SCIENCE NEWS

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TRANSMISSION OF TYPHUS FEVER BY FLEAS

FOR the first time the flea has been definitely incriminated as transmitting typhus fever in this country. Experiments proving this have just been reported by Drs. R. E. Dyer and L. F. Badger, of the U. S. Public Health Service.

Typhus fever in the Old World seems to be of slightly different type from the disease in the New World, and is transmitted by the body louse. It has been called jail fever and ship fever and was very prevalent in jails, crowded barracks and ships, city slums, and wherever people lived in congestion and filth. The disease has never reached serious epidemic proportions in the United States and for many years very few cases have been reported. The fact that the disease occurred in people who were not infested with lice led American investigators to suspect that some other insect was transmitting typhus fever in this country.

Drs. Dyer and Badger investigated cases of typhus which occurred on premises in the immediate vicinity of food-handling establishments in Baltimore in the late summer and fall of 1930. They found these premises heavily infested with rats. These animals were trapped and combed for fleas. About three dozen fleas were obtained from the rats and their nests.

The fleas were ground up and the emulsion injected into guinea-pigs, which contracted a disease like typhus fever. The clinical symptoms and the appearance of the organs and tissues corresponded with the symptoms and signs in pigs that had been inoculated with a strain of American or New World typhus fever.

Guinea-pigs which had recovered from an attack of endemic typhus produced by the New World strain were apparently immune to subsequent inoculation with the strain obtained from the flea emulsion.

Typhus fever is not to be confused with typhoid fever. The latter is caused by a bacillus, the former by a virus too small to be seen through the most powerful microscope. Typhus fever is transmitted by the bite of infected lice and fleas. Typhoid is transmitted by infected food, water or milk, and attacks the intestines chiefly. Typhoid fever is less often fatal than typhus fever. There is no known vaccine for typhus fever, while there is a preventive inoculation for typhoid.

PARROT FEVER IN NEW YORK CITY

DEVELOPMENT of five human cases of parrot fever, with one death in New York City, has just been reported to the U. S. Public Health Sevice. Dr. G. W. McCoy, director of the National Institute of Health of the Public Health Service, has gone to New York to investigate the outbreak, although the officer of the service on duty in New York has also been assigned to follow up contacts.

The disease has been traced to a shipment of six love birds which arrived in New York on January 4. Four of these birds are now dead, one is under investigation at the Rockefeller Institute and the sixth has escaped. The human cases have all been traced to one bird.

Just a year ago, the U. S. Public Health Service banned the importation of any parrots, love birds or similar birds, following a severe outbreak of parrot fever. In October, 1930, this ban was modified so that birds could be imported subject to certain restrictions, among them a stay of two weeks in quarantine for observation. The six love birds in question were held for the two-week quarantine and no signs of disease were observed. Apparently they harbored the germ or virus of the disease, without being affected by it. Students of the question think that the change to a cold climate causes the development of the disease in birds that are infected. The six birds implicated in the present outbreak had not left New York City, although the whereabouts of the escaped bird are not now known.

No change will be made in the importation restrictions if no further outbreak occurs. Dr. Charles Armstrong, of the National Institute of Health, has been continuing his studies on parrot fever and will probably get a new strain of the causative virus for investigation as a result of the present outbreak.

SOUTH AFRICAN GOLD

AT the end of 15 years the present gold mines of South Africa, which now supply over half of the entire world output, are expected to be near the end of their gold production, according to F. Lynwood Garrison, Philadelphia mining engineer, speaking before the American Institute of Mining and Metallurgical Engineers. The future production of the Witwatersrand's gold mines, said Mr. Garrison, depends on the possibility of mining and milling profitably the large tonnage of relatively low-grade ores known to exist in that area.

The director of the U. S. Mint, Robert J. Grant, presented figures showing that the production of new gold is mounting throughout the world following the decline that set in after the World War. Since the discovery of America, it is estimated that 40,000 tons of gold have been produced throughout the world.

In the production of new gold South Africa not only stands first just now, but in recent years has been far in the lead of all other regions. In the future economic development of the world, therefore, the South African supply of the standard metal is of paramount importance. During the next few years, African production will become even more important, despite the critical technical problems at present facing the gold industry of that continent.

Bankers joined with the engineers in discussing whether enough gold is being mined and whether the present business depression is related to the gold supply. The money users of the nation plan to join forces with the engineers in conserving the gold supply by devising

methods of using less gold in their monetary dealings, according to Mr. George E. Roberts, vice-president of the National City Bank.

PETROLEUM IN THE UNITED STATES

AIRPLANE maps and shallow drillings in various parts of an oil field now enable geologists to predict the discovery of new wells, Dr. Sidney Powers, chief geologist, Amerada Petroleum Corporation, Tulsa, Okla., told the American Institute of Mining and Metallurgical Engineers meeting in New York on February 18.

In a paper on the occurrence of petroleum in the United States, Dr. Powers reviewed the most recent findings of geologists on the origin and place of occurrence of oil in the various states and the bearing of these facts on the further development of new or existing fields.

The important oil fields of North America, Dr. Powers said, generally occur on the saddleback folds of the rock strata, the "anticlines" in geological language. This is in sharp contrast to the complexity of many European oil fields. Geology, geophysics and the automobile have in the last twenty years cooperated in stimulating modern methods of discovery.

Most American geologists believe that oil is derived from organic matter deposited in sediments as slimes, oozes or water plant débris, together with animal matter, in relatively tranquil or stagnant water. Other residues from this same débris are now found lithified as shales or limestones.

The oil and gas after formation may move a little distance before being retained by some suitable reservoir rock surface. Sandstone and limestone, among others, are good reservoir rocks. The largest yields of oil from single wells have come from limestone caverns in Mexico and Persia.

A relatively small area of the United States is underlain by developed oil fields. One fourth of the total production of the country has been from Oklahoma, which has about 300 oil and gas fields, 3,000 gas wells and 61,000 oil wells. California is the other leading oil-producing state. The largest gas reserves are to be found at the Monroe field in Louisiana and the Amarillo field in Texas.

RICE ON THE FARM

THE rice-fed hog of bottomland farms may some day be a rival for his corn-fed brother who now rules the uplands. This is suggested by experiments on the lower midwestern floodplains, described by Professor W. C. Etheridge, of the University of Missouri, who was in Washington recently for a conference called by the National Research Council.

Rice, Professor Etheridge reported, has been successfully grown on a large experimental scale 60 miles north of St. Louis. Ten acres of rich bottomland under rice cultivation yielded 877 bushels. Some of the rice varieties tested ran as high as 125 bushels to the acre.

Feeding experiments on cattle and hogs were successful. Cattle did almost as well on a straight rice diet as they did on corn, and on a feed of rice plus corn they put on weight as rapidly as they did on a mainstay diet of corn alone. With hogs, rice alone gave results equal to those obtained with corn alone. Of course, with all these flesh-making diets there were the usual additions of oilseed meal, alfalfa, or other protein foods, together with the necessary mineral and other diet accessories.

Professor Etheridge believes that we should begin to prepare now for a future in which farmers will slowly desert their present holdings on the hills and settle more and more on the rich but now largely neglected bottomlands. At present, cultivation of these lands is hampered partly by their frequent flooding, but mostly by our lack of knowledge of crops to grow there and the special methods of cultivation that will be necessary. He believes that by the use of machinery Americans can produce the immense crops that the Chinese get from lowland farms, but without the terrific amount of hand labor necessitated by the primitive agricultural methods employed in the East.

OBSERVING THE SUN'S CORONA WITHOUT AN ECLIPSE

A PROBLEM that has long engaged the attention of astronomers, that of observing the sun's corona without waiting for a rare total solar eclipse, has been partially solved by B. Lyot, an astronomer at the Meudon Observatory near Paris. He has reported to the Academy of Science how the form of the corona may be traced by the use of polarized light, provided the air is sufficiently clear. He made his observations from the 9,439-foot-high summit of the Pic du Midi, which was the first mountain to be used by astronomers for an observatory. However, this method does not permit actual photographs of the corona. To obtain these, astronomers must still wait until the dark disc of the moon covers the sun.

Ordinary light is made of waves vibrating in many directions, but when polarized the vibrations are mainly in one particular direction. Light may be polarized artificially by the use of special prisms, but it sometimes occurs in nature when sunlight is reflected from a cloud of small particles. The corona consists largely of such particles, so its light is largely polarized, a fact that has often been verified at eclipses.

M. Lyot's apparatus consists principally of a very sensitive polarimeter, that can detect one part of polarized light in a thousand times as much ordinary light. With a telescope lens he obtained an image of the sun, and screened the bright inner part with a metal disc the same size as the image. The glare thus eliminated, he was able actually to see directly the solar prominences, great flames of hydrogen and other gases that shoot out from the sun's surface. These also were first observed at eclipses. For many years it has been possible to observe them at other times with the aid of a spectroscope, but this is probably the first time that they have been observed directly.

With the polarimeter set a little way from the edge of the sun, about a fifth of its diameter, no polarization of the light was observed, but as the instrument was moved

inward it began, and increased as the edge was approached. M. Lyot believes he has shown conclusively that this is not due to any effect in the atmosphere, because very light clouds completely eliminated the effect. He made a series of observations by crossing the sun at different angles, and was thus able to plot the outline of the corona in all directions. As photographs of the corona at eclipse time often show streamers extending many times the diameter of the sun, he has probably only recorded the inner corona, which is much brighter than the outer portions. Therefore, astronomers will still find it necessary to travel long distances to observe a total eclipse. As a full check on M. Lyot's researches, it will be desirable to observe the corona by his method at the same time that a total eclipse is being observed elsewhere. In commenting on his work, Dr. Henri Deslandres, director of the Paris Observatory, of which the institution at Meudon is a branch, suggests that it may be possible to photograph the corona without an eclipse with the assistance of the spectroscope from a suitably clear station.

The Pic du Midi, scene of M. Lyot's labors, was the first mountain observatory. François de Plantade, who was born at Montpellier in 1670, and was a colleague of the great French astronomer, G. D. Cassini, was the first to propose an observatory on the Pic du Midi in order to take advantage of the clear sky. He made several ascents to study conditions and died there in 1741 while making such observations. His work was the forerunner of the modern American observatories in California on Mount Wilson and Mount Hamilton.

Dr. George Ellery Hale, honorary director of the Mount Wilson Observatory, in 1893 made some of the first attempts to photograph the corona from a mountain top without waiting for an eclipse. These experiments were made from Pike's Peak, but were unsuccessful. It has been tried again in recent years, notably by Dr. W. H. Steavenson, a famous English astronomer, who conducted experiments in Switzerland in 1927, but these also were inconclusive. M. Lyot's method is based on a different principle from these, however, and it will be of great value if its accuracy is confirmed.

ITEMS

THE Copeland bill to establish a commission to study the need of a new engineering and industrial museum under the Smithsonian Institution has been passed by the Senate. If the bill gets through the House, nine men, including an engineer, an industrial chemist, a manufacturer, three men experienced in transportation by land, air and water, respectively, an educator, a labor representative, and a museum expert will report on exhibits of this character when the present arts and industries building of the U. S. National Museum is razed to make way for widening of a street in that vicinity.

THE bill providing for the establishment of a national park in the southern Everglades of Florida has been passed by the Senate and is now on the House calendar. Friends of the measure hope to see it enacted before Congress adjourns, so that the work of acquiring the land for presentation to the U. S. National Park Service may go forward. The area is unique in that it shelters an almost unimaginable wealth of animal and plant life under tropical conditions and yet is easily accessible to thousands of persons of only moderate means and limited time for travel.

THE maternity and infancy welfare bill reported to the House by the Interstate and Foreign Commerce Committee is practically the same as the Jones bill which passed the Senate, and which had the approval of the U. S. Children's Bureau. The House bill, however, has a rider tacked on to it which sets up county health units for the U. S. Public Health Service. Miss Grace Abbott, chief of the Children's Bureau, by terms of both bills, will direct the maternity and infancy health work, and no time limit is set for the act to be in force. If the bill is passed by the House, and agreement is reached in conference with the Senate, so that final action is taken before March 4, the only way in which the work of the Children's Bureau can be curtailed in the future would be by withholding appropriations or repealing the law.

A FIFTY million-year-old whale skeleton, nearly complete and in excellently preserved condition, has been found in the San Rafael hills near Los Angeles. The huge skull, eight feet long, with its lower jaw in place and the whole perfectly preserved, together with a large part of the skeleton, has been excavated by J. W. Lytle, of the Los Angeles Museum, assisted by William Strong, H. A. Wylde and Lydia Bowen. It is now under preparation at the museum, where, because of its unusual completeness, it is regarded as a most important find.

THE proposed nine-foot channel for the upper Mississippi River will not only be a notable addition to the country's inland water-way system but it will also stabilize the resort industry in the famous lake region of northern Minnesota, if the theory held by Major-General Lytle Brown, chief of Army Engineers, is correct. It is a common occurrence now during a dry period in the summer for these lakes to suffer from a withdrawal of water into the river. As the water recedes, the shores are strewn with dead fish, and property values along these lakes decline. Major-General Brown believes the lake levels will be more apt to remain constant when the river attains a nine-foot depth than under present conditions. The deeper channel is being tentatively opposed by two Minnesota congressmen. These representatives from the northern part of the state say that they are not convinced that the levels of big resort lakes in their districts will not fluctuate greatly if War Department engineers maintain a channel depth of nine feet on the river. Major-General Brown is willing that legislation be introduced defining maximum and minimum levels for these lakes. He has also stated that the wild life refuges along the Mississippi shores will be five times as effective as at present, when a deeper channel is dug in the river.