BACTERIOLOGY

# "Phage" Found to Cure With Antitoxin, Not by "Eating"

## Famous Bacteria-Dissolving Power Secondary, Apparently Not Important to Conquering Disease, Report Declares

BACTERIOPHAGE, popularly known as the "germ eater," cures disease not by "eating" or dissolving the causative bacteria but by producing antitoxins in the body. The famous bacteria-dissolving power is merely a side-issue, apparently of no importance in curing or preventing disease, as has long been suspected by some investigators.

This explanation of how the potent but mysterious phage acts to cure or to prevent disease was given by Dr. N. W. Larkum of the Michigan Department of Health at the Indianapolis meeting of the American Public Health Association. Dr. Larkum reported studies supporting this theory.

### Hopes Not Entirely Fulfilled

When Dr. F. d'Herelle, formerly of the Pasteur Institute and Yale University, announced his discovery of bacteriophage, it gave rise to great hopes that here at last was a way to wipe out disease. All that would be necessary to stop an epidemic of cholera, for instance, would be to pour a tube of the proper bacteriophage into the drinking water supply. These hopes were not entirely fulfilled, but results were sufficiently good to encourage a number of physicians in continuing to use the phage and to investigate its mode of action. Among them has been Dr. Larkum.

If it is true, as he now strongly suspects, that all bacteriophages are capable of producing antitoxins, scientists now have the means to fight specifically most if not all known diseases caused by bacteria. This may be done from the preventive standpoint, by immunizing well persons with bacteriophage; or sick persons may be treated by injecting serums prepared by immunizing animals with bacteriophage.

### Poisons Are Real Causes

Dr. Larkum pointed out that in most if not all infectious diseases, the serious illness is caused not by the bacteria themselves but by the toxins or poisons they produce in the body. Bacterial or infectious diseases have only been successfully treated when soluble toxins could be obtained from the causal organisms and antitoxins developed.

For example, success in the treatment of diphtheria followed the development of diphtheria antitoxin. Prevention of this disease now is possible by injecting substances known as toxin-antitoxin or toxoid. These stimulate the body to produce enough antitoxin on its own to neutralize the poison from any diphtheria germs that invade it.

### Typhoid Patients Not Sick

The effect of bacteriophage when used to treat disease suggested that this was also the way it acted. When typhoid bacteriophage was injected into typhoid fever patients, it was particularly noticed that the symptoms of poisoning subsided. The bacteria did not disappear any sooner than usual, but the patients were not sick.

Earlier investigators, among them Dr. d'Herelle, considered this possibility but their studies led them to believe that bacteriophage did not produce antitoxin. Dr. Larkum and his associate, Ruth Corpron, however, conducted experiments with exactly opposite results. Their work showed that bacteriophage is not a toxin, is not itself an antitoxin, but produces or stimulates the production of antitoxin in the body.

BEAUTY FROM THE DESERT

*Centuries, perhaps millenia, since the cacti have boacted of "progress" in the perfection of their flowers; yet the big blossoms of this huge relative of the common night-blooming cereus were miracle enough to attract the fascinated attention of many visitors at the Chicago exposition, Century of Progress*

*Science News Letter, October 14, 1933*

ARCHAEOLOGY

# String of Beads 37 Feet Long Dug Up in Indian Home

A CLUMP of tiny beads which placed end to end make a bead string over 37 feet long is the prize discovery of archaeologists who have been excavating Indian ruins near Allentown, Arizona. The longest string of Indian beads previously found in the Southwest measured 32 feet.

The beads are of red and white shell, said Dr. Frank H. H. Roberts, Jr., who directed the excavations for the Laboratory of Anthropology at Santa Fe, and who has just returned to his post at the Bureau of American Ethnology, Washington. So small are the hand-made beads that 20 would be required to the inch. Sifting out the thousands of tiny specks from the earth required more than two days of labor.

Dr. Roberts suggests that the beads and some fragments of turquoise with them lay, perhaps, in the pouch of an important medicine man of the village. If so, the pouch and the sinew string that held the beads in place have long since disintegrated.

Assisted by students from the laboratory, Dr. Roberts excavated the village ruins, finding new evidence of the evolution of architecture in prehistoric Indian settlements.

When Southwestern Indians first made homes, they dug pit houses for themselves and roofed them with poles and brush. Around the houses were storage bins for winter food supplies. Dr. Roberts finds that the storage bins in time were enlarged into dwellings and there were even row houses in the old settlements. The underground pit house became the village kiva, or church. Down to today, Pueblo kivas where ceremonies are held are still built underground.

The evidence shows that these architectural changes took place in about 200 years for the different type structures are there and charred pieces of timber from the ruins tell the dates, in terms of tree rings, when the buildings were in use. The dates cover a period from 700 A.D. to 950 A.D.

*Science News Letter, October 14, 1933*

PUBLIC HEALTH

## Scientists Took First Chance With Encephalitis

BEFORE trying to give encephalitis or "sleeping sickness" to convicts by the bite of presumably infected mosquitoes, officers of the U. S. Public Health Service tried to experiment on themselves, as is the custom among medical scientists.

Dr. J. P. Leake, in charge of the federal health service's encephalitis investigations at St. Louis, Dr. L. L. Williams, Jr., and Dr. Bruce Mayne all took their chance of getting this serious disease by letting mosquitoes feed on patients and then on themselves. None of them has contracted the disease as a result. This may be because, in the course of their work with the patients, they have already acquired immunity.

The next step was to repeat the experiment with ten convicts, volunteers from the Mississippi Penitentiary, who will win their freedom if they survive the experiment.

In calling on Mississippi authorities for convict volunteers, the federal health authorities followed a precedent set in 1916 when a similar experiment with Mississippi convicts Dr. Joseph Goldberger of the U. S. Public Service was able to prove that pellagra is due to deficient diet and that it can be corrected.

*Science News Letter, October 14, 1933*

METEOROLOGY

# Microclimatology, Science That Studies "Working" Weather

### Temperature, Evaporation Rates and Other Environmental Factors Measured Close to People, Animals and Plants

WEATHER Bureau records are notoriously inadequate pictures of conditions which human beings, cats and dogs, cabbages and cornstalks are up against. Official thermometers are always perched well above ground, in structures that provide a maximum of shade and ventilation, and a considerable degree of shelter from direct wind, snow and rain. Hence, no matter how ideal their readings are from the viewpoint of pure atmospheric physics, they are of much less human interest than are those of the humbler unofficial instruments that share our common lot down in the sweltering street, or out on the blizzard-stung prairie.

#### Great Difference in Short Distance

Some scientists, especially ecologists, who study the intimate details of the social life of plants and animals in nature, have taken cognizance of this, and are using a kind of meteorology of their own. They read the weather factors where these are actually operative on living things; at the level of the grasses in the field, among the leaves of trees and bushes in the forest, and where man and his suffering fellow-creatures must breathe and sweat in the streets and crowded inside spaces of great cities.

This new and closely applied climate study has been given the name "microclimatology" by one of its pioneers, a German scholar. It is the climatology of little spaces.

Significant differences in this extremely localized weather can be found in amazingly short distances. One European student of the subject found greater differences in temperature between ground level and six feet above it, among the trees of a forest, than was shown on official records of "general" temperatures between cities on the coast and hundreds of miles inland.

Microclimatology takes account, also, of factors other than temperature, such as relative humidity, air movement, and their close companion, evaporation rate. Differences in these will be as marked as they are in temperature, over distances as little. Instrumental determinations of the evaporation rate from free water surfaces show three or four times as great evaporation in midsummer sun as in the shade a few feet distant. Determinations of wind velocity in a sheltered pocket behind trees or a wall show contrasts as striking, when compared with the record as obtained above the trees or roof-tops.

Of course, everyone who has ever kept a tree between himself and the sun in summer, or a wall between the wind and himself in winter, has been a kind of rule-of-thumb microclimatologist. But the active students of the new science want exact and quantitative data rather than loose and qualitative guesses. They want such information not only because it is more scientific but because it is more practical. For on the study of microclimatology, both indoors and out, will depend a great deal of the success in human comfort as well as the cost in cash, of the great new branch of engineering which is just arising—the practice of air-conditioning.

*Science News Letter, October 14, 1933*

ENTOMOLOGY

## 1933 Bad Grasshopper Year, Entomologists Report

GRASSHOPPER depredations in the United States during the past summer were the worst for many years, Dr. W. H. Larrimer of the Bureau of Entomology, U. S. Department of Agriculture, reports. Although the early hatching from their eggs in the soil was slowed down by wet, cold spring weather, subsequent heat and drought operated to the advantage of the 'hoppers, the damage they caused in late summer more than made up for their delayed start. Even into early October they were reported as still going strong in the northern Plains States. (*Turn Page*)