SCIENCE NEWS

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THE PREVALENCE OF LEPROSY

"LEPROSY is increasing in many parts of the world by leaps and bounds." This startling declaration, made by Dr. O. E. Denny, director of the U. S. Marine Hospital at Carville, Louisiana, national leper home, needs some qualifying, Dr. Denny explained in a Science Service interview.

Dr. Denny discussed the leprosy problem at the meeting of the medical board and the advisory committee on research of the Leonard Wood Memorial, a fund supported by the American public and devoted to the study of the nature and treatment of leprosy.

The number of known cases of leprosy is increasing in many countries, according to Dr. Denny. In the United States, for example, each year more cases are discovered and segregated. But there are probably no more cases of the disease now than there were twenty-five years ago. The apparent increase, that is, the increase in reported cases, is due to the fact that doctors are learning more and more to recognize cases of leprosy and to diagnose it correctly.

In India, for instance, there were about 300,000 recognized lepers about fifty years ago. Now there are between one and three million recognized lepers in that country. Whether this enormous increase is real or is apparent and due to better diagnosis and reporting is not known. Probably the increase is only apparent.

In one or two countries there is an actual increase in leprosy. In South America, authorities are concerned over the situation. In Argentina, where there was no leprosy to speak of twenty-five years ago, it seems to be increasing in actual fact. A possible explanation may be that more and more remote mountain villages and their Indian inhabitants are coming into contact with the larger towns and with civilization. Leprosy is to some extent a disease of civilization, and it is being spread as commerce grows between the remote villages and the larger towns where a few cases of the disease exist and where the Indians may come in contact with it for the first time.

In the South Pacific, in one or two of the very small islands, leprosy also is increasing and here, too, Dr. Denny believes that the increase is a real one. The largest of these islands is Naru. The population of each is only about 100 or 200. Here, with a very small increase in population, there has been a very sharp increase in leprosy during the last ten years. Twenty-five years ago, there was no leprosy on these islands. Now physicians making medical inspections are finding it and reporting it in the medical journals. The situation is, however, not alarming.

FUTURE RESEARCH ON FOOD AND DIGESTION

NEW goals for investigators to reach in their studies of food and its digestion were set by Professor Lafayette B. Mendel, of Yale University, at the closing session in Cincinnati of the Federation of American Societies for Experimental Biology.

Ten major problems in nutrition are awaiting solution, it appeared from Professor Mendel's remarks. These are:

1. The fate of the fats in the body. This foodstuff commonly constitutes one third of our daily food fuel intake, but no satisfactory or adequate balance sheet has ever been made to account for it all. Some is used for fuel, some is stored, some is excreted, but there is a missing fraction not yet accounted for.

2. The fate of the nitrogen-containing foods. The state of knowledge concerning these important foods, more familiarly known as proteins, is nearly as unsatisfactory as in the case of the fats.

3. An appraisal is needed of the relation of the minerals in the diet to such factors as vitamins and internal secretions.

4. The possible value of a number of pigmentary substances, such as chlorophyll, the green coloring matter of plants, needs to be investigated, now that another such substance, carotene, has been found important in connection with vitamin A.

5. Glandular foods, like liver, kidney and thymus, have a new significance in the diet since the discovery of their value in pernicious anemia, and they should be investigated further.

6. Further study of vitamins is required to complete our knowledge of these important factors.

7. The problem of alcohol as a food will probably be revived for further study.

8. Dropsy as a result of faulty diet presents a relatively new problem for investigation.

9. The rôle played by the organic acids of vegetables, such as citric, malic, tartaric and oxalic acids, which must be taken in considerable quantities in the ordinary diet, needs to be discovered. Vegetables themselves are claimed to have unique advantages in the diet. "Our knowledge of what actually happens to them chemically in the long reaches of the alimentary tract is woefully limited," according to Professor Mendel.

10. The way in which products of digestion are transported to other parts of the body deserves further scientific consideration.

In the future, scientific students of nutrition will solve problems such as these, which relate not so much to the composition of the foods we eat or to their effect on the body as to their actual fate in the chemical factories of the digestive tract.

"UNSALTING" THE GREAT SALT LAKE

THE Great Salt Lake of Utah, remnant of the prehistoric Lake Bonneville, is at last to be put to some practical use.

Scientists and engineers have perfected a method for "unsalting" a great part of it, and then harnessing it for the production of electrical power. In its present

state—seven times as salty as the sea—the lake is a dead loss in a very live world.

"Unsalting" the Great Salt Lake is not so impractical as it at first seems; the idea was, in fact, long ago advanced by the French engineer, Ferdinand de Lesseps, and it has been accepted as feasible after a series of detailed surveys and laboratory tests. The diking project involves these basic elements:

1. Diking off an initial area of 146 acres.
2. Providing sluiceways to insure continuous flow of water over the dikes.
3. Allowing sufficient time for displacement of brine by fresh water.

This last point is the problematical one. R. A. Hart, engineering expert of the Salt Lake Chamber of Commerce, has demonstrated to his own satisfaction that the initial area will be fresh in two years. Some investigators in Utah disagree with him.

The most difficult feature of the project is the erection of dikes sufficiently strong to stand the battering of the heavy water. The plan is for dikes of the earth-fill type, with a very gentle slope—about 15 to 1—and a maximum distance through the base of 500 feet.

Nature has already laid the main link in the dike system. This is Antelope Island, which lies in a north and south position just west of the eastern shore. From the extremities of this island will be built the dikes, one five and a half miles long, the other two and a half. Thus the embayed area will be fed by two or three streams which will—in time—displace the brine which to-day is unusable for steam power plants.

A million dollar loan for the project is being sought from the Reconstruction Finance Corporation.

THE FLOOD SITUATION

FLOOD stages in rivers of East and South, following recent rainy weather over most of the country east of the Rockies, were reported in a summary of the flood situation given to Science Service by M. W. Hayes, of the U. S. Weather Bureau.

In New England, the Connecticut and the Merrimac were characterized as in "rather high flood"; the highest in several years.

The Ohio and some of its tributaries are up, though not so high as they were a short time ago. The Ohio itself is rising slightly, though still well below bank-full above the mouth of the Kentucky River; from there to Paducah, Kentucky, it is due to rise again to flood stage, though not so high as it did a month ago. The Wabash is at flood stage.

The Mississippi is falling slightly above the mouth of the Ohio; below that point it is still swollen with the recent flood, although the state of the lower river is not at all serious. An upper tributary, the Illinois River, is out of its banks. A lower tributary, the Yazoo, in the State of Mississippi, is quite high; it has established a record for this late in the season.

The James, in Virginia, and the Neuse, in North Carolina, are high, but their waters are receding.

The Missouri and other rivers of the Northwest are making no trouble at all just now. The Missouri, in fact, is at a relatively low stage.

CELLOPHANE AND THREE-COLOR PHOTOGRAPHY

THREE-COLOR photography is making rapid strides toward perfection with the aid of that versatile material Cellophane.

In the photographic laboratory on the top floor of the Army Medical Museum, R. M. Reeve has been working quietly for almost a year on a color process using Cellophane sheets. The latest products of his experiment are pictures of flowers, people, scenery, diseased body tissues, all so natural in their colors that the photographs seem like fine and extraordinarily accurate water colors. The new photographic process may in some cases replace the work of water-color artists who copy scientific material.

The process is being perfected with a view to obtaining a government-owned patent. The cost of the process is reasonable.

To take the pictures panchromatic plates or films are exposed in the camera. One records the yellow color in the subject before the lens. Another film records greenish-blue. A third records red, which is really almost purple. At present, it is necessary to expose the three-colored films in succession. Mr. Reeve hopes eventually to perfect a tri-pack film which will "shoot" the three colors at once. Three prints are then made on correspondingly dyed Cellophane sheets. Each sheet has been impregnated with a different solution. While still wet, they are placed one over the other so that the picture coincides. The whole three-layered Cellophane picture is then fastened with adhesive to a paper backing and dried.

With all due care, Mr. Reeve says, film negatives taken separately sometimes turn out to be slightly different in size. In former three-color processes, this produced blurry outlines when the colors were assembled to make the picture. Cellophane, when wet, however, is flexible and can be stretched until the outlines coincide exactly.

The Cellophane films record very exactly the fine shadings of color in diseased tissue and other medical subjects. Photographs turned out by the new process are now being used at the Army Medical School in the form of colored lantern slides. Others have been placed on exhibit in the Army Medical Museum.

The Department of Agriculture is looking into the possibilities of the color picture for use in its exhibits and publications.

FUEL CONSUMPTION

INCREASES in the efficiency of using coal and oil may prevent increases in the annual consumption of these fuels in the United States during the next twenty years, is pointed out by Professor W. T. Thom, Jr., of Princeton University, in commenting on a recent estimate of fuel consumption for the future, which postulated an approximate doubling of fuel consumption in the United States by 1950.

Pointing to the relatively small increases in the amount of fuel used to produce power and useful energy during the boom period culminating in 1929, Professor Thom stated that it seems entirely possible that, even if our national energy requirements increase, we may, nevertheless, be able to supply a growing demand for energy,

without a corresponding increase in amount of fuel used, and possibly without any increase.

Commenting upon recent estimates of fuel consumption made by Professor W. Spencer Hutchinson, of the Massachusetts Institute of Technology, and August J. Breitenstein, Ashland, Pennsylvania, engineer, Professor Thom calls attention to the fact that really to be able to predict future fuel consumption, one must first be able to predict both the degree of prosperity which our domestic industry will enjoy, and how long the present business depression will last. As he explains, a period of acute trade depression fosters the introduction of radical departures in fuel saving economy as a means of cost-cutting. Such measures of fuel economy continue in use thenceforth, possibly causing a progressive reduction in the amount of fuel used, even while power output may be increasing.

In commenting on the use of population statistics as a basis for estimating our future national energy requirements, Dr. Thom further explains in a communication to the American Institute of Mining Engineers, that one may go astray by considering the population of the United States alone. With the free outflow of manufactured exports, our consuming population is to all intents and purposes greater than our national population, whereas, if prohibitive tariffs are in force against American goods seeking to enter other countries, then this foreign addition to our domestic energy-consuming population is unavailable and our fuel consumption is correspondingly lessened.

ITEMS

AN increase in the number of meningitis cases throughout the country has been reported to the U. S. Public Health Service. Health officials see in the situation a possible problem for the forestry camps where large numbers of young men will be concentrated. In all mobilizations of young men heretofore there has always been an increase in meningitis. The only known precaution that can be taken to prevent an outbreak of the disease in these camps is to avoid crowding in the sleeping quarters. Reports from state health officers for the week ending April 8, gave a total of 92 cases of meningitis. The total was 69 for the corresponding week of 1932. Since the first of March the number of cases reported in 1933 has been greater than in the corresponding period of 1932. This may indicate the beginning of another outbreak of the disease or it may be due to the fact that the year 1932 was unusually healthy. The 1933 figures may be nearer to the usual ones for the prevalence of this disease.

THAT oxygen in three to four and one half times the usual percentage in the air mixture breathed during muscular work seems to offer no advantages is shown by experiments by Dr. Francis G. Benedict and Robert C. Lee, of the Nutrition Laboratory of the Carnegie Institution of Washington, reported before the meeting of the American Philosophical Society. Volunteers were used who breathed ordinary air containing 21 per cent. of oxygen during part of the tests, while the rest of the time they were supplied with air mixtures containing from 60 to 90 per cent. No significant alteration was found in the total oxygen consumption per minute for the same amount of work. Neither was there any change in the ratio of oxygen used to carbon dioxide exhaled, thus indicating no change in the character of the material burned in the body. Finally, the oxygen absorbed during the recovery periods after work remained unchanged.

FAINT radiations from the night sky, not perceptible to human eyes but detected and analyzed by the spectrograph, were termed "cosmic radiations of the sky" by Dr. V. M. Slipher, director of the Lowell Observatory at Flagstaff, Arizona, speaking before the society. The radiations extend throughout the spectrum from ultra-violet to deep infra-red, generally stronger in the longer wave-lengths. Other illuminations from the night sky intercepted by Dr. Slipher's instruments have included light from auroral displays and the brief morning and evening twilight solar stimulation in the high atmosphere.

WHY plants growing in bogs, where there is always plenty of water, should have thick, tough, leathery leaves protected against evaporation, resembling desert plants in this respect has long been a puzzle to botanists. Dr. Kurt Mothes, of the University of Halle, believes he has found a possible key in the lack of nitrogen in bog water and soil, rather than anything to do with the water relationship itself. He was struck by the fact that of all bog plants the sundews, which capture insects with the stieky fingers on their leaves and thereby get plenty of nitrogen, are the least desert-like in their appearance and structure. The same might be said of two groups of American insectivorous plants, the Venus flytrap and the pitcher plants. To test the possibilities of his hypothesis, Dr. Mothes grew tobacco plants, which normally are anything but desert-like, in culture solutions containing plenty of other mineral nutrients but lacking in nitrogen. They responded by developing thick, tough, leathery leaves, with small stomata or "breathing pores" and other characteristic structures of desert plants. The full technical discussion of Dr. Mothes' experiments is published in the *Biologisches Zentralblatt.*

MALARIA has been completely routed from the Italian province of Istria, at the head of the Adriatic, by a million and a quarter little American fishes, in a campaign that has lasted for seven years. Dr. Massimo Sella, Italian director of the Italo-German Institute of Marine Biology at Rovigno d'Istria, tells how. When the work was started seven years ago, he says, the prospects were downright dismal. In the region around Rovigno there were over 800 mosquito-breeding ponds, and 94 per cent. of the population showed symptoms of malaria. But every year some 200,000 of the American top-feeding minnow, species Gambusia, were dumped into some of the ponds, while the others were treated with Paris green. The "wigglers" were eaten by the little fish or killed by the poison. In 1927 there were still 147 ponds harboring mosquito larvae; in 1931 only 7; in 1932 none whatever. For the past two years no one in the region has shown clinical symptoms of malaria. The little American fish have scored another victory.