

MEDICINE

# Better Control of Leprosy, TB May Come From Germ Studies

## "Germ Fingerprinting" Reveals Danger of Putting Hands to Mouth; Snakes Subject to TB, Meeting Hears

**B**BETTER control over tuberculosis and leprosy, even without specific cures for these plagues, is the hope of a group of scientists who met to pool the results of their separate researches on the germs of these diseases. The problem was outlined by Dr. Esmond R. Long, of the Henry Phipps Institute, Philadelphia, at the meeting of the American Association for the Advancement of Science at Denver.

Tuberculosis in man and animals, leprosy in man and leprosy-like diseases of animals, and a cattle plague known as Johne's disease are all caused by members of the same germ family, Dr. Long pointed out. These germs are known to scientists as acid-fast bacilli because the slender rod-shaped organisms all take a red stain or dye and hold it fast even when washed with acid.

These acid-fast bacilli are alike in another important respect. No matter what part of the body or what organ they affect, they all cause the same initial reaction in the body. Their presence is the signal for the appearance of large, single-nucleus scavenger cells which gobble up the bacilli and try to destroy them. But the bacilli cause chemical changes in the scavenger cells, turning the latter into what scientists call epithelioid cells. Groups of these cells form the tubercles of tuberculosis.

### Germs Make Chemicals

A chemical attack on the tb and related germs, sponsored by the National Tuberculosis Association, has shown that all of these germs, whether they cause leprosy, tuberculosis of man, tuberculosis of cattle, or other disease, produce many of the same chemicals in their tiny bodies. Each of them, in addition, produces one or two chemicals of its very own, entirely different from those produced by any other germ. Certain of these individual chemicals of the human tuberculosis bacillus can produce the same changes in the body's scavenger cells that the living bacilli produce.

Leprosy, a plague of the ages, is still

one of medicine's greatest mysteries. But G. W. McCoy, U. S. Public Health Service medical director, pronounced it "not one of our major public health questions," as it is in other parts of the world.

In most parts of the United States there is no need for the isolation of cases, in Dr. McCoy's opinion, except for charity reasons or because of the esthetic sensibilities of the community.

Dr. McCoy believes that nearly all cases of leprosy originate only in Florida, Louisiana, and Texas. But because the period between infection and development of the disease is ordinarily from five to ten years, and sometimes twenty years, the tracing of the source of infection is difficult. Only about a thousand cases of leprosy exist in the United States, half of which are known.

Dr. Ralph Hopkins of Tulane University, and dermatologist at the Carville National Leprosarium, presented evidence of a hereditary tendency to leprosy, and maintained that this justified segregation.

Hope that scientists will soon be able to transmit leprosy to some animal, in order to study the disease experimentally, was expressed by Dr. Malcolm H. Soule of the University of Michigan, who is convinced that Hansen's bacillus, first charged in 1874 with being the cause, has been grown artificially.

Dr. H. E. Hasseltine of the U. S. Public Health Service expressed the hope that science will find not only an animal that can be consistently infected experimentally, but the exact way the disease is transmitted from person to person, and a specific curative drug as effective as quinine for malaria and arsphenamine for syphilis.

### Germ Fingerprinting

There is an old proverb credited to the Chinese: "You must not touch your mouth to any part of your body except your elbow."

The excellence of this advice was brought out strongly in studies reported

by Dr. Severance Burrage of the University of Colorado School of Medicine.

Dr. Burrage has made many fingerprints on plates of nutrient jelly and studied the colonies of germs that spring up after them. He finds it a most effective way of sowing bacteria broadcast.

There is a decidedly practical aspect to the studies. Public regulations make much of washing and sterilizing dishes and glasses used in public eating and drinking establishments. Then fingers pick up these nice, clean utensils—and plant germs on them.

Said Dr. Burrage: "The habit of putting the fingers to the nose and mouth is universally common. The diseases transmitted by mouth secretions are numerous, including influenza, pneumonia, common colds, measles, meningitis, trench mouth, scarlet fever, whooping cough, tuberculosis, and diphtheria. With the exception of the last two, morbidity and mortality statistics show no decrease in this group of respiratory infections. The swapping of saliva, microbial fingerprinting, I believe is largely responsible for this. . . ."

"While it is a difficult problem to teach everyone to cure this finger-mouthing and finger-printing habit, it is my belief that a great advance could be made by instructing employees in food handling establishments on this point; teaching them the proper ways of handling foods and utensils, as well as showing them the dangers of the improper ways."

### Snakes Get TB Too

Snakes, fish, frogs, turtles, alligators and iguanas get tuberculosis as well as man and other warm-blooded animals, Dr. Joseph D. Aronson, of the University of Pennsylvania and the U. S. Office of Indian Affairs, reported. The bacillus that causes the disease in the cold-blooded animals, however, apparently cannot cause disease in warm-blooded animals. Neither can it be made into a vaccine to protect warm-blooded animals from their own type of tuberculosis, Dr. Aronson found from guinea pig investigations.

### Honored

For the method of detection and treatment of radium poisoning which he developed during the past few years, Dr. Robley D. Evans of the Massachusetts Institute of Technology will receive the first Theobald Smith award in the medical sciences, of the American Association for the Advancement of Science. This award consists of a prize of one thousand dollars and a bronze medal, founded by

Eli Lilly and Company of Indianapolis, to be given annually to an eminent investigator selected by the Association.

To diagnose radium poisoning, Dr. Evans uses a sensitive radiation detector called a screen-cathode quantum counter which detects the presence of minute amounts of radium's deadly gamma rays. Treatment of the condition consists essentially of a process of rinsing out the radium-contaminated calcium and replacing it with fresh pure calcium. The

rinsing out is done by giving parathyroid gland hormone which depletes the calcium in the bones. To make them hard again, more calcium must be given in the diet or as medicine. The method depends on the fact that radium and calcium are very similar in chemical properties and consequently any radium taken into the body tends to accumulate in the same structures—the bony framework—where calcium accumulates.

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#### METEOROLOGY

## Long Range Forecasts Unlikely to Be Attained

**H**OPEFUL but uninitiated people who envision long range forecasting of the weather as providing detailed information on a given day and hour and place are doomed to probable disappointment.

Hurd C. Willett of the Daniel Guggenheim Aeronautical Laboratory of the Massachusetts Institute of Technology took the "Almanac" type of forecast out of the realm of long range weather predicting at the meeting of the American Association for the Advancement of Science in Denver.

Accurate, short-range forecasts predicting local conditions can only be obtained when the full knowledge of widely distributed meteorological conditions are available both from ground stations and from aloft. This full knowledge is necessary, Mr. Willett pointed out, because the specific air masses are continually forming and disintegrating.

But, he added, "It seems rather improbable that the detailed development of [air mass] systems yet unborn can ever be forecast."

Long range forecasting, on the contrary, is based on the known fact that frequently pronounced weather abnormalities may persist over considerable areas for weeks, months and even years. The approach to the problem has been by two methods: the statistical method, using past records of weather and correlating them with an almost endless variety of variables; and the synoptic method, using synoptic charts or weather maps.

The weakness of the statistical methods, said Mr. Willett, lies in the fact that they are empirical shortcuts which have no concern at all with physical causes of the weather. Studying weather maps,

carefully prepared daily, however, furnishes a current picture of general circulation of weather over large areas. By studying this general circulation pattern it should be possible to see the influence of the pattern on contemporary weather conditions. A second aim would be to detect, if possible, empirical clues as to the future state of the weather circulation from its current state and tendencies.

For the past year, Mr. Willett indicated, meteorologists at Massachusetts Institute of Technology have been making such daily weather maps and studying them. They have found that during the colder half of the year the principal centers of weather action are the high pressure areas in Siberia and North America and the low pressure areas over Iceland and the Aleutian Islands. Important too are the subtropical high pressure areas over the Pacific and the Atlantic.

Last winter the abnormal warmth in the eastern states through December and most of January appeared due to the westward extension of the Atlantic high. Where this high met the cold mass over the continent there were heavy rains. In the Ohio Valley this led to floods.

In the West last winter's weather was marked by the abnormal disappearance of the customary Aleutian Island low pressure area and its replacement by a persistent high pressure area. This led to persistent cold air masses over the west and the usually warm mild Pacific air went north over the ocean instead of over the west coast of the United States. The western severe winter resulted.

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#### FAST BALL

Wesley Ferrell, crack mound ace of the Washington Senators, shows how he holds his fast ball. On the facing page, see how a pitcher's hand looks to the eye of the X-ray camera.

#### PSYCHOLOGY

## Brain Waves Like Human's Found in the Guinea Pig

**B**RAIN waves, those electric impulses that are detected in the human brain itself, are probably not associated with the higher thought processes of man.

The same sort of brain rhythms have been obtained from the brain of the humble guinea pig, it is reported (*Journal of Experimental Psychology*, July), by Drs. H. H. Jasper, C. S. Bridgman, and Leonard Carmichael of The Bradley Home, Brown University and the University of Rochester.

This brain wave pattern, known to scientists as the "alpha rhythm," is not outstandingly characteristic of the electric messages ordinarily sent out by the guinea pig's brain, the investigators said, but it is possible to record from the guinea pig brain, electrical variations which in frequency, regularity and continuity, present the same nature as a good record of alpha rhythm from the human cortex.

"The findings of well-developed alpha rhythms in the guinea pig would lead one to believe that this phenomenon is connected with some basic neurological mechanism, rather than with any higher elaboration of nervous function found only in the primates," the psychologists conclude.

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