SCIENCE NEWS

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DR. DYER'S WORK ON TYPHUS FEVER

FINAL proof that rat fleas transmit typhus fever in the United States was achieved by Dr. R. E. Dyer and his associates, of the U. S. Public Health Service, after months of work on the problem. In the midst of further investigations of the question, such as whether lice also may carry the American variety of the disease, and whether a newly developed vaccine will protect people against it, Dr. Dyer, senior member and leader of the research group, has been stricken with the disease.

Typhus fever in the Old World, called jail fever and ship fever, because it was often found in jails, ships, slums and wherever people lived in conditions of filth, is carried by the body louse. It is a very serious, highly fatal disease. In the United States, however, the disease appears to be much milder, rarely causes death, and has never reached serious epidemic proportions as it has in Europe. 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 it.

Dr. Dyer, with Drs. A. S. Rumreich and L. F. Badger, of the U. S. National Institute of Health, 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 guinea-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.

Further studies led Dr. Dyer to suggest that rats may be an important reservoir of typhus fever throughout the world and not alone in the United States. "It seems a reasonable hypothesis that epidemics of louse-borne typhus may have their origin from cases of typhus transmitted from rat to man by rat fleas."

In the studies to determine whether lice may transmit the American variety of the disease, Dr. Dyer and his assistant, Dr. W. E. Workman, went about for three weeks with 200 active lice strapped to their legs below the knee. They were trying to establish a colony of body lice for their work. Finding that the lice were rather particular as to their food and greatly preferred a diet of human blood, these intrepid scientific men volunteered to furnish the ideal diet for their experimental objects.

One of Dr. Dyer's first assignments after becoming a member of the staff of the U. S. Public Health Service in 1916, was to control bubonic plague in New Orleans. He has also made investigations on pellagra and on Rocky Mountain spotted fever. In the latter research, he showed for the first time that the disease frequently appeared in eastern United States, where it had been mistaken for typhus fever. He has also done research on scarlet fever and established the national unit for scarlet fever antitoxin.

MOUNT WASHINGTON WEATHER STATION

A WEATHER station on Mount Washington, N. H., which has the reputation of being the windiest spot outside the "Home of the Blizzard" in the Antarctic, opened on October 12 to record the gales, blizzards and quieter moods of the weather on this highest point in New England. Already the snows have begun, and there is no prospect that the observers will lead an easy life this winter.

The party that is attempting this arduous task is up there for the fun of it, but not simply to live there through the winter, though this in itself will be quite a trick. They will undertake to maintain a first order station and send out, twice daily, radio reports. They will also make many experiments in radio transmission.

In charge is Joseph B. Dodge, of the Appalachian Mountain Club, well known to all visitors at Pinkham Notch as the genial and capable manager of the club's hut system. Mr. Dodge, who has his home at Pinkham Notch at the base of Tuckerman Ravine, will be a frequent visitor to the station on the summit, and will maintain a fully equipped weather station at the base. The base station should provide many interesting comparisons of wind and temperature with the top. Those who will live on the summit are seasoned mountaineers. R. S. Monahan spent several weeks on Alaska's icy mountains this summer with Bradford Washburn's Mount Fayerweather party. Alexander A. Mackenzie, radio enthusiast, has been hutmastering at Pinkham Notch for the Appalachian Mountain Club. S. Pagliuca, electrical engineer, is thoroughly familiar with the White Mountains, and last summer was in charge of the Galehead Hut of the Appalachian Mountain Club system.

The New Hampshire Academy of Sciences is sponsoring the expedition and the Blue Hill Observatory, of Harvard University, is supplying most of the weather instruments and supervising the meteorological program. The U. S. Weather Bureau is also lending apparatus, as are likewise many individuals and firms. Fuel and food are being donated or supplied at wholesale prices by different companies.

To obtain a weather record on a wind-swept summit is not easy, and for wind velocity and snowfall usually difficult. Anemometers will go round so long as they are not covered with ice. But how is an anemometer to be kept clear when the wind is building frostwork from cloud particles at a rate of one to six feet in a single

night? The answer will probably be found in a heated anemometer, which the Blue Hill Observatory is constructing.

Snow falls so slowly that strong winds drive the flakes almost parallel to the surface of a mountain, up one side, across the top and down the other. Therefore, a cylindrical gauge with the usual horizontal receiver may catch only a little that may swirl into it. The rest is dumped into one of the ravines. Shielded gauges, with receivers parallel to the mountain slopes, will be constructed out of furnace piping and placed at various points on and around the summit.

To the summit of Mount Washington, altitude 6,288 feet, there have been transported, in addition to instruments, coal, food and other material, ten cylinders of hydrogen weighing 1,300 pounds that will be used during the winter to inflate 225 meteorological sounding balloons.

NEWLY FOUND ELEPHANT FOSSILS

FIVE teeth and several bone fragments of the woolly mammoth, the largest single find of this huge Ice-Age mammal ever made in the East, have been discovered on a golf course near Philadelphia, and were placed on display at the Academy of Natural Sciences on October 9.

The fossils were found by a workman during the course of steam-shovel excavation for a new water hazard. They were buried four feet under ground. The teeth weigh from three and a quarter to six and three quarters pounds each, and are in a good state of preservation.

Edgar B. Howard, of the academy's museum, identified the specimens as belonging to *Elephas primigenius*, one of three species of genuine elephants that roamed North America during and immediately after the Pleistocene, or glacial period. Although this species was the smallest of the three, it was still huge, the beasts averaging nearly ten feet high at the shoulders, with tremendous curving tusks bigger than those of any living elephant. It was protected against the cold by a thick coat of wool, overhung with long shaggy hair.

When this great animal lived in North America, its kindred were hunted by cave men in Europe, who also drew and sculptured their likenesses on the walls of their caverns and on ivory of their own tusks. Whether such hunters existed also on this continent has not yet been definitely determined.

OLD DRINKING HORNS

DRIED-UP heeltaps of beer and mead in two ancient drinking horns have yielded secrets of ancient German beverages, under the microscope of Professor Dr. Johannes Grüss, of Friedrichshaven. Professor Grüss summarizes his study in the German scientific magazine *Forschungen und Fortschritte*.

The two horns were found buried eight feet deep in a peat bog in northern Germany. They have zoological as well as archeological interest, for they were made from the horns of the once abundant but now almost extinct European bison.

Lurking in their cracks and under the scaled flakes of horn, Professor Grüss found dried remains of the dregs of liquors quaffed in the far-gone days when German warriors drank as mightily by night as they fought by day. He scraped out the dried and hardened remains, soaked them up and patiently examined them under his microscope.

One horn had been used for beer, the other for mead, the evidence showed. The beer horn contained starch and protein cells from emmer, a species of wheat, together with yeast cells and fungus spores. The discovery of emmer fragments is of importance, for although it has long been conjectured that the ancient Germans used this grain in their beer positive proof has not hitherto been brought to light. Emmer was used with barley in making the beer-like beverages of ancient Mesopotamia and Egypt.

Mead was a fermented drink made of a honey solution. The mead horn yielded numbers of pollen grains, of flower species visited by bees, together with the end of a bee's tongue. Mead was fermented mainly by a wild yeast found in flowers, and cells of this yeast were abundant in the scrapings which Professor Grüss got out of the mead horn.

ITEMS

VITAMIN D, in the form of an extract of cod-liver oil so potent that ten drops are of equal vitamin D value with three teaspoonfuls of standard cod-liver oil, is now available to the medical profession. This natural vitamin D is not an irradiated product and not a cod-liver oil concentrate, but an extract of the rickets-preventing principle of the oil. It is stated to be free from objectionable taste. The new product was developed by Professor Theodore F. Zucker, of the College of Physicians and Surgeons at Columbia University, and the privilege of distributing it through regular medical channels has been licensed to the S. M. A. Corporation. This firm is already distributing the recently isolated primary vitamin A, and expects soon to have a combination of A and D to offer for medical use.

INDIUM, metal so extremely rare that its price at present is ten times that of platinum, is becoming available in larger quantity. New ore sources have been discovered in America, and these, together with older known deposits in Germany, yield enough raw material to encourage expectations that the annual output of the finished metal, of 99.9 per cent. purity, will soon reach five kilograms, or a little over ten pounds. Because it has hitherto been scarce almost to the point of unobtainability, the possible uses of indium are still practically unknown. But with ten pounds a year in sight, chemists are looking forward to possible researches on it.

ABSOLUTE zero, the completely cold point at which all temperature ceases, is only seven tenths of a degree beyond the reach of physics now. Absolute zero is 273 degrees Centigrade below the freezing point of water; and Professor W. H. Keesom, of the University of Leyden, has succeeded in producing a temperature of minus 272.3 degrees. This was done by keeping a small quantity of liquid helium constantly stirred while a high vacuum was produced over it by means of a pair of powerful mercury pumps.