SCIENCE NEWS

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A NEW PAN-AMERICAN DISEASE

THE tropical disease, coastal erysipelas, which causes blindness, can become a Pan-American problem like malaria and yellow fever, in the opinion of Dr. Alfons Dampf, chief entomologist of the Mexican Government, who reported his investigations on the subject in the Chiapas region of southern Mexico to the Pan-American Medical Association.

The disease is caused by a parasite which spends part of its life in bloodsucking insects like buffalo gnats or black flies. Dr. Dampf made a special study of these bloodsucking insects and found that one of them is distributed from Trinidad, West Indies, to northern Mexico and another of them from British Honduras to the state of Vera Cruz and from Guatemala to the state of Oaxaca. As the disease in Mexico is slowly spreading from the interior to the coast, and as the transmitting insects are present in a much greater area, the conclusion is inevitable that onchocerciasis, as the disease is known scientifically, can become distributed over the greater part of Central America, invading perhaps also South America.

The parasite which causes the trouble is a nematode or roundworm of the Filaria family, from one to twenty inches long. It lives coiled up in tumor-like swellings under the skin of human beings. The larvae of this worm, in the form of the so-called microfilaria, swarm up from the cysts or swellings to invade the peripheric lymphatic ducts and are there picked up by bloodsucking insects of the Simulid family (buffalo gnats or black flies). The larvae undergo a transformation in the gnats, after which, the next time the gnat sucks blood, the mature microfilaria are passed from the proboscis of the fly or gnat to another person, Dr. Dampf explained.

As a result of the joint efforts of the commission of the Harvard Medical School under Professor Richard P. Strong, working in Guatemala, and of the various commissions of the Mexican Public Health Department, of which Dr. Rafael Silva is chief, which studied conditions in Chiapas and Oaxaca, the clinical aspects of the disease and the biology of the transmitting insects were learned. These investigations also showed that the vision of man is affected by actual invasion of the eye by the microfilaria. What species of Simulids and how many were concerned in the spread of the disease had still to be shown. Dr. Dampf's study supplied this necessary information.

In view of the danger of spread of the disease, the Mexican Government, through the public health department, has begun an active campaign against the Simulids, the transmitting insects, in Chiapas. The people are being forced to clean the breeding places in the mountain brooks and rivulets, to avoid in this way the imposition of the flies on the submerged vegetation. A special Onchocerciasis Commission, under the leadership of Dr. S. Gonzalez Herrejon, sent a staff of medical officers to the infested places, with the order to operate on every person having tumors and in this way to eliminate the danger of infection.

According to Dr. Dampf's report, the parasite was probably brought from Africa with Negro slaves who escaped from their masters and found a refuge in the interior of Guatemala, where transmitting Simulids are plentiful. In the same way two other disease-producing parasites, *Filaria loa* and *Dracunculus medinensis*, were once brought from Africa to South America.

IDENTIFICATION BY X-RAY

A NEW method of identification which may prove useful to police departments and life insurance companies has been announced by a Washington physician, Dr. Thomas A. Poole. The method makes use of x-ray photographs of the nasal sinuses, those tiny cavities in the skull which have been a source of intense discomfort and pain to many persons in recent years. Examination of over 2,200 pictures of sinuses, collected during the last eight years, have shown that in no two persons are the shapes of these cavities exactly alike, Dr. Poole stated. Furthermore, the bony partitions making the sinus cavities never change. Neither age nor treatment makes any difference in them, so that an x-ray picture taken of them at any time during a person's life will be a lasting and positive means of identification, Dr. Poole declared.

While thousands of x-ray pictures of the sinuses have been taken in nose and throat clinics during recent years, the first suggestion, so far as is known, for their use as a means of identification was made by a keenly observant patient of Dr. Poole's. This patient, Alfred I. Du Pont, has lost his hearing and the use of one eye, but with his remaining eye sees much that the ordinary person might miss, according to Dr. Poole. The latter had taken x-ray pictures of his patient's sinuses at intervals of several months. Mr. Du Pont noticed that the pictures, even after treatment and the lapse of time, showed exactly the same shape and size of sinuses, although the cloudiness of outline had cleared after treatment. He called Dr. Poole's attention to this and suggested that if this were a universal condition, insurance companies would find it a valuable means of identification.

Dr. Poole immediately studied the 2,200 x-ray pictures of sinuses in his own collection and then went to New York where he, together with other physicians, examined thousands of x-ray pictures in the files of the New York Eye and Ear Infirmary. They found no two of the pictures alike. Even twins showed differently shaped sinuses.

Representatives of an insurance company and of the Washington police force have conferred with Dr. Poole and examined his x-ray pictures. They were both very enthusiastic over the new identification method, Dr. Poole said.

X-ray pictures of teeth have occasionally been used to identify persons or dead bodies. X-ray pictures of other bony structures in the body might lend themselves to the same use. The tissues of the body degenerate quickly after death, but bones do not, so that if a rec-

ord is made of them during life they can be identified later.

THE HAIRLESSNESS OF MAN

MAN did not lose the bulk of his body hair because he took to wearing clothes, or because of any other environmental change adopted by him or forced upon him. The relative hairlessness of humankind is simply the most extreme expression of a general evolutionary trend to reduce the hairy coat in all the highest primates—man and the large apes. Some of the great apes have even fewer hairs per square inch of scalp, and the gorilla at least is often not as hairy-chested as a man. This is among the conclusions reached through a comparative study of hairiness among monkeys, apes and men, conducted by Dr. Adolph H. Schultz, of the Johns Hopkins Medical School, and reported to the journal, *Human Biology*.

Dr. Schultz selected areas of one square centimeter each, on head, chest and back of human beings of three different races and of many species of monkeys and apes. On each of these areas he painstakingly counted the hairs, and then multiplied the number by the total area in square centimeters, to get the total number of hairs.

Several of his results are not what might be expected from *a priori* assumptions. Human beings were found, for example, to have more hairs on their heads than some of the apes. The average number of scalp hairs per square centimeter was 312 for man and 307 for thirteen specimens of the large anthropoid apes. The gibbon, a small Asiatic ape, was much hairier on the head, with 2,035 hairs per square centimeter, and one monkey species, Aotus, had twice as many as that, with 4,083.

Gorillas are less hairy-chested than many men. Two adults had only six and three hairs, respectively, per square centimeter, whereas a man—not a very hairy-chested one at that—had nine. Two chimpanzees were also relatively bare-chested, with counts of 43 and 59; while the gibbon again showed a high count of 499. In regard to the back, man scored an absolute blank, with zero hairs per square centimeter; the anthropoid apes averaged only 276, but the gibbons 1,727. Various lower monkeys were even more hairy-backed.

Scalp hair varies in density among the human races, it appears. Six adult Negroes averaged 297 hairs per square centimeter, and three adult white men had a few more, with an average count of 333. But a Hawaiian showed only 216 per square centimeter, and a Chinese as few as 128.

NEW MATHEMATICAL MACHINE

A NEW machine which can solve the complex mathematical problems arising in the course of scientific research has been made by Professor V. Bush at the Massachusetts Institute of Technology. The "differential analyzer," as Professor Bush calls his mechanical thinker, will do for the advanced branches of science and engineering what the adding machine has done for business accounting methods.

When a physicist or chemist makes a guess or forms a theory about a scientific problem, he can often express it in the form of what he calls a "differential equation." This is a collection of mathematical symbols which has a perfectly definite meaning, but yet the scientist can not test it directly by experiment. The equation must first be "solved." The result of this process is a solution or "integral" which, though also an equation, has the advantage that all the quantities occurring in it can be measured in the laboratory. The obtaining of the solution often requires a high degree of mathematical skill and much patience. Professor Bush's new machine promises to do this difficult and frequently occurring job.

The possibility of using machinery to solve scientific problems was discussed in detail two hundred years ago by the famous German mathematician Leibnitz, who invented the differential calculus. Leibnitz's idea was to relegate to the machine those parts of the process of thought which are inherently mechanical and repetitive. But though he was a great genius and inventor he did not have the accurate machine tools, new alloys, thermionic tubes and photoelectric cells now available to the modern engineer.

The present status of physics and engineering is peculiarly favorable to a development such as Leibnitz imagined. The department of electrical engineering of the Massachusetts Institute of Technology has devoted itself to this problem. The new differential analyzer has already been used to solve problems of electric transmission and has been tested for precision. It consists entirely of mechanical parts. The main problems encountered in its construction have been those of backlash.

INDIVIDUAL VARIATIONS

THE fact that no two individuals, no matter how much they are alike, are absolutely alike in all respects was set forth as the basis of evolutionary progress by Dr. Adolph Schultz, of the Johns Hopkins Medical School, in a radio talk under the auspices of *Science Service*, given on October 9 over the network of the Columbia Broadcasting System.

"It may bluntly be claimed," he said, "that without variations there would be nothing to select from and without selection there could be no progress or at least no lasting change in, or evolution of, our physical make-up. A multitude of selective factors is continually at work among constantly occurring human variations. Some of these factors have lost their efficiency with advance in civilization, but that very advance has introduced new selective processes of sometimes very doubtful benefit to the human race. It is most essential that all these selections be carefully investigated so that we shall become able to place them under our control."

Variations are so ingrained in all living things that even the most intimate similarities prove on close examination to be differences still. Identical twins are not identical. They may be as like as two peas; but no two peas are alike when you look at them critically. Not even the individual is like himself; one of your arms is longer than the other, one of your shoulders higher, one

of your ears a little bigger. Absolute symmetry of parts does not exist anywhere in nature. Individual variations are as marked among animals as they are among men. All monkeys look alike to the casual observer, but Dr. Schultz has not found them so. He said:

"Among several hundred monkeys of one species, collected in the uniform environment surrounding one camp in the forest of Nicaragua, I found specimens with pug noses and those with straight profiles, some with large ears and others with small ones. In short, they differed from one another as widely as would an equal number of human city-dwellers and this in spite of the fact that these monkeys all had the same occupation, the same diet, the same climatic conditions, etc., and this during thousands of generations."

SHIP FUMIGATION

THE latest methods of fumigating loaded ships, as used at the New York quarantine station of the U. S. Public Health Service, have just been observed by a group of experts appointed by a special commission of the Health Section of the League of Nations. These experts reported they were highly pleased with the methods, which were demonstrated by Surgeon Charles L. Williams, of the U. S. Public Health Service. They will present a report of their investigations to the League of Nations next month.

Surgeon-General Hugh S. Cumming, of the U. S. Public Health Service, is chairman of the committee of experts. Other members are: Dr. R. C. Stock and Dr. C. W. Monier-Williams, of the British Ministry of Health, London; Dr. Adolfo Vila, of Cadiz, Spain; Dr. M. F. DeBruyne, of Rotterdam, Holland; Dr. Charles Vigne, of Havre, France; Dr. William Dryer, of Bremerhaven, Germany, and Dr. Charles L. Williams, of the U. S. Public Health Service.

Fumigation of ships is carried on to destroy rats and vermin that might carry disease and thus to protect seaports and nations generally from importation of disease. Fumigation of loaded ships presents a difficult problem which the U. S. Public Health Service seems to have met satisfactorily.

The method, as described by Dr. Williams, consists in spraying liquid hydrocyanic acid under a pressure of 75 to 100 pounds. The airjet sprayer used is an adaptation of the ordinary oxyacetylene blowpipe, the hydrocyanic acid being connected with the acetylene side and the compressed air to the oxygen side. This method was most successful in forcing the fumigating material into all parts of the ship. Other methods of fumigation will still be satisfactory on the ordinary ship which does not present special problems such as heavy rat infestation or inaccessibility due to large cargoes, and at the smaller quarantine stations which are not equipped to handle the more complicated new method.

ITEMS

RADIO reception is getting better, and it will continue to improve during the winter months, attaining conditions which have not been duplicated since the great improvement in radio receivers and the advent of the high-powered transmitting stations of recent years. This is the observation and prediction of Dr. Harlan T. Stetson, director of Perkins Observatory of Ohio Wesleyan University, at Delaware, Ohio, who has made careful studies of the relation between sun-spots and radio reception. Dr. Stetson says that during the past six months, from March to September, radio reception improved 400 per cent. During the same period sun-spot activity became less, the sun-spot index for September being only half its March value.

NEW evidence that liquid water molecules form in clumps of two or more has been presented by Professor Joseph W. Ellis, of the University of California at Los Angeles. The new evidence comes from the way in which infra-red or heat rays are absorbed by water. Certain new bands or dark patches observed in the infra-red spectrum favor the theory that the simple chemical units of two hydrogen and one oxygen molecules are probably linked in groups or even form a lattice-like structure. This theory has not been in favor with chemists recently. However, some phenomena observed during the formation of ice lend considerable weight to the idea.

COLORED flower-saps, extracted from the petals of a number of species, are being used to test the degree of acidity or alkalinity of chemical solutions, by Dr. E. P. Smith, a British botanist. It has long been known, in a casual way, that some blue flowers, dropped into a weak acid solution, will turn pink, but hitherto an exact measurement of their value as litmus-like indicators has not been undertaken. Dr. Smith has determined the color-values of a number of saps, ranging through red, blue, violet and purple, in the presence of a wide range of acidities and alkalinities. Among the flowers he has used are species of anemone, cineraria, hibiscus, primrose, tulip and morning-glory.

TURTLE by the ton is being handled by the Missouri Game and Fish Department in its project to eradicate undesirable fish and other aquatic animals from Lake Taneycomo. In the short space of two months more than 4,000 turtles, aggregating nearly eight tons in weight, were removed with nets from the lake, and at the same time a few bass, bluegill, carp and catfish were taken. All the game fish were returned to the lake, while some of the carp supplied fresh food for needy families in the community.

A DECREASE in infantile paralysis all over the country appeared in the reports of state health officers to the U. S. Public Health Service for the week of October 3, the last for which figures are available. The total was 955, which is 140 less than the previous week's total. States still reporting large numbers of cases were Massachusetts, 142; New York, 135; New York City, 140, and Michigan, 112. These figures are all lower than those reported last week by the same states, however.