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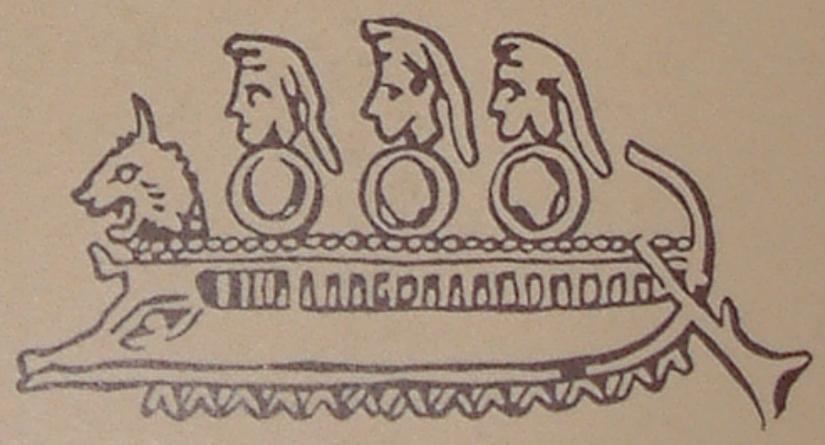

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RECENT OBSERVATIONS ON THE SUBMERGED HARBOURWORKS AT TYRE

BY

HONOR FROST

The traces of Tyre's historic harbours are hard to interpret: Renan, looking down from a fishing boat through two metres of water, was puzzled by columns lying in what seemed to be an absurdly small and unsheltered "harbour", attached to the south of the peninsula. In 1934, Père Poidebard's pioneer research "on land, from the air and from underwater" produced an invaluable plan covering some 5 km. of the now submerged harbour area (1), but his findings have never been entirely accepted. The persistence of certain questions was natural: the remains reported by professional divers could neither be examined by archaeologists, nor related with certainty to a particular level of excavation on land (because there was no method of dating architecture in marine conditions).

The notes that follow record dives that I made in 1966 in order to see some of the most puzzling areas mentioned by Renan and Poidebard, while at the same time trying to assess whether, by using modern methods, it would be possible to add to Poidebard's picture of this exceptionally complicated site.

I am deeply grateful to the Emir Maurice Chehab, Director General of Antiquities, for allowing me to dive at Tyre, for the facilities he has always so readily granted, and for the cooperation of his staff. My thanks are also due to the *Reis el Mina* of Tyre, Captain George Mahaowei for his good counsel, and to M. Artin Der Simonian for his painstaking treatment of underwater photographs made in unfavourable sea-conditions. His skill in this respect was, incidentally, acquired in the service of Père Poidebard.

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(1) A. Poidebard, *Un grand port disparu: Tyr*, Éd. Librairie Orientaliste Paul Geuthner, Paris, 1939.

It is impossible adequately to express my indebtedness to the late M. Henri Seyrig, then Director of the French Institute of Archaeology; without his encouragement, and the hospitality of his Institute, I could not have pursued this line of research along the Lebano-Syrian coast. My obligation to the staff and members of this Institute is very great.

THE OFFSHORE REEFS.

As an island, Tyre was central to a reef running parallel with the coast. Assuming a change in sea level, Poidebard postulates that because reefs afford the only natural shelter, those at Tyre would have been used as "outer harbours" (as distinct from "closed harbours" within the city's fortifications).

The reef is now submerged, but when in 1697, Maundrell (1) saw from a vantage point in the town the bays north and south of Tyre were "*defended from the ocean, each by a long ridge, resembling a mole, stretching directly out, on both sides, from the head of the island; but these ridges, whether they were rocks or walls, whether the work of art or nature, I was too distant to discern.*" A localised rise in sea-level in relation to the land has been reported, not far south of Tyre, at the Roman port of Caesarea, where the subsidence has been estimated as five metres in the last two millenia (2). The accepted, general, post-glacial rise in the level of the Mediterranean does not explain the more recent, localised oscilations observable along the Lebano-Syrian coast. In contrast with Caesarea, for instance, there are indications that the island of Sidon has remained at virtually, the same sea-level during the past two millenia (3), while a strip of coast north of Beirut (which I will discuss later in connection with the fish-tank at Bouar) has risen by 80 cm. out of the sea since late Roman times.

A combination of factors could account for the disappearance of those Tyrian reefs which Maundrell saw: man's intervention, erosion and earthquakes. Alexander's causeway turned the island of Tyre into a peninsula, thus upsetting the equilibrium of the area by diverting the flow of marine currents. The erosive force of currents that could no longer flow round the island would have been unleashed on

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(1) Henry MAUNDRELL, *A Journey from Aleppo to Jerusalem*, edited by David Howell, p. 66, Khayats, Beirut, 1963.

(2) KELLER-AMIRAN, "A Revised Earthquake Catalogue of Palestine", *Israel Exploration Journal*, Vol. I, 1950-1, pp. 223-246.

(3) Honor FROST "The offshore island harbour at Sidon and other Phoenician Sites in the light of new dating evidence". *The International Journal of Nautical Archaeology*, Vol. II, No. 1, March 1973, Seminar Press London & New York.

the southern reef, which was already attacked by the prevailing swell from the south-west, and possibly weakened by man-made rock-cuttings.

The southern reef is now entirely submerged; the northern is still marked on the surface by a few rocks. These may soon disappear under the pounding of the waves, to judge from the newly broken fragments that litter the slopes of the reef. In addition, earthquakes, so common in this area, must also have contributed to the disappearance of the two reefs.

The Southern reef: existence of constructions?

Poidebard alleges that there are traces of construction on the submerged, southern reef, at depths of between 9 and 15 metres and at a distance of some 2 km. from land (1). From a boat on the surface, he noticed two alignments of blocks, respectively 500 and 390 metres long, which he identified by buoys "OP" and "AQT". These he interprets as "*moles*" or "*brise-lames aménagés sur hauts fonds*". His divers reported that *seen in elevation* these wall-like constructions were, in places, "twice the height of a man", having more than one course of masonry with *alternating joints* (a phenomenon which could not be natural). As additional proof, a sample of a block raised by his divers from AQT was found to be conglomerate, a stone unlikely to exist in conjunction with the *rameleh* of the reef.

Poidebard's photographs of OP and AQT (taken from the surface) are very persuasive. In my own diving experience I had never seen such regular fissuring on any dunary reef along the Lebano-Syrian coast; nevertheless, his interpretation remained in dispute. Neither view could be conclusive because neither Poidebard nor his critics had seen the "walls" in elevation. In September 1966, I dived on both sites; what I saw confirmed Poidebard's critics regarding OP and AQT, in particular, though it does not invalidate his general suggestion that the reefs might have been used as "outer harbours".

At no point on either OP or AQT could I find a height of more than 1.50 m. (plate 1), or indeed any second course of masonry; consequently, no alternating joints. What I did find was that these curiously regular, wall-like formations consisted of rock that had been deposited in layers only about 30 cm. deep; this structure was most pronounced at AQT (see plates 2 and 3). Seen from above, the fissuring was surprisingly regular in some places, but somewhat similar formations do exist on land, along the coast.

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(1) A. Poidebard, *op. cit.*, pp. 31-37, Carte I, Pl. VII, and XIX-XXV.

ALIGNED COLUMNS IN THE SOUTHERN "CLOSED HARBOUR".

The foregoing observations show Tyre's harbourworks to be more obscure han might have been supposed either from Poidebard's publication, or by comparison with contemporary ports such as Sidon, Ruad and Tabbat el Hammam (1). In 1963, I buoyed the columns that are aligned within the mole which bounds to the south the small "Closed Harbour" adjoining the present excavations. The columns thus marked were situated by theodolite readings, and transferred onto Poidebard's plan. M. Ojeil, the excavation surveyor responsible for this part of the work, then related this "harbour" plan to the present excavation by adding to it the main colonnaded esplanade and the Roman "monument with granite columns". Far from clarifying the original function of the fallen columns, it gives rise to a disquieting surmise: did the area ever represent a harbour, or was it a submerged section of the ancient town? The following list of recent observations needs to be explained:

1) The colonnaded esplanade, on land, ends somewhat abruptly within Poidebard's "dock area".

2) Again on land, near the Roman "monument with granite columns", a 6 metre trench reaches present sea-level and reveals in the sand courses of masonry comparable with those mapped by Poidebard in the sea (2).

3) Underwater, the alignment of the broken columns (3) within and roughly parallel with the mole shows that they could neither have been (as was suggested by Renan) placed there to strengthen the mole, nor could they have been taken to the shore for trans-shipment as building stone.

4) The density of sherds in the sea is incompatible with the bottom of a harbour, even allowing for a high percentage of pottery washed in from the excavation dumps or from the strata to the north-west of the area. In depth, the sea bed contains as many sherds as any trench on land. This surprising fact has been revealed by a freak of nature: in the northern "dock" a marine current has cut a trench 80 cm. deep, with almost vertical sides. In marine conditions this is unusual, and here

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(1) Honor FROST, "Rouad, ses récifs et mouillages," *Annales Archéologiques de Syrie*, Tome XIV, 1964, pp. 67-74, and "Arwad a Photogrammetric Survey", Tome XVI, 1966.

(2) I am indebted to the Emir Maurice Chéhab for personally communicating this fact.

(3) This summary plan represents only two mornings' work in bad weather conditions; it must be regarded as provisional.

results from a deposit of clay (sand or mud reach stability on a much shallower gradient). Deliberate trenching is therefore feasible in this part, whereas in the rest of the area the stratification of the sub-bottom could only be studied by coresampling.

In addition to these conundrums, the plan of this supposed harbour was always rather surprising: its small size and exposed "entries" could only have allowed access to oared boats. Such shelter would have to be justified by a specialised function, either ceremonial or strategic. Now that the questions are posed, a campaign of underwater research (as distinct from the few dives I have been able to make) is evidently needed in order to find out whether or not this area had ever been a harbour.

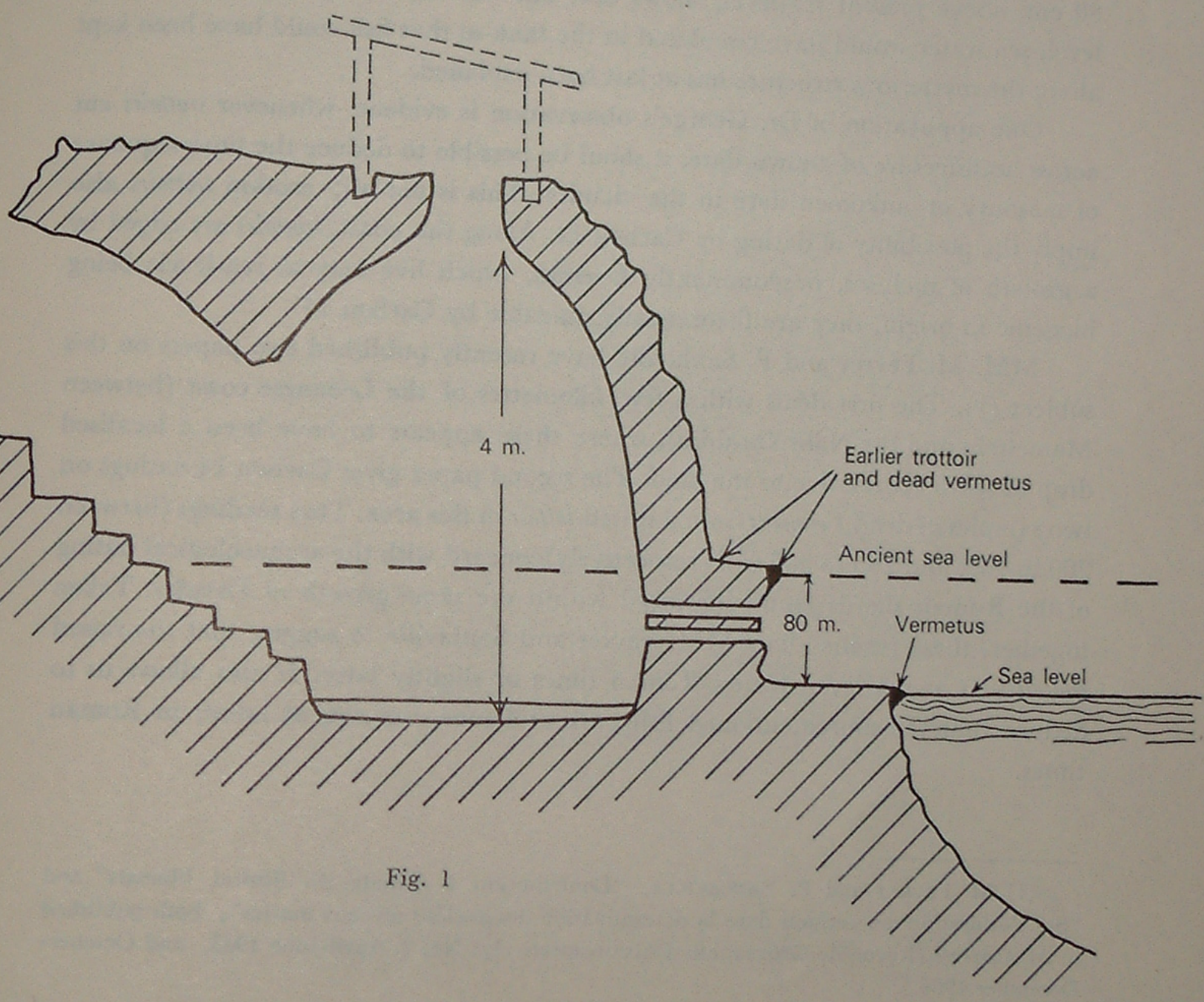

Fig. 1

Archaeologists practising stratigraphy may be surprised at the importance given to these findings, but it must be remembered that hitherto no dating at all was possible in marine conditions. The colossal sea-walls of Arwad, for instance, are attributed by some authorities to the Phoenicians and by others to Crusaders. In the circumstances, this new method of dating is very encouraging, especially as it suggests the possibility of developing similar archaeological applications of sedimentology and other such disciplines.