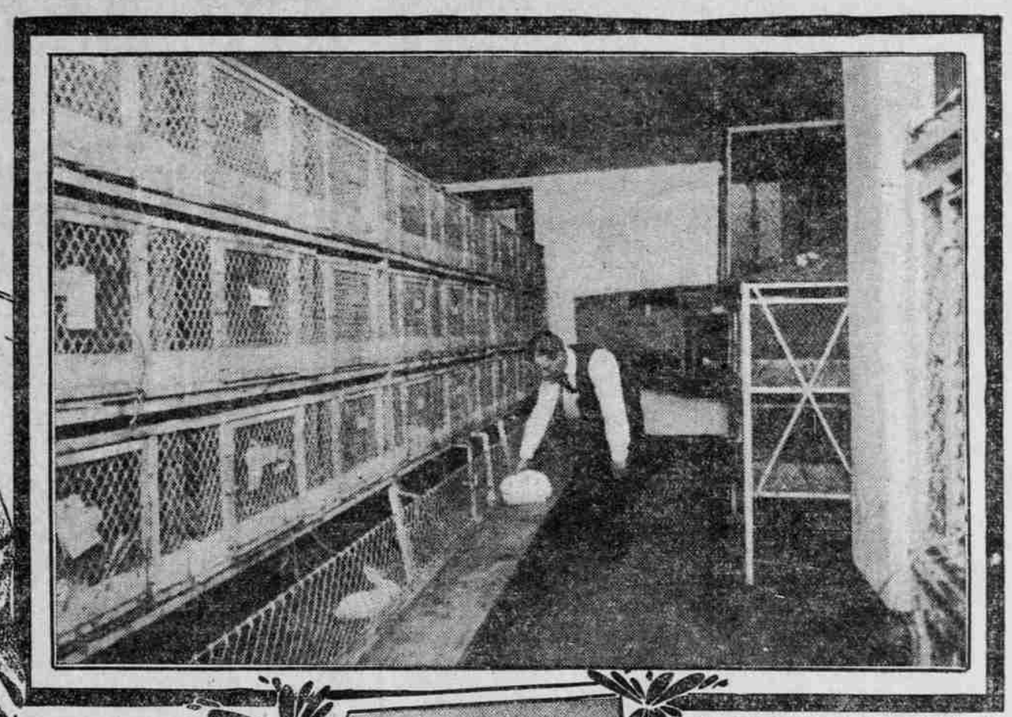
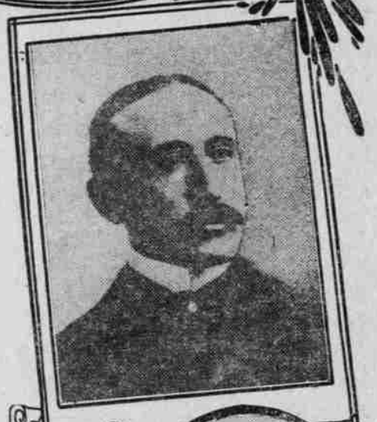
DEADLY GERMS on STREET CAR STRAPS

Recent Discoveries by American Scientists Concerning Disease-Breeding Bacteria

BOTTLING ANTI-TOXIN



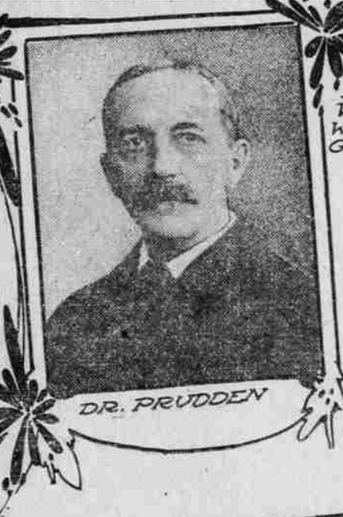
INTERIOR OF LION HOUSE, LABRATORY OF NEW YORK'S HEALTH DEPARTMENT, WHERE EXPERIMENTS WITH GERMS ARE MADE WITH GUINEA PIGS, RABBITS, ETC



DR EWING

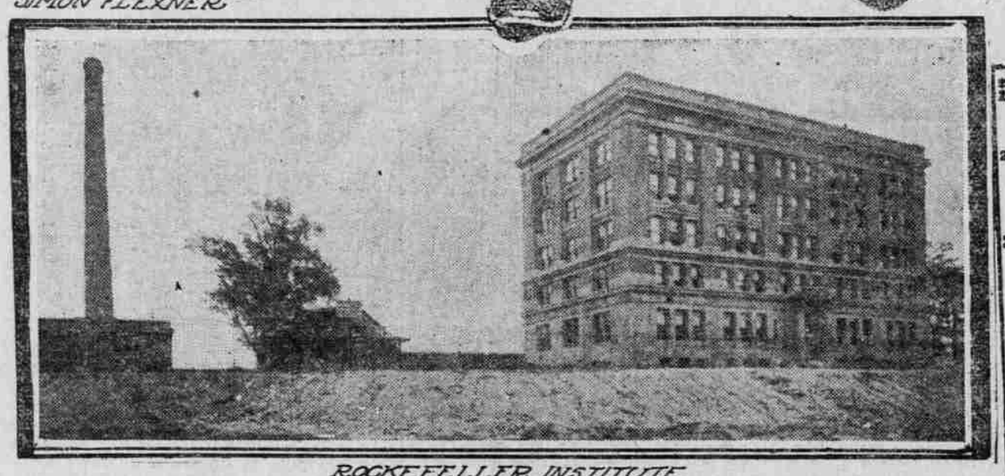
SIMON FLEXNER

DR PARK



DR. PRUDDEN

INJECTING HORSE WITH TOXIN, LABRATORY OF THE BOARD OF HEALTH, NEW YORK



ROCKEFELLER INSTITUTE

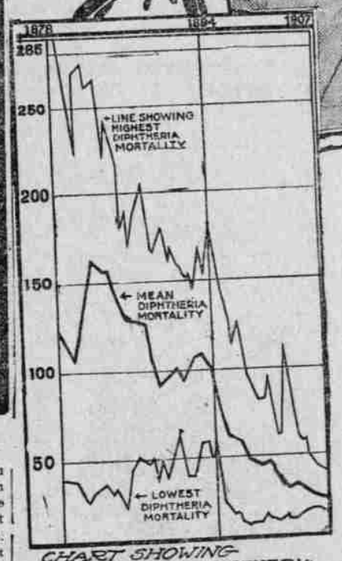


CHART SHOWING DECREASE OF DIPTHERIA OWING TO USE OF ANTI-TOXIN

BY DEXTER MARSHALL.

A well-known humorist once wrote a newspaper column of funny copy on the possibility of contracting disease from streetcar straps. His editor printed it and his readers laughed at the odd notion. Then all hands promptly forgot all about it. No one had the least idea that the journalist-jester had come within a mile of hitting the mark.

Since then the question of germ communication from the diseased to the healthy, with the streetcar strap as the road, has been raised on various pretexts at various times, both in the newspapers and out of them. On one occasion at least there was a sort of concerted effort to show that the "common or garden" variety of streetcar strap is just naturally swarming with deadly germs.

In that case possibly the ultimate aim was to show that some one had invented a form of strap that would not harbor germs and so promote a new industry—the manufacture of self-sterilizing streetcar straps.

But nothing came of this disinterested effort to safeguard millions of strap-hangers from disease, and to this day there never has been any wide publication of the easily ascertained facts of the case. Over and over again the most dreadful possibilities have been hinted at in print, and every time the traction officials have snorted at the bare suggestion that a harmful germ could stick to a strap. But neither the traction officials nor the promulgators of the strap germ theory ever have gone far enough to settle the discussion.

Recent analyses made under the direction of the New York health department of straps taken from surface cars in the metropolis, however, show that the humorist's skit about "Death in the Strap" was not entirely wide of the mark, and that disease germs of a deadly character sometimes do stick to the straps, although they were not found in great numbers.

One of the reports of strap analysis, returned by Dr. A. W. Williams to Dr. William H. Park, director of the laboratory maintained by the New York health department for research work with reference to contagious disease, says that certain "cultures" made from a part of the strap scrapings developed "only a few colonies of the usual micro-organisms found in the air; moulds, yeast and cocci." A second culture yielded organisms rather more likely to produce disease in human beings, while in the third culture "a large spore bearing bacillus similar to B. Subtilus"—to use the technical language of the report—"and a small, short chained streptococcus were developed." No diphtheria or tetanus germs were found, although it seems to have been expected that both might be.

However, the streptococcus, a common cause of blood poisoning, which, as well as the pneumococcus, is held responsible for pneumonia, is by no means a desirable thing to handle on a streetcar strap or to come in contact with in any way. That the streptococci found were as harmful as their name looks in print was discovered by the Health Department attaches, who inoculated two guinea pigs with cultures from the straps. One of the little animals was dead in a few hours, "both the large spoor-bearing bacillus and the small streptococcus" being found in the blood of the heart. The other guinea pig was made uncomfortable by the inoculation, but did not

later analysis of strap scraping by the New York Health Department showed fewer germs than the first straps. In fact, no germs from human lungs were found at all.

Great Victory Over Tetanus.

Discussing the result of the analyses Dr. Park said that the germs found, together with many others, some of which are much more deadly than they, are floating constantly in the atmosphere of all cities, and that the country air is rarely altogether free from them, although of course much purer.

"It is hardly possible to inhale the breath in town," Dr. Park continued, "without taking in germs of one sort or another, since the dust of the streets is full of them. Man is immune to most of these germs, since most of them come from horses. Fortunately few germs originating with one species of animal are dangerous to individuals of other species. There are some exceptions to this, however. Thus the germs of tetanus flourish in horses, cows and other animals, and also in man, but not so well. Man is susceptible also to the germs of hydrophobia—which always originate in some lower animal, and the germ of which never floats in the air; of anthrax, a disease of cattle; of glanders, a disease of horses, and of tuberculosis, whether communicated from a human being or a lower animal.

"Undoubtedly most persons living in cities breathe in tetanus germs occasionally. Undoubtedly also the germs sometimes pass the filtering apparatus of the nose and penetrate to the lungs, where, so far as known, they can do no harm. The deadly work of the tetanus bacillus the rigor which is known as lockjaw, follows the introduction of the germ into freshly injured tissue only. Every one is familiar with the tetanus outbreaks which have followed the Fourth of July for so many years, and also the deadly tetanus development which sometimes follows a wound in the foot caused by a rusty nail or something like it.

"You have noticed, no doubt, that the science of preventive medicine scored so big a victory over tetanus this year. In New York 1200 bottles of tetanus anti-toxin were given out by the Health Department before the Fourth, and sufferers from blank cartridge wounds were treated with the anti-toxin. So far as I have heard only one case of tetanus was developed in the entire city. The tetanus anti-toxin was perfected by Behring, the German, and Kitasato, the Japanese scientist. Behring discovered this anti-toxin years before he found the diphtheria anti-toxin, which has been of such great benefit to mankind, but for some reason the tetanus anti-toxin was not pushed so promptly nor so determinedly as the other.

"Tetanus poison, by the way, is one of the deadliest known to science. It is 50 times as strong as strychnine and 20 times as strong as cobra venom. This year's splendid demonstration of the value of tetanus anti-toxin means that tetanus may now be controlled as effectively as diphtheria long has been controlled. Few persons outside the medical profession understand what has been accomplished with the latter disease, but a chart has been prepared which shows the facts graphically.

"Twenty years ago the mortality from diphtheria in 29 of the world's largest cities—New York, Philadelphia, Boston, Buffalo, London, Paris, Berlin, Vienna, Chicago, Brooklyn, then a city by itself; Dresden, Munich, Liverpool, Glasgow, Edinburgh, St. Petersburg, Koenigsberg, Frankfort, Amsterdam and Hamburg—was nearly five times as great as now, the average being 150 deaths to every 100,000 of population and the range being from the great proportion of 285 per 100,000 down to about 50.

"The observations on which the chart is based were begun in 1872. Sanitary science and general knowledge of the nature of diphtheria increased rapidly in the years immediately following and the death rate from that disease decreased with corresponding rapidity. Three or four years later the diphtheria death rate went up to 150 again till about 1890. There was then a second rise, but since 1894, when the anti-toxin came into general use, the rate has decreased yearly; at the present time the deaths from diphtheria in those cities do not average more than 30 in every 100,000 inhabitants.

"In the diagram the heavy middle line represents the average death rate for 100,000 from diphtheria in the cities named and the heavy vertical line the introduction of anti-toxin. Lines showing extremes of fluctuation are also given.

"The report of the analysis says that no tetanus germs were found, but it is not impossible that they and many others might be were a sufficient number of analyses taken. Tetanus germs would not be specially dangerous on a streetcar strap, anyway; they would be less dangerous there than in many other places in fact, and could do little harm unless there was a laceration of the hand grasping the infected strap. In such cases tetanus germs might lodge in the wound and multiply, as they do unless the anti-toxin is used when boys get hurt 'on the Fourth' with fireworks. Germs that are 'blown in' by explosion are especially troublesome, however.

"Tubercle germs are more common than most other disease germs in city air. You are likely to take them into your system almost daily, and at certain times of the year this is true also of the germs that produce pneumonia, colds and the like. Everybody knows nowadays that the best way to resist any disease is to maintain a state of general good health.

"It should be understood that disease germs are to be found wherever dust settles," Dr. Park continued, "and that is almost everywhere. The mere fact that streetcar straps are worn smooth by contact with many hands prevents the adhesion of much dust to them, and the same is true of hand railings of all sorts. Germs freed by the exhaling breath of infected persons soon die in ordinarily pure air and, also, if deposited on straps or elsewhere, die off rapidly, except in damp weather, merely from drying up.

"Many persons who are quite well, apparently, carry disease germs about with them. One in every 500 persons in New York is supposed to carry diphtheria germs in the throat, although the disease does not develop in more than one in 50 cases, except when the weather is stormy or otherwise especially trying. Many persons, also, who do not become ill, carry the germs of tonsilitis, bronchitis and other throat diseases with them.

"By putting his hand in his mouth and later grasping a streetcar strap such a person may deposit germs on the strap, and so pass on a disorder from which he has not suffered himself, and of which he is the unwitting transmitter. It is probable that the streptococci found on the streetcar straps which were analyzed recently were deposited in that way. To 'catch' a disease of the class mentioned from a strap, however, you would have to put your own hand in your mouth after clinging to an infected strap.

"And, while there is some slight danger from infection by this method, there is quite as much danger of infection from shaking hands with a consumptive person and in a dozen other ways. Dr. Baldwin, of Saranac Lake, has had consumptives wash their hands in sterilized water, after which the water has been analyzed. In practically every case of this sort it has been found that the water contained bacilli of tuberculosis to kill a guinea pig.

"Although not found on any of the straps analyzed by the New York health department, the germs of various eye diseases, such as ophthalmia, virulent conjunctivitis and trachoma—brought to this country from Southern Europe, where it was introduced from Egypt—might be deposited readily on straps, railings and elsewhere by one suffering from such a disorder, after rubbing the diseased eye. These diseases may be and often are transmitted by contact, either with persons suffering from them, or with surfaces of other kinds as well as straps which they have touched.

"One per cent of those who have suffered from typhoid fever carry the germs with them. The New York health department is now dealing with a remarkable case of this sort—a woman cook who had typhoid years ago, but is now in robust health. As reported in the newspapers last Spring, typhoid has appeared in several households in which she has been the cook. That she was the cause of the fever in a family on Long Island by whom she was employed was not discovered until after the regular family doctor, a well-known bacteriologist, and a sanitary engineer of reputation, had all sought vainly for the fever's cause.

"When, at last, the mystery was unraveled, she was taken in charge by the health authorities as altogether too dangerous a person to be allowed at large. She is still confined to the North Brother Island Riverside Hospital, and there is no telling when she will be set at liberty."

Summing up the case for and against the streetcar strap, Dr. Park concludes that it is as dangerous as any other substance with which persons suffering from communicable disease habitually come in contact and no more so. It is conceivable that various diseases have been contracted from infected straps, but in the nature of things there is no way of tracing any such case.

The Fight Against Germs.

The danger from disease germs of every kind is much less today than even a few years ago. As the science of bacteriology is brought to a higher state; as the nature of disease germs and the means of destroying them are better understood, the control of germ diseases will improve from year to year. At the present time more men and vastly more money are engaged in fighting disease through scientific research than ever before, and the fight is being carried on in every civilized land.

The names of Koch, the German, and Pasteur, the Frenchman, always will be associated with this fight, no matter how far beyond their furthest advances the antigerm contest may progress. The Pasteur Institute in Paris is the most efficient and most famous center of the anti-germ war today, with the Imperial Institute of Infectious Diseases at Berlin a good second. The Jenner Institute of Preventive Medicine in London is in the same class and is doing great work.

In this country, the Rockefeller Institute, opened in New York a year or more ago, and of which Dr. Simon Flexner is the director; the Memorial Institute in Chicago, founded by Harold S. McCormick, of which Dr. Ludvig Hektoen is the director; the Phipps Laboratory in Pittsfield, and the tuberculosis department of the Carnegie Institute are all bound to be important factors in the fight against the germs. Mr. McCormick is the son-in-law of the founder of the Rockefeller Institute, the Memorial Institute was established in memory of a little daughter who died of scarlet fever, and consequently much of the institution's work has been directed specifically to the study of that disease and others, such as measles and whooping-cough, to which children are peculiarly susceptible.

Hektoen's work, both as director of the Memorial Institute and in the Rush Medical School, connected with the University of Chicago, entitles him to be counted among the germ fighters who are worth while in this country. It might be supposed from his name that he is of foreign birth, but he is a native of Wisconsin, the son of one of the Swedish immigrants, who have made so deep an impress upon the Northwest, and have added one of its most interesting elements to the modern composite American race. Dr. Hektoen is still young, being only 44, and has plenty of time before him in which to prosecute the fight. He is a graduate of Decorah College, Iowa, but he studied also at Prague, Berlin, Vienna and the University of Wisconsin. He has had to make his own way in the world, and one of the rounds of his ladder was the post of Coroner's physician in Chicago, which he held from 1890 to 1894.

He is much interested in the curious discovery by the Englishman, A. E. Wright, of substances in the blood which he terms "opsonins," and which, by their effect upon the germs, he says act as appetizers," to the white corpuscles of the blood and so enable them to destroy many more germs than they could without such stimulus. Dr. Hektoen is not lacking in breadth, but he is a great detail man, and does much of his original work with his own hands.

Flexner and Welch.

Dr. Flexner, a Kentuckian by birth, is the same age of Hektoen. Flexner is of Jewish descent, and he took post-graduate courses at Johns Hopkins, the University of Strassburg and the University of Berlin, after getting his M. D. degree at the University of Louisville. He is little and slight, with spectacled blue-gray eyes and close-cropped hair that is too gray for 44, yet he doesn't look old beyond his years. To tell the truth, he might be taken for a man either five years less or five years older than he really is. He works like a dynamo. He has absorbed a rather German air from his long residence at German universities, and, because of a protracted stay in Japan, where he went to see what the little brown scientists of the Rising Sun Empire were doing in bacteriology

(Concluded on Page 11.)