WHERE DID BRONZE AGE SHIPS KEEP THEIR STONE ANCHORS?

The question might seem trivial unless one actually gets the feel of such anchors. Imagine your largest suitcase turning into stone and - instead of a handle - having a hole through it! Its weight would have increased to about 100 kg. This would make it well nigh impossible to lift, even if it happened to be standing upright, but supposing it was lying flat on the ground? Having no handle, it would have to be levered up, so that rope could be passed underneath, then looped through the hole, as a substitute handle. Meanwhile if the stone fell over accidentally, it would probably break. Sorcerised suitcases are mythical, but the present corpus of Bronze Age anchors is both real and significant. The weights of such pierced-stones range from less than a kilo to over a ton, depending on the kind of floating object they were intended to immobilize (from fishing tackle to large vessels). The weights relevant to this discussion are in the order of 100 to 200 kg.

Technically, anchors made of stone are a most inefficient means of immobilising any vessel so, in order to compensate for this, and bearing in mind that square sails forced Bronze Age craft to drop anchor on dangerous mooring places, all Bronze Age cargo ships had to carry very large complements of anchors. Typologically, the date and shape of certain Bronze Age anchors can be gauged from the speciments offered in such places as the four Late Bronze Age Temples at Kition in Cyprus[1] and various sacred contexts at Ugarit Ras- Shamra in Syria, particularly in one of the two Temples on the Acropolis[2]. This temple was dedicated to the Weather God, Baal Sapounah; whereas its twin temple, standing on the same hill, was dedicated to the Earth God Dagon (the latter, being of little use to sailors, got no anchors offered to him).

On these two Late Bronze Age sites there was a high percentage of very heavy anchors, whereas in the Middle Bronze Age temples at Byblos, only one anchor weighed as much as 200 kg[3]. At Kition, the number of anchors weighing over half a ton suggests that some Late Bronze Age craft must have been giants, analogous to the great Corn Ships of Rome (probably represented by the 4m. lead stock weighing 1,860 kg., found off Malta, now in the Maltese Maritime Museum Fig. 1). Bronze Age giants are, for instance, suggested in Temple No. 4 at Kition, by 6 anchors each of which weighs in the order of 850 kg., while another (so far unique) weighs 1,350 kg. The average weight at Kition can, however, be considered as around 100 to 200 kg.

Considering that a man cannot be expected to handle much more than 50 kg., especially on a moving boat, anything larger would have had to have been lowered mechanically (with the exception of certain pyramidal anchors with a wooden handle, designed to be lifted by two men[4]). The traditional mechanism used for lowering weights is a mast-derrick, such as the one appearing on a Cypriot jug in the British Museum (Fig. 3). This painting shows a vessel whose cargo is symbolised by two pithoi; at the prow, a sailor is depicted in a characteristic pose: with one of his hands steadying the wooden bar, or derrick coming from the mast, the other guiding the cable from which hangs a heavy stone anchor. Admittedly the jug is 8th rather than 13th century BC, but the device it shows is so simple that it probably came into being with the mast itself.

I must, however, draw attention to an iconographic pitfall which might puzzle anyone looking at a drawing of this much reproduced painting instead of either the jug itself, or a well-angled photograph of detail such as Fig. 2. Because the jug is round, when the painting is traced off it, the result looks distorted; as on Fig. 4, the hull of the ship curves like a half moon; the steering-oars are nearly horizontal, while the anchor at the end of its cable flies off obliquely. Looking again at the photograph, it becomes absolutely clear that the artist meant to show the boat floating horizontally and the anchor dropping vertically.

Mast-derricks being still in use, Fig. 3 shows a contemporary version of the jug painting; both the ancient and the modern sailors are in the same position: with one hand steadying the derrick, the other guiding the cable. Curiously enough the contemporary sailor is raising a concreted mass of Bronze Age ingots, for this photo was taken by the late Joan du Plat Taylor, at Cape Gelydonia, Turkey, during George Bass' first excavation in 1960.

Naturally, all stone anchors dangling in the air from ropes, are liable to hit something hard and so get their bottoms chipped. But once in the denser element, water, the danger is minimal. I will not demonstrate the point by dropping a carafe of water on the floor, because you all know it would break, whereas if I threw it into the sea, it would not. This law of nature is signifcant, because it relates to deductions regarding damage to anchors, made by two scholars of such eminence (the late Prof. Claude Schaeffer and more recently George Bass) that they are liable to be handed down to generations of students. Consequently, the causes of chips and breaks on ancient anchors need to be scrutinized, before passing on to the related subject of how and where stone anchors were placed on board a boat.

In the last volume of Ugaritica[5], Prof. Schaeffer himself, commenting the Ugaritic Temple anchors, stated that the fact that their bottoms were chipped, proved that they had been used at sea before being "re-used as building stone" on land. Both statements are missaprehensions. Bass, writing recently in the American Journal of Archaeology about anchors still in situ on the magnificent B.A. ship (which he is at present excavating with Cemal Pulak, off Ulu Burun, near Kas, in Turkey) states that all the "Kas" anchors have chipped bottoms. He then quotes Schaeffer, agreeing with him that the damage must have ocurred when the anchors landed upright on rocks on the bottom of the sea and reiterates the view that the anchors in the hill-top Temple at Ugarit had been re-used as building stone[6].

Current research at Ugarit Ras-Shamra bears out the opposing view. I am grateful to the present Director of this excavation, Prof. Marguerite Yon, for the opportunity to re-examine the Ras Shamra anchors in the light of new evidence and revise the summary catalogue which I made of them some 25 years ago[7]. It is now clear that only some of the Ras Shamra anchors had chipped bases and that this damage had ocurred in the air and not undersea. The 4 largest and most important anchors from the Temple of Baal were dug, for instance, during an Ottoman excavation in the late 19th century (Schaeffer took over the site in 1922). Inevitably, these like other anchor-stones were moved around and, since their significance was not understood until the 1960s, they were handled none too tenderly; most of them have ended in the Excavation's headquarters by the sea. By contrast the bases of anchors which remained built into temple walls had un-chipped bases which were good as new. In addition, it has gradually become clear that on all the principal temple-sites : Ugarit, Kition and Byblos, not only were most of the anchors evidently new and without any certain sign of wear, but also there

were unfinished anchors on each of the sites. These unfinished anchors appear to have been made on the spot, indeed at Kition, examples were found in the Workshops attached to the Temples. Modern stone anchors (for it must be remembered that they are still used in the Mediterranean on small boats, see Fig. 5) are not, incidentally, characterised by chipped bottoms, but of course they are much lighter - in the order of 20 kg. - so that they can lie on deck and be lowered manually; I have often watched them underwater (Fig. 6) and have never seen one getting damaged on the bottom.

The chipped bases of the Kas anchors, as described by Bass in the American Journal of Archaeology, are more likely to be attributable to having had to have been kept upright - like amphorae - on board the boat, rather than to accidental damage on the bottom. Had they not been stowed upright, rope through their apical holes could not have been quickly tied to the end of the mast-derrick. This derrick had not only to drop anchors overboard, but also to pull them out of the sea again, then drop them back into their alotted positions on board. During the second operation the base of a dangling anchor would almost inevitably knock against something hard, especially if the sea were choppy. It follows that those anchors which survived long enough to be used twice (for losses must have been frequent) would not only have had to have been kept upright, possibly in compartments, they would also have had to be kept within easy reach of the derrick's "arm". Conversly, some 20 slabs of stone each about a metre long could hardly have been laid out on a fore-deck (nor were they so laid out, according to the plan of this wreck-site).

The latest, splendid phase-plan shows that the ship landed on a steep slope so that everything topled over, then started slipping downwards. At the top of the slope we see a concentration of small cargo including Canaanite jars; then a stack of ox-hide shaped ingots; then a row of 6 large and 1 small anchors; then a row of 4 large pithoi which, because of their shape, because of the air originally trapped inside them etc. became displaced, rolling downwards around a rock which sticks up out of the bottom. There follows a second stack of ingots (which because of the increased gradient have slipped); a second row of 7 anchors (which for the same reason are also in worse order than the first). Beyond this point, at the other extremity of the hull, there are small finds (not shown on the plan). The full complement of anchors, so I am told, now stands at a total of 21! Fig. 7 is a hypothetical sketch (suggested to me by the published plan) showing how the many anchors might have been placed within reach of the derrick arm, some distance from the mast, which is itself forward of the ship's centre.

To sum up : a main complement of big anchors was essential for immobilizing Bronze Age vessels on the dangerous stops which their square sails forced them to make. On the wreck at Ulu Burun there appears to have been only one small anchor; I should, however expect that one or two might have been kept on deck for the ship's dinghy, for kedging and so on, but detailed descriptions of the "Kas" anchors are yet to be published; very wisely, the stones themselves are being left on the bottom to hold down and protect the wood of the buried hull until the time comes to excavate it.

That the anchors on this Bronze Age wreck are as many as 21 is not surprising to me, but two other findings are. Firstly that (although it is irrelevant to the present discussion), all the Kas anchors appear to be 1-holed weight-anchors. Secondly, it is unusual that a whole complement of anchors should be found in situ on any wreck, since the first thing to be done by a ship in distress is to drop anchors. Evidently the Kas ship must have sunk exceptionally quickly, unlike the two other Bronze Age wrecks have been excavated to date.

On the wreck at Newi Yam in Israel, paradoxically, it is the complement of 15 anchors which has survived, with only one adze, one chisel and a few haematite weights... just suficient to testify the existence of a vanished cargo, thus proving the site to be a wreck rather than some kind of mooring improvised with 15 anchors. The site was excavated by Ehud Galili. The anchors are grouped within an area of 7x7 m., in shallow water near the beach. In antiquity, the depth is estimated to have been 1.50 m., consequently at the time when the ship ran aground, she could easily have been salvaged. Like most people, Galili was so surprised by the number of the anchors, that he has suggested that at least some of them must have been used as ballast (particularly on the grounds that he has not been able to trace missing fragments of 2 of the anchors)[8].

Unlike "Kas", the Bronze Age cargo which Bass excavated at Cape Gelydonia, Turkey, in 1960 did not represent a complete wreck : there were two groups of finds, but no hull. At the time, it disappointed me that no anchors were found, but after over 20 years hope may be renewed, for the site has been revisited and a trail of artifacts discovered; if this trail is followed, it might eventually lead to the place where the distressed ship started casting her anchors.

Other Bronze Age wrecks will doubtless crop up, although it would be optimistic to suppose that many could be as complete as the Kas wreck. It confirms that anchors of the period could be too big for one man to handle and that their numbers could reach as many as 21. Both weight and bulk would have required

a mechanical means of lifting - in all probability a mast derrick - consequently the anchors would have had to have been kept in rediness, well within the reach of the lifting gear. To have laid such a number of such bulky anchors on a fore-deck, would have given Bronze Age cargo-ships the appearence of mini aircraft-carriers. I suggest the anchors were stowed upright in the areas implied by the two rows of anchors which show on the most recently published plans of this Ulu Burun, "Kas" wreck.

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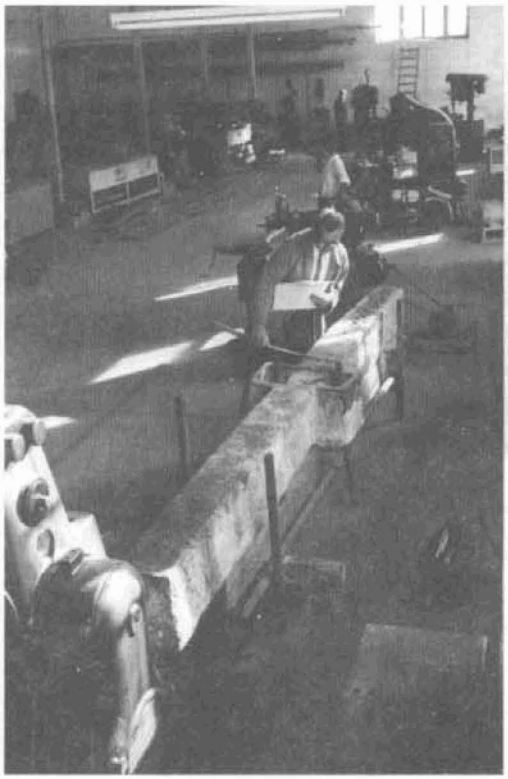
6. George Bass, "A Bronze Age Shipwreck at Ulu Burun (Kas)", *American Journal of Archaeology* 90 (1987), p. 291; see too "The Oldest Known Shipwreck", *National Geographic* vol. 172, 6, 722 (1987). Note : earlier plans appear *in Tropis* I (Ed. H. Tzalas, Athens, 1985).
7. Honor Frost, "The Stone Anchors of Ugarit", *Ugaritica* VI (Paris 1969) 235-245.
8. Ehud Galili, "A Group of Stone Anchors from Newe-Yam", *IJNA* 14, 143-53 (London, 1985).

ILLUSTRATIONS

1. 4 m long lead stock being examined by Gerhard Kapitan; it is now in the National Museum, Vallatta, Malta.
2. Cypriot Bichrome IV jug (British Museum, 1926, 6-28, 9) showing sailor lowering a round shaped stone anchor, from a vessel's prow, by means of a mast-derrick.
3. Sailor using a mast-derrick to lift an object from the sea (photo : Joan du Plat Taylor).
4. Distortion caused by tracing (correctly) the painting on the Cypriot jug fig. 2 above.
5. A contemporary stone anchor ready to be used, on the deck of a small fishing boat (Island of Arwad, Syria, 1970).
6. The modern anchor in (Fig. 5) seen underwater as it was being lowered.
7. Schematic reconstruction howing stone anchors in an upright position, within reach of the mast-derrick, based on (below) the wreck-formation at Ulu Burun, Kas, as shown in the 1987 excavation plans (referred to in the text).



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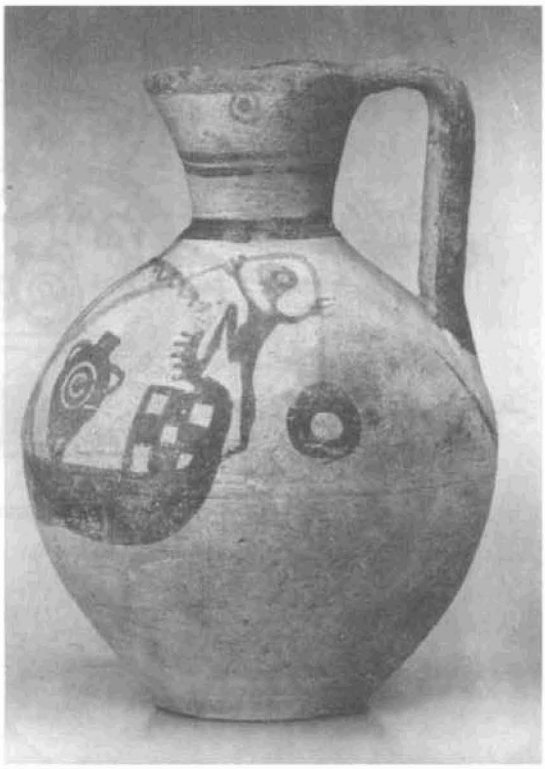


Fig. 2

Fig. 3

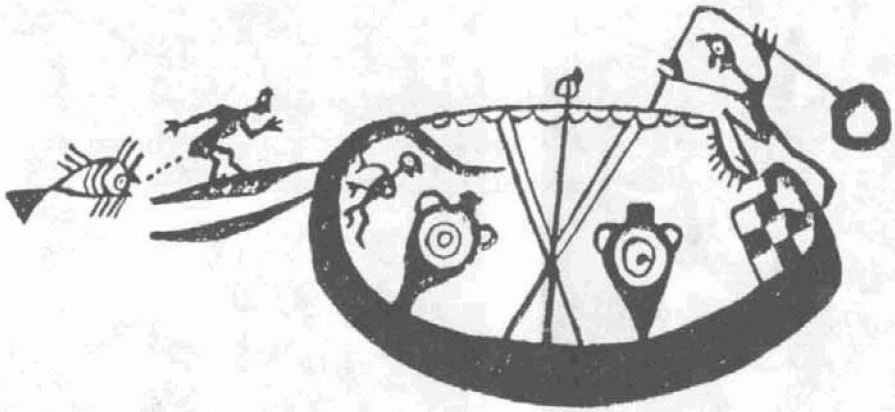
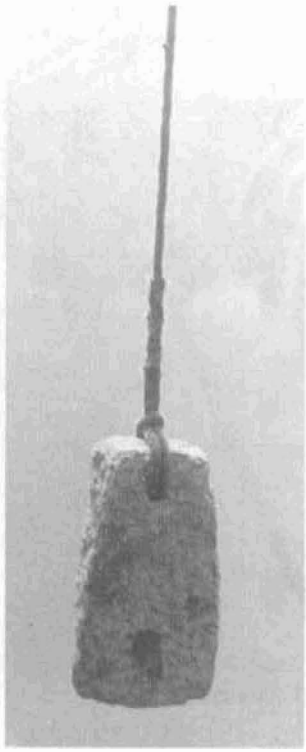


Fig. 4

Fig. 5



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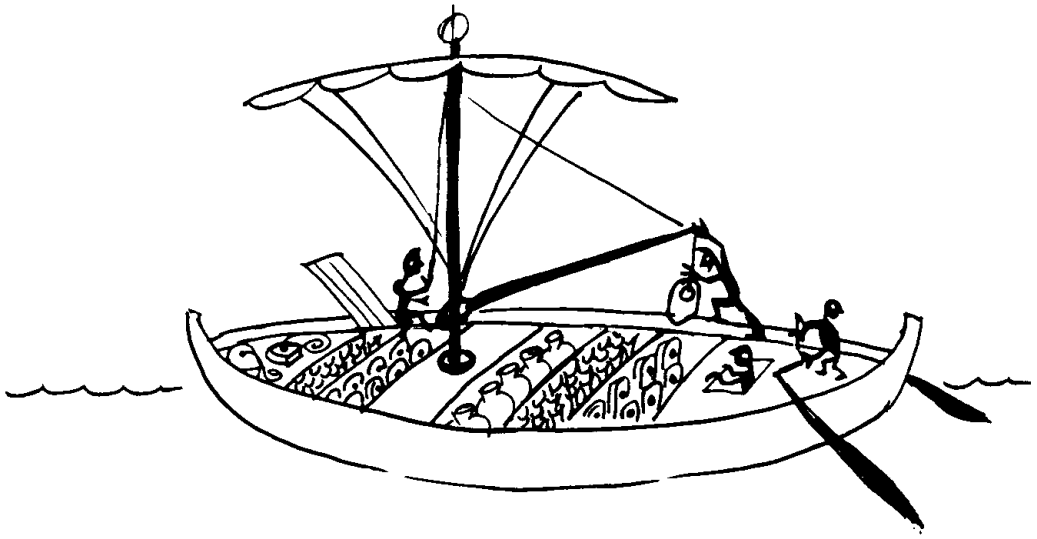

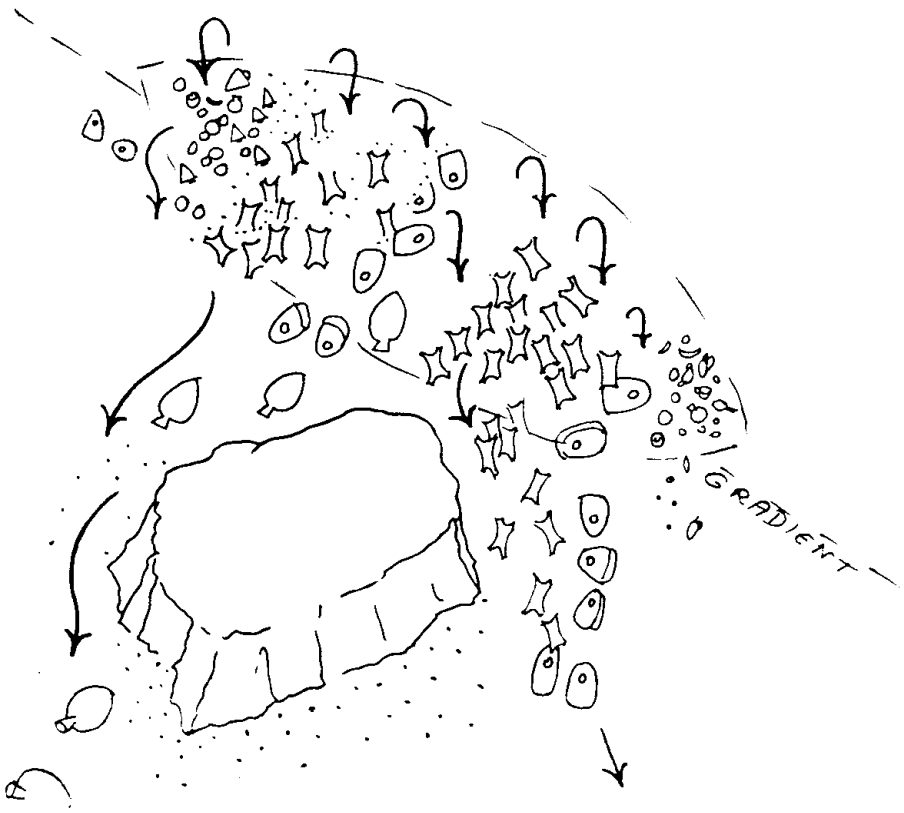

Fig. 7