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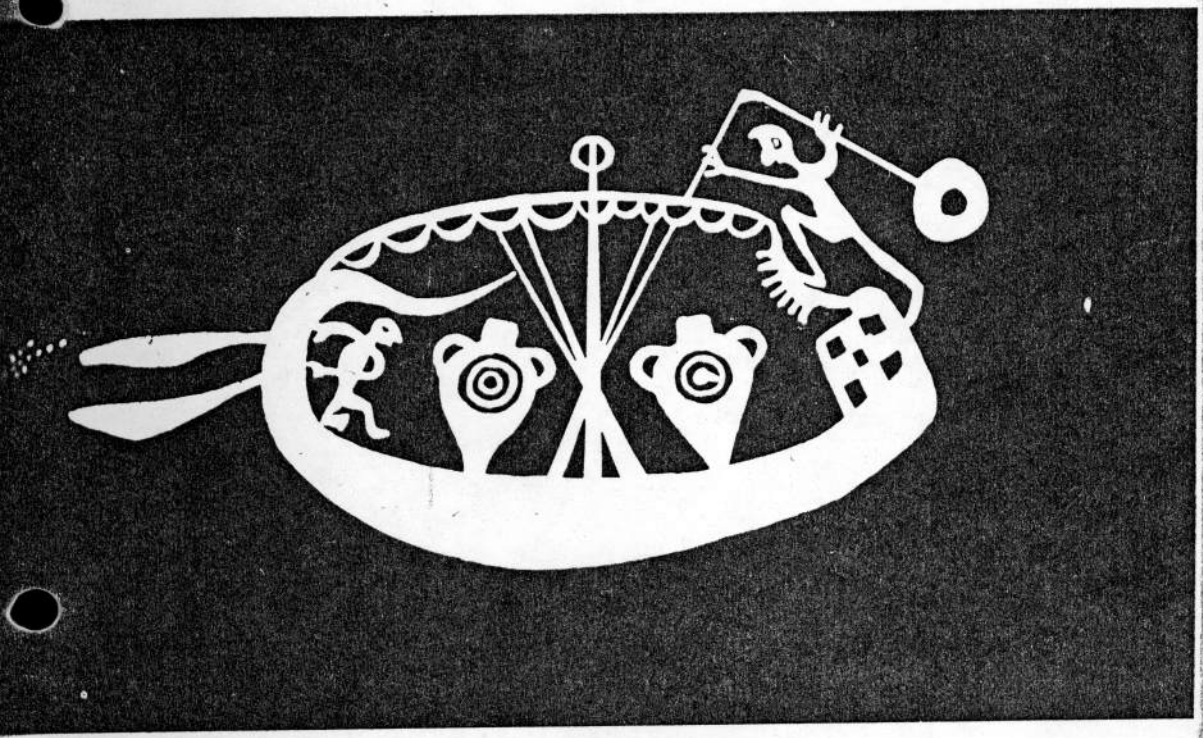
and Underwater Exploration



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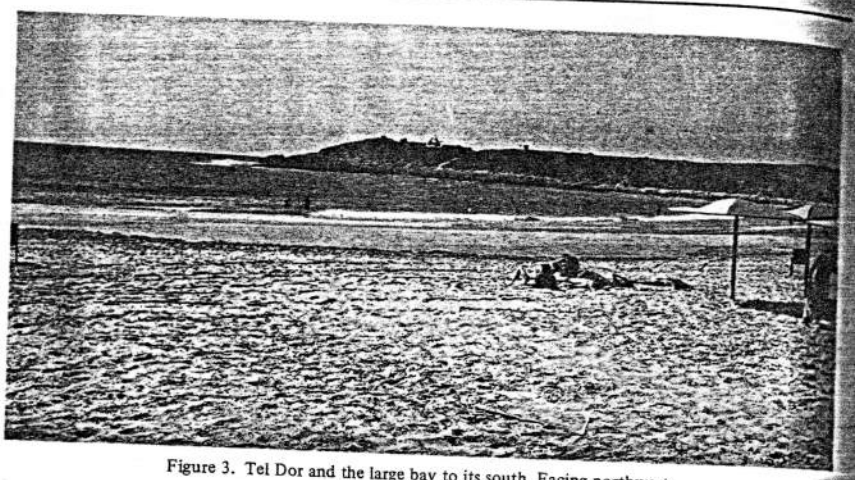

Figure 3. Tel Dor and the large bay to its south. Facing northwest.

tant and the necessary diving and boating equipment have been acquired.

The IDA's sea base is now located in a large stone building next to the ancient maritime site of Dor. This historic structure was originally built as a glass factory by Baron Edmund de Rothchild in 1893 for the purpose of supplying bottles to the vineries of Zichron Yaakov (Fig. 1). The manager of the glass factory was Meir Dizengoff who was later to become the first mayor of Tel Aviv. The plan was to use the local beach sand for the production of the glass, the harbour accommodation of the lagoon opposite Tantura, and the convenience of its proximity to Zichron Yaakov. Unfortunately, it soon became apparent that the local sand was of poor quality for glass production and subsequently sand was imported from Europe. This, along with other unexpected problems made the factory uneconomical and it was shut down in 1896. Since then the ruins of the building have stood empty forming a gracious local landmark.

Recently the restoration of the glass factory has been undertaken with the intention of

Figure 4. Anchor A47. Weight 100 kg.

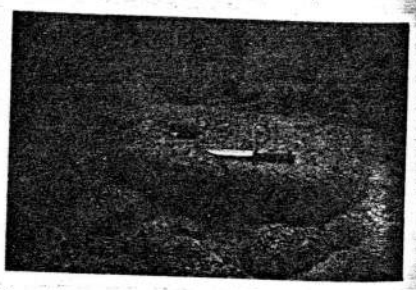

Figure 5. Anchor A34 *in situ*. Weight 170 kg. Facing west.

ultimately turning it into a centre for maritime and regional archaeological investigation. At present several rooms have been restored. These function as work and storage rooms for equipment and artefacts, an office and a small lecture hall.

Field work is often carried out in conjunction and mutual co-operation of the Undersea Exploration Society of Israel and the sea workshop of the University of Haifa's Center for Maritime Studies.

The following note summarizes several of the more significant investigations carried out by the IDA in the field of underwater archaeology (Fig. 2).

Dor/Tantura

The proximity of the ancient site of Dor and the later village of Tantura to the IDA's sea base made its environs a natural testing ground for learning sound underwater work techniques during the extended formative period when various logistical problems impeded extensive work farther afield.

Our work at this site during the years 1976–79 centred around the large bay bordering the southern edge of the tel (Fig. 3) and the lagoon between the island chain directly to the south of it (I Shḥafit, I Dor, I Tafat and I Ḥofami) and the shore. The seabed in this region is

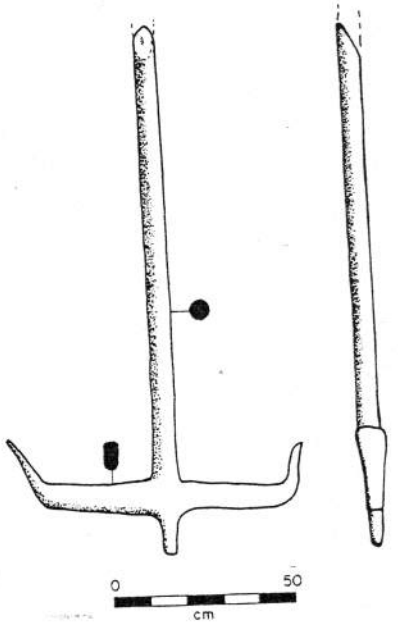

Figure 6. Line drawing of the Byzantine anchor.

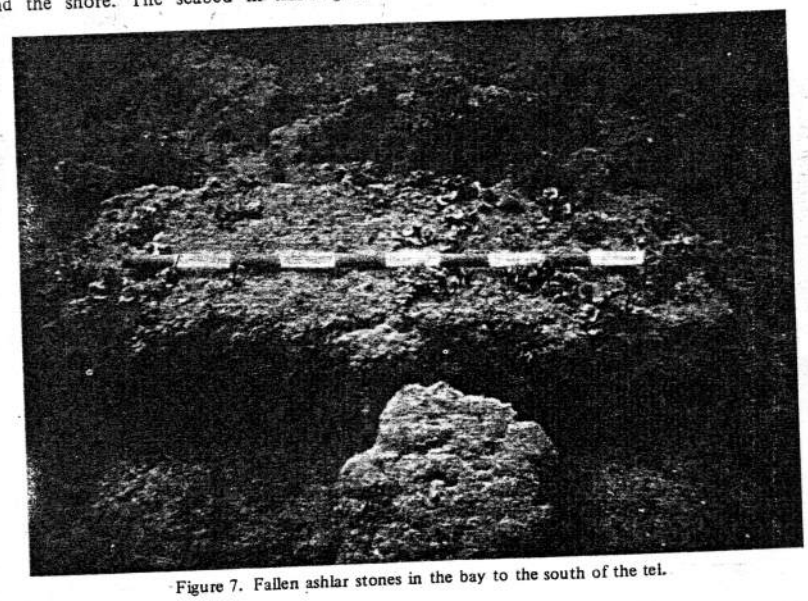

Figure 7. Fallen ashlar stones in the bay to the south of the tel.

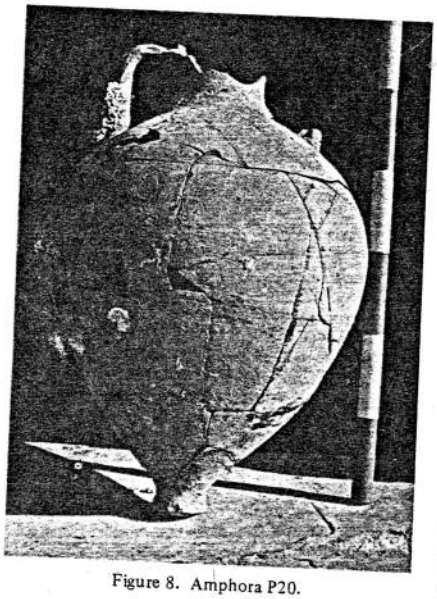

Figure 8. Amphora P20.

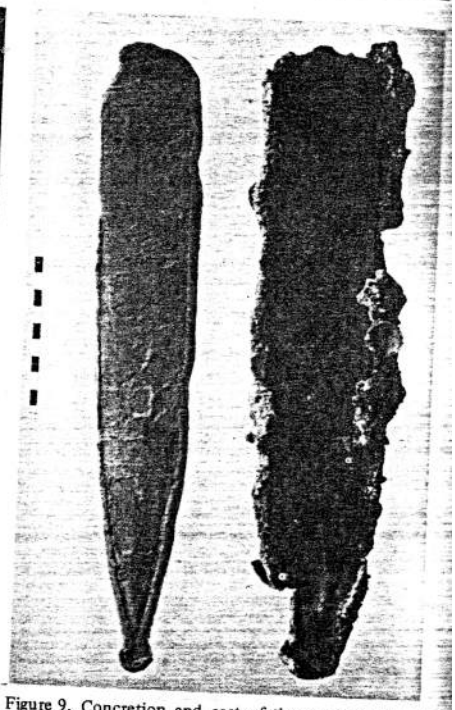

Figure 9. Concretion and cast of the sword scabbard W50.

buried under a sand cover which is constantly shifting. As it moves the sand reveals different portions of the actual seabed for varying periods of time. By keeping a careful watch for the appearance of new 'openings' we were able to survey a large part of the actual seabed in this area.

The survey revealed over 50 stone anchors and net weights found singly and in grouped sites. Perhaps the most interesting anchor group was that found in the area between the islands of Tafat and Ḥofami. Here more than 20 anchors were found grouped together in a well-defined area. One anchor from this site (Fig. 4) has certain typological parallels with two anchors from Ugarit which date to the Middle or Late Bronze Age (Frost, 1969: 242–45, nos. 27–28). Two other anchors from the same site (Fig. 5), among the largest found in the survey, are almost identical in size and shape and were found lying *in situ* in a manner which indicated that they must have belonged to the same ship.

These anchors along with others found in their proximity suggest that an early anchorage off Dor was located in the lagoon between the island chain and the coast, an area sheltered from winds which forms an ideal natural proto-harbour. The anchor site under discussion may perhaps be best understood as the entrance to such a proto-harbour, a place where ships may have stood at anchor before entering or after leaving.

Between I Tafat and the shore an iron anchor (Fig. 6) was found together with several broken jars, all of which date to the 6th–7th centuries AD, lying in an area where the sand had been partially swept away. These artefacts may hint at the existence of a Byzantine wreck at this spot.

In the bay south of the tel and about 50 m from it a group of over 50 ashlar blocks of the type common at Dor in the Hellenistic period were found lying scattered on the seabed (Fig. 7). Their distance from the tel precludes their having fallen from structures on it. It, seems probable therefore, that they either originally comprised some structure built in the sea or had been the cargo of a ship involved in removing building materials from the tel for secondary use.

The survey also revealed a number of ceramic remains which range in date from 6th century BC up to modern times (Fig. 8).

An elongated concretion found in the centre of the large bay to the south of the tel proved to have originally contained the lower part of a sword and scabbard the only remains of which were some wood fragments, a black liquid and the scabbard's impression on the concretion. Using the concretion as a mould, a plastic cast was made of the scabbard (Fig. 9) which appears to have been made of wood, covered with leather and terminated by a small circular projection. The date of this artefact is at present unknown.

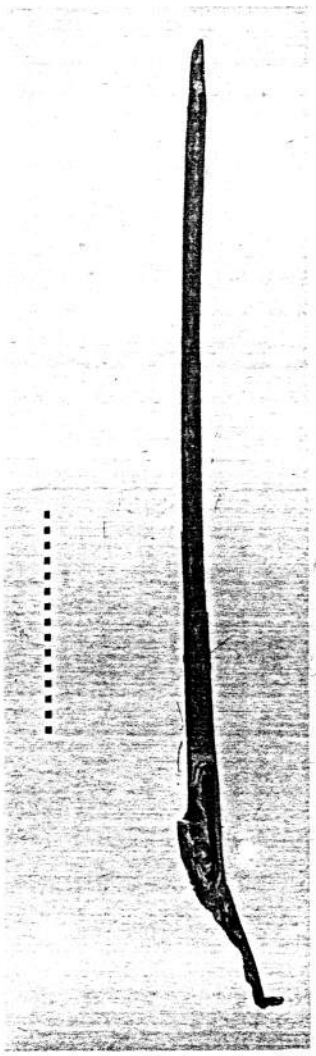

Figure 10. Napoleonic flintlock musket W33 after cleaning and restoration.

A number of flintlock muskets, several lead musket balls and an iron cannonball were found scattered about in the area between the islands of Tafat and Hofami (Fig. 10). The existence of 18th century ordnance strewn about the seabed in this area had been known since the survey carried out here by the Undersea Exploration Society in 1965. At the time it was assumed that they made up the cargo of a local shipwreck although no remains of the vessel itself were found.

During the survey four flintlock muskets were removed for identification. At the same time the local history of Tantura was researched. On this basis it is now possible to relate the ordnance to an historical event which took place in the spring of the year 1799.

Napoleon raised his famous siege of Acre on 20 May in that year and retreated with his army southward along the coast, arriving the next day at Tantura. From here he had intended to evacuate his troops by sea, but was prevented from doing so by the British. Faced with a difficult march to Jaffa for which he lacked sufficient provisions, and with many wounded and plague stricken soldiers, Bonaparte ordered excess ordnance to be disposed of in order to free all beasts of burden for transporting the wounded. To prevent the weapons from falling into enemy hands they were buried on the beach, burned or jettisoned in the sea during 21 May and the morning of 22 May.

Colonel Paul Willing, Conservator of the Hotel National des Invalides has recently identified the muskets removed during our survey as French service muskets of the 1777 model. This same model continued in service with several modifications until 1840.

Ha-hotrim

In the autumn of 1976 a heavily concreted Crusader sword was found in the vicinity of Kibbutz Ha-hotrim during an inspection dive carried out with members of the Centre for Maritime Studies sea workshop (Fig. 11).

The sword was found lying on the sand bottom at an approximate distance of 200 m from the shore. When found it was lying on a