

Honor Frost

PLANTS ON SHIPS: DUNNAGE, DECORATION AND PERISHABLE CARGOES

44

*"It was so old a ship – who knows; who knows,
And yet so beautiful, I watched in vain
To see the mast burst open with a rose;
And the whole deck take on its leaves again".*

James Ellroy Flecker, "Old ships".

INTRODUCTION

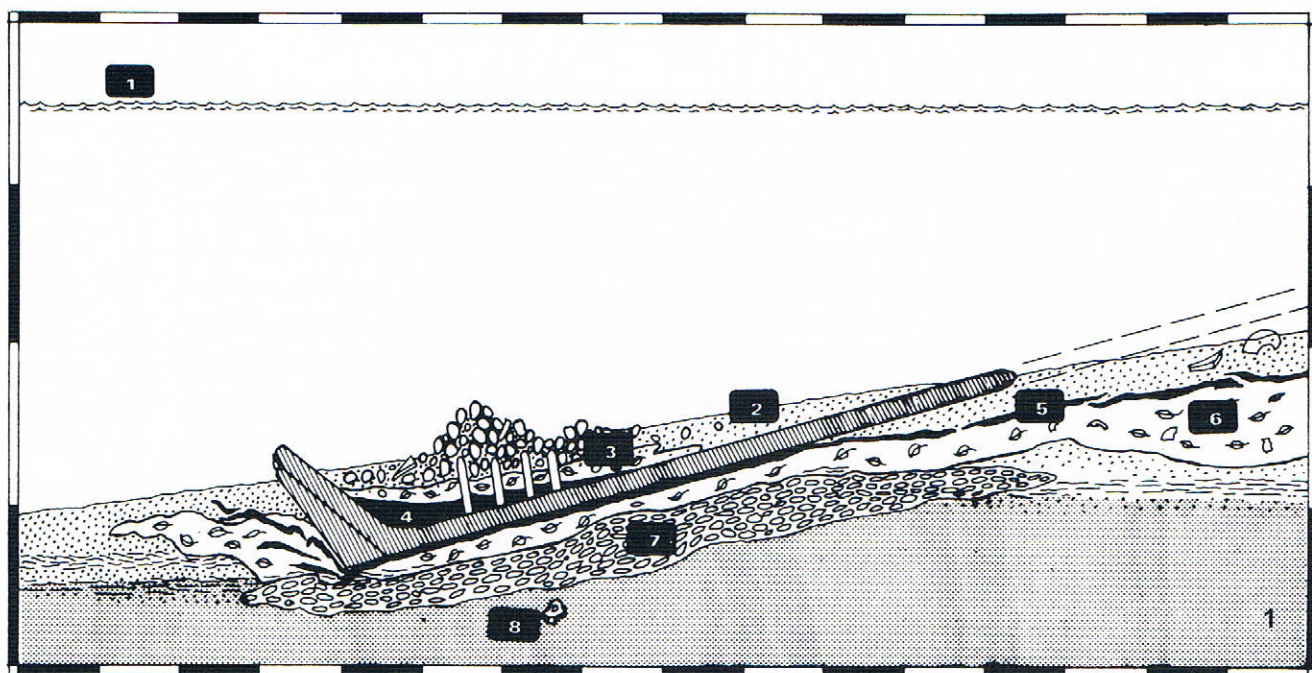
A "sleeping beauty" perfectly preserved in death (like Rider Haggard's "She") is a romantic myth hitherto unsupported by mummification whereas, even without treatment garlands, bouquets, fruits and seeds fare better than flesh in the dryness of Egyptian tombs (for example: Tutankhamun's, see F. N. Hepper, 1990), almost rivaling the carefully desiccated leaves and flowers pressed between the pages of a Victorian *herbarium*.

Divers have noted that on wrecks where plants have been sealed away in anoxic conditions, myth briefly matches reality. At first sight, I myself mistook for modern some green leaves found on a 3rd century B.C. Phoenicio-Punic hull, which sank off a spit of sand called "Isola Lunga", north of ancient Lilybaeum (modern Marsala) in Western Sicily (H. Frost, 1976). The interest of this and other similar findings is that, potentially, the archaeology of plant-travel could take its place beside the history of plant-travel (for example: the arrival of the potato in Europe; Bougainville's gift of a flaming red creeper to the Mediterranean; Cook's Australasian imports and those of countless 18th and 19th century botanists who shipped the plants and flowers now decorating European houses, as well as plants now taken for granted industrially.

Marine archaeology is a fairly recent discipline, while excavating in air and underwater is utterly different technically, so it may be of interest to resume a few submarine findings, and recall some of the open questions relating to the sea-travel of plants along Levantine shores.

THE PUNIC SHIP WRECKED OFF WESTERN SICILY

On the exceptional wreck of a Punic, cargoless, oared ship, north of Marsala, speedy sand-burial had created anoxic conditions, while iron sulphide (caused by an admixture of decaying *Poseidonia* leaves) combined to produce the ideal chemical environment for preserving organic matter. The vessel's stern had been driven down into the seafloor by some unnatural force (perhaps ramming), leaving the keel at an unusual angle, so that the prow had broken off and been washed away (Fig. 1). After the wreck came to rest, at a depth of only 3 m., the flat sea-floor had quickly recovered its equilibrium: sand which constantly moves back and forth, piled up round the obstruction, burying the wooden remains until only the tip of the stern-post (Fig. 2) and ballast stones (which had tumbled backwards on impact) were left to mark the presence of hull-remains. The wreck's shallowness incidentally, came as a great surprise to marine archaeologists who used to consider depth as essential to the making of "a good wreck". Moving some top stones on this wreck, revealed the blackened tips of ribs protruding from sand and lower down, once the sand had been fanned off them, the colours of these hardwood frames and floor-timbers began to show; then still further down, the yellowness of the hull's pinewood planking (Fig. 3). The remains of the ship looked as good as new although, in fact, waterlogging had

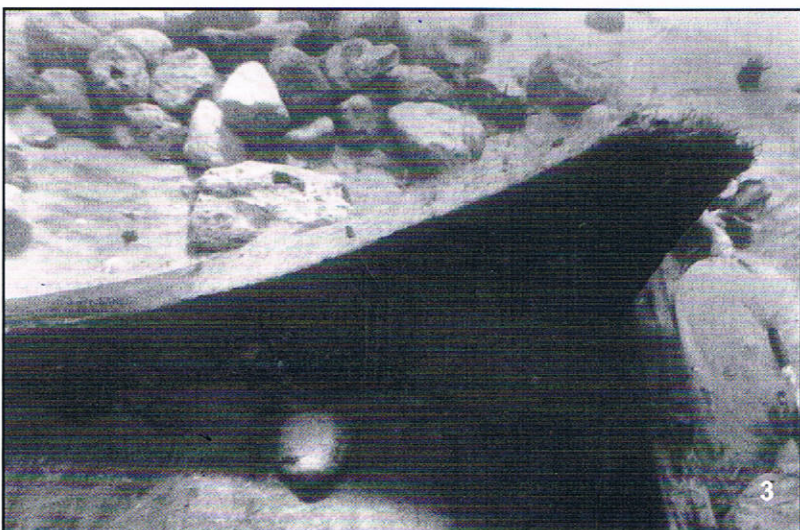


1 Schematic section of the wreck of the Punic Ship, excavated off-shore, to the north of Marsala, Sicily. On sinking, its keel had been driven downwards while the hull listed to port; the speed of sand-burial preserved the hull's stern and part of one side.



(1) Sea level; (2) surface sand and ballast; (3) vegetable matter, largely dunnage; (4) "Gunge": food remains and vegetable matter of peat-like consistency trapped in the keel-cavity; (5) lead-sheathing detached from the outside of the hull; (6) vegetable matter: brushwood etc, sucked under the hull from the 'kitchen area I' (which was forward and to port of the keel-remains, so not shown on this section); (7) flattened and compacted balls of *Poseidonia* fibres; (8) Prehistoric sherd in the "virgin" sand underneath the Punic wreck-formation.

2 The tip of the *Acer* (maple wood) stern-post of the "Marsala Punic ship" as first revealed by some natural shifting of the sand on the surface of the seafloor.



3 Excavation showed yellow hull-planking looking good as new. In the foreground a floor-timber is seen *in situ* in a part of the keel-cavity which had been almost emptied of organic matter and ballast stones.

made its wood as soft as cheese.

It took four annual seasons to excavate this wreck; the consistency of the bottom varied from one part to another, as did the nature of the burial, so that a variety of technical solutions

had to be devised and applied. The only constant was that every morning the site had to be cleaned, because over-night currents washed in all manner of rubbish: plastic bags, old "slip-slops" and Coca Cola cans as well as the autumnal fall of blackened leaves of *Poseidonia* grass which floated gently to-and-fro just above the bottom, carpeting its whole surface. The part due to be excavated, had to be cleared by gathering up the detritus and dumping it down-current. Thus it was that, while first working downwards towards the keel-cavity, I found myself disposing of leafy branches and wondering vaguely whether they had fallen off a boat, before even suspecting that they might have been there since the mid-third century B.C. a suspicion soon confirmed by the appearance of more green leaves (Fig. 4) as I (now with the utmost care) fanned sand off the planking.

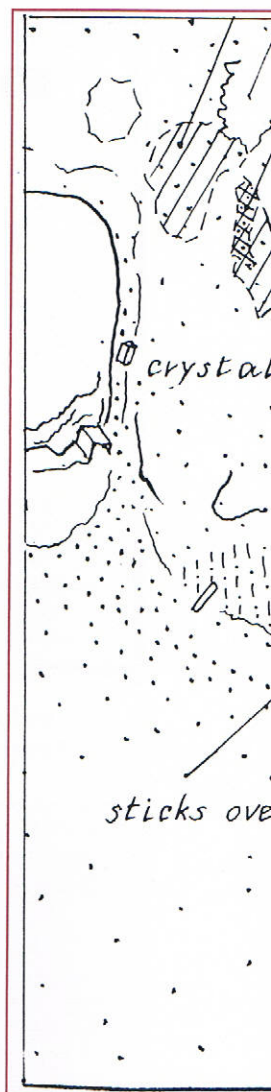
4 Close-up of two newly excavated (therefore still green) leaves of *Philyrea*.

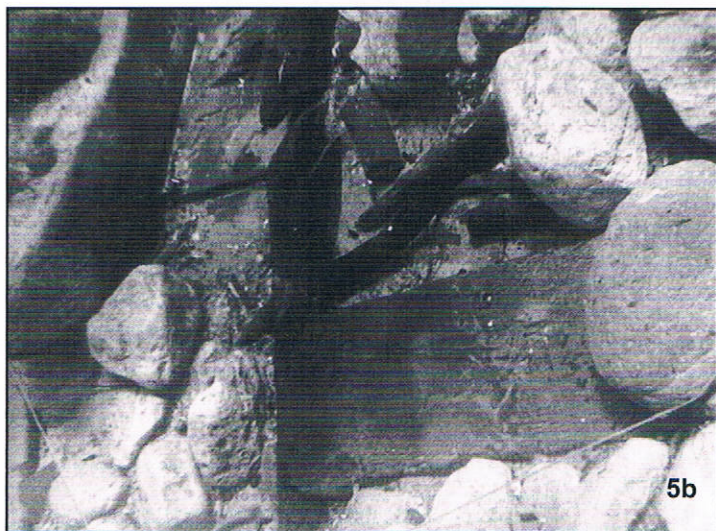
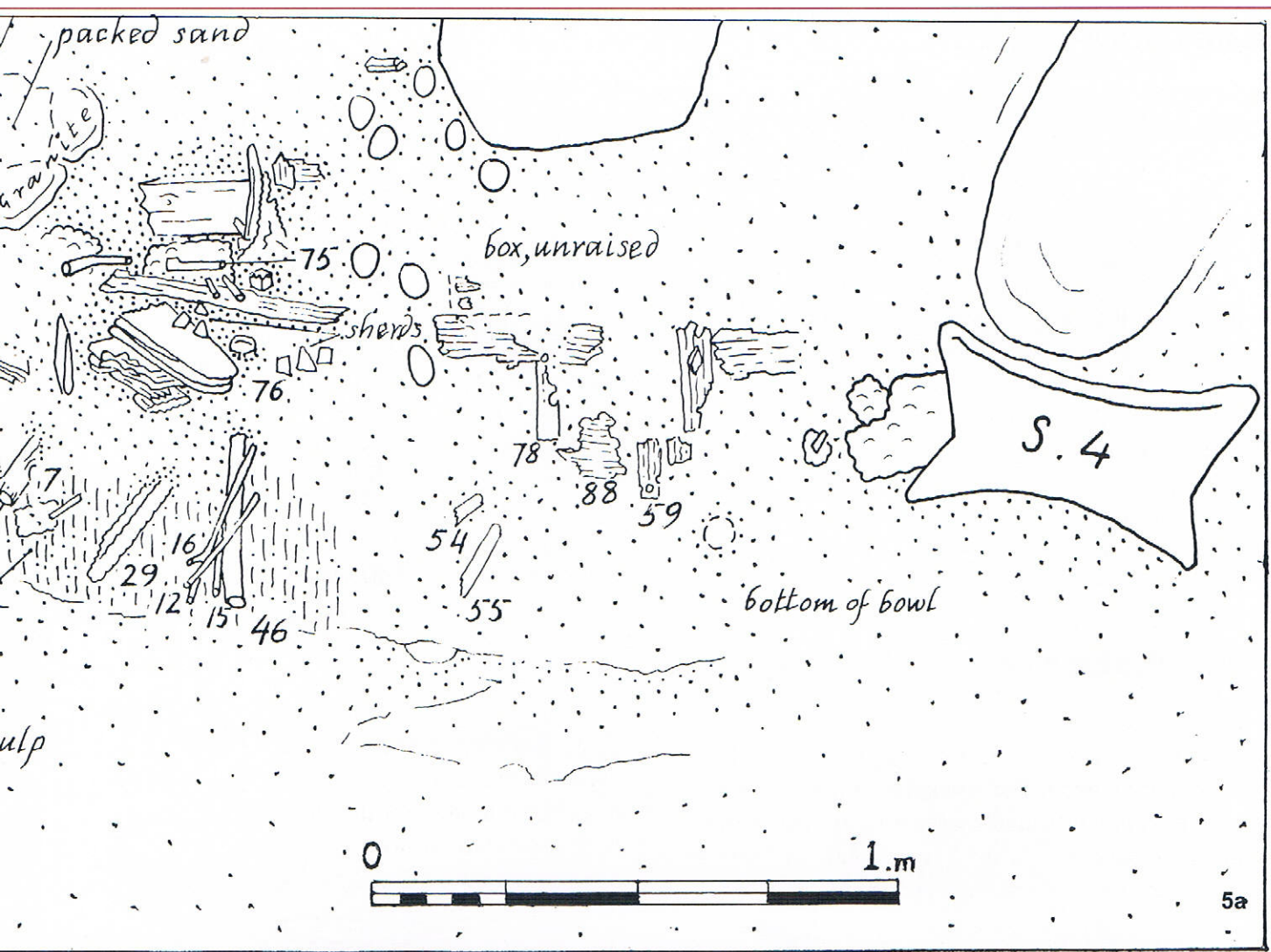


DUNNAGE

This plant material represented dunnage, or the freshly gathered stems and branches which are laid over the bottom of a hull to protect it from being damaged by heavy cargo or ballast stones, I had already drawn scraps of dunnage on a Late Bronze Age wreck at Cape Gelidonya in Turkey (fig. 5, compare with 5b and 5c similar dunnage on the Punic hull which sank over a millennium late). This was in the early days of methodic submarine excavation, (G. Bass, 1967, p. 49 & 168) and the seafloor at Gelidonya was rocky, so the hull itself had perished and only a few scraps of organic matter survived in pockets of sand, held down by stones or heavy cargo. The Gelidonya twigs were not as well preserved, plentiful and informative as the dunnage on the Punic hull (Fig. 6-7) which, for instance, included a scrap of bracken (the rachis of a fern, probably *Pteridium*). Since bracken does not grow within walking distance of Marsala (or for that matter of Carthage) it

showed that the wrecked vessel could not have been built in either of these Punic territories.





5 a- Dunnage lying loose on the site of 13th century B.C. wreck at the base of Cape Gelidonya (Turkey). This detail shows a pocket of sand, on the otherwise rocky bottom, where excavation was revealing brushwood branches that had been cut as dunnage (ex. Nos. 7, 12, 15, 16) to cushion the vanished hull from heavy cargo, such as the copper ingot ("S4"). Only small scraps of thin wooden boards survived, but no coherent sign of the hull, unlike the Marsala Punic ship.



5 b-c- The same type of dunnage found *in situ* on planking and between the "ribs" of the 3rd century B.C. Marsala Punic Ship (well-preserved because of quick sand-burial). In this case the dunnage was cushioning the empty hull of a war-ship from ballast stones, rather than cargo.



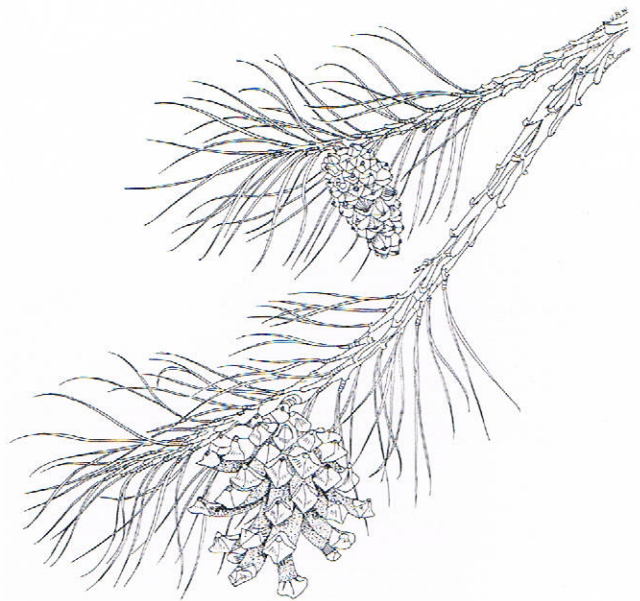
Pistacia lentiscus



Quercus cerris



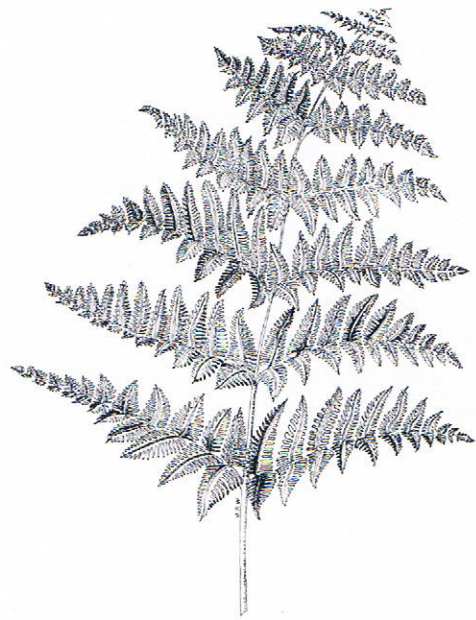
Phillyrea media



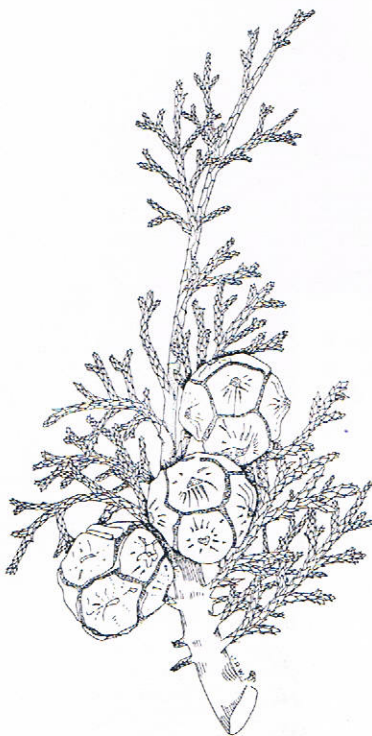
Pinus sylvestris



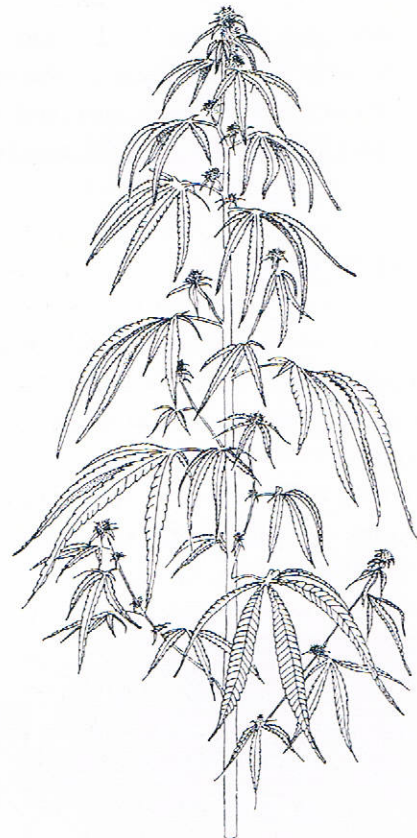
Myrtus communis



Pteridium aquilinum



Cupressus sempervirens



Cannabis sativa

Cannabis Sativa had been found in two baskets in the "kitchen area", as well as with the remains of food in the keel-cavity. All the other samples came from the dunnage. Drawn by John Wood (Punic Ship Excavation team-member and diver).

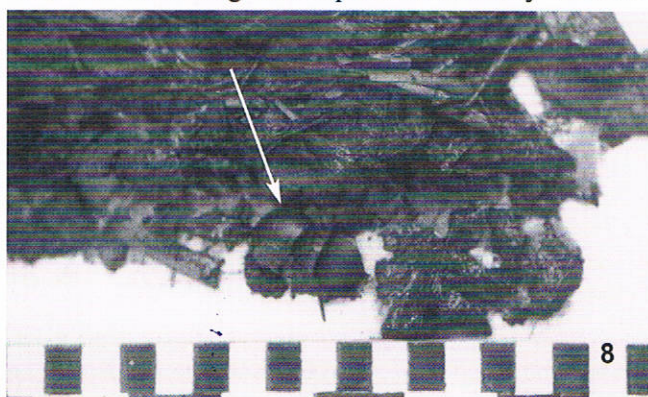
THE QUESTION OF WHERE A SHIP HAS BEEN BUILT

The information was particularly interesting, because all wrecks carry evidence of the ports they visited and often of the “nationalities” of their crews, but no hint as to where

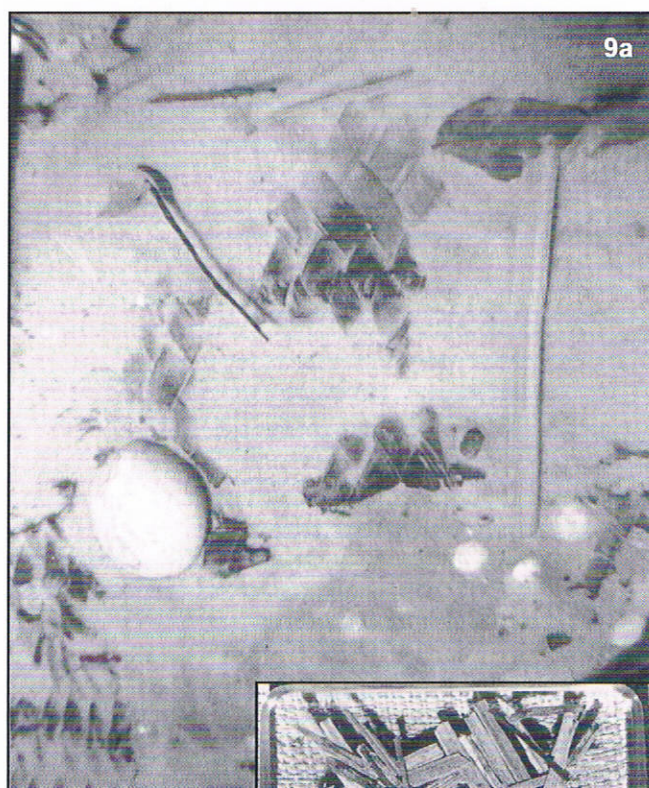
their hulls had been built. This exceptional hull was, however visibly brand new, because the putty used inside it had not had time to harden before the green leaves of the dunnage, then the ballast had been thrown in (some leaves and stones remaining embedded in the putty). Consequently the hull must have been launched from a place where bracken grew. The ship was also visibly Punic, since its builders had painted their instructions onto its planking in Phoenicio Punic. It follows that the scrap of bracken, eliminated the two most obvious locations for the ship’s place of origin: Carthage and Lilybaeum (Marsala), pointing instead to Latium (where bracken grew near the sea in one of the enclaves of Punic territory which had survived in that region (H. Frost, 1974 p. 82 and 276 and H. Frost, 1987).

THE REMAINS OF FOOD

More and more dunnage came to light as excavation proceeded, while the keel-cavity was packed solid with an admixture of leaves and branches and the remains of the oarsmen’s meals which had fallen down into it. The eatables included butcher-cut meat bones as well as the shells of almond, pistachio, hazel nuts (Fig. 8) and olive pits (for fear of confusing subsequent laboratory identifi-



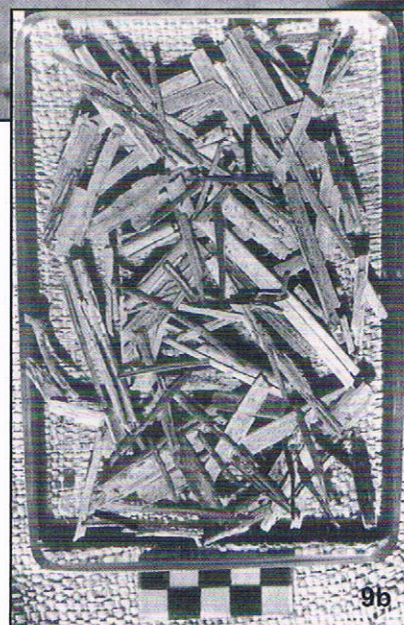
cations, we had to stop eating olives on the boat). Amongst this “gunge”, fragments of some kind of stem stood out because they had turned bright yellow. Three years later, more such stems were found in two baskets in the “kitchen-area” (Fig. 9a and b); they were identified as *Cannabis Sativa* in the Jodrel Laboratory (H. Frost, 1974, pp. 59, 64-5, 84 & 88). *Cannabis Sativa* was also carried for medicinal purposes on the Maltese galleys of the order of St. John (J. Muscat, 2002, p. 32).



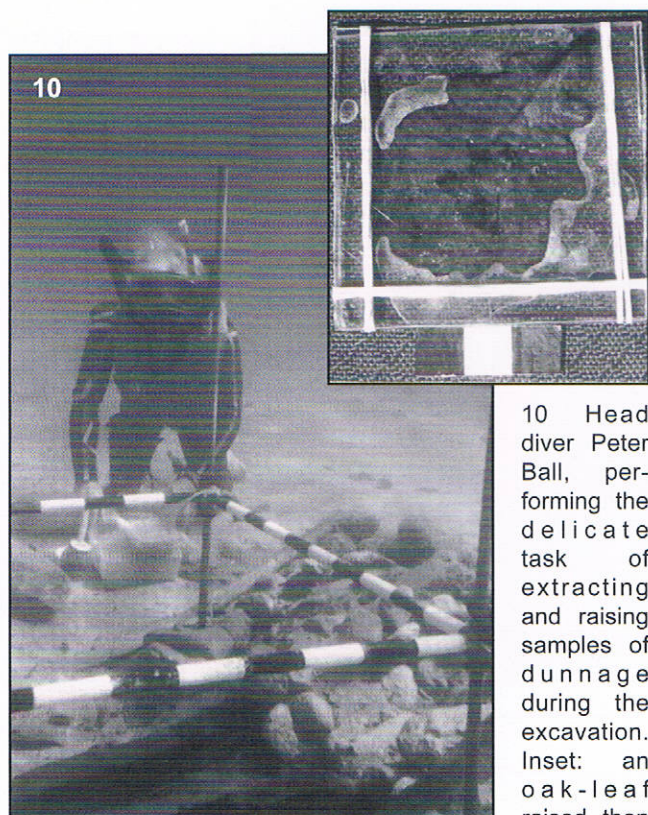
8 A Hazel nut in the “gunge” of organic matter that had fallen into the keel cavity.

9 a A detail from the excavation showing a scrap of one of two baskets, with two stems of the *Cannabis Sativa* the basket had contained.

9 b The stems of *Cannabis Sativa*, whether in the contexts of baskets, or of the food in the keel-cavity had all turned bright yellow. Samples were preserved by John Wood who embedded them in plastic.



During the first stages of excavation we had agonized about raising leaves so fragile that they started to dissolve into powder when handled. Borrowing techniques from paper-conservation, we gradually learned how such fragile scraps could be picked up by sliding something like blotting paper under them then how, once sealed into plastic boxes and raised (Fig. 10), the sea water could be changed by using pipettes etc. But after a time when,



10 Head diver Peter Ball, performing the delicate task of extracting and raising samples of dunnage during the excavation. Inset: an oak-leaf raised then

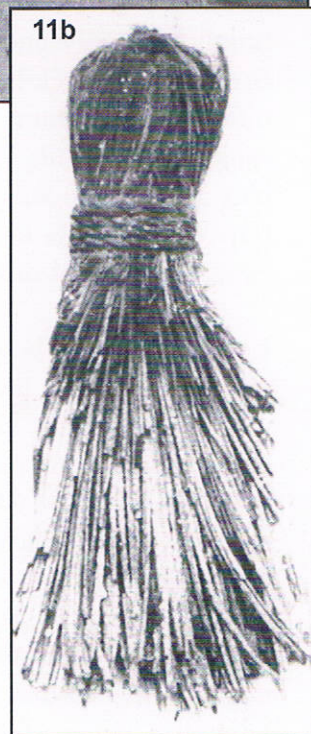
sandwiched between glass.

besides such recognizable objects as a besom (Fig. 11 a-b) and an eye-splice knot (Fig. 12) as well as much string and rope, we found ourselves faced with cubic meters of plant-material (Fig. 13a, and b), all that could be done was to fill plastic bags with random samples, leaving laboratories to choose what they wanted for plant-anatomical-identification (deep gratitude is owed to Dr. David Cutler and the Jodrell Laboratory, Royal Botanic Gardens Kew, for having taken so much of it).

11 a & b More plant material from the Punic Ship: a small brush, or 'besom' seen underwater emerging from the sand in 'the kitchen area' (the diving-knife is 26 cm. long). The besom made ready for freeze-drying.



11a



11b

THE ARCHAEOLOGICAL POTENTIAL OF "WRECK BOTANY"

Again, the most archaeologically interesting aspect of plants on wrecks, is that their preservation does not depend on antiquity or depth, but on the time it took for sand or mud to cover them. For instance: on four wrecks, at depths ranging from 3 to 60 m. and periods separated by more than a millennium, there is no difference between the preservation: of the juniper branches and pine-cones packed round the cargo of over



12 Rope and string of varying thickness was found on the Punic Ship, including this eye-splice knot (also found were a couple of wooden marlin-spikes used for splicing). Again, the knife which serves as a scale is 28 cm long.

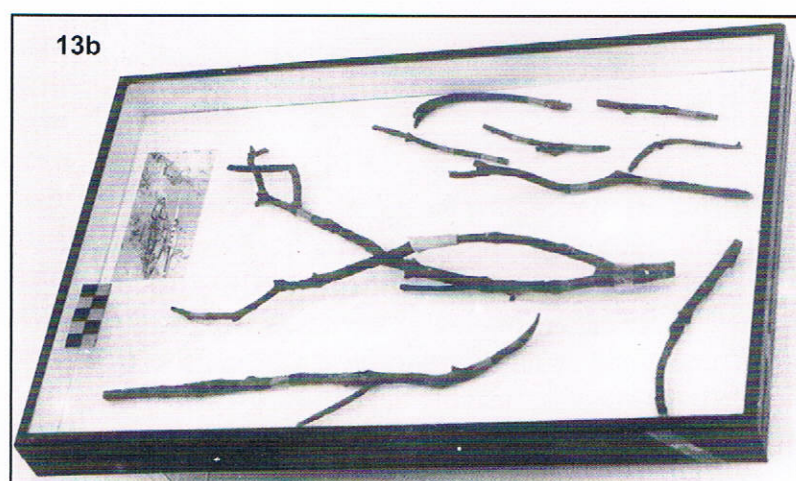
13a Brushwood branches emerging from the sand in 'the Kitchen Area'.

13b Some of the branches preserved, after treatment with Polyethelene glycol.

6000 amphorae on the 1st century B.C. wreck off the Madrague de Giens, in France (P. A. Gianfrotta and P. Pomey, 1980); the above-mentioned plant-material on the 3rd century B.C. "Punic Ship" off Sicily and that of a second Bronze Age wreck in Turkey: the magnificent, 14th century B.C. vessel that sank off Uluburun, which besides edibles and dunnage, contained logs of rare woods in its cargo (C. Pulac, G. Bass, *et al.*, 1984 onwards).



13a



13b

Environmentally both the Bronze Age wrecks in Turkey lay below headlands whose steep cliffs continued undersea to considerable depth before reaching the sandy flatness where wooden hulls are most likely to be undisturbed before burial. More than a decade had passed between some twigs being noticed at Gelidonya and larger amounts of dunnage being found and studied at Uluburun, where there were not only bigger patches of sand, but also where there was more heavy cargo such as pithoi to give shelter to organic matter, while methodological skills had

also improved and the botanist, C. Ward Haldane, was among the divers.

FINDING BURIED WRECK AND FACING NEW QUESTIONS

It follows that there is no reason why the remains of Bronze Age Cedar-carriers should not be preserved in either deep or shallow water, between Byblos and

Pharaonic Egypt... but how to find them? And what kind of questions will they raise? Despite half a century of experience in sub-aquatic excavation, interest had tended to remain focused on the ubiquitous potsherd which every diver sees and every archaeologist understands. A diver with an eye for anomalies occasionally finds perishables; even anchors dragging across the seafloor sometimes bring them to the surface, but they are more often uncovered by engineers laying pipelines in the sand, or the foundations for moles and jetties. In Sicily, it was the captain of a dredger taking sand for glass-making, who scooped up bits of ancient wood and reported them to the authorities, thus leading to the survey of a wreck-filled zone, and the discovery of the 'Punic ship'. Once the possibility of finding plant material is understood, textual evidence can be examined in a new light.

LINERS AND LUXURY

Throughout history, certain kinds of cargo like timber or grain, have travelled at certain periods, on certain regular routes or shipping-lines. The name 'liner', has come to mean a large vessel, which also carried passengers (often in luxury), on one of these regular routes. The 'P and O' Liners linking Great Britain with India had undoubted glamour, while the Transatlantic Liners linking Europe with America produced the opulence of the 'Titanic', the great 'Queens', the 'Normandie' and most recently the largest 'Queen Mary'.

In Magna Graecia and Imperial Rome, because ship-design was unsafe and piracy was rife, travel was as perilous as it was luxurious (many 'Titanics' resulted). There is no shortage of dis-

persed cargoes which show a degree of luxury which can be judged from rich bronze candelabra, portable mosaics, exquisitely wrought decorations which had once been attached to the finest of wooden furnishings etc. Many such objects have already been raised from the sea (often without adequate study of their contexts). There is of course no reason to excavate every wreck that is found, unless it is going to answer some outstanding question. Missing-links include "Corn ships" and 'Cedar-carriers'. Both are well attested by texts and connected historically with Lebanon and the Eastern Mediterranean by trade in plant-material (*Papyrus* as well as *Cedrus L.*). Questions need to be formulated now, before some diver chances on a site then pulls out everything solid and saleable while sacrificing the plant material.

GRAIN SHIPS

At the time when the Greeks in Eastern Sicily were prospering on the export of grain to Ptolomaic Egypt, no less than 60 grain-carriers were built for the Alexandria-line by Hieron II of Syracuse (L. Casson, 1971, p. 195). Then around 240 B.C., Hieron undertook a 'Concorde'-like venture: he added a giant luxury liner to his fleet, using Archimedes as architect in charge. She was called the 'Syracusia' and is described in detail by Moschion, transcribed by Athanaeus (for the Greek text with an up-dated translation see L. Casson, 1974, p. 191-9). Estimates of the vessel's tonnage are based on the detailed list of the cargo she carried on her maiden voyage; they fall between 3,650 and 4,200 tons (the discrepancy of 850 tons being due to uncertainty about which system of metrology Moschion had been using when he wrote: 'a *measure of grain*').

THE 'SYRACUSE GARDEN'

The 'Syracusia's' holds were of course filled with vegetable matter in the form of grain, but it is the decorative use of plants that captures the imagination and already poses a specific botanical question. Passengers were accommodated on the uppermost of two decks, where floors were paved with multi-coloured mosaics illustrating the Iliad;

the state-room cabins had three couches; walls bore paintings; a chapel dedicated to Aphrodite was paved with agate and other Sicilian stones; one of the doors was made of "aromatic cedar" with ivory inlays. There was also a well-furnished library and reading-room; a gymnasium, a bathing pool (as well as some copper baths). All this was interspersed with promenades, leading between beds of plants and arbours of white ivy and grapes, or according to Cecil Torr (1894) "covered walks shaded by vines". Aft of this luxury, there were 10 stables for horses; with other compartments for their fodder and gear, riders and grooms. Such riches would attract pirates, so security was assured by armed marines posted above the passenger area, behind protective screens, they also had devices for dropping missiles onto attackers (all designed by Archimedes).

Giantesses have their disadvantages and the 'Siracusia's' were that she was no *caboteur*. She had turned out to be too big to get into some of the harbours where she should have called, "When Hieron heard this..." he gave her to Ptolemy, since Alexandria was not only the biggest importer of Sicilian grain, but the 'Siracusia' could lie safely in her harbour. Moschion's story ends at this point; whether the vessel, now renamed the 'Alexandris', ever returned to Syracuse (by avoiding the smaller harbours) is unclear; there were, however, the 60 other grain-ships still plying the line, so it would be interesting to know the nature of their return cargo, since it would have been unusually uneconomic to travel empty but for ballast.

THE WILD PAPYRUS OF SYRACUSE

Papyrus as well as being a decorative water-plant, was one of Alexandria's principal exports throughout antiquity. Moschion himself was probably using it to write on, but he does not mention it as decorating the bathing pool on the 'Siracusia' during her maiden voyage, while the return car-

goes of the 60 other grain ships on the Alexandria line are unknown; two growths of *Papyrus* beside the Great Harbour of Syracuse are therefore enigmatic.

Vessels enter this large Bay, through the opening between the rocky Cape Plemyrion and the rocky island (now joined to the shore) which bore the nucleus of the original Syracuse. Once inside the Bay, which is over 6 km. long and 3 km. wide, vessels can either lie at anchor in the middle of it, or tie up near the center of the town. A few passengers, coming mostly from Malta, still disembark near the spring named after the Nymph Arethusa, where the first of the two growths of *Papyrus* meets the eye. A clump of very big plants flourishes in this spring which Pausanias and Strabo describe at beach-level. Now, since Syracuse went on being overbuilt, this pool is well below the level of the present town (Fig. 14).



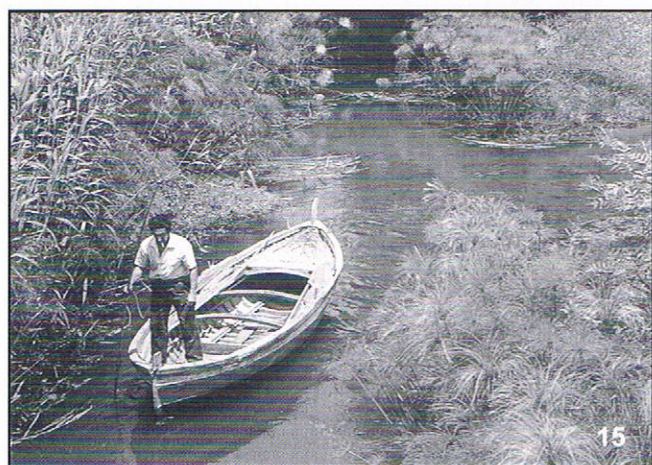
14 Syracuse Harbour; the growth of *Papyrus* in the freshwater "Spring of Arethusa" (where vessels have always taken on water); described in antiquity as on the beach, this spring is now several meters below the level of the present town.

Ships took on water from it and according to the British archaeologist who lived in Syracuse, Margaret Guido (1958), Nelson's fleet did so before sailing for Alexandria and the Battle of the Nile. It is not known how, or when the sub-tropical *Papyrus* arrived in Syracuse (and nowhere else in the Mediterranean), but it could have been deliberately planted there at almost any period, then gone on flourishing in these well sheltered

surroundings. The second growth of Syracusan *Papyri* is even stranger.

Across from the town, the Bay's landward shore is long, low and marshy, with a river mouth in the middle of it. The mouth belongs jointly to the Anapo and Ciani Rivers. The Anapo is a "normal" river flowing down from hinterland hills; the abnormalities of the Ciani include the second growth of *Papyri*.

FONTANA CIANI AND THE PAPYRUS MUSEUM



15 Wild Papyrus along the banks of the Ciani River; which rises from a legendary spring, then meanders along before joining the Anapo River and flowing into the Bay of Syracuse. This wild Papyrus suggests a monopoly-breaking connection with the Papyrus whose growth in the Nile Delta was deliberately restricted.

Wild *Papyrus* (Fig. 15) covers the banks of the Ciani River for a distance of about 7 km. and surrounds its source which surges up through a small lake, or large pool. Sport divers interested in speleology visit it, but the water there is untemptingly cold, dark and filled with roots, so suffice it to recall the legend. Ciani (one of Persephone's nymphs) was also, like her mistress, abducted by Pluto who, to get her (now in floods of tears) together with his chariot back to the underworld, had to strike the earth with a trident to open a tunnel down which they drove. Ciani's tears never abated; hence the river.

The wild Syracusan *Papyrus* accounts for the Town's *Museo del Papiro* (see References) which deals with the manufacture and use of the plant as

a writing-material, leaving the history of its presence in Sicily uncertain. Some claim that the plant is indigenous, others that it was introduced from North Africa by Arabs, who besieged and occupied Syracuse for a relatively short spell during the mid-ninth century. This was a transitional period, because paper had already been invented in the Levant, although it did not completely supplant Papyrus until the tenth century (Ali Mohamed Fahmi, 1950 pp. 2-3). In any case, nothing indicated that Papyrus was either cultivated, or manufactured beyond the Nile, where its growth and export were particularly connected with Lake Mariotis (which in antiquity preceded Alexandria as the outlet for Nile into the Mediterranean). Trade in papyrus reached a peak during the Ptolomaic period, so it would have been natural to have carried manufactured papyrus to Syracuse in the empty holds of returning grain-ships. Furthermore, industrial espionage and theft are nothing new and the Syracusians had good reason for challenging the monopoly of papyrus cultivation in Lake Mariotis where, according to Strabo (who was referring to the species of the *Papyrus* called 'Byblus'), states that "*certain of those who wished to enhance the revenues, adopted the shrewd practices of the Judaeans... for they do not allow the Byblus to grow in many places, and because of the scarcity they set a higher price on it and thus increase the revenues, though they injure the common use of the plant*" (Geography, XVII, I).

BYBLOS AND "BYBLUS": TOWN AND PLANT

The Papyrus "*Byblus*" gave its name to the Bible, to books in general and to the Lebanese town which, during the Hellenistic period acted as a staging-post for shipping Delta Papyrus to Greece, whereas during the Bronze Age the town's best documented trade had been the export of timber to the Delta. Guide-books call it "Cedar", but there is no proof that this was the only tree involved, while in texts, pre-Linnaean plant-names are dubious. Nevertheless recent plant-anatomical identifications of Egyptian objects in museum collections are confirming the importance of Cedar (for an up-to-date overview

see *AHL* 14, *Cedrus Libani*, 2001). Cedar trees grow in many parts of Lebanon, but at Byblos the advantage was that the hills behind the town came nearest to the sea and – in the past – this made logging easier (although even by the Roman period they had been damaged

by deforestation and now they are bare (see fig. 22). The *early* history of timber export from Byblos is exceptionally well-attested, by comparison to the *early* history of the town's connection with the Papyrus-trade (a subject to which I will revert).

Archaeologically, a century of continuous excavation on the Byblian headland (by Renan, Montet and the Dunand) confirms that from the 2nd Dynasty (c. 2613-2494) the pharaoh Sneferou ordered the building of forty large vessels for bringing “Byblian” timber to Egypt (Wachsmann, S., 1998). Not long after, a funerary barge *over 40 m. long* was built in Egypt, out of Byblian timber, for carrying the body of Sneferou's successor, Cheops (or Khufu) down the Nile. This vessel which is now displayed in a museum outside the Pyramid of Cheops, incorporates a considerable amount of Cedar (M. Z. Nour, *et al.* 1960; also S. Jenkins, and J. Ross, 1980). Byblos is of course a Greek name; Bronze Age names for the town were Semitic (for instance: Gubla). Our subject being plant travel rather than linguistics, or population change, it might seem better to avoid quibbles, but this cannot be, because the importation of *Papyrus* antedated Hellenism (although by how long has yet to be established).

ISIS AND BYBLOS AND THE DELTA

The cult of Isis was central to Byblos, while her story not only echoes and symbolizes the pattern of the timber-trade, but also closely connects it with the habitat of Papyrus. The Isis story has been handed down by authors ancient and modern: from Plutarch and Diodorus Siculus to J. G. Frazer (1907 and 1949). Maurice Dunand, who mentions the legend in his short but authoritative guide-book: *Byblos: son histoire, ses ruines, ses*

légendes (1963) recommends his readers to G. Lefebvre's (1949) popular text.

Isis went to Byblos in search of the body of her murdered husband-brother Osiris, which had been put into a wooden coffin; thrown into the sea; carried northwards; then washed up onto the Byblian shore. An Erica tree of great size grew round it, so splendidly encasing it that the King of Byblos had the tree felled and used it as the central pillar of his palace (note 1). It is an amusing coincidence that vessels which are either badly designed or too old, are often referred to in English as “wooden coffins”. More significantly, it is the existence of a north-flowing current along the Levant coast. The ancients must have been aware of it, so it is hardly surprising that Osiris' coffin was said to have been carried northwards until it washed ashore on the Byblian headland.

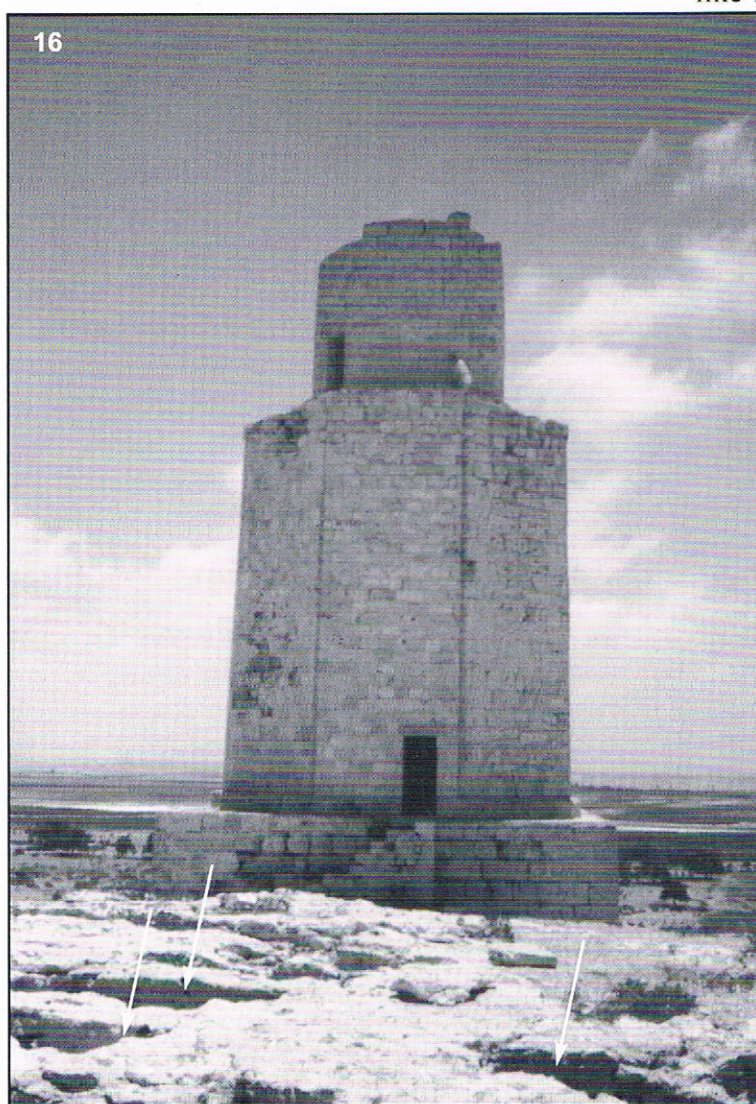
Isis, after getting the tree and coffin back from the King of Byblos, had the coffin shipped to the Delta, but the vessel carrying it sank (as so many timber-ships must have done) not far south of Byblos, opposite the mouth of the Nahar El Fidar (or Adonis River). Undeterred, Isis finally succeeded in getting the body to the Delta, only for it to be stolen and cut into pieces by those who had originally murdered Osiris.

With unwaning determination Isis found and buried 14 of the pieces. As a result shrines dedicated to the “Body of Osiris” sprang up. They include those on either side of the present town of Alexandria. To the west: “Taposiris Magna”, on the rocky ridge that separates the pre-Alexandrian harbour in Lake Mariotis from the sea (the ancient harbour fell into disuse when its entrance channel silted). To the east, Taposiris Parva is also on rocks by the mouth of the sheltered bay (near the present Montazah Palace). Both outcrops, like the spit of rock called Ras Byblos (which runs out from the shore beneath the cliffs of ancient Byblos) bear the remains of coffin-shaped rock-cut, one-person, graves (H. Frost, 2001, Figs. 9 & 10, J.-Y. Empereur, 1998, pp. 222-3). At Taposiris Magna these graves can still be seen round the base of the well-known Hellenistic

tomb, built on the pattern of the Hellenistic Pharos of Alexandria (Fig. 16).

16 Tap Osiris Magna, a ridge between the sea and the Ancient harbour in Lake Mariotis where the

Papyrus Byblus was cultivated. One-place-rock-cut graves (arrowed) are seen around the base of the famous Hellenistic tomb in the shape of the Pharos of Alexandria. The graves are reminiscent of those on Ras Byblos in Lebanon.



THE QUESTION OF RETURNED CARGOES

As with Syracusan grain-ships, there is no mention of what Byblian timber-ships carried back from the Delta. References to the export of timber go back to the 3rd millennium and earlier, but it is not until the Iron Age that a reference to Papyrus appears. Its context is, however, worth examining for the hint it gives that the plant had already been traded at an earlier date.

The inference comes in the story (itself written on a very large Papyrus) of a Priest of Amon who, like his predecessors, had been sent to Byblos to buy wood for the sacred barge in his god's Temple at Thebes. Unlike his predecessors, Wen-Amon had to do his shopping during a period of recession in Egypt. At Byblos, King Zaker Baal (c. 1075 B.C.) complained that the trade-goods the Priest had brought, which included papyrus, were insufficient to pay for the wood he wanted. To prove the point, the King then ordered ancestral accounts to be brought out.

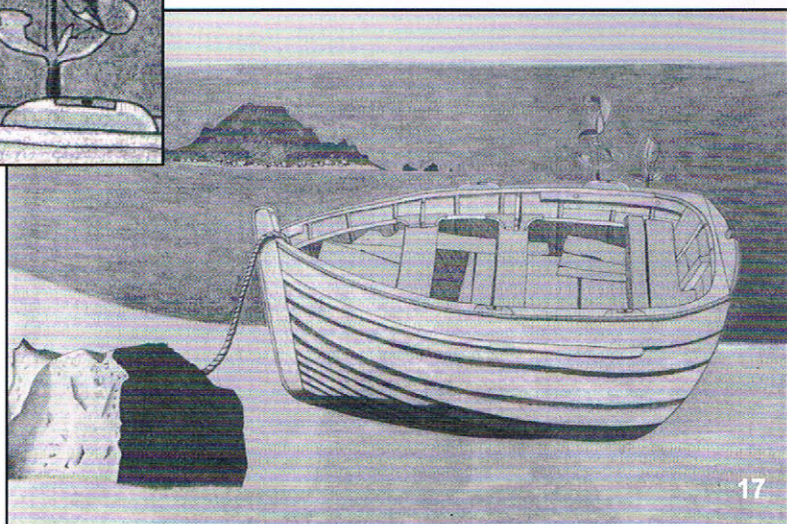
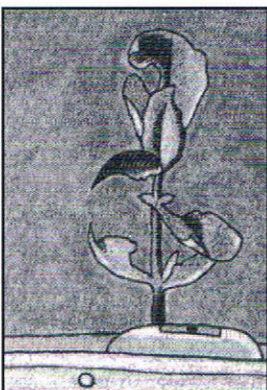
This raises two questions: how many generations of ancestors did the accounts represent? And were the accounts themselves written on clay tablets, or *Papyrus*? The translations (J. B. Pritchard, 1973 and M. Lichtheim 1976) use such words as: *relations*, *forefathers*, then *scrolls* and *journal rolls* which are said to have been *unrolled*. A non-epigraphist may therefore wonder (given that Wen-Amon's journey took place during the early Iron Age) whether Papyrus (among its many other uses) might not have become a writing-material in Byblos some generations before Zaker Baal? Because despite the invention of the alphabet being associated with Byblos (N. Jidejian, 1971), no clay

tablets have been found there (in contrast to the comparable sites of Ugarit and Mari where libraries of clay tablets have been unearthed). The only clay tablets that spring to mind in connection with Byblos, are the pleas for Egyptian help, writ-

ten by the unfortunate Byblian King Rib Addi (1375-1355); these clay tablets were found among the Tell El Amarna Letters. Since wrecks are usually dateable, the remains of a buried hull discovered with some of its organic contents would help to clarify such questions.

PLANTS ON SMALL-CRAFT AND FISH POISONS

17 "Beach scene with a boat" (1945), by Lucien Freud (private collection).



James Ellroy Flecker's poem and Lucien Freud's drawing of a boat evoke the garlanding of vessels and other ancient practices that continue to this day. Boats are not only decorated on launching, but also at other sacred ceremonies and on feast-days, while plant-material is brought on board for many other reasons, for instance: the nuts and olives eaten by Punic oarsmen, or the dried herbs which sponge divers sprinkle on the crumbled cheese they keep tied up in handkerchiefs and eat as snacks, or the leguminosae wild or cultivated, which they add to the fish *corba* they boil-up on board in the evening. Sicilian boatmen still carry a bunch of garlic – not for eating, but against the evil-eye (because the devil does not like its smell). Lebanese fishermen use a herbal poison to stun fish which, after eating it turn white and float to

the surface, where those big enough are collected and the rest abandoned. The practice goes back to antiquity.

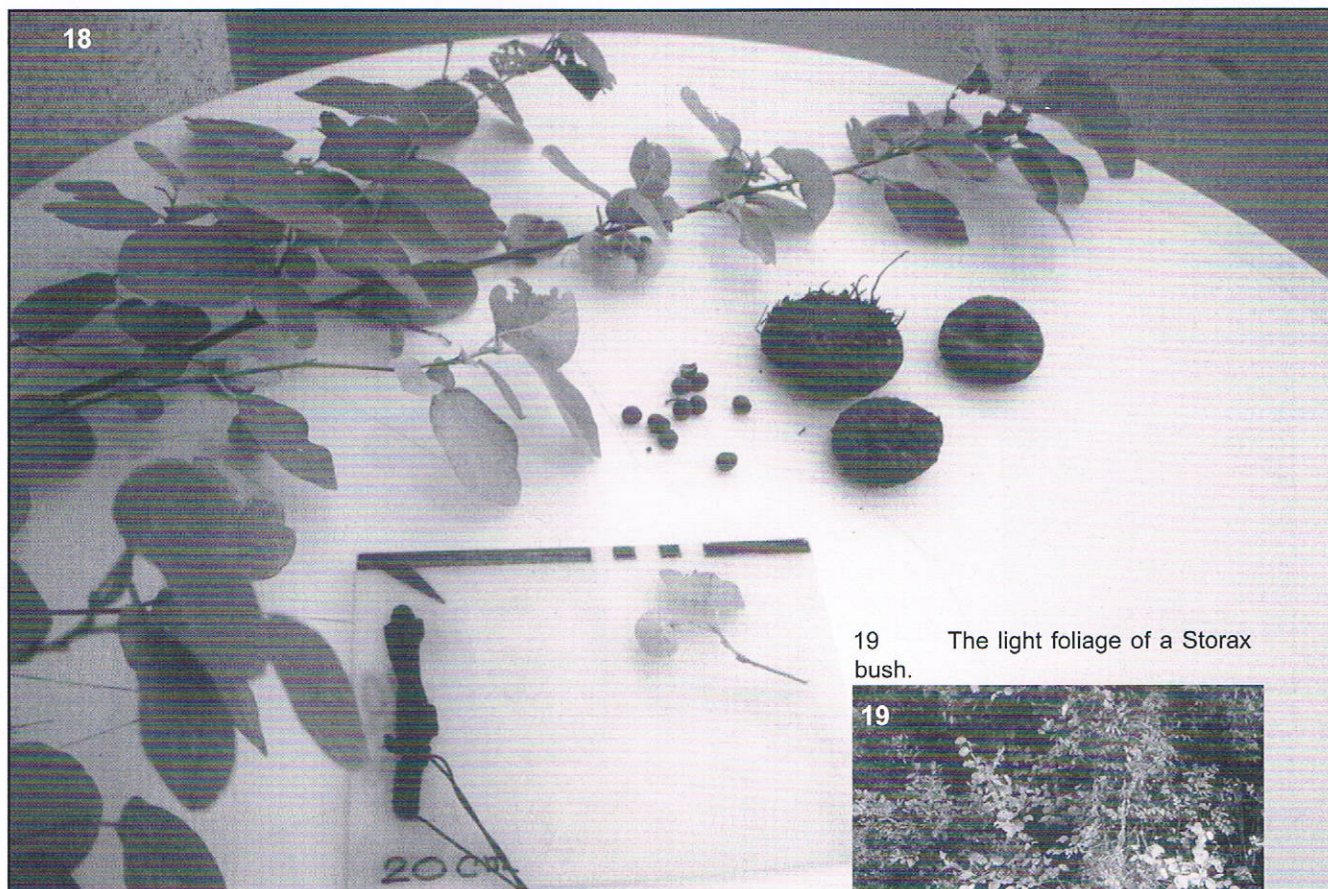
Recently off Byblos (the modern Jbeil), while anchored at a depth of over 30m. on a fishing-ground two kilometers from the coast (where the ships that carried timber to ancient Egypt had probably dropped their anchors), I noticed a ring of small, white and seemingly lifeless fish round a fisherman's float. This was surprising, because it would be well-nigh impossible for dynamite to be effective in such deep water and also where no dynamiter could even see the fish he was aiming at. My questions to our boatmen about these little fish, obviously too small to be worth picking up, met with the answer "*haouze*".

Later, I was told by the diving instructor at a sporting club in Beirut, that he deplored the revival of *haouze* (caused by the increasingly severe punishments for using dynamite) commenting that dynamiters only let fly when they could actually see fish that would sell for more than the cost of their dynamite (\$2 per kilo), whereas *haouze* (which is cheap and can be home-made, kills indiscriminately, as was already apparent from the "small-fry" floating off Byblos). Nevertheless making *haouze*, that is to say collecting the wild plant-material; drying it; pounding it down, then mixing it for use at sea is very laborious, so a ready-made chemical that looks like white powder is now being substituted.

Research was sparked off when this matter was discussed at table with friends: Imad Saïdi went down to the local hardware shop to see whether the original plant poison was on sale. He returned with a packet of dried, blackened seeds, not unlike small, cherry-stones. He then embarked on the etymology of the word "*haouze*" (which turns out to be a generic term which also takes the form of a verb used by fishermen in the sense of "to poison (fish)". As to the packet of dried seeds: no satisfactory botanical identification could be found either in Lebanon or London.

On the following year (2003) I returned to Byblos in the month of October to catalogue votive stone anchors excavated in the temple-area; this gave the opportunity to continue *haouze*-research through the local community, in particular through Monsieur Dib Bilen, his grand-son Pierre and my colleague

Dib Bilen also remembered that as a boy he had used cyclamen tubers to poison fish, gathering them from beneath the few remaining pines on the hills above Byblos. Even fewer trees survive there now (fig.22), while by October no cyclamen leaves remain to mark buried tubers, so he lead us to Amchit where, on a private estate, a friend knew the exact location of his cyclamen clumps.



19 The light foliage of a Storax bush.



Michel H  lou. Two “*haouze*” plants were found (Fig. 18), the samples were put into “deep-freeze” and carried back to London, where I am indebted to F. Nigel Hepper for the identifications and two historical references. The dried seeds that looked rather like cherry-stones, turned out to be from a green cherry-like fruit growing on a small tree (fig. 19) called *Styrax officinalis*, or Storax (in Lebanon, the previous year, it had been suggested they might be from *Prunus ursina*). Another plant used to make *haouze* is the tuber of wild cyclamen (*Cyclamen persicum*). Storax grows in the verdant valleys that cut through the coastal cliffs on either side of Byblos (our specimens came from the Astarte valley just north of the ancient town (figs 20 and 21).

18 A Branche of Storax, *Styrax Officinalis*, note its green cherry-like fruits, one of which is laid below the centimeter scale on the writing-tablet; between the two are some of the fruit’s small blackened seeds (bought in a Beirut hardware shop) and to the right, three large, dark Cyclamen tubers.

We returned to Byblos carrying samples of both storax and cyclamen, confirming what fishermen had already told me: contrary to what one might expect, *haouze* plants do not grow on the sea-shore.

The poison is made by drying the seeds and tubers, then “pounding them down like *khibbé*” (Lebanese *khibbé* is made in stone mortars). How the poison is administered to the fish is less clear. In pools where there is no current it can be used in powder-form, otherwise it is mixed with bread and made into pellets, to which “sand” can be added to prevent

them from floating away (the sand is no deterrent to fish, since they normally find their nourishment in either the sand or mud of the sea-floor, or by nibbling away at rocky-concretions).

20 The road up the uninhabited Astarte Valley ends in an industrial building, Monsieur Dib Bilan with its caretaker



21 The end of the road: the caretaker holding the Storax branch he helped to cut.

Michel Hérou's relatives in Byblos recalled a method of using *haouze* in the kind of rock-pools known to geologists as “solution-basins” or “*marmites*” (see *AHL*-N°15, 2002, p. 74 and figs 29 and 30). The Mediterranean tide of only 20 cm. is suffi-

cient to carry fish into such pools as it rises, leaving some of them stranded as it falls. Boys choose the right moment to dose a pool with bags, or weighted pellets, or simply scatter *haouze* in powder-form in pools that do not “leak”; if they do, any channel through which water and with it fish may escape, can be deliberately blocked up. As proof that ebbing tide strands fish, I remember finding a large flying-fish in a pool too small for it to be able to gather momentum to take-off again. But of course the average size of the stranded fish is relatively small, although quite large enough to make a family “*fritto misto*”. Poisoning pools is only good for subsistence-fishing; it cannot produce a marketable catch.

22 Monsieur Dib Bilan searching in vain for cyclamen in the now de-forested hills behind Byblos.



How *haouze* is administered in deep-water for commercial fishing is less clear. Combining the poison with conventional nets or hooks would obviously be a contradiction in terms, since if a fish swallows bait from a hook, there would be no need to poison the bait. Probably *haouze* (in bag- or pellet-form) is released on the bottom from some kind of container, strategically placed, so that once the fish are stunned by the poison, they will reach the surface within a calculated area marked by a float (as was the case in the above mentioned example on the Byblian fishing-ground). But whether fish are caught in a rock-pool or at sea, they are always gutted immediately, on the spot. More research is needed on the possible effects of fish poisons on fish eaters.

HAOUZE IN HISTORY : ICONOGRAPHY & THE CONSUMPTION OF GROUPERS

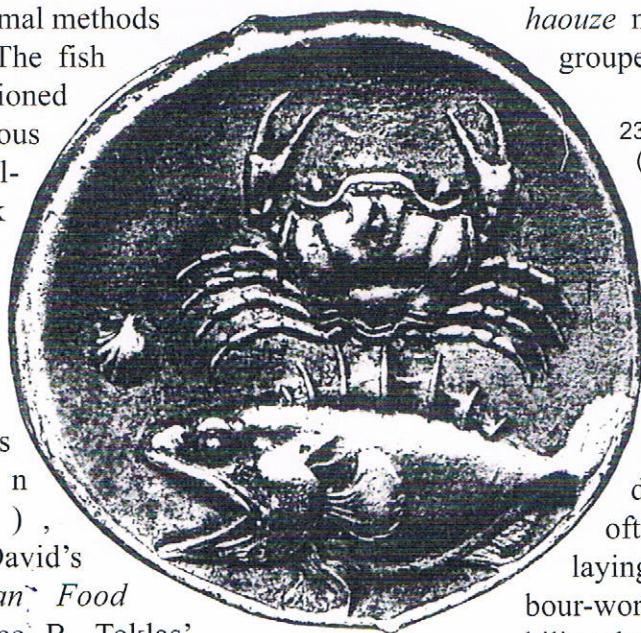
I am indebted to Nigel Hepper not only for identifying the samples of *haouze* I brought back to England in 2003, but for the following references

(from a fuller account he is preparing for the Journal *Economic Botany*, published in New York). Firstly, *Cyclamen persicum* contain the poison cyclamine which, according to Pliny was used on arrowheads. Secondly, that C.C. Georgiades in his *Flowers of Cyprus: Plants of Medicine* (p.31, 1987) says "The writer met an old fisherman in the District of Paphos using cyclamen tubers as bait for fishing; he said "it paralyzes the fish". Other references to the ground seeds of *Styrax officinalis*, include their use in powder-form in mountain streams where "it froths and stupefies eels, which come to the surface half-stunned and are easily caught" (I presume that the powder would be put in rock-pools, rather than scattered mid-stream where it would be quickly dispersed).

Representations of the thick-lipped, rounded finned grouper on coins (fig. 23) and on fish-plates of classical antiquity are intriguing, because these game-fish are still difficult to catch by normal methods of fishing. The fish is not mentioned in such various yet well-known cook books as *La Cuisine Bourgeoise* (Urbain Dubois, 1883); Mrs Beeton (1861), Elizabeth David's *Mediterranean Food* (1955); Alice B. Toklas'

French Cookery, (1954); Alistair Little's fashionable recipes (1993) or Anissa Hérou's *Lebanese Cuisine* (1997). This is probably because groupers are fished more for sport rather than commerce. They became fashionable as a by-product of Cousteau's publicity for scuba-diving. In smart Mediterranean restaurants where customers look at uncooked fish before choosing the one they want, the hole left by the sportsman's arrow is often pointed out to them with pride, and a sport-diver who bought a grouper in a fishmonger's (a rare find), is reputed to have taken it to his diving club where put an arrow through it, before taking it home to impress his wife.

Groupers are seldom netted; they are wary, intelligent fish, often growing to a large size and living to a ripe old age, in lairs under rocks at a depth of around ten metres. They sally forth to find food, but on seeing a predator above them, scurry back home. The hunter then has to wait above the lair until the fish puts its head out to see whether the coast is clear, at which point he must dive down deep enough to shoot a spear through the spine, behind the head. Hunting groupers in this way, would be almost impossible without a good mask and spear-gun, so how was it possible that the fish become so familiar to the artists of antiquity? The answer may be "*haouze*", for fishermen acquire a good enough knowledge of fish and their habitat, to be able to place a suitably disguised dose of *haouze* near a lair and wait for the stupefied grouper to float to the surface.



23 A grouper on a coin of Agrigento (Babelon J. *Chefs d'oeuvres des monnaies grecques* (Paris 1952, Pl. XXXIII, Agrigente, 413-406 A.C., N°166)

ENVOI

Lebanese divers may at any time be called upon to report on the remains of plants. Such material is not only found during the excavation of wrecks, it is often uncovered accidentally during the laying of a pipe-line, or the building of harbour-works. It is also within the realms of possibility that, sooner or later, deep-water remote-

controlled investigations may lead to the discovery of a Byblian, Bronze Age shipwreck, perhaps containing a cargo of timber, or papyrus. In June 2000, surveying by Robert D. Ballard, in extra territorial waters off the Sinai Peninsula produced astonishingly clear photographs of the remains of two Phoenician wrecks of the 8th century B.C. The hulls were sand-covered, but the protrusion of the top layer of solid cargo (in both cases amphorae) together with the piles of stone anchors marking the vessel's bows, were sufficient to define their character.

On a sandy sea-floor and at depths of several hundred metres, the preservation of organic matter ought to be good. One could not expect to see a cargo of papyrus, although small submersible and remote-controlled vehicles have arms that could pick up some solid object containing a sample of vegetable matter. On the other hand, the straight lines of large tree trunks under a blanket of sand might well show up under a ROV's flood-lights. The survival of wood and other plant material does of course depend on the chemical environment of the part of the sea-floor on which it has come to rest (and chemical environments can vary considerably even within a single small area).

It behoves diving archaeologists to prepare themselves for botanical finds. Raising them is a skilled job, but much the same applies to organic matter on land when it has been preserved in the dryness of Egyptian tombs or encapsulated in Siberian ice, or in any other environment where mummification may be encountered. Conserving such remains may not always be possible, but recording them and taking samples is 'a must'. In addition to the standard archaeological questions relating to who traded with whom at a given period, plant material opens countless wider vistas relating to social history, superstitions, religious practices, methods of fishing, the history of medicine and so on.

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I thank Dr. F.N. Hepper for his identification and comments on the "haouze" plants and also for pointing out the existence of the tree: *Erica Arborea* (among the otherwise small heath plants in this family). The tree occurs naturally in "S. Europe, N., Africa and northern Asia Minor as far as Lazistan and the foothills of the W. Caucases".

Note

One possible explanation for the name Haouze in arabic is that it derives from the word "water container" or "water tanker".