SCIENCE NEWS

STUDIES OF MEASLES AND SCARLET FEVER

Science Service

THE successful use of a preventive serum for measles has been announced by Drs. George H. Weaver and T. T. Crooks in a report to the American Medical Association on the results of the use of the serum in the Durand Hospital of the John McCormick Institute for Infectious Diseases.

The study was made on 57 children, all susceptible to measles, who were known to have been exposed to the disease. Of these 48 were injected with the serum. All the remaining nine came down with the disease. Of those given the serum treatment, 44 failed to develop the disease, while of the remaining four the measles rash appeared in three in from one to six days after the serum injection.

The main use of the serum seems to be limited to the prevention of the disease when given during the first week of exposure. The Chicago investigators also conclude that babies are naturally immune during the first few months of life, and confirm earlier beliefs that one attack gives relative immunity. A Berlin physician has collected the results of 2,000 cases where serum from the blood of patients convalescing from measles had been injected into the veins of persons exposed to the disease, and has found that it has protected in more than 97 per cent. of all exposures.

The development of a test to determine human susceptibility to scarlet fever has been announced to the American Medical Association by Drs. George F. Dick and Gladys Henry Dick of the John McCormick Institute for Infectious Diseases of Chicago. It is expected to do for scarlet fever what the Schick test does for diphtheria.

The responsibility for scarlet fever has apparently been fastened firmly on a suspected germ, a streptococcus that destroys blood corpuscles. And, more important, the two medical experimenters have taken the first steps toward a method of immunizing against the disease by use of products obtained from the apparently specific scarlet fever streptococcus.

Drs. Dick and Dick recently were able to produce scarlet fever experimentally, using human volunteers as subjects. The disease developed in the volunteers after cultures of hemolytic streptococci were swabbed on their tonsils and pharynx. Using the filtrate from cultures of this streptococcus they have now been able to devise a skin sensitization test that tells whether the person tested is susceptible to scarlet fever.

All convalescent scarlet fever patients showed a negative or only slightly positive reaction to the new skin test. But 41.6 per cent. of persons tested who had not had scarlet fever showed positive skin tests. If this ratio holds generally, it means that less than half of the population is susceptible to scarlet fever.

The filtrate used in the skin sensitization test will not react properly when it is mixed with serum from convalescent scarlet fever patients, and this may lead to a means of prevention of scarlet fever, similar to the antitoxins used in treatment of diphtheria and other diseases.

Progress in the use of a serum for the treatment of scarlet fever has also been reported by Dr. A. R. Dochez, of Columbia University, and Dr. Francis G. Blake, of Yale. Serum from horses inoculated with the hemolytic streptococcus was used in the treatment of scarlet fever patients with promising results.

INJURY FROM RADIUM

Science Service

EXPOSURE to radium radiation for a few hours daily over a long period has apparently been shown to be dangerous to health, says a report of the U. S. Public Health Service. The blood seems to be especially affected, showing a reduction in the number of both the red and the white corpuscles. Blood pressure becomes abnormally low.

These conclusions follow a study made of workers at the U. S. Bureau of Standards who handle radium daily and are exposed to its effects. Practically all the radium sold for medical or scientific purposes in the United States is sent to the Bureau of Standards for measurement. Twelve of the employees of this radium section, five men and seven women, were studied over a period of months. All but two had handled radium for at least six months previous to the beginning of the test. One had been out of the radium section for a year and a half, but before that had been in it for more than six years.

The fact that the employees were exposed to radiation in spite of precautions taken to prevent the rays striking their bodies was demonstrated by the use of sensitive films such as are used for taking dental X-ray pictures. These were worn by the men and women for several days and when developed showed unmistakable evidence of exposure to radiation. The principal areas of exposure were the head, arms and hands.

The probable reason for the effect of the rays from radium on the blood, while X-rays have no such influence, is stated to be that the more penetrating gamma rays of the radium affect the bone marrow, which is known to be the source of the blood cells. While none of the workers observed was invalided during the period of the test, one had just recovered from an illness diagnosed as anemia and showed fewer blood corpuscles than normal, both red and white. Practically all the others showed a tendency to diminution of the blood corpuscles especially of the white ones, which are those concerned largely with immunity from and resistance to disease. Blood pressure was below normal in practically all the workers during the whole time of the study.

As a result of these findings it is recommended that workers in radium should be protected as far as possible by the use of metal screens opaque to the rays; that they

should be subjected to frequent physical examinations; that they should not be permitted to work more than five days a week with at least a two day period intervening between the two rest days; and that they should have vacations of two weeks, taken at six months' intervals, and spent as largely as possible out of doors. Further investigations are in progress.

AN AUTOMATIC POWER PLANT

Science Service

A GREAT hydro-electric plant which needs no man about the place while it furnishes power to the industries of New England is located at Searsburg, Vt., on the upper waters of the Deerfield River. Excepting for the occasional visit of an engineer, it operates in complete solitude, attending to its duties unassisted, even to meeting whatever emergency may arise.

It is wholly automatic in its control. If serious trouble arises in its mechanism, it shuts down and stays shut down until experts have made things right again. But if the trouble is trifling and of a sort to correct itself, the big waterwheel and generator rest for a time until conditions are again normal, and then start up again turning out their thousands of horse power. Other automatic stations are in operation elsewhere; the idea has been tried out in small units. But the plant at Searsburg is the largest of its kind in the world.

The plant is the uppermost of the seven stations of the New England Power Co. on the Deerfield River. Its turbine, rotating at 360 revolutions per minute, drives a generator having a capacity of 6,500 horse power. The only help from human beings that is required is an occasional looking over and attention to the lubricating system, and remedying of any trouble, or to set the governor mechanism to produce a given amount of power, or to start up the turbine at some predetermined moment.

If the company's dispatcher down in Millbury, 100 miles away in central Massachusetts, decides to tie in the Searsburg power, say at 6 o'clock the next morning, a man visits the station and sets an alarm clock for that hour. When the alarm goes off, the control circuit is closed, the gate of the huge penstock is opened, the water pours through the wheel and the generator begins to convert its power into electric current and deliver it to the high tension wires which stretch along the right of way to the distant distributing station at Millbury.

Or the dispatcher, knowing the flow of water which is to be let down from the company's Somerset reservoir, which impounds the flow of the upper watershed, may decide that the automatic plant shall generate 2,000 or 3,000 or 4,000 horse power, whatever may seem desirable under given conditions. In such a case a dial on the governor is set for that power, which is all that the station will generate until the setting of the dial has been changed.

These are by no means all the human characteristics of the automatic station. If left to itself to run as it wants to, the turbine will start up when water arrives in sufficient volume, and will shut down when the water falls below the efficient limit. Should a bearing become heated the penstock gate closes, in which case the wheel will stay idle until experts come and remedy the trouble. But when generator windings become too warm, the unit shuts down only so long as the temperature remains abnormal. When the windings cool off, turbine and generator run along merrily again.

In times of high water, when the river flow itself is ample and storage water is not a factor, the Searsburg plant runs right along all by itself, day and night, a constant, dependable source of power. It is here that another automatic function is important, the regulation of power generated to the load imposed. When the load falls off the action of the governor causes the supply of water to decrease proportionately, which means the production of a smaller amount of power.

VOLCANIC TIDES AND ERUPTIONS

Science Service

ANNOUNCEMENT of the discovery of daily and monthly tides in the lava in the cratar of Kilauea volcano in the Hawaiian Islands was made in a lecture before the Washington Academy of Sciences, on January 23, by Dr. T. A. Jaggar, director of the Hawaiian Volcano Observatory of the U. S. Weather Bureau. The observatory is located on Kilauea. Dr. Jaggar said the observations might be valuable in predicting future eruptions.

The liquid lava shows a twice-a-day fluctuation in level of from two to seven feet, a daily variation of three to five feet and a monthly shifting of the time of maxi- and minimum level. This would not be the case if the "tides" were due to weather conditions which change irregularly, but it might be due, Dr. Jaggar said, to control by the sun and moon.

The hard lava floor of the crater also showed a daily change in level of about one foot, but the times of maximum and minimum were nearly opposite those for the liquid lava, the high level occurring in the morning in the case of the liquid and after midnight in the case of the solid lava during a period of two months last summer when observations were taken.

Seasonal tilting of the ground on which the observatory stands was also reported, the tilting causing a plumb line shift of from 15 to 25 seconds of arc. Seasons in which this tilting was least showed the least amount of volcanic activity and a decline of the lava column in both Kilauea and Mauna Loa. Since 1919 the winters have shown strong monthly tilts and strong lava activity while the summers showed a corresponding decline.

Dr. Jaggar said the daily tidal movement provides forecasting data from hour to hour, while the seasonal tides when fully worked out should assist in forecasting from week to week. A few years of observations should be sufficient, he stated, to determine the period of eruptivity of Hawaiian volcanoes, and to place it on a quantitative basis.

PLATINUM IN SOUTH AFRICA

Science Service

PLATINUM has been discovered in the Transvaal in quantities which are expected to be large enough to re-

duce materially the price of the precious metal. An authoritative account of the find and of its possibilities by P. A. Wagner, of the Geological Survey, and T. G. Trevor, inspector of mines, appears in the current number of the *South African Journal of Industries.*

The discovery was made last summer by Adolph Erasmus, a well-known prospector. He was looking for tin at the time, and was, in fact, going over a region that had been repeatedly prospected for both gold and tin without any platinum having been found. The discovery, says the article, "shows how largely blind fortune enters into these things, and how sometimes one discovery leads to another."

The farm on which the discovery was made had been proclaimed as a public gold field in the early days, but when all claims were abandoned it was deproclaimed. Subsequently tin was discovered on it, and a mine of that metal was worked several years until the deposit was exhausted. Mr. Erasmus thought there might be more tin there and proceeded to make a few tests.

Almost the first panning yielded not only a few specks of gold, but a "tail" of grayish white concentrates that lagged behind the gold in the pan. Reasoning that since platinum is the only metal he had heard of that was heavier than gold, and that these residues must be heavier than the gold and therefore probably of platinum, Mr. Erasmus immediately communicated with his principal. Investigation showed platinum present in workable quantities, the first discovery of commercial quantities of the metal in Africa.

Several companies are now exploiting the deposit which is located in the Waterberg district, about 100 miles north of Johannesburg. The lodes are known to extend for a distance of 10 to 15 miles, with many surface outcrops. The ore averages about 9 troy ounces to the short ton, although some samples have yielded as high as 137 ounces. The yield generally is very variable.

Economically, the discovery is of great importance. Although almost indispensable in many chemical operations, and especially desired for further research in the fixation of atmospheric nitrogen, the cost of platinum is very high. More than half the total product is now used in jewelry, since platinum rings and settings have become popular, and the demand from jewelers fixes the price which has risen to about $100 an ounce, or about five times that of gold.

The pre-war price was less than half the present figure. The supply then came chiefly from the Ural mountains, but the war and the revolution in Russia stopped that source to a great extent, and other poorer sources in various parts of the world had to be depended on. South African platinum will, so the authors of this report declare, probably prevent any further rise in price and more probably will help to materially reduce it.

ITEMS

Science Service

COD LIVER OIL is not only good for growing children, it is good for cows and pigs. English scientists have found it to be a valuable cattle food. More than that, it provides cows with the essential vitamin A which then appears in the milk, keeping up the vitamin content when, as in winter, it is not available from natural sources. It has been found that cows fed on cod liver oil do not show an increase of fat in their milk, the milk is no richer in cream, but the amount of vitamin is greatly increased. Cows normally get their supply of vitamin A from fresh grass, but it is absent in dried hay and in grain feeds so that the milk in winter is deficient in this respect and children fed this milk do not get from it the vitamins so necessary to their growth. Cod liver oil feeding solves this difficulty and makes possible the production of milk rich in vitamin at all seasons. Only a small amount of oil is needed, two ounces a day being enough for a cow. Even in larger doses no fishy or oily taste is given the milk.

DISCOVERY of cave drawings made by the black aborigines of Australia, rivaling in interest those found some years ago in the caves of southern France, has been announced by Dr. Herbert Basedow at Adelaide, Australia, as the result of extensive explorations in central and northern Australia, according to dispatches published in London. The older carvings were supposed to be fossils until Dr. Basedow had examined them. A similarity between the system of geometrical and conventional designs and the hieroglyphics of ancient Egypt was pointed out by the discoverer. Bilateral symmetry often indicates the human form, and the line, the lattice and the cross are all used to represent human beings. The cross is the most sacred structure known to the natives and is produced only during their religious ceremonies. The cave drawings are made with a pigment of ochre and fat and have endured for thousands of years, Dr. Basedow believes. Some of them relate legends, others give directions for the initiation ceremonies connected with fire-worshipping ritual and with ordeals, some of which are extremely cruel. Dr. Basedow also has found that the blacks comprise all three of the main cultural divisions established for the fossil men of Europe. They use rough stones as implements just as they find them, or they chip them into some conventional shape, or they grind them to a fine edge as desired.

A NEW water-cooled X-ray tube which will make possible the shortening of the period of radiation of malignant tumors from several hours to less than fifteen minutes, has been developed by Dr. W. D. Coolidge, of the General Electric Co., who has reported on his invention to the American Medical Association. Heretofore, in the treatment of cancer it has been necessary to use tubes with low amperage over long periods of time, the exposure to the rays being in some cases as long as 24 hours. The new tube permits the use of as high as 50 milliamperes to secure a voltage of 250,000, reducing the time of treatment in ordinary cases to less than five minutes. Before releasing the tube for general use, experiments were conducted by Dr. J. T. Case, of Battle Creek, Mich., known as an authority on X-ray treatment. More than 500 tests on animals were made before the method was tried in human cases. Dr. Case says that the use of the new tube is quite safe in the hands of the experienced X-ray worker.