

## The Early Helladic Shipwreck at Dokos

Dokos is a small uninhabited island situated in the Gulf of Argos with the Peloponnese to the West and the island of Hydra to the East. Upon the discovery of the wreck in 1975 by Peter Throckmorton, a preliminary survey of the site's location in Skindos bay yielded favorable results. With a permit from the Greek Archaeological Service, Dr. George Papathanasopoulos and Nikos Tsouchlos of the Hellenic Institute of Marine Archaeology (HIMA), constructed a general plan of the area and a rough photomosaic that pointed out important features of the seabed. The pottery fit the typology of the Early Helladic (EH) period, dating to some two and a half thousand years B.C. A second survey was carried out in 1977 with the help of Haralambos Kritzas. After two days of the expedition, it was found that a short, conventional excavation would be impossible due to the amount of artifacts on the seabed as well as the steep, sloping gradient of the wreck site. It was not until 1989, when government restrictions were lifted and funding sufficient, that a full scale excavation with a twenty member team stationed at Dokos took place.

HIMA recently finished its third season of excavation at Dokos, and are engaged in an intensive conservation campaign in their lab constructed at the Museum of Spetses. Due to the amount of finds in need of treatment, with the addition of the lack of funds and man power, the work has been slow, but consistent. To increase productivity, all the finds are logged into a computer for easy referencing and research. HIMA is in the process of organizing excavations at Dokos for the 1992 season and continues to research and prepare the artifacts for a complete excavation report.

In view of the impracticability of using the conventional grid and survey method, mainly because of the steep gradients and irregularity of the seabed in the area of the excavation, HIMA turned to a new system, the Sonic High Accuracy Ranging and Positioning System, for mapping and plotting the positions of finds underwater. Yiannis Vichos heard of this system in February 1988 from the then president of the Institute of Nautical Archaeology (INA), Donald Fray.

Known as SHARPS, the system was designed by INA scientists for use in underwater excavations, mapping and plotting positions of finds on the seabed by employing an echo system for fixing the three-dimensional position of a point. The system consists basically of four transmitters- receivers, a control unit and a computer with at least

640k of RAM, a hard disk, the 8087 mathematics processor and a graphic screen. The transmitter-receivers are connected to the control unit and then to the computer by cables of up to 300 m. in length. Three of the transmitter-receivers are set solidly on the seabed at a maximum distance of 100 m. from each other so as to form a triangle. They act as receivers for the sound pulses transmitted at a fixed rate by the operation of a trigger; the latter permits the diver to decide and control the frequency and duration of the transmission. This transmitter is moved by the diver to the different points with a measured accuracy in the order of two centimeters at 100 m. The triangular grid employed is defined by measuring the distances between the three receivers A,B, and C on the inclined plane bounded by the lines joining each pair of vertexes, namely AB, BC, CA, and the depths  $h_A$ ,  $h_B$ ,  $h_C$ . The position of the transmitter (trigger) in relation to the three receivers is determined in the same way both horizontally and vertically: the receivers receive the transmitted signals and send them to the control unit, and the distance of the transmitter from each receiver is calculated from the time taken for the signal to be received. The three distances and the three depths are used to calculate the coordinates of the transmitter in the three dimensions x,y, and z in an arbitrary system of reference defined by the receivers. The calculations are based on the mathematical relationships resulting from the triangular grid and on the speed of the sound pulse through the water.

In addition to the SHARPS system, an extensive photographic archive was compiled. All phases of the excavation were photographed, from the set-up of the installations on land and in the sea to marked feature finds while still in place, after being raised, and before and after conservation work. To make a photographic plan of the site and the main bulk of the finds on the bottom, a stereophotographic frame was used. It enabled us, after the photographs had been correctly joined, to construct a simple photomosaic of the underwater site, and the same photographs were used for photogrammetry, to make an accurate scale plan of the site. The photomosaic is made up of partially overlapping photographs taken with a succession of exposures from the frame's first position. The stereographic frame was designed and used primarily by the president of HIMA, Nikos Tsouchlos, while the underwater photography of the work on the bottom and individual finds in situ were photographed by Kyle Jachney.

Upon early evaluation of pottery and other surface finds, the site was dated to circa 2200 B.C., or the EH II period, constituting the largest closed body of materials from the EH period. The clay vases are estimated to number more than 500; including most known EH pottery types. They include many of the deep spouted sauceboats in a variety of shapes and sizes, as well as cutaway jugs, shallow and deep bowls, also in a variety of shapes and sizes, amphorae, plates, cups, jars, askoi and pithoi, and household utensils and grinders. A preliminary examination of the pottery and an inspection of the many sauceboats suggest that the types resemble those from Askitarion in Attica (A.E. 1953-1954, 69, figs. 8-10, pl. 1), and the sauceboats compare to those from Lerna in the Argolid, Lithares in Boeotia and from the Cyclades.

If Dr. Papathanasopoulos' view that the Dokos sauceboats originated in Attica is confirmed, then the position of the wreck may lie directly on the maritime trade route from South Euboea to the Saronic and Argolid gulfs, ending at the Early Helladic center of Lerna. The importance of the wreck is enhanced by other finds: two fragments of the same lead bar might also point to an Attic provenance for the pottery, for it is known that the ore was being mined at Lavrion in the EH period. Two primitive stone anchors were also found, at a distance of forty meters from the wreck and in deeper water, precisely on the line the ship would have taken after entering the bay. The anchors may have been dropped by the EH ship just before she sank.

The thousands of obsidian blades, chiefly from Milos, that have been found at every Neolithic and Early Helladic site in Greece, on the mainland and the islands, are clear evidence of trade by sea in the distant past (7000-2000 B.C.). Thus, the cargo of the EH ship that was wrecked by the entrance to the small inlet on the island of Dokos may be considered tangible proof of sea trade in Greece and the oldest seafaring document so far to emerge from the floor of the Aegean.

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