

OCEANOGRAPHY

Probe Pacific Depths

Floor of the Pacific, which has been supposed to be quiet and unchanging, now found to have been the scene of tremendous activity. Mountain range discovered.

By MARJORIE VAN DE WATER

► THE supposedly quiet, unchanging depths of the Pacific Ocean floor have been the scene of tremendous activity not so long ago, geologically speaking.

Mountain ranges have been pushed up from the ocean bottom, volcanoes have erupted, mountain peaks have sunk into the sea and super-skyscrapers have been patiently built up, inch by inch, by tiny marine organisms to a height that makes the Empire State Building seem microscopic.

These were a few of the varied findings of a joint expedition of the Scripps Institution of Oceanography, the U. S. Navy Electronics Laboratory, and three other scientific institutions under the leadership of Prof. Roger Revelle. On this expedition the Pacific was explored from the stratosphere above 100,000 feet altitude down to 20,000 feet below the surface of the sea.

Perhaps the most important discovery of the expedition was an undersea mountain range. This extends at a 120-degree angle to the Hawaiian Island chain for a distance of more than a thousand miles, the highest summit reaching 14,000 feet from the sea floor, but submerged under about 2,700 feet of the Pacific's waters.

Peaks Flat on Top

Most of the peaks are flat on top. This shows that they were once eroded or worn off by wave action in shallow water. That was before they had sunk to their present depths.

Further evidence that these submerged peaks were once in shallow water is pro-

vided by specimens dredged from their tops—clam shells, snails and sea urchins, reef coral. These creatures cannot live in the ocean depths; they are shallow-water organisms.

Could they have been submerged by rising waters caused by an accumulation of sediments on the ocean floor? The answer to this is given by measurement of the thickness of the sediments made by Prof. Russell Raitt, one of the members of the expedition. Seismic refraction techniques showed that the sediments are from 1,500 feet to 3,000 feet thick. So this would not account for thousands of feet of sea water over the top of the highest peaks.

Volcanic Activity

Cores drawn up from the ocean bottom by a recently improved technique showed that just a few feet beneath the surface of the sediments you can often find layers of volcanic ash. That means that in recent times, speaking geologically, volcanoes have been erupting in the depths of the sea. In each core the ash layers are different in thickness and in depth. Consequently the ash must have been thrown

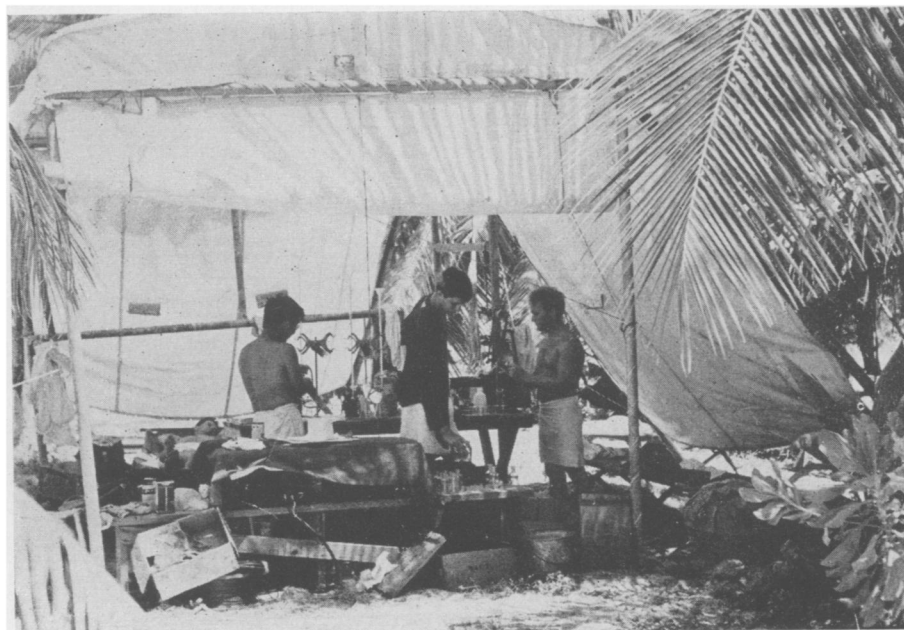
out by different volcanoes at different times.

Bikini Atoll, scene of the atom bomb test explosion, is built on an ancient undersea volcano. So is Kwajalain Atoll. The volcano is topped by a fantastic structure built of the discarded skeletons of coral and other animals. As the volcanoes sank gradually beneath the waves the coral structure kept up with the rising waters, always staying just at the surface. Eventually there arose an underwater skyscraper several thousand feet tall; Kwajalain Atoll is the largest structure ever erected by living creatures.

Coral chunks were found that, like all the rock on top of the sea mounts, were covered with a thick layer of manganese. Now, there is practically no manganese in sea water. So how did thick layers of manganese build up on the sea floor? That is a puzzle to scientists.

Typically, the metal is in the form of round, rough balls, about the size of a walnut, of nearly pure manganese dioxide. Inside the nodules there is always a nucleus of something else. Sometimes it is a pebble of volcanic rock, sometimes the ear bone of a whale or the tooth of a shark. In some cases the teeth are from sharks now extinct.

Another surprising find in the cores drawn up from the deep sea bottom were bacteria. There were as many as 10,000



BIKINI LABORATORY—On this volcano-based coral island, working under primitive conditions and in great heat, specialists sorted the sea water samples taken from the Pacific's depths.

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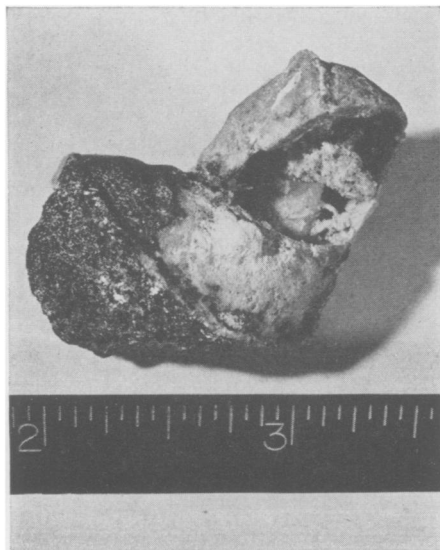
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BIG SNAIL—Showing a layer of manganese accumulated on the shell.

bacteria per cubic centimeter near the surface and practically the same concentration 10 to 20 feet below the surface.

There is little if anything that the bacteria can nourish themselves on in the seabottom muds. So the bacteria may have lain there in a state of practically suspended animation.

When the scientists brought them to the surface in their coring apparatus and put them into a culture medium, they started to grow and multiply! These same bacteria were alive long before the first man walked the earth. After several million years in the mud of the sea floor, they still live.

With a new instrument developed by William Van Arx of the Woods Hole Oceanographic Institution, called the "jog-log," measurements were made every two hours of the ocean currents. Information about the currents near the equator was surprising.

The new instrument works on the principle that the motion of sea water through the earth's magnetic field sets up an electrical current. This current can be measured

by trailing two electrodes astern of the ship.

The northern equatorial current, between 10° and 15° north of the equator, does not flow directly from east to west, it was found. Instead it flows toward the southwest. And the equatorial counter-current, which has been supposed to flow directly west to east, actually flows about 40° south of east. Farther south, within 6° of the equator, the direction of the current again swings around to the southwest.

Prof. Revelle gives two possible explanations for these new findings, both representing new ideas in oceanography.

Either the currents are sinuous, he deduces, and meander across the ocean like a tortuous river. Or else there is a series of giant eddies in the equatorial region, with diameters of a thousand miles or more.

Another means of bringing knowledge from the deep was an instrument in the form of a two-pronged spear. With this a series of temperature measurements was made. These twin measurements made it possible to calculate how rapidly the earth is cooling off, that is, how fast the heat is flowing from the earth's interior through the rocky crust.

Science News Letter, March 3, 1951

ORNITHOLOGY

Bird Believed Extinct Discovered in Bermuda

See Front Cover

➤ THE DISCOVERY of the Bermudian cahow—a bird widely believed extinct since 1625, was reported by The American Museum of Natural History.

Proof of the existence of this mysterious oceanic bird, a petrel, was uncovered during a recent search in Bermuda conducted by Dr. Robert Cushman Murphy, Chairman of the Department of Birds at the museum, Louis L. Mowbray, Curator of the Bermuda Aquarium, David B. Wingate, and Mrs. Murphy.

The group has captured five live cahows and counted at least 17 burrows in rocky crevices where the cahow nests, thus indicating that more still survive, Dr. Murphy reported. Other examples of unknown number were heard and seen at night over the nesting islets.

The cahow is a rather docile bird, about the size of a pigeon but possessing longer wings. It is grayish-brown on top and has a white underbelly. He also said that its curved beak is black and its eyes are ringed by black feathers.

It has been a prevalent belief, according to Dr. Murphy, that the cahow became extinct largely because of a shortage of food in Bermuda between 1609 and 1621. He stated that history records that groups

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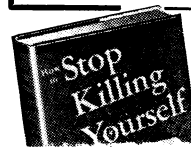
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