

THE SHIPS' GRAVEYARD OFF ISRAEL'S COAST

Nine ancient ships which were wrecked off the coast of Israel have provided maritime archaeologists with a unique collection of evidence.

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In maritime terminology the inhospitable western border of modern Israel remains, as in antiquity, a veritable 'no man's coast'. With a contour shaped like a smooth, concave arc, the daunting linear shoreline is poorly endowed with shelter along the greater proportion of its length, a condition which plagued generations of ancient mariners who sought a stable platform for trade in this part of the Eastern Mediterranean. As a result of the numerous remains of nautical tragedies detected beneath the sea, marine archaeologists often refer to the coast of Israel as a vast ships' graveyard, estimating that wrecks of vessels which foundered in the open sea during storms are buried at intervals of 100 metres,

Fig 1. Aerial view above Dor. Beyond the overgrown city extends a string of islets which form a natural anchorage, now filled with silt. Further south, toward Caesarea, the shoreline is open.



perhaps even less, along the length of the shore.

Toward the foot of the southern termination of the Carmel Mountains, 24 kilometres south of Haifa, the inhospitable landscape abruptly changes. The prevailing wide, open sandy shoreline is replaced by a less hostile area distinguished by small bays and barren rock platforms. A conspicuous characteristic of this geographical transition point is a 950-metre-long chain of five offshore islets which collectively form a natural breakwater creating a well-protected anchorage. The city of Dor, founded on a promontory overlooking the islets at least as early as the first half of the second millennium BC, was acknowledged by ancient mariners as a reliable point of relief, a rare beacon of hope in a sea of trouble.

While journeying across Palestine in 1880 W.M. Thomson, a visitor to the region, encountered little inspiration at the contemporary settlement of Tantara which had emerged amongst the ruins of Dor, only 'a sad and sickly hamlet of wretched huts, on a bare seabeach, with a marshy flat between it and the eastern hills'. Before lapsing into a provincial backwater, however, historical sources emphasize that this modest natural anchorage had retained a position as one of the region's most important maritime facilities, continuously exploited from the thirteenth century BC onward.

Around 1075 BC, Wenamon, an Egyptian priest from the Temple of Karnak at Thebes (Luxor), sought shelter at Dor en route to procure cedar timbers at Byblos. The priest's memoirs of the journey describe the former city as inhabited by the Sikuli Sea People and refer to the existence of a harbour and a fleet of at least eleven ships. According to the fifth-century AD geographer Stephen of Byzantium, paraphrasing an earlier source, subsequent Phoenician settlement included a formal harbour facility and was brought about by the local abundance of a certain shell fish, murex, the raw material for the creation of a luxurious purple dye.

Once Sebastos, the state-of-the-art port complex at Caesarea equal in size to the legendary Piraeus,

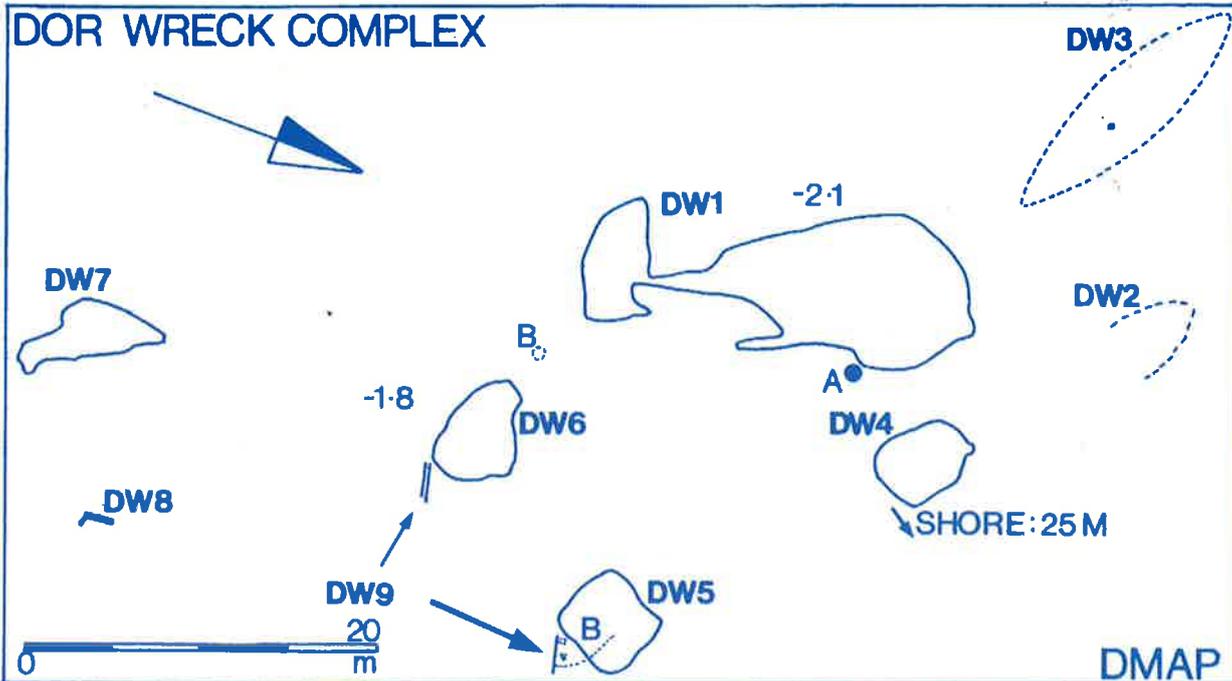


Fig 2. Plan of the surfaces of wreckage naturally exposed at south Dor in 1991. Remains of vessels occur at a frequency of one every ten metres on this section of seabed.

Fig 3 (below). Wooden hull planking protruding from the sand at site DW4, a Byzantine wreck of the 6th-7th century AD.

began to operate almost within sight of Dor in 10 BC, sources indicate that decay began to set in. Accordingly, Josephus Flavius regarded the city in the first century AD as a poor choice for a dependable harbour because the sand blown onto the shore by the winds impeded the entry of ships and forced merchants to anchor offshore, unprotected against the elements. Although coins minted in AD 111/112 enigmatically describe Dor as 'ruler of the seas', St Jerome's translation of Eusebius' *Onomastikon* establishes that by AD 390 the ancient city was a spent force, and no longer inhabited.

Unlike the settlements whose 16 metres of complex multi-layered stratigraphy spread over 40 acres and which have been subject to exploration ever since John Garstang of the British School of Archaeology in Jerusalem sampled the site in 1924, questions concerning the maritime dimension have only recently received archaeological attention. An evaluation of the three bays, initiated by the Israel Department of Antiquities in 1976, produced such promising results over a number of years that a reputation as one of Israel's oldest and most promising underwater sites was acknowledged.

By definition, a haven which is either artificially constructed or draws its security from the natural features of a coast is synonymous with safety. For this reason, lacking any clear historical documentation, dating a harbour relying on artefact association is notoriously difficult; with perhaps the exception of deliberate jettison or cargo spill, little maritime-related gear tended to be deposited within an active harbour. In any case, any accidental spillage within a controlled environment would be rapidly salvaged. More essentially, the ever-churning sands and submerged sediments of the Eastern Mediterranean usually prohibited any stratigraphic sequence to accumulate.

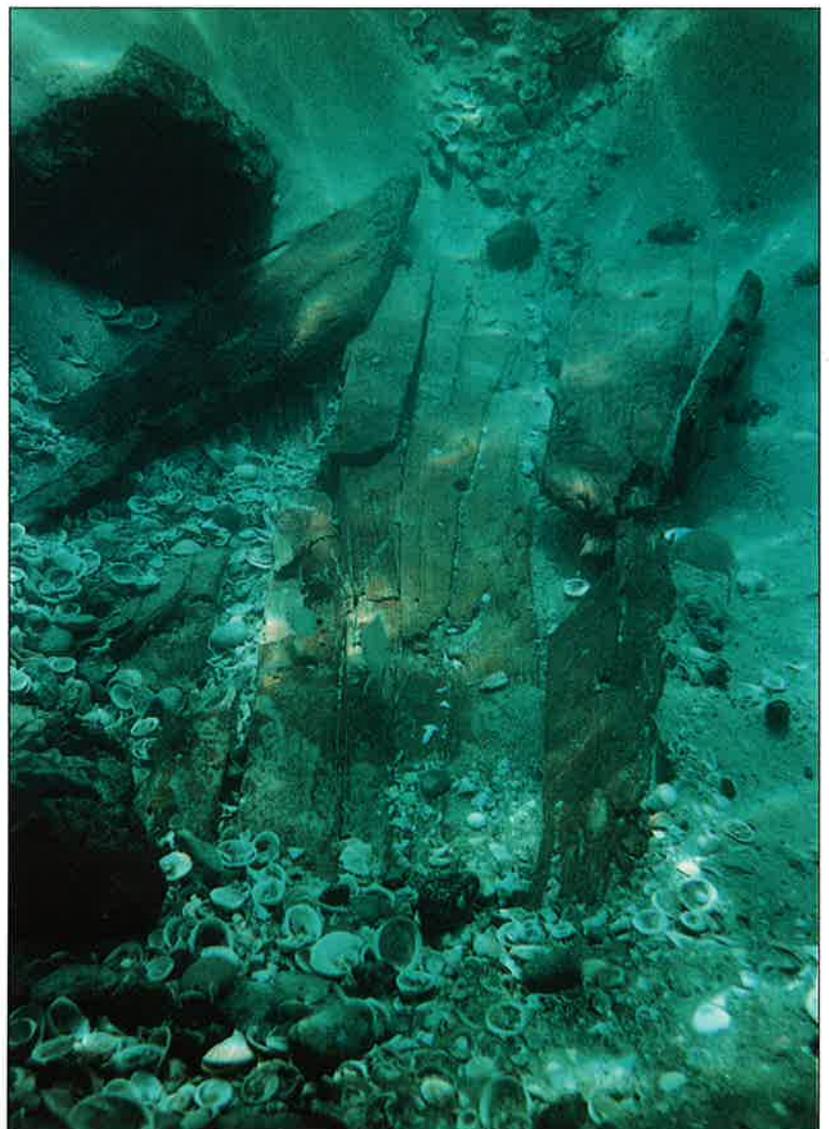




Fig 4. A Byzantine copper flask from DW1, a wreck from the first half of the 7th century AD. Height: 22.9 cm. Above left: original condition after recovery, encrusted with sand and shell. Above right: condition after preliminary conservation.

Since rarely is a sample of the objects of trade once handled in a harbour available, evaluations of the structural design and chronology of breakwaters, quays, moles and other architectural components developed as the principal concern of harbour archaeology. Similar installations at Dor, including the city's Hellenistic dry-docks, Roman harbour, anti-silt channels, and a twelfth-century BC quay have been investigated by the Center for Maritime Studies at Haifa in past years and demonstrate that the natural advantages of this coast were widely exploited throughout antiquity.

For reasons not entirely understood the harbour floor and seabed at Dor are far from sterile. Surveys have recovered the largest collection of ancient stone anchors (a class of artefact often dubbed the potsherds of marine archaeology) from any single Mediterranean location. Shattered amphoras litter exposed sections of seabed and the range of objects varying from millstones, swords, cannons, lead ingots, iron anchors to shipwrecks has proved surprisingly profuse. This large body of artefacts deposited offshore and the question of maritime contamination evoked has emerged as the principal concern of the Dor Maritime Archaeology Project, an Anglo-Israeli mission directed by the authors.

The apparent severity of maritime contamination at Dor is in part a consequence of the regional disturbance of nature's equilibrium through coastal sand quarrying and a programme of offshore marina and breakwater construction which reduced the thickness of the sand mantle overlying the seabed all along the coast of Israel following the foundation of the State in 1948. Like many sections of the seabed within the shallow waters of Israel, archaeological horizons once deeply buried are intermittently exposed during winter storms at Dor.

Influenced by the natural seasonal cycle, the majority of fieldwork conducted underwater during the last 15 years tended to concentrate on the months between November and March, the most tumultuous climatic period of the year and time of maximum artefact exposure. Unusually severe summer storms, however, between June and October 1991 reduced the height of the submerged sand in

the breaker zone south of Dor to the lowest recorded level. At the very entrance to the ancient anchorage, delineated by the string of five rocky islets, remains of nine shipwrecks emerged in less than three metres of water within a 70x40 metre expanse of seabed, presenting an exceptional opportunity to examine one of the most intriguing parts of the haven.

Unable to predict just how long the ships' graveyard would remain accessible, two excellently preserved post-medieval hulls which frequently protrude from the sand were omitted from the survey programme in favour of previously unrecorded wrecks. Five Byzantine formations of the sixth-seventh centuries AD (site nos. DW1 and DW4-DW7) were characterised by spreads of ballast stones less than 25 metres long within which amphora fragments, hearth tiles from galleys, and durable personal belongings of the sailors were intermixed. The majority of the amphoras and other pottery containers stored aboard the ships seem to have been either salvaged or swept onto the shore by the sea at the time of the tragedy. The meagre pottery record surviving consisted of bag-shaped Palestinian amphoras and suggests that the ships were local merchant vessels of modest proportions, almost certainly capable of operating internationally. Large quantities of roughly-hewn ballast stones indicated that three of the Byzantine ships were in a transitional stage of trade, without a cargo. Rectangular stone ashlar building blocks comprised the cargo of two others.

The fine condition of metallic objects and sections of hull planking, in contrast to the low rate of pottery preservation, was due to both the overburden of sand which reduced oxidation and general deterioration and the heavy ballast stones which functioned as a sealing layer. A wooden rigging block retrieved from DW6 had remained in perfect condition by becoming trapped in a sand-filled shallow hollow between ballast. Similarly, a section of wood exposed on one of the five Byzantine sites (DW4) owed its preservation to the tons of overlying boulders and sand which cushioned, rather than crushed, the ship's planking.



Fig 5. A copper cauldron from DW7, as recovered from the sea. First half of the 7th century AD. Height: 18.1 cm.

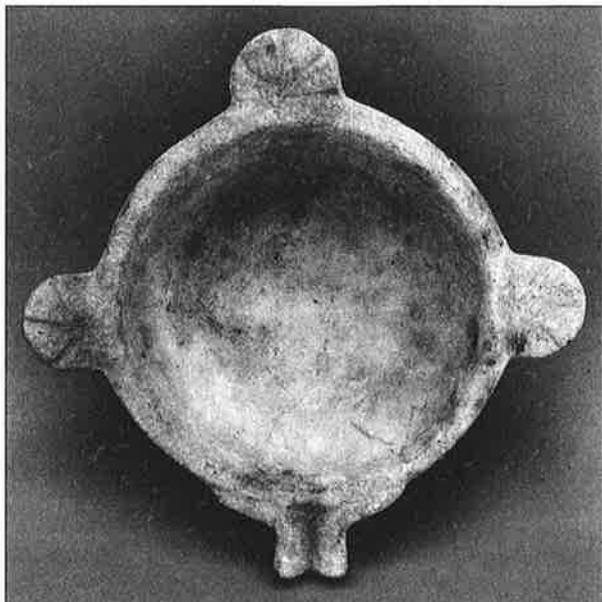


Fig 6. A mortar of white marble from DW1, first half of the 7th century AD. Width: 34.8 cm.

Unlike typical Roman ship construction, which emphasised the importance of attaching parts of outer hull planking together with wooden mortise-and-tenon connections placed usually no less than ten centimetres apart, distances between the wooden joints on any one cyprus plank from site number DW4 extended as far as 37 centimetres, a feature comparable to fourth-century AD contexts at Yassi Ada, Turkey and the Dramont F wreck off the south coast of France. The absence of wooden pegs locking each tenon within its respective mortise, however, is a feature more reminiscent of seventh-century shipbuilding. Carbon-14 tests on the wood carried out at the Weizmann Institute of Science in Israel confirmed that the ship had been active sometime between the mid-sixth and the first quarter of the seventh century AD. Indeed, at least four of the five Byzantine wrecks examined in 1991 foundered within this same time-frame, curiously a period when St Jerome reported Dor was no longer an urban settlement.

Three of the sites produced evidence that meals and wine were served on board the vessels from pure copper containers. Two wine flasks of the seventh century AD were broad based and composed of several pieces of metal sheeting dove-tailed together and soldered at tooth-shaped seams. This characteristic, a typical trait of Byzantine metallurgy, was also employed on a cauldron from DW7 (Fig 5) and a pot lid (from DW1). Both the iron handles of the copper flasks and some carpenter's tools, picks and hammers, from two of the sites, an essential requirement of any sea-going ship in antiquity, had developed a layer of encrustation: a reaction to the immersion of iron in a saline environment. A fine white marble

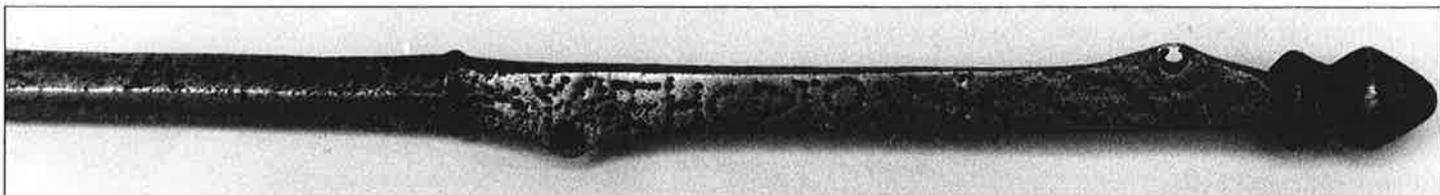
mortar with a false spout and three lugs incised with a linear decoration (Fig 6) was another domestic utensil recovered from the galley of DW1.

According to inscriptions incised on two steelyards, the captain responsible for navigating DW7 into trouble during the early seventh century AD was a certain 'Psates of Rhion'. The symbol of the cross occurs on both sides of the inscriptions mentioning this character and one beseeches Jesus Christ the Saviour, ironically, to ensure protection from harm during sea voyages. Both steelyards are amongst the finest preserved from the Byzantine world. The larger example, 97.3 centimetres from tip to end and retrieved complete with suspension chains, seems to have been an antique at the time of its loss: an assortment of inscriptions on three sides of the collar at one end imply the object had three successive owners. During its lifetime one of the device's two hooks, used to suspend the bar while objects were weighed, became ineffective and was changed for a slightly different version. Whether two lead plugs covering one of the statements of ownership were attached to conceal and negate the previous owners proprietary or to readjust the official balance of the steelyard, remains unclear. Similar to the larger steelyard, the graduating weight scale of the smaller piece (42.8 centimetres in length) (Fig 7) was indicated by a series of Greek letters.

Though the quantity of material concentrated on each wreck was sufficiently coherent to allow the date of the vessels to be deduced, none of the sites were entirely free from later intrusive contamination. Encrusted rope and wooden hull components from a vessel less than 200 years old had settled upon the ballast of DW5, a fifth Byzantine wreck which was encountered at a depth of less than two metres. Nineteenth-century roof-tiles from Marseille and a light scattering of amphora fragments, Cypriote or Rhodian imports of the sixth to fourth centuries BC, also appeared amongst the 5x5 metre section of exposed ballast. The close proximity to the shoreline had caused debris from deeper parts of the bay to be washed into this natural catchment zone and, as the depth of the sand around DW5 continued to diminish as the late summer storms persisted an intact, but partially crushed war helmet (Figs 8 and 9) originating from a late fifth-century BC wreck in slightly deeper waters was found on the perimeter of this site.

Vastly different to helmets crafted a century earlier which afforded extensive protection and almost entirely enclosed the head, epitomised by the Corinthian piece which accompanied the Etruscan ship wrecked at Giglio, Italy, to its resting place (*Minerva*, January 1990, pp. 3-6), the type of helmet

Fig 7. Terminal of the smaller steelyard from DW7. An abbreviated form of the name of the merchant aboard the ship is incised on the bronze and bordered by crosses. First half of the 7th century AD.



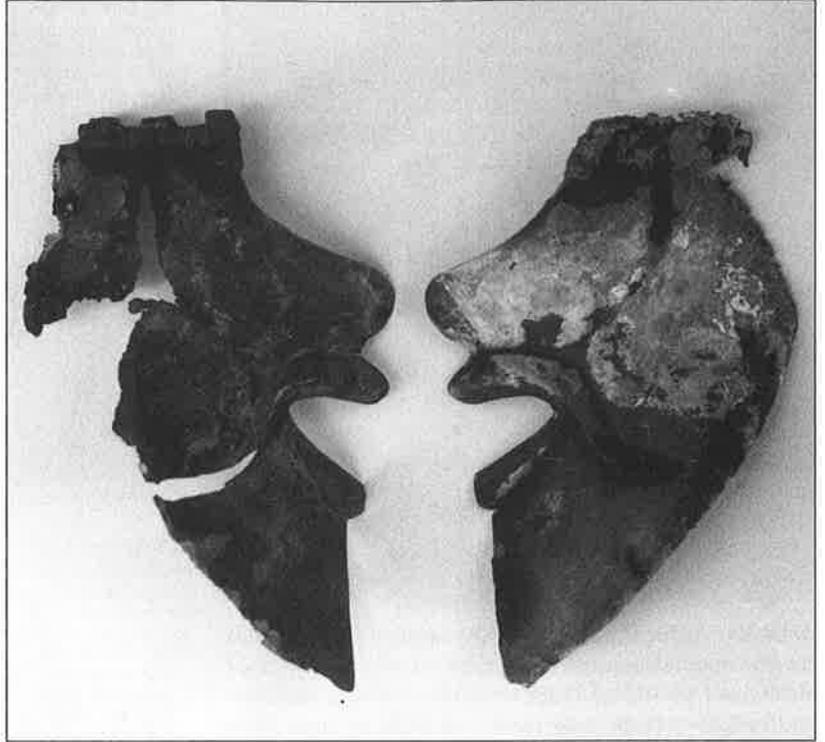
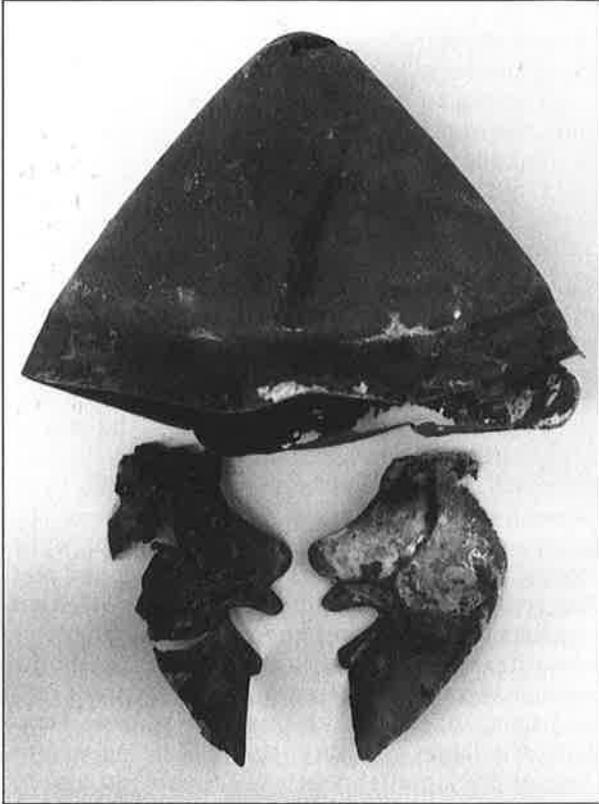


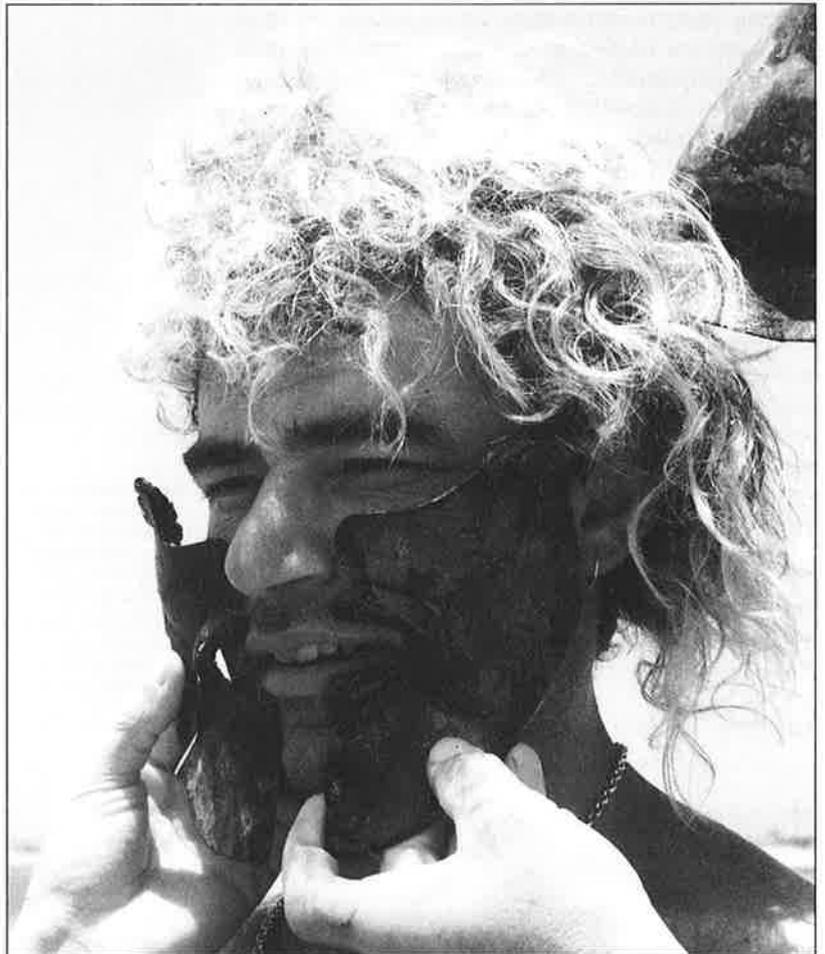
Fig 8. Greek war helmet from a late 5th-century BC wreck at Dor. Above left: the complete helmet. Above right: detail of the cheek-pieces from the helmet.

from Dor exemplifies a changing preference for greater mobility and freedom. With the exception of a narrow, everted brim and an extension at the back to protect the nape, the bronze, ovoid Greek helmet (29.4 cm high, 23,5 cm wide, and 1.5 mm thick) was a simple utilitarian creation, devoid of decoration.

Several Athenian tombstones of the late fifth century BC depict hoplite warriors wearing this form of basic defensive head-gear. The discovery of a pair of cheek-pieces alongside and within the helmet from Dor, originally attached to the sides on hinges riveted into the bronze, is an interesting addition to the number of existing examples. Both cheek-protectors appear somewhat theatrical, decorated with facial features including thickened lips, an elegant downward-sweeping moustache, and an over-exaggerated cheek bone.

The clash of styles between the plain helmet and sculpture-like side accessories is, according to Professor A. Snodgrass from the Museum of Classical Archaeology at Cambridge University, apparently an unparalleled hybrid combination. Examples of the plain helmet, known in antiquity as a *pilos*, are documented on the Greek mainland at Olympia and Dodona and appear on ancient reliefs of the late fifth century BC. The side-pieces, in stark contrast, typify the 'Thracian' helmet form favoured several decades earlier in the mid-fifth century BC. Whether these antiquated cheek-pieces were later joined to the helmet for defensive or purely decorative purposes, their condition seems to have been pristine prior to their loss in the sea. A shallow dent on the upper part of the main helmet implies this piece had seen active combat prior to its deposition in the entrance to Dor harbour.

Fig 9 (below). A fisherman with the cheek-pieces from the Greek war helmet.



Underwater Archaeology

Collectively, the group of nine shipwrecks and four others examined in the same vicinity in recent years constitutes the most extensive graveyard of wrecks so far documented along the coast of Israel. Their presence in one of the only available natural havens along this shoreline, however, was both unpredicted and paradoxical. The ever-shifting submerged sand-banks at Dor are clearly the immediate cause of the losses. As Josephus implied in the first century AD, even a sea captain highly familiar with the region could be easy prey for the constantly moving sands. Seeking the calm waters behind the chain of islets during a storm, a ship approaching at high speed with the wind behind it would find navigation in high seas almost impossible. In these circumstances both the shore and the islets would have been seen not in terms of shelter but as a serious threat.

Yet the lack of alternative safe havens in the area continued to attract a high level of shipping, even in the Byzantine era when historical sources testify that the city was deserted. Completed underwater surveys in fact suggest maritime activity peaked in this period which was one of economic prosperity and demographic increase throughout Palestine. Quantities of iron anchors, amphoras and, of course, entire shipwrecks litter the seabed and reflect the intensity of this shipping. To what extent their presence was

conditioned by a need to seek shelter rather than conduct trade transactions remains obscure. A cosmopolitan assemblage of Egyptian storage jars and North African fine wares uncovered in a Christian basilica and rest-house established close to the shore at Dor from the mid-fourth to mid-seventh century AD indicates the partial range of the city's Byzantine trade network. Throughout this period the site's magnetism as a gateway to the Holy Land was enhanced by a fragment of rock from Golgotha, the site of the Crucifixion, displayed as a relic in the basilica.

Yet, whether a pilgrim, merchant, or ship's captain, the dangers of this 'no man's coast' remained a universal dilemma throughout antiquity and into the post-medieval era. Storms of equivalent ferocity to those which disclosed the multi-period concentration of merchant vessels at Dor in the summer months of 1991 would have devastated any form of maritime traffic caught unawares along the coast of modern Israel, irrespective of the fact that generations of experience recognised summer as the internationally open season for seafaring. In retrospect, the merchant vessels lining the ships' graveyard at Dor graphically confirm that the risk and act of wreckage, lamented by mariners throughout the ages, was imply an inevitable by-product of the clamour for the fruits of commerce. 

Sean A. Kingsley and Kurt Raveh are co-directors of the Dor Maritime Archaeology Project.

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