SCIENCE NEWS

Science Service, Washington, D. C.

HAWAII DURING THE AGE OF GLACIERS

RECENT geological researches indicate that Hawaii had its own ice cap during the Age of Glaciers. At the same time one of the islands, Lanai, was sunk almost 1,200 feet into the ocean.

Ice-carved lava flows indicate that Mauna Kea's lofty but sleeping volcanic peak had an ice cap during the time when America's northern regions and high mountain ranges were covered with glaciers. Studies of the summit by Dr. Herbert E. Gregory, of the Bishop Museum, and Dr. Chester K. Wentworth, of the Honolulu Board of Water Supply, assisted by local ranch managers and the United States Army, show that ice crept down from the summit, almost 14,000 feet above sea-level, to about 10,500 feet above sea-level, where it deposited moraines similar to those found in other glaciated regions.

Snowline during the ice age, the authors report in the *Bulletin* of the Geological Society of America, was depressed to about 12,000 feet above sea-level, while to-day, with the ice retreating rapidly in most parts of the world, the summer snowline in Hawaii would stand at 15,000 feet, if the mountains were sufficiently high. Quite active before the coming of the world-wide cooling of climate that produced the Pleistocene ice ages, Mauna Kea shows no evidence of activity during the intervals between ice advances and has erupted only mildly since the ice retreated.

Only a short distance from Mauna Kea, on the island of Lanai, Dr. Harold T. Stearns, of the U. S. Geological Survey, found that the arid shoreline of the lava islet had once stood 1,200 feet higher than at present, and had fallen in a number of steps to the present level.

Describing his researches in the *Bulletin* of the Geological Society of America, Dr. Stearns states that the island has emerged from the sea at an irregular rate, forming definite beaches when it was submerged 1,200 feet more than at present, another when it was under water by 560 feet more than it is now, a series of beaches from 560 to 250 feet above sea-level, and a pronounced beach at 250 feet above sea-level. Only 95 feet above present sea-level are a series of sea-deposited conglomerates, attesting to a shoreline at that level in the past. Below present sea-level, submerged shorelines tell of sea-levels lowered 300 and 60 feet, perhaps during the ice ages. The evidence suggests that all the Hawaiian Islands were submerged and then elevated during the past. The changes in shoreline are too great to be explained by changes in sea-level caused by the growth and shrinkage of polar ice caps during the Pleistocene ice ages, although the later, lower terraces may be the result of this.

THE THIRD JAVA APE-MAN SKULL

A NEW-FOUND skullcap of Pithecanthropus, ancient ape-man of Java, is unique in showing a marked resemblance to the skulls of the Peking race found in caves in northern China. This resemblance consists in a noticeable arching or doming of the top of the skull, which is not present in the two previously known Pithecanthropus skulls, one discovered in 1937 and the other in 1891.

The new find is described in *Nature* by Dr. G. H. R. von Koenigswald, who works under the auspices of the Carnegie Institution of Washington, and Dr. Franz Weidenreich, of the Peiping Union Medical College, leader of researches at the Choukoutien caves, where remains of Peking man are found.

The third Pithecanthropus skull, like its two predecessors, is a large fragment. It consists of the complete right parietal bone, which makes up most of the side of the skull, with part of the left parietal and a piece of the occipital bone, which forms the back of the skull.

The fragment exhibits a crest along the top and a depression on the side, which "entirely correspond to those which are characteristic of the Sinanthropus skulls. The pronounced flattening of the cap, so specific for the two Pithecanthropus skulls known hitherto, is completely missing in the case of this new Pithecanthropus skull."

On the other hand, the new skull has certain features in common with both Java and Peking skulls, especially in a general lowness of the entire cap as compared with the higher doming in skulls of modern man, and in having its greatest width at the sides of the face just forward of the ears, instead of much higher up, as in present-day races. The condition of the sutures or seams between the bones indicates that the skull is that of a juvenile individual.

It is pointed out in conclusion that "All the new Pithecanthropus finds demonstrate how important and promising it is to search for fossil man in Java."

THE USE OF GAS IN THE ERADICATION OF PLANT DISEASES

AMERICA'S great tobacco crop has been saved from its most menacing enemy by a gas warfare method, and the way opened for application of the same method in attacks on other plant diseases, by investigators at Duke University and the Virginia Agricultural Experiment Station in cooperative investigations.

Blue mold, or *Peronospora tabacina*, which is a plant itself, was singled out of several thousand plant diseases for special investigation. It works only in darkness, preferably between midnight and daylight. Like certain human diseases, it thrives best upon a healthy living host. Its dust-like reproduction bodies, or spores, are scattered far and wide by the winds, or fall to the ground in leaves and there lie in wait for any tobacco plants which unsuspecting farmers may plant in the infested soil. The wind-borne spores, which scattered from Florida to Canada last year, send out feeding tubes into any part of the tobacco leaf, even the hairs, but only when dew or water is on the leaf. Although it sometimes appears in the fields, in early spring, its greatest destruction is to be found in tobacco seed beds.

When sprays were applied, their disinfecting action did not always reach the microscopic spores. Almost

simultaneously, investigators in Australia and at Duke University realized that new technics in plant protection were necessary. Gas was the logical answer, gas that would penetrate to all parts of the plant above ground and cover all exposed surfaces. Several chemicals were tried. Some destroyed the seed beds like fire, some were ineffective. Benzol, xylol and tolulol, hydrocarbons distilled from coal, were effective. But an accident occurred: a seed bed upon which investigations were being conducted was destroyed. So the work was taken to the laboratory. Plants were grown in glass jars, temperatures were regulated, benzol vapor concentrations were precisely controlled and checked by gas analysis technic.

The effect of benzol on tobacco seedlings was minutely studied. Working night and day, it was determined precisely how much benzol was required to cause injury to tobacco seedlings. Over 1,000 square yards of tobacco beds in North Carolina and Virginia were fumigated. The tricks of the parasite were learned in the cold, wet nights of early spring. Time after time, the blue mold was destroyed on the second night of fumigation.

For the first time a method was demonstrated which would kill the parasite without harming the plants. The disease could be held in check with one thirtieth the amount of vapor required to destroy the plants. One sixth of the amount of gas lethal to the plants would completely destroy the fungus after the second application. This discovery is important. A chemical has been discovered that would harmlessly penetrate the tissues of the host and yet destroy the parasite.

THE BIRTH AND DEATH RATES IN THE UNITED STATES

AMERICA'S rate of population increase is up to six per 1,000 people. More babies are being born in the United States this year than there were in 1937, and fewer of them are dying. Fewer of all of us are dying, as a matter of fact. There is a pretty good chance that, in spite of the "little depression," American health figures for the year will set a record.

A survey for the first half of 1938 has been published by the U. S. Public Health Service. It states that "Another outstanding feature of the mortality record for the first six months of 1938 was the wide-spread decline in the infant mortality rate. Only five states reported a higher rate than for 1937, and the current rate is nearly nine per cent. less than that for last year. The birth rate for 1938 has continued slightly above that for 1937. This increase, combined with a lower death rate, has resulted in a crude rate of natural increase of 6.0 per cent. per 1,000 population, compared with the corresponding rate of 4.3 per 1,000 population for 1937."

For the population generally, the same six-month trend, if carried through the remainder of the year, will place the country's mortality rate at the lowest point on record, with the possible single exception of 1933. The rate for the first six months of 1938, 10.8 per 1,000 population, is only slightly higher than the low rate for 1933 and represents a decrease of 8.5 per cent. from the rate for 1937.

The drop in the influenza-pneumonia death rate is an important factor in this decline; but almost all diseases show similarly steep declines in the numbers of their victims. Improvements in the tuberculosis and maternity mortality situations are cited as most encouraging. The campaigns for greater traffic safety seem to be succeeding.

Cancer, however, continues its ominous creep; mortality from this disease increased three per cent. over that for the same months in 1937.

BAUXITE ORE AS A SOURCE OF ALUMINUM

A WAY has been discovered in the electrochemical laboratory of Columbia University to use low-grade bauxite ore from Italy as a valuable source of aluminum.

The discovery potentially breaks the semi-monopoly of the few sources of commercially acceptable high-grade bauxite ore. This bauxite ore has been a highly important "strategic" mineral in the maneuvering of nations for economic supremacy. In a report to the Electrochemical Society, Professor Colin G. Fink and V. S. de Marchi describe their new method of removing the excessive amount of iron oxide from low-grade Italian bauxite and producing, on a practical scale, a residue which will yield shining aluminum.

Bauxite is the name of rock containing hydrated alumina mixed with various oxides. White bauxite, very rare, is rich in alumina and low in iron oxide. It is used in ceramics and in the production of artificial gems. Red bauxite, more widely distributed, is used in the production of aluminum. Ferruginous bauxite, very abundantly distributed in nature, contains so much iron oxide that it is not commercially used at present.

It is with this third type of bauxite that Professor Fink and Mr. de Marchi worked. Their aim was to discover a way to remove most of the iron oxide and make possible the use of the once valueless ore as a source of commercial aluminum. Moreover, they sought to refine red bauxite and bring it into the class of the rare, white bauxite.

Chemically, the steps in the new process consist of treating bauxites with high iron content with an excess of sulfur at high temperatures. By this treatment the iron oxide is converted into iron sulfide. The excess sulfur that does not react is boiled off. Along with the change of iron oxide into iron sulfide the presence of sulfur changes over the other impurities present, titania and silica, into their sulfur compounds. These sulfides are then treated with an excess of chlorine and aluminum chloride results.

It is reported that "The chlorination of the sulfided Istrian bauxite at 600 degrees Centigrade removes 90 per cent. of the iron oxide, over 50 per cent. of the titanium dioxide and 14 per cent. of the silica. The alumina losses were only 9 per cent. The reaction is complete within the first five minutes of chlorination. If the chlorination . . . is carried out at 920 degrees Centigrade, 94 per cent. of the iron oxide and 66 per cent. of the titanium oxide are removed. The alumina losses are only 7 per cent."

THE NOMENCLATURE OF COLORS

SCIENCE is nearing the end of its task of trying to set up a few simple names for colors which will bring order out of the more than 2,000 designations which colors now have.

In a report to the Niagara Falls meeting of the Optical Society of America, Dr. Deane B. Judd, of the National Bureau of Standards, stated that only a few revisions remain in the task of finding 320 designations for all colors.

Actually only a few names are needed in the system devised by the Inter-Society Color Council. Eight adjectives—strong and weak, light and dark and pale, deep, dusky and brilliant—are applied to each hue name to make up the total number of 320.

The names agreed upon are: pink, red, orange-pink, red-orange, red-brown, orange, brown, yellow-orange, yellow-brown, yellow, olive-brown, olive, yellow-green, green-olive, green, blue-green, blue, purple-blue, purple, purple-pink, red-purple. And in addition, white, grey and black.

The scientific classification of colors, Dr. Judd said, was undertaken at the request of the American Pharmaceutical Association to simplify the color designation of drugs and chemicals.

In its broadest aspects the new system of simplified colors could be applied to all fields of activity where colors are used. However, manufacturers might be adverse to putting out a color known as a "weak" pink or a "weak" blue, even if it is scientifically accurate. Thus Twilight Mauve, Titian Tan, Patio Blue and the other new fall shades will probably continue in use.

A NEW MILKING PROCESS

A NEW milking process, in which air is excluded from all steps, all the way from cow to bottle, has been invented by Burgess A. Lee, of Lockport, N. Y., working in collaboration with Professor Oscar Erf, of the Ohio State University. Milk obtained by this process is claimed to be protected against losses of calcium and vitamins that occur when the fresh-drawn milk is exposed to air.

Milk as it comes from the cow's udder contains two gases in solution, nitrogen and carbon dioxide. Contact with oxygen is stated to cause precipitation of calcium salts and loss of vitamin constituents. This loss, according to Professor Erf, is responsible for the failure of pail-fed calves to thrive as well as their udder-fed companions. Exposure of milk to air is aggravated in the cooling process of present dairy practice, where it is flowed openly in a thin sheet over chilled pipes.

In the new process the milk is drawn from the udder by a vacuum milker operating at one half an atmospheric pressure. It is carried to a Pyrex tank, still under partial vacuum, and thence through the bottle-filling valve, invented by Mr. Lee, directly to the bottles. A mixture of nitrogen and carbon dioxide is added to bring it up to atmospheric pressure and exclude oxygen, and the bottles are capped. Only after filling and capping are the bottles cooled.

Patents on the new valve and filling process are assigned to William R. Kenan, Jr., owner of the Randleigh dairy farm near Lockport, N. Y., where research looking to the improvement of the nutritive value of milk is being conducted.

ITEMS

BLISTER rust, deadly enemy of pine trees, is loose in central California now, the U. S. Forest Service has discovered. This fungus pest appeared in the East some years ago, worked its way across the continent by way of Canada, and has been spreading among the forests of the Pacific Coast region.

DR. ALBERT M. SNELL, of the Mayo Clinic, Rochester, Minn., reported at the Duke University medical symposium that sprue, emaciating disease of the tropics that usually starts with a very sore mouth and frequently ends in death, has its counterpart in non-tropical regions. A large number of cases which seem to be closely allied to if not identical with tropical sprue have been reported from the temperate zones. Among the symptoms of the temperate zone ailment are marked emaciation, anemia, spotted or pigmented skin, tetany (painful muscle spasms) and softening of the bones. The last two conditions, tetany and bone softening, which indicate lack of calcium, or lime, and lack of vitamins, are the chief points of difference between tropical and non-tropical sprue.

DR. GEORGE W. MCCOY, former director of the U. S. National Institute of Health and now professor of preventive medicine and public health at Louisiana State University School of Medicine, at the Duke University medical symposium reported that leprosy can not spread at present in the northern states of this country. The most important factor in attempts to control leprosy as an epidemic disease is this inability of leprosy to spread in our own northern states and in certain other localities contrasted with its fairly easy spread in other parts of the world, including states bordering on the Gulf of Mexico. The cause of the disease has not yet been satisfactorily settled, although there are many theories, including germs and improper diet.

DELICATE quick-frozen strawberries, that rival the fresh fruit in their taste and texture when defrosted and served, are now being preserved by chilling them in cold sugar syrup. In a report to the Food Preservation Conference, sponsored by the University of Tennessee and the American Society of Refrigerating Engineers, R. Brooks Taylor, of the Engineering Experiment Station, described the improved freezing process. Merit of the method is that the individual fruit is frozen at a temperature a little above zero degrees Fahrenheit instead of at severe temperatures used in some other methods. The freezing agent is sugar solution kept cold by cooling coils in the freezing container. Over 100,000 pounds of fruit have now been frozen with excellent results. Only six minutes is required for the treatment.