ARCHAEOLOGY

Excavation, Sea Style

A wide variety of scientific techniques are being combined to help uncover sunken ships and cities in an effort to bring to light another corner of man's history.

➤ A MELTING POT of modern sciences is helping to locate, excavate and preserve the remains of ships which met their violent fate on the ocean bottom many years ago.

Octopii have been enlisted to draw cargo up from the sea depths. The aqualing was developed to make man more at home in the largely unexplored medium of the sea. Lifting techniques have been developed to remove ancient ships from their underwater graveyards and modern chemistry is being used to preserve the structures and what they contain in order that they may be observed and studied in museums and laboratories. History and land archaeology have been invited to locate and analyze the place of shipwrecks in history.

A step toward making man mobile in the undersea environment was taken when Jacques-Yves Cousteau, then a lieutenant commander in the French Navy, arrived at a synthesis between the brief liberty of the unaided dive and the laboriousness of the dive with suit and helmet. He developed the aqualung, a self-contained air supply which would supply air at the same pressure as the surrounding water. But this was only a step.

Problems Encountered

Two more related problems had to be solved. The first was to reduce the danger of the bends, a condition which arises when the pressure of the nitrogen in the blood is let off too suddenly, causing sometimes-fatal bubbles to form in the tissues of the body.

This can be overcome by what is called stage decompression but it is a time consuming process. Work underwater is already slowed by the medium itself to say nothing of the time spent carefully mapping any archaeological site.

Also nitrogen under the pressure to be found at great depths has a dangerously narcotic effect. One diver encountering the euphoric feeling it produces could hardly keep himself from removing his air mask and giving it to the fish so that they might breathe. This has been partially overcome by substituting helium for the nitrogen but helium causes speech complications, making a man's voice sound somewhat like Donald Duck's. It also saps body heat.

But a solution is in sight—the two man submarine Asherah, built by the Electric Boat Division of General Dynamics for the University Museum of the University of Pennsylvania. Designed for great maneuverability, the craft can descend safely to 600 feet, remaining for as long as 10 hours at a time. Many undersea shipwrecks, lying in 200 to 300 feet of water, will be excavation material for the sub. Mapping of the wrecks will be done with three-dimensional photography. The submarine was tested last summer in the Mediterranean by George Bass of the University Museum.

Electronic devices such as magnetometers are aiding in the search for underwater vessels. Induction detectors may be used underwater to survey in detail a wreck already located. Some can detect the presence of any electrical conductor up to five feet away.

Many of the mapping techniques are similar to those used in land archaeology but lifting and site cleaning methods have presented a special problem to underwater archaeologists (who are incidentally a new breed of animal. In the past, few archaeologists knew how to dive and relied on divers with little or no conception of the necessity for delicate and precise observation and excavation).

"Airlifts" are used to remove the mud and silt covering a site, but with caution because of the potential damage they may do to material underneath. The airlifting device consists of a tube into which a jet of air is blown from the bottom upward, sucking sand, mud and small objects up with it. Large objects are frequently lifted to the surface by attaching them to balloons which are inflated on the bottom and allowed to float to the top.

Once objects destined for preservation have reached land, they are cleaned and often treated with a coating of plastic or wax.

University of Pennsylvania

DRAWING IN THE DEEP—The undersea artist is Claude Duthuit, of the University Museum staff at the University of Pennsylvania, using a pencil and a piece of frosted plastic to chart the positions of relics from a Bronze Age shipwreck. Only after making his "map" will he remove the objects for further study—a rule first learned by archaeologists on land.

Myth of Atlantis Queried

Though the myth of Atlantis is not likely to be borne out, at least two cities are known to have tumbled into the ocean as results of earthquakes and are valuable partly because this was the way they met their doom.

The town of Helice mentioned in the "Iliad" was destroyed in 373-2 B.C. by an earthquake which leveled the temple of Apollo and other Delphian monuments and was immediately afterwards submerged by the sea. Port Royal, Jamaica, was dumped into the ocean by an earthquake in 1692, much later to be excavated by an expedition sponsored jointly by Edwin A. Link of the National Geographic Society and the Smithsonian Institution.

Though there are evidences of the ruins of cities around the edges of seas and islands, resulting from a gradual settling of the earth's surface, the sea is primarily used by man as a tool in one of his most important activities—trade. The most important underwater archaeological discoveries will most probably come from painstaking excavation of shipwrecks. With careful and precise analysis these will lead to a better understanding of the trading routes and the substance of the trade of the ancients.

Few examples of ancient ships have been uncovered on land. Even the draining of Lake Nemi in Italy yielded only a few showboats designed for a king's pleasure.

But here lies a built-in difficulty. Ships were built to reach their destination and it may well be that the weakest and least important ones will succumb to the sea. It seems amusing, for example, that the oldest ship ever found and excavated, dating from 1200 B.C., appears to have been a junk ship, carrying a load of old (even in the junk dealer's time) metal objects. The tools and other artifacts discovered on board seem to have been broken before the ship left port. The shipwreck occurred off Cape Gelidonya, Turkey, and was excavated by a team from the University Museum.

Another difficulty is that prospective archaeological sites can be found in areas where dangerous reefs can be expected to have intercepted many ships in times past. One such archaeological "omelet" is located off Yassi Ada, Turkey. About 15 wrecks are piled up there, but when a wreck strikes a shallow reef, its contents scatter and it becomes mixed with the material from other wrecks.

The best-preserved wrecks of the group are those which managed to sail on for a

few hundred yards after the initial blow and settled in preservative mud and fine sand. Parts of their cargoes of pottery were left exposed to the sea and they were discovered in precisely this chance position by sponge divers engaged in other work.

It is difficult indeed to locate shipwrecks on the basis of old records of the wrecks if any are available and the "archaeological omelets" yield little that is of value so the "science" has often been left partly to chance.

Underwater archaeology began developing when chance art finds caught up in a fisherman's net or brought to the surface by Mediterranean sponge divers were brought from the sea to be evaluated by land archaeologists. The bronze bust of Demeter now in the Izmir Museum in Turkey was hauled in from a shipwreck in a sponge diver's net, as were a bronze statue of a Negro youth and a statuette of Fortuna and many others. The wrecks which yielded these prizes lie in 200 to 300 feet of water.

But these finds were all taken "out of context," and thus could mean little more than the finds themselves, though a great many of the important Greek bronzes to be found in museums today have been rescued from the sea in just this way (fishermen's nets).

Even the famous Elgin marbles, the Parthenon friezes now in the British Museum, were sent to the depths, though in modern times, when one of the ships transporting them succumbed to the ravages of the sea. It was three years before they were rescued.

During the next stage of its development, underwater archaeology reaped the benefits of this aqualung, but the salvage approach to archaeology continued.

Romans May Have Prefabricated

A ship had gone down in the water off Mahedia, Tunisia, carrying a shipload of Greek columns. The Romans may have been transporting ancient Greek temples as we transport ancient Scottish castles and French chateaux. The Romans erected buildings of uniform style wherever they settled and this prefabrication idea may help to explain it.

But the ship which carried the columns was neglected in favor of the treasures aboard, and was not studied in enough detail to help better substantiate this archaeological hypothesis. It may be that the vessel was bringing part of a plunderer's booty back to Rome from Greece.

A Japanese ship went down at the time of World War II. Some of its contents were of value but it had fallen into such deep waters that its was then inaccessible to man. But not to an octopus. Octopii have a tendancy to get themselves into tight places and squeeze against the sides if attempts are made to remove them. A number of these creatures were tied to lines and let down to the level of the vessel. They squeezed themselves into the containers on board and were brought to the surface, thus salvaging some of the ships contents.

However, undersea archaeologists will soon be as comfortable in their "diggings" as their landlubber counterparts are in theirs. New tools for exploration and recovery, together with a new philosophy of scientific caution, will make the difference.