

8,000 Years Under the Sea

Those cities beneath the sea that Jules Verne wrote about so memorably were, of course, totally fictional. But underwater archaeologists have long known that sunken cities, hidden under mantles of sea sand, are a very real fact of the ocean-bottom habitat.

Occasionally, a furious storm scours the ocean floor, strips away the sand mantle and reveals – however briefly – one of these long-submerged settlements.

One day in 1984, just such a storm raged in the waters off Atlit, a town on Israel's northern coastal plain. When the churning subsided, divers found, 1,320 feet offshore and 29.5 to 40 feet down, the partially uncovered ruins of an 8,000-year-old pre-Pottery Neolithic B settlement.

This onetime farming settlement, known as Atlit-Yam, proved to be the earliest, largest, deepest-down submerged prehistoric site ever discovered in the Near East.

The Atlit "dig," led by diver-archaeologist Ehud Galili, is today still going strong. The team is daily retrieving an archaeologist's treasure trove of human skeletons, farming and hunting implements and house foundations.

One skeleton is apparently that of the earliest known skin diver – complete with evidence that he suffered, 8,000 years ago, from auditory exostosis, an ailment common among present-day scuba divers.

So far, the Atlit team has been lucky: though minor storms have "blown" sand back across a few of the buildings already studied, most of this rare site is still quite clear and accessible.

It seems likely that many ancient settlements "drowned in the depths of the sea" are uncovered temporarily by storms, but never come to the attention of archaeologists. Fortunately, the Atlit site was discovered, quite coincidentally, during an underwater survey project being conducted since 1983 along the Carmel Coast of Israel. This project, still ongoing, was being undertaken by the Center for Maritime Studies, Institute of Archaeology and Maritime Studies, Haifa University. The excellent preservation of the site has provided us with a wide range of finds.

Underwater archaeological sites have been known along the Israeli coast for some time but these, for the most part, belong to the later historical periods: from the Bronze Age on. It is only in the last 20 years that earlier occupations from the Neolithic and Chalcolithic periods have begun to be recorded as a result of sand quarrying projects and construction of offshore facilities



A diver inspects a mysterious stone mound or tumulus at the underwater site. Below, a recovered lower jaw showing severely worn teeth.

such as breakwaters. These activities have caused changes in the equilibrium of the sands covering the near-shore sea bottom. Displacement of the sands, generally caused by intense storms, exposes the clayey sea floor. It is during such exposures that man-made remains have been recorded. These include the remains of wrecked ships and cargoes as well as submerged prehistoric settlements such as the village at Atlit-Yam.

Unfortunately, those forces that allow for the discovery of such sites are the very ones that create difficulties in mapping, collecting and excavating. The continually shifting sands may cover a site within a few hours, just as quickly as it is exposed. Also, during these short exposures a site can be eroded rapidly and be damaged by the high energy of the ocean currents and breakers. Thus it is necessary to locate and document the sites as quickly as possible.

To date, only a small portion of the Atlit-Yam village, an area of 330 feet by 990 feet, has been exposed and surveyed. But already a great deal of information has been gathered, and we can now begin to develop a picture of this Neolithic community.

The village was established on the south bank of Nahal Oren stream near its ancient outlet to the Mediterranean Sea. The settlement was situated in a small valley bounded



on the east and west by sandstone ridges which parallel the present coast line. At the time Atlit-Yam flourished, the shore line was about 1,000 feet from the village, just beyond the western ridge. The surrounding environment consisted of oak forest, marshes and open areas

which provided arable land and pasture.

The village contained a number of dispersed structures, 12 of which have been recorded in the exposed area. Four of these are the remains of houses and the others are various types of installations including walls, pavements, enclosures and pits. One of the houses has been completely exposed and is typical of the others found. Rectangular in shape, the building measures 30 by 17 feet and is constructed of large, undressed stones. Additional attached walls suggest exterior rooms or courtyards and there are two small alcoves at the north end of the structure. Floors are hard-packed clay, rubble pavements, or slabs.

The remains of a small hearth were recorded in one of the northern alcoves. Buried in the other alcove was the skeleton of a 17-year-old girl. Several feet to the north of the house, adjacent to a stone pavement, was a double-burial site containing an adult male and a three-to-four-year-old child. Also in the vicinity of this house were found additional walls, floors, hearths, flint imple-

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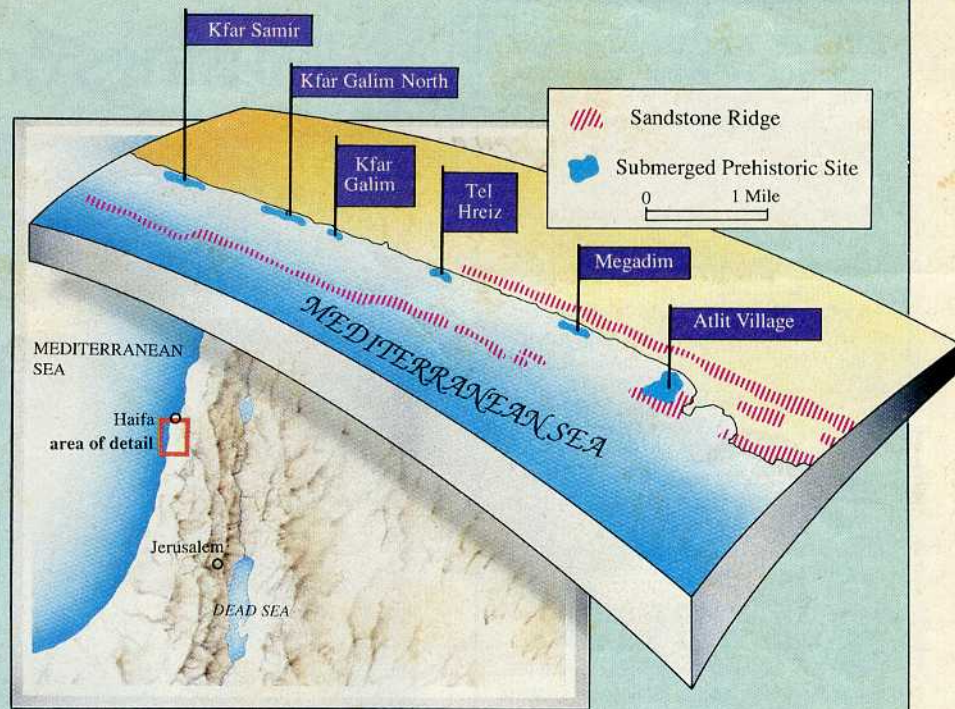
ments, grinding stones and animal bones. Interestingly, no artifacts other than a single bone tool were found within the building. This fact suggests that most activities took place outside of the house.

Other structures at the site, most of which are free-standing walls, are difficult to interpret. One of these walls, built of fired red bricks and at least 65 feet long, is oriented along an east-west axis, paralleling the direction of the ancient channel of Nahal Oren which is several feet to the north. There is a possibility that this wall was intended to protect the village from the river's seasonal floods, but this remains to be further investigated.

As for the economy of the village, the evidence strongly points to a heavy dependence on farming, together with hunting and exploitation of the sea. Among the flint implements recovered are many which can be related to agriculture: adzes, hoes, axes and sickle blades. Numerous grinding implements, such as mortars and pestles, attest to grain processing and eating. The discovery of grains of domesticated emmer wheat and lentils is direct proof of the importance of farming. The arrowheads found point to the continued importance of hunting. The absence of defensive walls seems to indicate there was no inter-community warfare, hence no hostile use of arrows.

The faunal remains so far identified consist mainly of cattle bones and horns, with some goat, gazelle, fallow deer and pig remains. The gazelle, deer and pig were definitely wild, but for cattle and goats, the picture is not so clear. Morphologically, the bones of these two animals suggest wild forms but there are other indications that they were indeed domesticated. First, nearly all body parts are represented, which is usually not true of animals that are hunted and butchered in the field. Also, there was a large concentration of cattle bones in the courtyard of one of the houses, many of them bearing cut marks and other signs of butchering. The preliminary interpretation is to view this area as an abattoir. Such a slaughter-pen would not have been needed if the animals were hunted and killed in the field. The evidence, however, points to the initial stages of animal domestication, just prior to when, after generations of breeding in captivity, genetic changes would have begun to manifest themselves in the animals.

The discovery of human burials, of course, is always of the utmost importance to the prehistorian and, to date, the remains of five individuals have been recovered from Atlit-Yam. These bones offer a



Israel's Carmel Coast showing the Atlit site. Other underwater sites being explored are from the Late Pottery Neolithic to the Chalcolithic periods.

wealth of information and provide insights into aspects of life in a Neolithic village.

In all cases, the burials are located close to the houses, which strongly suggests that, even after death, an individual was still considered a member of the household. Indeed, the double burial of a man and child indicates that family graves were situated near living quarters.

A number of the skeletons exhibit signs of disease and health problems possibly caused by dietary or other environmental factors. For example, tuberculosis and arthritis were common, as are indications of infectious disease, including those causing high fevers during childhood. Occasional bone breaks and cracks suggest traumatic injury as well.

Two of the skeletons exhibit an exceptionally high degree of dental attrition; their teeth are worn right down to the roots. The wear patterns, however, are not the result of eating or of dental disease; these people probably used their teeth for a task which still remains a mystery.

Worth highlighting here is the fact that one of the individuals found is probably the first known skin diver. In one ear is a small growth about the size of a match head. Today, it is known that such growths are the result of spending long periods of time in and under the water. The disease, called auditory exostosis, is prevalent among modern-day scuba divers. Just why this person spent so much time in the water

is still not known. However, the fish bones in the site may indicate that free diving was a means of fishing.

It seems, then, that exploitation of the sea played a vital role in the economy and daily life of these early farmers. However, while the sea contributed to the prosperity and success of the community it may, in the end, have been a major factor in the village's abandonment. At the time the village was lived in, the sea level was lower, and the coastline was about 1,000 feet to the west of the settlement. This lower sea level (about 45 feet below present sea level) was the result of huge quantities of water being trapped in the glaciers much farther to the north. Toward the end of the Pleistocene and beginning of the Holocene, as the glaciers began melting, sea levels began to rise slowly. At some point, with the encroachment of the sea, the shore was so close to the village that coastal dunes covered the area and continued habitation was no longer possible. Following abandonment, the village was submerged.

The excavation and study of the Atlit-Yam submerged village is an ongoing project. After each winter storm, when sea conditions permit, diver-archaeologists clamber into outboard-powered dinghies and head toward the site. Each new dive yields additional retrievals so that a clearer picture of this very important period in man's social and cultural development is slowly beginning to emerge. □