Dr. Nichols visited a certain area frequently during a summer and fall, marking all toads he could catch with identifying tags and carrying them various distances from the point of capture. Of 141 toads removed one mile or less from "home," 63 were subsequently recovered. Thirty of them had found their way back to the home territory in from 2 1/2 hours to 24 days.

Miniature Cannibalism

Cannibalism is not a monopoly among saw-toothed South Sea Islanders and wild black men of Central Africa. It exists far down in the sub-human world, among the one-celled animals, the protozoa.

Dr. A. C. Giese of Stanford University reported cases of protozoan cannibalism which he has studied. The successful eaters of their brother-microbes frequently become giants of their kind.

Old Fort a Science Outpost

Deep in the heart of Africa stands an old fort, built by the Germans as a World War stronghold. It is now an outpost of science, whence attacks are made on much smaller enemies than soldiers, but in their way deadlier—the dreaded tsetse flies, carriers of African sleeping sickness.

Here labor scientists who are trying to rid Central Africa of this depopulating scourge, stated Dr. P. J. Parrott, vice-director of the New York State Agricultural Experiment Station at Geneva, N. Y. Dr. Parrott saw the fort-laboratory during a recent scientific trip that began at Cape Town and ended at Cairo.

Another scourge of Africa, also depopulating in its effects though less directly so than the tsetse fly, is an importation from the New World; the prickly-pear cactus. Tradition says it was originally brought in in 1750 and used for fencing and for its fruits. Now it is ruining thousands of acres of farm and pasture lands, as it did in Australia.

The same means that broke the grip of the Australian prickly-pear plague are being tried against it in Africa, Dr. Parrott reported. The *Cactoblastis* caterpillar and other cactus-eating insects have been imported from Australia. Their success in Africa is proving much less spectacular, however.

Grasshopper Heartbeats

An apparatus that makes a permanent record of the secrets of the heart of a grasshopper was demonstrated by Drs. Frederick Crescitelli and Theodore L. Jahn, of the State University of Iowa. It writes down all oc- (*Turn to Page 30*)

GEOLOGY

Lost Continent Sought With Artificial Earthquake at Sea

Geologists Hear of Coal Age Dustbowl, Migrating Beaches, Origin of Mountains and Earth Itself

HUNTING for evidence of the lost continent of Appalachia with TNT and a ship-load of instruments has occupied Dr. Maurice Ewing, Lehigh University physicist, for several years. Long believed to be the source of much of the sedimentary rock on the Atlantic seaboard, Appalachia was only a theoretical and unreachable region until recently. Dr. Ewing described to the meeting of the Geological Society of America the equipment which he, cooperating with explosives engineers and geophysicists, has developed to aid in the search.

Adapting for undersea use the "artificial earthquake" methods used by petroleum geologists in the search for concealed oil-bearing structures, Dr. Ewing has designed a complete series of instruments, consisting of two bombs, four seismic listening instruments and a timing and recording device, for use on the sea bottom.

Strung out on a cable, like the knots in a kite tail, the instruments are lowered over the side of a moving ship, and laid out on the ocean floor. Then, after enough time to permit placing, automatic machinery sets off one explosive charge, and the instruments record the vibrations set up by it. Later the second charge is set off, and recorded by the automatic machines. Then the machinery is drawn to the surface, and the records studied.

Sending a sound wave down through the rocks and recording the time between the explosion and the arrival of the reflected waves tells geologists where changes occur in buried structures. By using his newly-developed equipment, Dr. Ewing hopes to find out what rock structures lie below the sea bottom even when three miles of water cover it.

Cooperating in this work were the Geological Society of America, which

SCIENTISTS RELAX

Humorously pondering the fate of the universe, the high priest of Mineralesia, guarded by two stalwart savages, awaits his cue. This scene is part of the annual Pick and Hammer show, at which Washington geologists satirize their profession and tell apocryphal stories of field experiences. The director of the show is in the foreground.

supplied money from its Penrose Fund, the Woods Hole Oceanographic Institution, which loaned its research ship, the Atlantis, to Dr. Ewing, and engineers of the E. I. du Pont de Nemours Company, who worked out special explosive equipment with Dr. Ewing.

Coal Age Dustbowl

Wind-scarred rocks, grim evidence that Colorado endured a desert climate a quarter of a billion years ago, while luxuriant rainforests throve in coal-forming bogs in the eastern United States have been discovered in the upper layers of the Fountain Sandstone. They were described by Dr. W. H. Schoewe, University of Kansas geologist.

Found in the upper layers of the sandstone that forms the red pinnacles and buttes on the Rocky Mountain front, these stony evidences of ancient dustbowl conditions are the first of that age found in the United States. Swirling dust of 250,000,000 years ago carved the rocks into easily recognized sharp-edged forms, which were buried in the desert sediments laid down in the desert bed of a drying sea. Later desert deposits covered them. Today, they are just being exposed again as the surrounding rock wears away. Other similar stones have been found nearby in rock beds of later ages, says Dr. Schoewe.

Beaches Go and Come

California's beaches are cut away during the winter, and built up during the summer, according to many observations made during the past generation. Studies of the ocean floor near these beaches, reported by Drs. U. S. Grant and F. P. Shepard, oceanographers of the Scripps Oceanographic Institution at La Jolla, Calif., show that the sea floor is changed as the beaches advance and recede.

Near Santa Monica, the sea floor was built up as the beaches were cut away, while at La Jolla the sea was deepened for at least 1,000 feet from shore when the shore was cut away.

America Wearing

Rain and snow, floods and dust storms, are wearing away North America. It is only a matter of years until it will be all worn away to sea level, provided the continent does not rise as it has done in the remote geologic past. The speed of this wearing away, and how it will progress during the distant future has been studied by Dr. Alfred C. Lane, Tufts College radioactivity expert, who reported that erosion proceeds very much like radium disintegration.

GALL INSECTS AND INSECT GALLS

Largest collection in the world of these interesting objects was shown in Indianapolis by Prof. Alfred C. Kinsey of Indiana University.

Suppose, said Dr. Lane, that the average elevation of North America is 2000 feet above sea level, and also that the continent is wearing away at the rate of 1 foot in 1000 years. Then, according to some theories, the entire continent would be worn away to sea level in two million years. According to Dr. Lane's theories, this is not the case at all. The erosion rate does not remain constant as the lands wear away. Removing the second foot would not take 1000 years, but longer.

Using his formulae, Dr. Lane calculates that to wear away 200 feet from North America would not take 200,000 years, but a much longer time—eighteen million years.

Blisters Make Mountains

Blisters of hot materials deep in the earth, followed by undertows of viscous molten rock, may cause the building of mountain ranges, according to a theory of mountain-making presented by Dr. John L. Rich, University of Cincinnati geologist. When a mass of rock is heated by radioactive disintegration, a blister is formed as the rock expands. As the blister rises, the surrounding area sinks, in part because of the deposition of materials on it as the elevated blister is eroded. Deep in the earth, currents of rock are set up, which continue until a pressure-balance is reached.

Atoms Shape World

Submicroscopic atoms of radioactive elements, disintegrating and producing heat, may be responsible for the present terrestrial topography, according to a theory presented by Dr. Bailey Willis, Stanford University geologist, who returned recently from a year's research in the south Pacific area.

Radium and similar elements, irregularly distributed through the earth's crust, cause local "melting spots" as it breaks down into simpler materials such as helium and lead, with the release of heat, according to this theory.

Eventually, the local "melting spot," technically named an asthenolith, grows, migrates, and causes intrusions of molten material into and under the surface rocks. Our mountain, plains, lava flows, and sea basins are thus all the result of terrestrial "hot boxes."

Cores in Mountains

Cores of once-molten rock, resembling gigantic inverted duckpins, recently discovered in the Henry Mountains, of Utah, were described by Dr. Charles B. Hunt, of the U. S. Geological Survey.

Rising through sandstones and shales during the early Mesozoic period, when

dinosaurs were lords of all creation, these rock masses have narrow necks where the surrounding rocks were hard, and spread out when they encountered weaker materials.

Cubic Miles of Ash

Fifteen cubic miles of volcanic ash were ejected by Mt. Mazama, of which Crater Lake, in Oregon, is a remnant, during its lifetime of perhaps a million years. Rising from the ruins of older volcanoes during the ice ages, Mt. Mazama grew to be a 15,000-foot, ice-shrouded volcano by the piling up of layers of lava flows from the central crater.

About 10,000 years ago, great eruptions, like those at Mount Pelee, threw out fifteen cubic miles of volcanic ash and poured clouds of hot vapors 35 miles down nearby valleys, Prof. Howel Williams, University of California volcanologist, reported. Then the top of the mountain fell in. Minor recent eruptions built two small cones within the dying crater, and the waters of the present vast blue lake accumulated. The eruption of 10,000 years ago resembled the cataclysm that destroyed Krakatau, in Sunda Strait, in 1883. Less violence would have produced a crater like Kilauea's.

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ANTHROPOLOGY

Fiji Islanders Dress for Dinner; Annoyed by Guests in Shorts

Home Planning for Polygamous a Problem Among Primitives of Alaska, Anthropological Members Hear

FIJI Islanders dress for dinner, and take their etiquette seriously. So the American Anthropological Association, meeting at New Haven, was told by Miss Dorothy M. Spencer, who reported studying manners and tact among natives whose very name Fiji is used to suggest wildness.

Repeating a Fiji dinner party faux pas, as told her by a native, Miss Spencer said:

"People of his village extended a dinner invitation to the district commissioner and his assistant, who were Europeans. With best of intentions probably, the officials attended the dinner party attired in shorts, a costume which the natives well knew to be an informal one, reserved for working hours, field excursions, and the like.

"The men were furious, and the women, too, felt themselves insulted that they would be forced to serve such unmannerly foreigners."

Entering a Fiji house, Miss Spencer said, it is etiquette to walk in front of any seated individual. Walking behind him is rude, for the good reason that a "hostile-minded person would be in a good position to deal the man a blow when he passed behind his back."

Good manners are so vital, in Fiji circles, that one chief shot himself rather than live after his younger brother spoke to him disrespectfully.

Navajo women have stopped making pottery bowls, and almost given up making baskets, and no wonder!

Here are some of the accidents supposed to make trouble, or spoil a Navajo basket, as reported by Harry Tschopik, Jr., of Peabody Museum, Harvard University.

No one must watch while the basket is made—the basket will be sure to break.

No one may step over the materials.

The basket maker must not swear.

She must work always on the concave surface of the basket, because if she turned it over, she would lose her mind.

After the design is started, a basket maker may eat meat and bread, but no salt.

There are plenty more requirements, but this gives an idea. A basket that is not made right is considered no good in ceremonial sings for healing the sick, where the baskets are mainly used.

Mr. Tschopik said that the basket making conditions he described are those of Navajos of Ramah, New Mexico.

Planned for Two Wives

How to arrange a house for two wives is a problem that Ten'a Indians of Alaska have solved. These Indians often have two wives, and generally choose sisters, Rev. Robert J. Sullivan, S. J., who spent the past winter in their villages along the Yukon River, reported.

In a two-wife household, the husband keeps his things along one side of the house, midway between front and rear walls, he explained. The first and more important wife sits, and keeps her belongings, between the man and the entrance. The other, less important wife gets the place on the other side of the man, near the rear.

According to Ten'a etiquette, it is rude for a woman to pass in front of a man, Father Sullivan explained. The first wife, established near the door, can go out for food or for household duties without walking in front of her husband. The second wife isn't important enough for any one to care if she does walk in front.

Children of Ten'a Indians get what they want by the sure-fire method of crying for it. Parents cannot stand tears, and will give their babies almost anything for which they cry, Father Sullivan observed.

Soil Saving Methods Old

Ancient farmers in Mexico used exactly the same techniques for conserving soil that modern engineers advise.

Reporting her observations in southern Mexico, Miss Emma Reh, of the Catholic University of America, told of finding Indians in the Mixteca region planting their steep, mountain-side fields and using time-honored devices to keep the soil from washing away.

Their soil conservation ideas include leaving strips unplowed with native vegetation cover, and building retaining walls of stone along contour lines through the fields. The walls are reinforced by planting maguey. Indian farmers also block gullies with stone walls, built in series like stairs, to break the rush of water during heavy rains. The Indians are often late with their precautions, and complain that "The soil runs off our fields like grease off a hot griddle."

"A steep field may last two to five years, and then it has to be rested for a long time or abandoned," said Miss Reh. "The Mixteca is typified by barren eroded hills and mountains, probably despoiled by man."

Evidence of the ancient Indian struggle against soil erosion is found on mountain sides, which are marked from the top down by ridges like stairs, banked by stones, by means of which the Indian lords, soldiers, and common people were able to farm.

Science News Letter, January 8, 1938

Thousands of alder bushes are being planted in the Swiss Alps to check the snow from sliding down in avalanches.