SCIENCE NEWS

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THE EARTHQUAKE IN ASIA MINOR

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JUST as man-made bridges are less sturdy than the solid land they connect, so too are the great "land bridges" of the earth which link continents more unstable than other regions. The land bridge areas of the earth are characteristically earthquake areas and so it is with the Asia Minor region which produced the terriffic post-Christmas shock that has killed thousands in Turkey.

World-wide seismological earthquake records gathered by Science Service and sent to the U. S. Coast and Geodetic Survey for analysis show that the shock's epicenter was at latitude 39 degrees north and longitude 39 degrees east; approximately 100 miles southwest of the Turkish Black Sea port of Trebizond. The epicenter thus came almost directly under the large town of Erzincan in the Armenian mountain terrain. The first shock on December 26 is known to have occurred exactly at six hours, 57.4 minutes P.M. Eastern Standard Time.

Rugged mountain ranges mark the region and the average altitude of the country is about 7,000 feet. The severe temperature of 22 degrees below zero, reported in scattered cables by the press, is thus understandable at this time of year. The sharply-folded mountainous terrain of Asia Minor continues over to become the Balkan Mountains, the Dinarie Alps and the Alps in Europe. At the Spanish-French border they form the towering Pyrenees and the elevated Spanish Plateau. One fringe of the mountains shoots off southward and becomes Italy and the hills of Sicily. Although now separated by the waters of the Mediterranean Sea, it is probable that Italy and Sicily once formed an additional land bridge linking Europe and Africa. Characteristic of present and former land bridge areas of the earth are their often mountainous terrain, potential volcanic activity and earthquake susceptibility. The link between North and South America is typical as is the region linking Asia and North America around Alaska. Not all the world's earthquake regions, however, are necessarily of the land bridge type. The countries and regions which border on the Pacific Ocean—Japan, the west coast of the United States and Canada and the nations on the western side of South America—are of this character.

Considering the number of earthquake shocks which occur over the earth in a year, one finds that a disaster like that in Turkey is the exception. The Turkish shock was a strong one, but its damage came because it occurred in a region having a fairly large population. Many a severe quake is recorded which is little noted because it occurred in remote areas with little loss of life.—ROBERT D. POTTER.

GERM-KILLING CRYSTALS FROM SOIL BACILLI

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PNEUMONIA protection by crystals of a chemical obtained from germs that prey on other germs was announced by Drs. René J. Dubos and Rollin D. Hotchkiss, of the Hospital of the Rockefeller Institute for Medical Research, New York, at the meeting in New Haven of the Society of American Bacteriologists.

So far, only mice have been given the new germ-killing crystals. Studies on other animals and other disease-causing germs besides the pneumococcus are under way, but have not yet been completed. The material described is so powerful that one millionth of an ounce is sufficient to protect a mouse from a pneumonia infection which would otherwise kill it rapidly.

Another chemical compound was obtained in pure crystalline form from the same germ source, but this second compound is ineffective in mice. Studies of the chemical differences between the two compounds will, it is hoped, help to explain what is necessary to secure a protective action against infection within the body of the animal.

Discovery of the germ-killing and apparently curative material was the result of a deliberate search in which the investigators took advantage of the fact that certain species of microorganisms or germs are known to be antagonistic to other species of microorganisms.

Staphylococci, commonly found in boils, abscesses and flesh wounds, were the bacteria chosen as the prey. Bacilli able to live upon them were found in soil. When grown in artificial media free from other bacteria, the bacilli still retain the ability to kill staphylococci and grow and multiply in their presence. Furthermore, the bacilli were found able to kill not only the one species, but also a large group of organisms having in common with staphylococci the property of being "Gram-positive" (meaning that they are dyed in a particular way by a much-used bacteriological stain). Some other Gram-positive bacteria which are also susceptible are streptococci, pneumococci and diphtheria bacilli.

From the bactericidal organisms was obtained a non-living chemical agent which by itself was able to kill the Gram-positive microbes. This chemical agent has now been further purified, and two pure crystalline chemical compounds have been isolated from it. Both of these bactericidal compounds are so active that a millionth of an ounce is sufficient to kill a few billion pneumococci in the test-tube.

CHEMICAL CURES OF DISEASE

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MORE successful use of sulfanilamide and related chemicals in curing germ diseases is promised by a new test reported on December 28 by Professor E. K. Marshall, Jr., of the Johns Hopkins University, to the Society of American Bacteriologists at New Haven. The test, which takes advantage of the feeding habits of mice, provides a much-needed method of evaluating chemical remedies on a quantitative basis. It was worked out by Professor Marshall and associates.

Sulfanilamide, sulfapyridine or some other chemical remedy is mixed with the food of the mice. Because

these animals eat frequently and at regular intervals, there is always some of the chemical in their systems. A constant concentration of the remedy can thus be maintained in the animal's blood, and this gives a basis for determining what blood concentration is necessary to cure streptococcus infection, or which of several remedies is more effective in amounts that give the same concentration in the blood.

From such studies, Professor Marshall explained, it can be learned more exactly which remedy to use, how large a dose is effective, and how often it needs to be repeated. At present, he pointed out, the value of sulfanilamide and related remedies is somewhat hampered by lack of exact information on these points.

The way in which sulfanilamide acts in the body to check the growth of disease germs and thus "cure" the patient might also be determined from such quantitative comparisons with other similar chemicals. This knowledge might lead to the development of even more effective chemical remedies.

ELECTROSTATIC ELECTRICITY IN INDUSTRIAL SEPARATION OF PARTICLES

ELECTROSTATIC electricity is now being used by the food industry for the dry separation of particles.

Shelled nut meats can be separated from the shells. Raisins can be stripped from leaves and stem material. Watercress seed can be removed from rice, and pest seeds separated from various economic seeds, according to the report of O. C. Ralston and Foster Fraas, of the U. S. Bureau of Mines, given on the Chemical Engineering Symposium of the American Chemical Society at the University of Michigan on December 29.

Electrostatic separation—making use of the different behavior of dissimilar particles under the influence of an electric field—has long been used for mineral separation. To a large degree it has been superseded in this field, however, by flotation methods. In contrast, the food industries, where a dry separation is needed, use it widely and it is constantly being improved. This progress, in turn, indicates possibilities of applications in mineral separation by the electrostatic method. One new advance is to pre-condition the surface of the mineral to be separated so that the particles can be more easily drawn apart in the electric fields. Acidic gases, such as hydrofluoric acid, have been found effective for silicate minerals. Feldspar and quartz can be separated by this method. The hydrofluoric acid forms potassium and aluminum fluorides on the feldspar particles, whereas the quartz particles are merely etched by the treatment and silicon tetrafluoride vapor passes off.

For the separation of minerals like limestone, dolomite, magnesite and borax, vapors of acetic and benzoic acids have been used for the pre-conditioning treatment.

THE ALARMING TREND OF POPULATION

ALARM over the trend toward lower birth rates was expressed by Professor Raymond Pearl, of the Johns Hopkins University, in his presidential address before the American Statistical Association, in which he said people in the prime of life are contriving to throw off some of the burden of supporting young and old by having fewer children.

"Just possibly what mankind is slowly and steadily doing," Professor Pearl said, "may turn out in the long run to be the moral equivalent of curing a toothache by the effective but disastrous technique of cutting off the patient's head. There is no good in making life easier if there is not going to be anybody around to live it."

The world's population, he said, increased nearly fivefold in the three centuries between roughly 1630 and 1930. This brought about present efforts to lessen crowding and discomfort, which now are showing results in lowered birth rate and increasing numbers of the old.

Analyzing the population problems of the United States, and citing "such weird economic philosophies as those currently associated with 'ham and eggs' or '$200 a month,'" Professor Pearl said: "It is plain that the old folks, on the one hand, and the youngsters, on the other hand, by their own lusty bellowings and the supplementary skullduggery of their 'humanitarian' friends are ganging up, as the expressive phrase goes, on the half of the population that does the work, pays the bills and taxes, and in cold fact earns the livings for all."

Counting both young and old, the burden borne by the harassed section of the population between fifteen and fifty years old is actually not so great as it was a century ago, Professor Pearl finds. In 1840 for every 1,000 persons of these ages there were 1,084 younger or older to be taken care of; in 1930, for each 1,000 of the "reproducer-worker phase of life" there were only 880 persons besides themselves to be cared for.

To instill into the minds and consciences of the mass of our people that their chief concern is the composition of the population may, Professor Pearl said, be the principal duty of the American Statistical Association in years ahead.

THE SLAUGHTER OF BISONS BY THE CANADIAN GOVERNMENT

BISON are being killed by the thousand at Buffalo National Park near Wainwright, Alta., in the greatest slaughter of these animals since the days of Buffalo Bill. The range must be cleared of all animals before spring, by order of the Canadian Government. It is needed for other purposes, though official silence is preserved on what these purposes are. Rumor says the area is to be used as a great aviation training area, for the education of thousands of flying fighters for duty overseas.

Before the hunters began the slaughter, there were more than 3,000 bison on the range, besides 1,500 elk, 500 deer, 125 moose and 35 imported yak from Tibet. The elk are being given to Indians on reservations as they are killed, the bison carcasses will be butchered and the meat and hides sold on the market.

Wiping out of the Wainwright herd will not, of course, mean the end of bison in Canada. The largest herd of these animals in the world, some 30,000 head, are kept on a tremendous range of 17,000 square miles of wooded country, in northern Alberta and southern Mackenzie provinces. A considerable surplus of animals from the

Wainwright herd were sent to the great range some time ago, and smaller surpluses have also been distributed to other ranges and parks in Canada. Canadian conservation officials state that the range at Wainwright has deteriorated through over-grazing, so that it would be inadvisable to keep so many animals there regardless of other possible uses for the land.

The Wainwright herd had its beginnings a generation ago, when the Canadian government bought 700 head from Michael Pablo, a Mexican ranch owner living in Montana. Mr. Pablo had built up his herd from a few survivors of the great slaughter on the Great Plains during the latter part of the nineteenth century. When the bison began to become too numerous for him, he offered his herd for sale to the United States government, but was turned down. The Canadian government then bought the 700 animals, at $250 each, and moved them to the Wainwright area, where the herd grew by natural increase to more than 3,000 head.

Before the depression, surplus animals were shipped to the great northern bison range. When shipping costs became too much for the Canadian budget, the surplus was killed and marketed. The present wholesale slaughter is being handled by a modern packing firm which secured the contract on bid.

THE EVOLUTION OF MAN

THERE was no one cradle of humanity from which all the kinds of man grew up. Man evolved in various parts of the world, faster in some regions than in others, according to Dr. Franz Weidenreich of Peiping Union Medical College, in a paper read before the American Anthropological Association.

Dr. Weidenreich, who is best known for his studies of ancient remains of Peking Man discovered in caves near Peiping, pointed out that "in the past decade our knowledge of fossil man has advanced as in no earlier period." From skeletal remains of ancient man now available for scientific scrutiny it is now clear, he said, that there were varied types of man on earth during each successive phase of evolution as far back as prehominid, or pre-man, days. In each phase, he explained, all individuals had certain features in common, just as *Homo sapiens*, who rules the world to-day, belongs to one species the world over. But just as *Homo sapiens* is divided into races, so his predecessors appeared somewhat different in different regions.

In their own parts of the world, such hoary prehominids as Pithecanthropus of Java and Peking Man of China, who lived half a million years or more ago, were ancestors to later types in their own regions, said Dr. Weidenreich. Western Europe's undiscovered prehominids may prove to be much older than those of Asia, he pointed out, because more advanced types of man were so ancient in regions such as England. Pre-man types found in Java and China indicate to Dr. Weidenreich that man must have branched off very early "from a common anthropoid-like stem which had already adopted an upright posture, while braincase, jaws and dentition still retained their anthropoid characteristics."

ITEMS

A NOVA, or "new" star, similar to what the Star of Bethlehem may have been, was discovered on Christmas Eve by Dr. F. L. Whipple, of the Harvard College Observatory. It is now of tenth photographic magnitude, and thus invisible to the naked eye. Evidence indicates that it flashed to its maximum brightness some time last summer, but then eluded the watchfulness of astronomers. It is located in the minor constellation Monoceros, the Unicorn, near the southern horizon.

THREE more "white dwarf" stars, heavyweights of the heavens, have been found by Professor Gerard P. Kuiper, of the McDonald Observatory at Fort Davis, Texas, raising the number known to twenty-five. White dwarf stars are relatively close to earth and some of them weigh a million pounds per cubic inch. The new white dwarfs are Wolf 1, Ross 548 and the faint star in what astronomers call Selected Area 26. They are all comparatively lightweights, with densities of about 3 tons per cubic inch, which still is thousands of times the weight of earthly matter.

THE year 1939 will go into the pages of weather history as the "warm" year, according to a summary just prepared by J. B. Kincer, chief of the Division of Climate and Crop Weather of the U. S. Weather Bureau. Only one month, February, can be classed as abnormally cold for the nation as a whole. All the other months were either moderately warm or were definitely far above ordinary seasonal temperature. December, in particular, has been way above temperature averages for this time of year.

TWO of the most important colors in nature—the red pigment of blood, known as hemin, and the green pigment of leaves, known as chlorophyll—have molecules shaped like little wagon wheels, round and flat, Dr. R. P. Linstead, of Harvard University, stated at the Eighth National Organic Chemistry Symposium of the American Chemical Society meeting at St. Louis on December 29. The "hubs" of the molecule "wheels," he explained, are different for hemin and chlorophyll. In the center of the hemin wheel is an iron atom. In the center of a chlorophyll wheel is a magnesium atom.

A PREHISTORIC crossroads, where at least three early Indian tribes left traces of their presence, has been discovered by archeologists in the area of north-central Texas soon to be flooded by Possum Kingdom Dam. Shortage of WPA workers has temporarily halted joint efforts of the University of Texas and the WPA to salvage all possible Indian material in the sector before the dam is completed late in 1940. Bison which thronged Possum Kingdom Basin are believed the attraction which drew aborigines from various parts of Texas. The excavations thus far have shown a new southern limit to which certain cultural traits of Plains Indians spread. Hope that the shutdown will be brief is expressed by A. T. Jackson, of the University of Texas, in charge of excavations, because time lost now means "work can never be done."