



GASOLINE BOMB SHELTER—This is an “inside” view of one of the vast concrete tanks now being built far underground at strategic coastal points and naval outposts to protect from bomb damage millions of gallons of aviation gasoline and diesel fuels. Everything in the tank is lined with synthetic rubber sheets.

ARCHAEOLOGY

Archaeological Year

First definite evidence on many historical questions unearthed in South American countries by expeditions of the Institute of Andean Research.

➤ “ARM-CHAIR brooding or treasure hunting of the past has been almost entirely replaced by highly evolved excavation technique combined with exhaustive and exact historical research,” Dr. William Duncan Strong, director of the Ethnogeographic Board, told the Anthropological Society of Washington in their first meeting of the season. In support of his statement, Dr. Strong presented the findings of the Institute of Andean Research program for 1941-1942.

Supported by the Art Committee of the Coordinator of Inter-American Affairs the brief archaeological program of the Institute of Andean Research stands out as the widest activity in a single year in the history of Latin-American archaeological research, Dr. Strong said. Some of the “firsts” unearthed by this

archaeological program are as follows:

Venezuela and the West Indies: The first definite evidence of the relationship in pottery styles between the mainland of South America and the islands of the West Indies was obtained.

Colombia: Baths cut out of the bed rock of a shallow stream were found, no doubt the forerunner of the modern sunken bath.

Southern Highlands of Peru: A number of important pre-Inca sites in the Cuzco region were discovered and some of the recorded or vaguely known sites restudied. Inadequate plans of the famous Temple of the Sun will now be replaced by an accurate large-scale plan drawn up by members of the Institute.

Central Coast of Peru: Rich textiles with complex designs which should stimulate not only scholarly interest but the appreciation of artists and designers all over the world were brought to light. Several early civilizations were discovered, including structures containing simple altars that apparently represent the earliest temples yet known in coastal Peru.

Northern Coast of Chile: An unusually complete record of a long period of human occupation was obtained. Evidence shows that the coast or desert area was first settled by a simple fishing population, using two types of fish-hooks, one cut from shell, the other a composite hook; bowls cut from lava; barbed harpoons with pressure-flaked stone points; and coarse percussion-flaked stone tools. A sharp break in the cultural pattern implies the arrival of a second non-agricultural fishing population utilizing distinctly different equipment. Then the introduction of agriculture, marked by simultaneous appearance of corn, cotton, gourds and perhaps beans, is accompanied with the first use of pottery, textiles and coiled basketry.

Mexico-United States: Exact relationship between prehistoric cultures of Mexico and those of the Pueblo and lower Mississippi areas in the United States has for some time been a problem worked on by both North Ameri-

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can and Mexican archaeologists. The Institute of Andean Research excavations in both eastern and western Mexico are significant in this regard, Dr. Strong declared. Excavations near Tampico give promise for the first time of linking early levels on the east coast of Mexico with those of the lower Mississippi valley.

American food plants feed a large part of the modern world, and their history is more than coincident with the rise of both ancient and modern

civilizations. Although the expedition secured ancient plant materials which may aid in solving basic problems of plant genetics, the comparative study of these and many other cultural materials awaits the time when American scientists can once more concentrate upon the arts of peace, Dr. Strong explained.

He further predicted that in the post-war world cooperative research along archaeological and other scientific lines will surge forward in all American republics.

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ORDNANCE

Cannon-Testing Chamber

Construction which contains compartments that can be regulated for temperature and pressure to simulate stratosphere ready to test aircraft guns.

► A STRATOSPHERE chamber to test new heavy caliber aircraft cannon will soon be ready for its first trial at the proving grounds of the Army Air Forces at Elgin Field, Fla. It occupies a 50-foot space and provides a 22-foot range for the projectiles.

The chamber is similar in general construction to stratosphere chambers used to test instruments and engines. The temperature in it can be lowered from 70 degrees above zero Fahrenheit to 70 degrees below in less than 12 minutes. At the same time the air pressure may be reduced from sea-level pressure, 14.7 pounds per square inch, to 2.2 pounds. By its use conditions encountered in ascending from the earth at an ordinary temperature to 40,000-foot altitudes may be simulated.

This particular stratosphere chamber for testing guns has three compartments. Its total length is 50 feet. The first compartment takes enough of the interior space to hold an aircraft cannon with its barrel projecting through into the second compartment, which is 22 feet in length. The third compartment is a sandtrap chamber of reinforced concrete holding 20 tons of sand.

When a cannon is to be tested it is put in place in the gun compartment. The chamber is sealed, and the temperature and the pressure are lowered, simulating atmospheric conditions being met by a warplane rising from the earth into the stratosphere. When the conditions of a desired altitude are obtained the cannon is fired. The shell

passes through the 22-foot compartment and through a port-hole into the sand-trap.

The changing conditions encountered in ascending to a high altitude cause a terrific shock contraction to all metals, many of which contract at different rates. It is important to know how this effects firing mechanisms and gun barrels. Also the lack of oxygen and sub-zero weather have an effect on the detonation and speed of the projectile. These essential matters may now be studied by use of the new stratosphere chamber. In the past they have been determined only in actual combat.

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ENGINEERING

Vacuum System Devised For Shoal-Water Propeller

► LANDING BARGES and other shoal-water craft have their propellers completely protected, and yet given the benefits of deep-draft "bite" in the water, in a unique construction system devised by George G. Cooke, New York inventor.

The propeller is mounted above water-level in a slope-sided well rising into the central part of the hull. Above the highest point in the well is a narrow standpipe, connected to a vacuum pump driven by the engine. The standpipe may be of any height up to 28 feet, the limit to which atmospheric pressure at sea level will lift a column of water.

When the pump is in operation, water is pulled up into the well and the standpipe. The propeller acts on this mass, which has properties of water as deep as the column in the standpipe is high. It is good, "solid" water, instead of being "full of holes" and hence an unsubstantial basis for the propulsion thrust, as water near the surface frequently is.

Several other advantages are claimed by the inventor. The propeller is always up out of harm's way, even if the boat runs over sandbars, logs or other submerged obstacles. If grounded, the reversed propeller digs the boat free by hydraulic action of the forward-pushed current. The water mass in the well seems to act as a sort of inverted center-board, increasing stability.

Adjustments and repairs on the propeller are easily made, Mr. Cooke states. Since the center well drains when the vacuum system is not operating, it is merely necessary to open a manhole and go to work, without having to fumble around a submerged propeller or dry-dock the boat. Patent rights in Mr. Cooke's propulsion system are vested in the Shallow Water Boat Company.

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SCIENCE SUBJECTS Gain NEW Interest



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