat and drink."

Two important departments which have proven of inestimable value to this city are the Child Welfare Society and the Victorian Order of Nurses. Offices of both organizations are in the public health building.

The accomplishments of the Child Welfare over a period of six years in London have now become historic. When the society was founded infant mortality here was more than double what it is now.

The Child Welfare nurses, since 1916, have



DR. H.W. HILL
DEAN OF LONDON'S
INSTITUTE OF
PUBLIC HEALTH.



Dr. Hill—Now what would
you like to-day??
We have everything
on the shelf from
Diphtheria to Leprosy.
TRY OUR "FLAGELLA SUNDAY"

HELP FOR LONDON'S MOTHERS.

Every mother in London, rich or poor, can receive advice and help from Child Welfare nurses. No fee is charged, the expenses of this organization being met by the United Welfare Fund.

But while the Child Welfare Society serves the mother and baby who cannot afford help, the Victorian Order of Nurses carries on its activities in all directions among the poor. Those who can pay are expected to do so in full or in part, but for those who cannot pay the services and knowledge of a graduate can be secured from the Victorian Order. These nurses visit the poorer homes of the city, make beds, bath babies and put everything in order for the bedridden or convalescent mother.

The educational value of such work may be better comprehended when it is considered that not many years ago uninformed and frequently misinformed mothers had no alternative than to apply their own meagre knowledge and experience to the problem of rearing children. Is it strange, then, that infant deaths in London were so appallingly many?

Yet the field for further educational work among the indifferent and bigoted is still unlimited. Notwithstanding the remarkable strides made in the past decade, the battle has hardly begun. The forces of public health must be further strengthened and consolidated if disease is to be routed from its stronghold and its awful menace removed from the hearts of mothers and babes.

For, even with the best scientific knowledge at their disposal, thousands of citizens maintain an attitude of skepticism and doubt. Superstition, sophistry and crass stupidity are still dominant characteristics in the life of twentieth century parents. "Busybodies" and "Nuisances" are still favorite epithets hurled at self-sacrificing nurses and doctors who desire only to aid in the campaign against poverty and disease.

London, however, is extremely fortunate in having such excellent facilities for public health. With the Institute of Public Health carrying on its vital work and producing post-graduates in public health every year, with Queen Alexandra Sanatorium at Byron achieving a record for London of the lowest tuberculosis death rate in the Dominion; with the University of Western Ontario medical school pouring qualified physicians from its portals each year; and finally, with the Children's Hospital, Victoria Hospital and kindred organizations equipped with the most modern public health essentials, the future of this city from every standpoint of public health is bright indeed.