SCIENCE NEWS

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THE COMING TOTAL ECLIPSE OF THE SUN

THE first total eclipse of the sun in the United States since 1925 is the attraction that will bring astronomers from all over the country to positions near San Francisco on April 28. Then the tip of the moon's shadow will graze the earth along a line crossing the coast in Marin County, California, about 20 miles north of the Golden Gate, traveling northeastwards across the state, passing just south of Marysville and Honey Lake.

Crossing into Nevada about 40 miles north of Reno, the shadow continues over the southeastern corner of Oregon, over Idaho, and then leaves the earth at a point some fifty miles east of Butte, Montana. Only over this narrow line, scarce a half mile wide, will the sun be obscured, and the ordinarily invisible corona around it flash into view for a second or so.

This is a very unusual eclipse, a so-called "central" eclipse, the first of its kind in 18 years. Usually, an eclipse is either total or annular. Either is caused by the moon getting directly between the sun and earth. But the distances vary. Sometimes the shadow of the moon reaches to the earth and beyond, and the regions which it crosses see the sun totally obscured. This is a total eclipse. At other times, the shadow, conical in shape, with the point away from the sun, fails to reach the earth. Then the eclipse is "annular"; the moon, seeming a little smaller, does not fully cover the sun, and a ring of sunlight is seen around it.

A central eclipse, like the coming one, is both. Where it starts, out in the Pacific Ocean, it is annular. The earth, being round, bulges several thousand miles towards the moon, so by the time the eclipse approaches the Pacific Coast the tip of the shadow reaches the earth and the eclipse becomes total. But instead of the shadow on the earth being a hundred miles or more in diameter and causing an eclipse lasting several minutes, the shadow in April will be under a mile, and the eclipse at its longest will last a second and a half. Then, after the tip leaves earth in Montana, the path in which the ring of sun can be seen continues across Saskatchewan, Manitoba, Hudson Bay, Quebec and Labrador and ends out in the middle of the Atlantic Ocean, 5 hours, 29 minutes and 55 seconds after it began, some ten thousand miles away.

An annular eclipse is of no scientific value, but along the path of totality astronomers will try to make observations only possible at a total eclipse. At Camptonville, Yuba County, about 125 miles northeast of San Francisco, will be a party from the Lick Observatory of the University of California, under the direction of Dr. J. H. Moore. Dr. D. H. Menzel will be with him. Farther east, near Honey Lake, will be a group from the Mount Wilson Observatory, in charge of Dr. S. B. Nicholson. On the edge of the Black Rock Desert, about 12 miles northwest of Gerlach, Nevada, Dr. Heber D. Curtis, director of the Allegheny Observatory at Pittsburgh, will make observations.

Flying in airplanes above will be still other astronomers. Dr. R. J. Trumpler, of the Lick Observatory, will fly in an army airplane, while other observations will be made from planes from the Mare Island navy yard.

Because of the great number of bodies in the solar system that exert a pull of gravity on the moon, its path is a very tortuous one, and astronomers are not able to predict its path with absolute precision. As a result, says Dr. R. G. Aitken, associate director of the Lick Observatory, in a report to the Astronomical Society of the Pacific, "it is still impossible to predict with perfect accuracy the central line of the shadow path at any eclipse. The outstanding error is only a small fraction of a mile, and when the eclipse lasts one or more minutes this is quite unimportant, since the eclipse path is then many miles wide. On April 28, 1930, however, this small uncertainty is serious, and, for all his care, the astronomer may find himself just too far north or too far south to be on the shadow path.

"That is the reason why astronomers at the coming eclipse are planning chiefly to make spectrographic observations of the sun's lower atmospheric layers, known as the chromosphere; for these can be carried out successfully and with results of decided value, even if the spectrograph is just outside the shadow path.

"A photograph of the corona, however, can be taken only at stations on the path. The Lick Observatory-Crocker Expedition, therefore, plans to set up three cameras, one on the computed central line, one about one third of a mile north of it, and a third an equal distance to the south."

In order to predict the most accurate position possible of the path of the shadow, astronomers at the U. S. Nautical Almanac Office, in Washington, under the direction of Professor James Robertson, have made a last-minute calculation of the path. Using observations of the moon made as recently as March 12, they have calculated the path to within a hundredth of a minute of latitude and longitude, or less than a hundred feet. With such recent observations, there should be little wandering of the moon between the last one and the eclipse itself.

HEMIANTHROPUS OSBORNI

FRAGMENTS of skull, face-bones, jaw and shoulder-blade, found by Professor Wilhelm Freudenberg in Ice-Age gravels of the Bammental near Heidelberg, have proved upon piecing together to be the remains of a big ape-like creature with a brain bigger than that of any known anthropoid ape, either living or extinct, says *Natural History*, a publication of the American Museum of Natural History, New York. The animal has been named by its discoverer *Hemianthropus osborni*, in honor of the seventieth birthday of Dr. Henry Fairfield Osborn, president of the American Museum.

The *Hemianthropus* part of the name is Greek for "half-man." The creature, if an ape, was a highly ad-

vanced kind of an ape. Its somewhat gorilline face was uncommonly wide, and its brain is stated to surpass that of the Trinil skull from Java, and to equal in size the brain of Neanderthal man. The Trinil skull, *Pithecanthropus,* is considered to be human by a great many scientists, though some are of the opinion that it belonged to an ape; but Neanderthal man is unquestionably human. The editor of *Natural History* adds a note that "the question of the validity of *Hemianthropus osborni* as distinct from Heidelberg man remains an open question."

The Heidelberg man has been represented to date only by a jawbone found at Mauer near Heidelberg, in sands of the same geologic age as the gravels that have yielded the bones of *Hemianthropus.* It has been regarded as undoubtedly human, though of a very primitive type, characterized chiefly by its exceedingly massive structure and its almost total lack of a chin. The jaw which Professor Freudenberg found is even more chinless than the classic Mauer specimen. Its lower border resembles that of the Java skull.

Professor Freudenberg has been a tireless searcher for human and anthropoid remains in the region around Heidelberg. Recently he found a portion of a broken and water-worn arm-bone which he attributes to a fossil gibbon.

MID-ATLANTIC ISLETS AND GEOLOGICAL THEORIES

FOUR tiny islets in the middle of the Atlantic Ocean, the largest of them only an eighth of a mile across, bear heavy evidence against the validity of the Wegener hypothesis of the westward drift of the American continents, which has proved very attractive to many geologists. Dr. Henry S. Washington, of the Carnegie Institution, discusses the significance of these rocks, and especially their bearing on the problem of the origin of the long submarine ridge of which they are a part, in the first issue of the *Journal* of the Maryland Academy of Sciences.

The islets are known as St. Paul's Rocks, and they stand up alone in the midst of the South Atlantic, almost midway on the shortest line that can be drawn between Africa and South America. But although the highest point on them is only 64 feet above high-tide mark, the islands are lofty mountain-tops. For they are a part of a 9,000-mile-long submarine mountain range, or ridge on the ocean bottom, that extends through the middle of the Atlantic Ocean throughout almost its entire length, and rises in places as much as 18,000 or 20,000 feet above the bottoms of adjacent deeps. Other peaks that raise their heads above the surface of the sea form the islands and island groups of the Azores, Ascension, Tristan da Cunha, St. Helena, Gough and Bouvet. Of these, all except St. Helena lie directly on top of the ridge.

The course of the ridge is most peculiar and suggestive. It holds very closely to mid-Atlantic throughout, running almost directly north and south in the South Atlantic, swinging northwesterly to parallel the coasts of South America and western Africa, then north and northeasterly in the North Atlantic. In general, it runs parallel with the continental land lines through its whole length.

Geologists have long puzzled over why this ridge should exist and why it should follow the course it does. Two completely opposite theories have been advanced: one, that it represents the edge of a rift in the earth's crust caused by the pulling apart of the eastern and western continents; the other, that it is due to the squeezing together of the crust under the ocean basin, causing it to hump up.

The rocks of the little mid-oceanic islets furnish the clue. All the other islands located on the ridge are volcanic, and their lavas tell little, because they are melted rock, coming from unknown depths and resulting from imperfectly known physical and chemical processes. But the stone that forms St. Paul's Rocks is not a lava, but part of the deep crust of the earth, like the granite of our older mountains on land, though even more massive and heavy, and different in its chemical composition. The group of St. Paul's Rocks is the only place on the whole course of the ridge where the real crustal stuff from under the ocean bottom comes to the surface.

Dr. Washington finds that this massive rock shows signs of having been subjected to tremendous squeezing pressures, such as could have come only from sidewise thrusts humping up the ridge between them, and not from a tensional effect resulting from the pulling apart of the continents.

A NEW PHOTOELECTRIC CELL

RUNNING motors with electricity from sunlight is one of the possibilities forecast by the invention of a new type of cell that converts light directly into useful quantities of current. It is the invention of Dr. B. Lange, of the Kaiser Wilhelm Institute for Silicate Investigation. Previously this has not been possible. The new cell, the essential part of which is a "sandwich" of copper oxide between two layers of metallic copper, may also prove a revolutionary improvement in talking movies and television and in many phases of scientific work.

Ordinary photoelectric cells, consisting of a layer of a metal such as potassium inside a glass bulb containing either a vacuum or a small amount of inert gas, can only be operated with an auxiliary source of electric current. When light falls on the potassium layer, electrons are given off. When connected to a battery, or other source of current, the electrons are carried to another metal plate or wire which forms the other electrode. Thus, the flow of the current is regulated by the amount of light falling on the potassium layer.

In Dr. Lange's cell, the light falls on one of the thin copper layers and the electrons are driven off. They pass through the copper oxide layer, which is exceedingly thin, only a few layers of molecules in depth. When they reach the other layer of copper an electric current results. Because of the short distance through which the electrons have to travel, the cell operates without the slightest appreciable lag. The current given off is

powerful enough that when a rapidly flickering light shines on the cell, the current can be fed into a loud-speaker and a note vibrating at the same rate as the light can be heard.

Other advantages of the copper cell are that it does not show fatigue as does the ordinary type, it can be operated indefinitely without loss of efficiency and it is much more sensitive to the infra-red waves, too long to be visible.

In round numbers, Dr. Lange estimates, his new cell is ten times as efficient as the older types. But by the proper adjustment of the middle layer, and the use, perhaps, of other materials than copper oxide, he foresees the possibility of increasing the efficiency still further and converting light directly into large quantities of electricity. Even as constructed at present, the cell should prove a radical improvement in talking movies and television. It will also, suggests Dr. Lange, be useful as a photometer, to measure light intensity, because the current given off is directly proportional to the light falling on it, over a long range of brightness.

ITEMS

THE vital hormone of the cortex of the adrenal gland has been obtained in an extract called cortin, Professor F. A. Hartman and Dr. K. A. Brownell, of the University of Buffalo, reported to the American Physiological Society. The adrenal gland has two parts, one of which, the cortex, is essential to life. When the adrenal cortex is destroyed by disease or accident or removed by operation, the animal or man dies shortly. However, the Buffalo scientists stated that their extract will prolong the lives of animals whose adrenal glands have been removed so that they live from two and one half to three times as long as untreated animals without adrenals. The extract when properly made is harmless when injected into human beings. It has been given by mouth with beneficial results in some instances. The method of preparing it was briefly described in the report.

NEW knowledge of the vitamins was disclosed at the Chicago meeting of the American Society of Biological Chemists. Destruction of vitamin A by radiothorium was reported by Professor A. G. Hogan, C. L. Shrewsbury and Gerald F. Breckenridge, of the University of Missouri. This vitamin is important for promoting growth and for preventing eye disease. It is found in butter, cheese, eggs, spinach and liver. While the experiment was conducted with radiothorium, the inference is that any radioactive substance would have the same effect on this important vitamin.

EVIDENCE that the California condor, largest of flying birds, once ranged well to the east of its present habitat in California has been discovered in Conkling Cavern, N. M., the celebrated bone cave where human remains were recently discovered associated with fossils of extinct camel, ground sloth and other strange animals. One wing bone has been identified as that of a California condor by Dr. Hildegarde Howard, of the Los Angeles Museum, whither the bones from the cavern have been removed. In all, the cave has yielded about 100 bones of birds.

THE world's smallest opossum, a tiny animal no bigger than a mouse, is a native of Argentina. H. Harold Shamel, of the U. S. National Museum, who describes the new species in the *Journal* of the Washington Academy of Sciences, states that the specimen was collected some time ago by Dr. Alexander Wetmore, but that it remained unstudied in the museum until now. The little opossum is less than five inches from nosetip to tailtip, and nearly half its length is accounted for by tail. The specific name given it is *muscula,* which means "little mouse." There are many species of mouse which are larger.

CANADA would like to stop buying $3,000,000 worth of sulfur in the United States every year. An experimental plant for extracting sulfur from the mineral, iron pyrite, has begun operation in the hope of producing sulfur at a cheaper price than the import cost, Horace Freeman, chemical engineer, of Shawinigan, Que., told the Canadian Institute of Mining and Metallurgy meeting at Toronto. Canada must have sulfur to make the sulfite liquor used in her vast paper industries and to make sulfuric acid. Most of America's sulfur is now mined in Louisiana and Texas in a practically pure state. Combined with iron, as the sulfide or pyrite, it is found in large quantities very near Canadian paper mills, but in the past there has been no satisfactory method of extracting it.

EVEN if Americans are wasteful, as is often claimed, they salvage nearly a billion dollars' worth of their waste every year. This is according to figures of the U. S. Bureau of Mines on the amount of scrap and secondary metal recovered which is increasing every year. The waste trade industry is concentrating in large units. Even gold and silver is recovered in quantity from jewelry and dental waste. Photographic solutions contain half an ounce of silver to the gallon and 1,000,000 feet of waste movie film yield 800 ounces. Of the 500,000 tons of secondary copper recovered annually, part comes from 300,000 burned out electric lamps collected by one company. About forty per cent. of the annual supply of tin and lead has been used before. The iron and steel saved in a year is worth $500,000,000. Other metals salvaged in quantity from scrap, sweepings, skimmings and dross are mercury, zinc, antimony, aluminum and nickel.

HELIUM has been produced at the government plant at Amarillo, Texas, at a cost which compares favorably with that of hydrogen. More than a million cubic feet of the non-inflammable airship gas, of which the United States has a monopoly, was made during January for a net cost to the government of $9.64 the thousand cubic feet, according to a statement made by the U. S. Bureau of Mines, which built and operates the plant. Inflammable hydrogen, which is still used in lighter-than-air craft of other nations, can be made at costs varying from three to nine dollars the thousand cubic feet.