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.

Science News Letter, October 30, 1943

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 centerboard, 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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