

GEOGRAPHY

Geographical Guinea Pig

Scientists from all fields will study results of the atomic bomb test at Bikini on land, in the sea and in the air for many years to come.

By MARTHA G. MORROW

► BIKINI ATOLL, one of the least known island groups in the world until the proposed atomic bomb tests brought it into the limelight, by the end of June will have been as thoroughly scrutinized as any spot on earth. Plants and animals on the island, fish in the lagoon and surrounding ocean, geological formation of the island itself, wind and currents—all are being extensively surveyed prior to the atomic bomb tests to be held during the coming summer.

Until a year or two ago little was known about these palm-covered bits of land in the atoll. The only detailed maps of the region were those captured from the Japanese. Vessels that might have brought back reports on the atoll and surrounding waters were forbidden to

go near this or any other atoll of the Jap-mandated Marshalls group.

To biologists these atomic tests, which will drastically reduce all life in the area, offer an ideal man-made opportunity to study how new life is introduced to a region. After the test, biologists will return periodically to explore the possibility of life having survived the explosion and to study new types of life as they appear on the atoll. But first they must know what life exists there today, so the snails, clams, crabs, lizards, lagoon fish, terns and frigate birds are being carefully catalogued.

Not only is Bikini being thoroughly investigated, but neighboring atolls as well. Currents in this region flow in the direction of the Philippine Islands and Asia. Thus Eniwetok atoll, which is down current and might possibly be contami-

nated by powerful radiations due to the explosion of the atomic bomb, and Rongerik atoll, which is up current and probably won't be contaminated, are both being scrutinized.

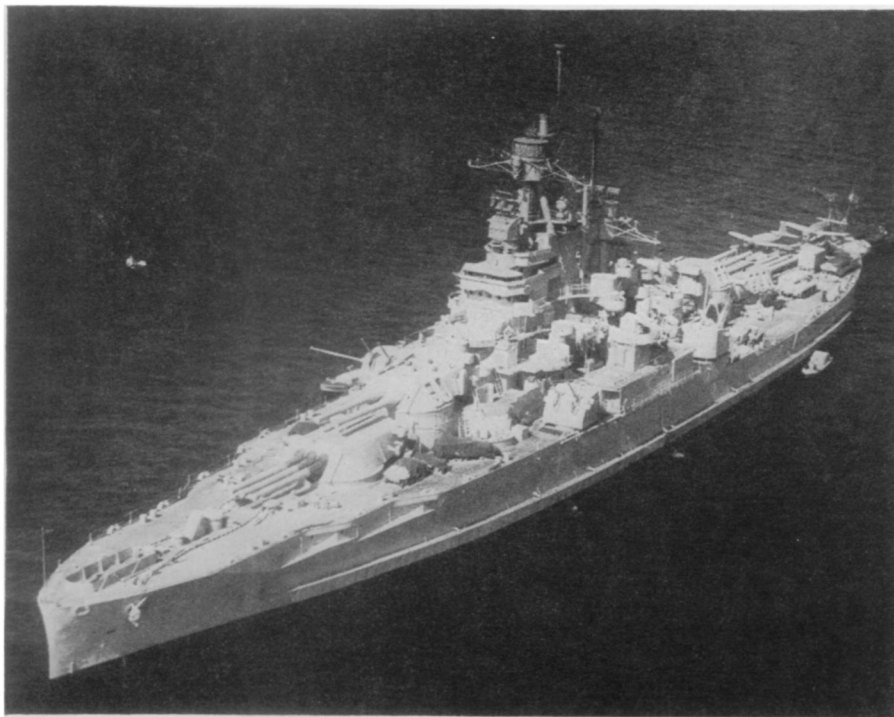
The worst that could happen is that every animal on the island will be killed. Then if larvae from neighboring islands could not survive the long trip, life there would fail to return to the island afterward unless imported by man. On the other hand, if some animals survive the terrific explosions of these devastating bombs, new species due to the powerful radiations may develop. Certainly if a new type of life is begun, scientists want to be present at its birth.

The soil on Bikini is generally too poor for agriculture. Coconut palms are about the only trees, but there are also some pandanus, breadfruit and papaya. Among food plants, arrowroot is of considerable importance; taro and yams are somewhat less common. A strip of *scavola* bushes generally grows as a mangrove thicket along the water's edge. The extent of damage to plant life and how long it takes for the island to regain its vegetation will be determined by precise and long-continued surveys.

When the atomic bomb bursts over Bikini atoll, a lot of fish will undoubtedly be killed. Marine biologists, with the assistance of a corps of expert fishermen, will study the effect of the explosion on fish inshore, in the lagoon and in the open ocean. Reef fish, upon which the natives lived, are expected to suffer, but life in the open ocean probably won't be affected much.

Early objections to the bombing experiments, on the score of possible material harm to commercial fisheries and the whaling industry, have been overcome by the selection of Bikini atoll as the site. The fish here, though abundant enough, are too far from any possible market to be of economic significance, and the little coral island is remote from all known paths of whale migration.

To study where water containing the radiant materials will drift, a contamination survey is being planned. Tests will show the amount of radiation in the water near the atoll and also some distance from it. This will help determine how soon people can safely return to the region. The irradiated particles will also show the path followed by the ocean



Joint Army-Navy Task Force One photograph.

BULLSEYE FOR ATOMIC BOMB—Glistening in her new bright orange-red paint is the USS Nevada which is to be the center target for the joint Army-Navy atom bomb test at Bikini. First of the Navy's oil-burning super-dreadnaughts, the Nevada is a veteran of 30 years' service. Although now declared obsolete, the splendid lines which made her famous are still unspoiled.

currents in this region, concerning which little is known at present.

There are over 20 islands in the atoll, of which Bikini is the principal one. This coral ring, 21½ miles long, is about 2100 miles from Honolulu and 2450 from Yokohama. The 167 men, women and children living on the island, of Melanesian and Chamorro extraction, consented to be moved to a previously uninhabited island 109 miles east, in the Rongerik atoll.

Atoll of Live Corai

An atoll is formed from a bed of live coral which is thought by some scientists to have been built upward gradually from submerged mountain peaks that at some time in the geological past rose close to the surface of the sea. Presumably because the coral polyps at the edges of the bed, and particularly to windward, receive more food, they build more rapidly and form an irregularly circular reef of live coral surrounding a shallow lagoon. The maximum depth of the Bikini lagoon is about 200 feet. The bottom is flat and sandy except where cones of live coral rise to or near the surface.

By breaking off fragments of coral and carrying them inward, the waves have created islands here and there around the reef. Elsewhere the reef, typical of atolls, rises only to or near the surface of the sea at high tide, and is broken at one or more places by passages through which the tides flow to and from the lagoon.

Geologists hope to find the depth of the coral layer through the atomic bomb explosion and to determine definitely whether the peak upon which the atoll is built is of volcanic origin. After an explosion has been set off, much can be told concerning the type of material through which the vibrations travel by clocking the time needed for them to be "echoed" back to the surface by the various layers.

Waves near the explosion are expected to be several scores of feet high but the



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wave height will rapidly decrease much like the height of ripples when a pebble is dropped into a pond. Thus, the waves will probably not break over any of the islands in the atoll even though the highest point on any of these is only about ten feet. "Wave people" are on the scene to measure the height, wavelength, and speed of the waves with instruments, cameras, echo-sounding machines, and television.

Unanswered questions include how such waves would act and how much surrounding islands would interfere with their normal course. All the instruments set up to measure the waves are remote-controlled so that the people in charge will be a long, long way off.

Participating Agencies

A number of institutions are taking part in this scientific survey. They include the U. S. Navy Hydrographic Office, the Woods Hole Oceanographic Institution, U. S. National Museum, the Fish and Wildlife Service of the U. S. Department of the Interior, the U. S. Geological Survey, and the U. S. Coast and Geodetic Survey. The University of California through its College of Engineering and the Scripps Institution of Oceanography, the University of Southern California and the University of Michigan will also be represented. The U. S. Navy Electronics Laboratory at San Diego, the Geotechnical Corporation of Boston, the U. S. Navy Mine Warfare Test Station at Solomon's Island, Maryland, and the Bureau of Ships of the Navy Department will also cooperate in the study.

Two ships belonging to the U. S. Navy's Hydrographic Office are on the scene. Complete floating laboratories, the *USS Sumner* and the *USS Bowditch*, include all the equipment necessary to survey the area, test ocean currents, take the temperature of the water, identify material on the ocean bottom and study weather conditions. Both are stocked with all the apparatus needed to design and print maps on the scene. In addition, six smaller ships are being employed.

As this area will probably be the center of scientific investigation for years to come, the results of these surveys will be coordinated and published by the newly-established Division of Oceanography of the Hydrographic Office, so that all known information on this closely-scrutinized geinua pig will be available.

Science News Letter, June 1, 1946

INVENTION

Electric-Eyed Machine "Inspects" Plants

➤ A HOEING MACHINE, designed for thinning and weeding operations in such crops as sugar beets and cotton, "inspects" the plants with an electric eye before it chops out weaklings and weeds, sparing the stronger, more promising specimens. It is the invention of Leo A. Marihart of Monterey County, Calif., who has just been granted U. S. patent 2,400,562 on the device.

Mechanical cotton-choppers and beet-thinners have been invented, but they have the weakness of being entirely mechanical. They knock out predetermined spaces in the rows of young plants, and it is a matter of chance if they spare the right ones.

In Mr. Marihart's invention there is a revolving set of blades that block out whole segments of the line. Following after it, however, is another set of blades whose action is intermittent; they swing round and clip out finer bites of soil and roots only at the bidding of photocells that "look" at each plant through light filters and "decide" whether it is a weed or a desirable citizen of the crop community.

Science News Letter, June 1, 1946

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