

## Roman harbours of Algeria

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An archaeological survey of Roman harbourworks on the North African coast was carried out between Cherchel near Algiers and Tunis. Diving techniques were used. 17 sites were examined and Pottery taken from Tipasa harbour is described.

### INTRODUCTION

The aim of the Maghreb Project 1968 was to carry out an underwater archaeological survey of Roman Harbourworks on the North Coast of Africa between Cherchel, just west of Algiers and Tunis. The project was proposed in 1967 by the Cambridge Maghreb (Illyricum) Expedition which was diverted to Yugoslavia. It was to add to the study of ancient ports in the Maghreb, started in 1966 with a survey of sites between Lepcis Magna in Libya and Tunis, by the Cambridge Expedition to Sabratha.

Past experience in coastal reconnaissance had shown that the survey of the 30 sites involved in the project could be carried out by a small mobile team.

With flexibility in mind, a Ford Transit Caravan was purchased. This was fitted out to take diving and surveying equipment while still serving the main purpose of being a fully appointed mobile base. The location of the likely harbour areas at each site was made considerably easier by a preliminary search, before leaving England, of the published literature, charts and aerial photographs. Several rare books, not available in England, were found in the Musée Stefan Gsell in Algiers.

### Historical background

Although North Africa is rich in prehistoric remains, it is not until the colonization by the

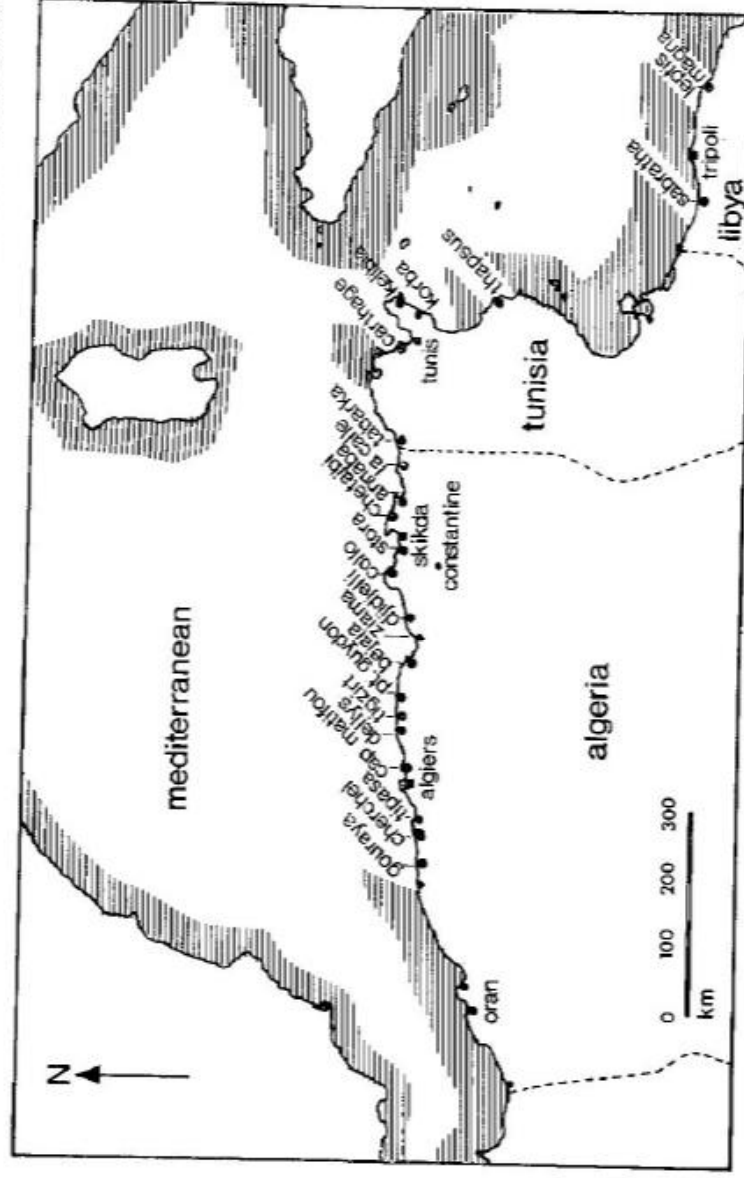


Fig. 1 Map of North Africa showing sites of submerged harbour works.

Phoenicians that any significant maritime and coastal development are found.

The route that brought the silver and tin from southern Spain took the Phoenicians through North African waters. In the 11th century B.C. they founded the colony of Gades where Cadiz now stands, though the archaeology is much later. By the time that Carthage was colonized by the Phoenicians from Tyre, traditionally in 814 B.C., the coast would be well known to the traders of the nation, with settlements springing up along the coast, based on the facilities of shelter and provisions.

After their defeat by the Greeks at Himera in Sicily in 480 B.C. and after the fall of Motya in 397 B.C., the Carthaginians concentrated on expansion to the west. In the succeeding centuries the maritime strength of Carthage grew and traces of her culture and occupation spread along the coast and up into Spain. The 1st Punic war, ending in 241 B.C., saw the Romans expel the Carthaginians from Sicily, so long contested with the Greeks, who were themselves now eclipsed by the Power that was to have such an influence on North African history.

The subsequent expansion in Spain, and the invasion by Hannibal, of Italy, with his celebrated crossing of the Alps in 218 B.C., led ultimately to the defeat of Carthage by Scipio Africanus at Zama in 202 B.C., and her destruction in 146 B.C. The Romans developed their new colony of Africa and its already flourishing production of corn, oil and wine, to the point where North Africa is often referred to as "The Granary of Rome".

Now, in the 1st century, more than ever, comes the development of the ports on the coast. Many small towns along the coast were colonized by Augustus during the period 33-25 B.C. At this stage they were the lifeline of the colony; later they turned again to commercial use.

The African provinces flourished throughout the life of the Empire until the Vandal conquest under Genseric in 439 A.D. The reconquest by the Romans from Constantinople in 533 lasted 160 years, surviving the insurrection of the indigenous Berbers, until the Arab conquest from the east in 698 A.D.

#### *The harbours*

The reflection of this varied history in the underwater archaeology of North Africa is confused, and in many parts obscured. One can distinguish many of the sheltered coves and shelving beaches of the early voyagers. Sailing was always hazardous in ancient times even in summer, the only season used for this purpose, and voyagers would try to keep land in sight for most of the journey. Each evening they would anchor in a sheltered bay, or draw their boats up onto a shelving beach to pass the night and replenish their supplies. A number of sites begin their name with *Rus*—reminding one of their origin, *rus* being the Phoenician word for a cape.

There are small trading posts, and here and there the sites, and sometimes remains, of the great seaports and naval bases of the Empire. The scarcity of natural harbour sites along the north coast has led to the use of the more obvious sites throughout the ages, and the maritime expansion in the 19th and 20th centuries has destroyed much valuable evidence of seafaring in the ancient world. Today there are few remains above water, for where there has been no overbuilding, submergence can have occurred for several reasons: the simple process of erosion and wave action, a rise in relative sea level or a local land subsidence (Algeria is a fairly active earthquake area). In the area of a large river mouth silting may have covered any remains.

We do not expect to find extensive construction of the Phoenician age, for their settlements were essentially staging posts, and little trading was carried out. The Romans, on the other hand, used larger ships for their trading along this coast; the principal harbour works on this coast belong to the Roman era.

Where, in particular, overbuilding has occurred some useful information may be gleaned by consulting charts and travellers' accounts that might predate these developments.

#### METHODS

For surveying, the normal method of alidade surveying from two points on a fixed baseline was discarded in favour of direct survey from a single point, using a combination of rangefinder and sensitive prismatic compass. By this method complete surveys could be carried out by two people in half the time that would have been needed with a single alidade. The two instruments are combined in a Teletop which was hired from C Z Instruments of London. The accuracy was not quite as good as can be obtained by careful use of an alidade.

Even with a Ferrograph inshore echo sounder and the Teletop, the job of underwater search, whether by snorkel or aqualung, was extremely lengthy and put the most strain on our limited manpower resources. The emphasis, naturally, was on underwater search and of all our working time about 50% was spent on snorkel search, 15% on aqualung diving, 15% surveying and the remaining 20% on general assessment.

In total, 30 sites were considered from the literature available and 17 were found worth investigating; of these, five were found to have interesting remains underwater. The twelve sites not investigated were unsuitable, either because of modern building or heavy silting.

#### Sites Investigated—From West to East

##### GOURAYA (*Gunghit*)

Remains of a small Punic settlement dating back to the 4th century B.C. lie on a headland overlooking two sandy sheltered bays facing north. One at least of these is widely presumed to have served as a port.

Lehmann Hartleben (1923) talks of a mole to the

east of the headland, Gsell to the west of the headland, but no trace was found of either of these. It is thought that the discrepancy between these two accounts may be due to an error in translation between German and French, or a slip of the pen.

#### CHERCHEL (*Caesarea*)

*Introduction*—The site of Cherchel (Figs 2 and 3), built round a small offshore island, owes its origin to the Phoenicians who much favoured such a situation. It was not, however, until the 1st century B.C. that the town achieved any prominence under the Moorish King Bocchus, who made it his capital. On the death of Bocchus, the Romans took over Mauretania having installed Juba 2nd as king. Under the influence of Juba and his wife Cleopatra (daughter of Cleopatra and Antony) Caesarea became a great cultural and commercial centre. In 43 A.D. under Trajan, the town became the base for a squadron from two great fleets, Classis Syriaca and Classis Alexandrina. It was also an important commercial port, second only to Carthage in North Africa.

In 455 A.D. the town was taken by the Vandals, and in 533 A.D. it became a part of the Byzantine Empire. Ibn Haukal, writing in the 10th century A.D.,

describes the town as being in ruins but the port remaining. A hundred years later El Bekri states that the port is silting up. Until the French occupation the port was used by pirates, and in 1854 the modern port of Cherchel was built over the constructions of the Turks who had occupied the town in the 16th century (Gsell, 1952).

Gsell (1911, 1929, 1952) states that the Roman port consisted of two basins. The military port, corresponding to the modern harbour but slightly smaller, was protected to the north by the Ilot Joinville and to the west by a jetty connecting the island to the mainland. The commercial basin to the east of the military port and connected to it by a narrow entrance is thought to have been bounded by a breakwater running from the Pointe des Marabouts to the Ecuil du Grand Hamman, and another breakwater running north east from Ilot Joinville, now probably under the modern jetty.

In 1932 Lacoste and Quémard sent a helmet diver down to the submerged rocks to the west of Cap Tizrene. From his opinion that they were artificial, they proposed that they were the remains of a mole protecting a third, eastern basin. In the 1950s, Diolé postulated a fourth basin to the west of Ilot Joinville.

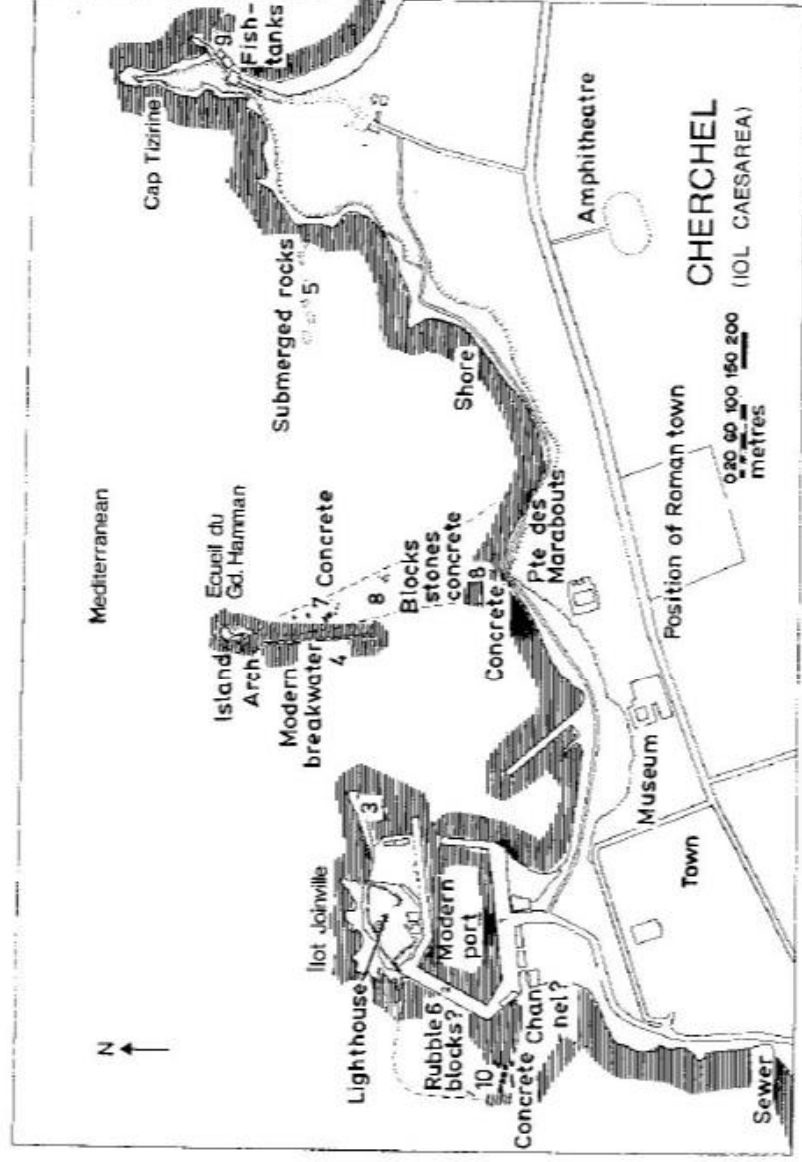


Fig. 2. Plan of harbour works at Cherchel.

Ravoisic (1840), with drawings made in the early 19th century, and Shaw (1783) go some way toward clarifying a problem that has been considerably aggravated by earthquakes and extensive modern construction. The town is known to have been destroyed twice by earthquake, the most recent being 1738, the other in antiquity.

*Search*—Underwater search was concentrated in the area of rubble and concrete (6) by the modern port, the breakwater (7) running to Ecueil du Grand Hamman, the submerged rocks (5) and the fish tanks (9). It was not possible to get permission to dive in the modern port. In addition to this, some time was spent looking at various reefs and likely-looking outcrops in the bay to the west of Cherchel.

The modern harbour jetties (1, 2, 3) now cover any remains of what could have been the ancient military port but on the Ilot itself there are still a number of Roman walls and foundations. To the west of the island the seabed is littered with rubble which may or may not be artificial but in which it is impossible to see any coherence. The outside edge of the rubble is fairly well defined. On the south of this area there are seven large concrete blocks ( $6 \times 8 \times 5$  m) in a line (10), one of which breaks surface. The blocks seem to face onto a channel running east-west. It is not well defined, but on the other side of it lies more rubble. It proved impractical to search close inshore at this point due to the effluence of the town sewer. A search by a towed snorkeller revealed no further sign of any construction further westwards.

The area between Pointe des Marabouts and the Ecueil (8) produced evidence of construction of three dates, only one of which could be ancient. The most modern construction is a substantial precast concrete breakwater (4) barely showing above the surface. The other two consist of scattered blocks of concrete. The largest of these blocks (7) measure  $2 \times 8 \times 5$  m and contain football-size stones. These are almost certainly modern, for samples revealed an iron shackle and a modern roofing tile. However, area 8 is also strewn with blocks, stones and small pieces of concrete which may be ancient lying in only a few feet of water. Much of this concrete has smaller aggregate and samples were taken for analysis.

The Ecueil itself bears a low concrete arch from which a sample was taken. A large bastion of Roman concrete on the shore at Pointe des Marabouts lines up with the arch and the remains in the water. Very few small finds were apparent, apart from a millstone, lying between the two largest concrete blocks (7).

Diolé (1952) has reported some mysterious holes round the Ecueil. Several more or less cylindrical holes were found there in 2 m of water. They were some 2 m in diameter, and penetrated the bed rock vertically to a depth of up to 2 m. There was nothing to suggest that these were artificial, though they are curiously regular, and must represent what Diolé reported.

The submerged rocks (5) to the west of Cap Tizirene were examined. These comprise the mole as reported by Lacosse and Quémard (1933) and Diolé (1952) but are in fact a natural reef. In any case, the bay that it would have protected is shallow, less than 2 m deep, and improbable as a harbour. Under the eastern cliff of Cap Tizirene some submerged rectangular foundations (9) were found which are thought to have been fish tanks (Fig. 3). There are three principal rectangles surrounded by concrete walls whose tops are just below sea level. The interiors of the tanks are filled with rubble and stones.

Two of the tanks have what appear to be sluice gates. Sluice 1 consists of five rectangular stones with chamfered tops 15 cm below sea level, placed 2 cm apart to cover a gap of 1 m. Sluice 2 is more elaborate, consisting of a single slab of stone with equally spaced keyhole slots cut in it. On the inner and outer faces, corresponding vertical semi-cylindrical recesses were cut and the key-holes cut between them. Depth probing with a steel rod showed what may be the bottom of the sluice gate some 75 cm below sea level, but this is conjecture.

In the cliff overlooking the foundations are four lined cisterns, 1 m above sea level. The layout and lines of construction indicate that they belong to the structure in the water.

*Conclusions*—To make any specific interpretation about the layout of ancient Caesarea on the slight evidence available would be difficult but it seems that the existence of the two outer harbours is improbable. It would appear that the theory of an inner military harbour and an outer commercial harbour is the most plausible.

The entrance to the small modern harbour is often tricky, especially in a north-east wind. It is felt that some entrance to the west would have been necessary in these conditions and would also have helped to supply circulatory currents to keep the harbour free from silt.

The large blocks of concrete found to the west (10) might be pillars on which an arched jetty could have been constructed. Perhaps these are the remains of a jetty protecting a western entrance to the military port.

From the level of the slots in the fishtank sluices, it would appear that there must have been a relative upward change of sea level of at least half a metre since Roman times.

#### TIPASA (*Tipasa*)

*Introduction*—Tipasa was founded by the Phoenicians and after the Roman Conquest was used as a military colony before reverting to a civilian role.

Commercially, it was of considerable importance. Christianity was introduced early and in the 3rd century Tipasa was a bishop's see. Most of the inhabitants continued to be heathens until some time in the 4th century, when, according to the legend,

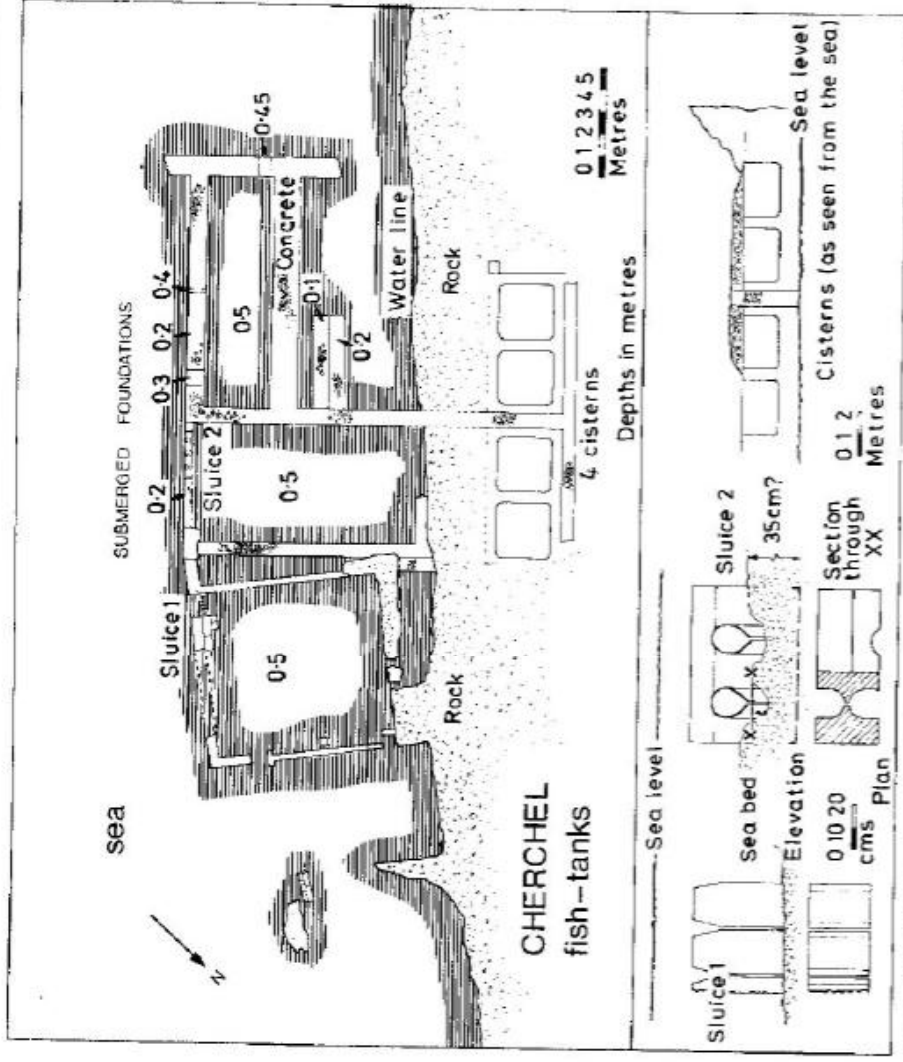


Fig. 3 Plan of fish tanks at Cherchel.

Salsa, a Christian girl, threw the head of their serpent idol into the sea. The enraged populace stoned her to death. The body, miraculously recovered from the sea, was buried on the hill above the harbour.

The ruins of Tipasa lie on three small hills overlooking the sea. Among the olive and eucalyptus trees overgrowing the site are the remains of three great churches, baths, a theatre and an amphitheatre. Perhaps one of the most striking features of the site is the number of graves. The necropolis of Tipasa has yielded much of interest concerning the history back as far as the 4th century B.C.

Four possible harbour areas have been proposed over the last sixty years, but it was not until this summer that the controversy was resolved.

*Search*—The first of these areas, the Chenoua beach, lies below the Punic necropolis near the mouth of the Wadi Mitidja to the west of the town and would have been ideal for drawing boats out of the water except in a westerly wind. This may well have been the original Phoenician landing point; some early Punic tombs have been found nearby.

The second position, the bay to the west of the

modern lighthouse, has been suggested as a port because of the extensive remains of roads and dwellings near the shore. At first sight the Admiralty chart supports this view as it shows a reef at the entrance to the bay 300 m offshore. This reef, however, although marked by a line of breakers in rough weather proved to be a shallow shelf and entirely natural. Without some form of seaward protection the bay is unsuitable as an anchorage.

On the western side of this bay, below the excavated remains of the Baths near the Grande Basilique which stands on the cliff, there are three small rocket tanks. The tank dimensions were:

- (1) 9 m  $\times$  8.3 m and 0.3 m above sea level
- (2) 2.3 m  $\times$  2.8 m and 2 m above sea level
- (3) 14.4 m  $\times$  5.2 m and 1 m above sea level (marked 1, 2, 3 on Fig. 4). Tanks 1 and 3 each have a wide opening to the sea in one of their sides. None of them has any sign of lining. Near these tanks were a number of small round holes cut vertically in the rock. Some of these seemed to be smoothly coated with mortar.

Soundings by Baradez, a previous Director of

Excavations at Tipasa, suggested that the ancient port had been an inland basin or cothon just to the east of the small modern fishing harbour. He took 140 core samples from which he postulated the outline of the basin. In more recent years when the modern harbour of Tipasa became overcrowded, it was decided to excavate and reflood this supposed Roman harbour. In doing this, the bulldozers removed, not alluvial deposit, but the remains of houses, effectively showing that this was part of the town not the harbour. Even now the remains of walls and foundations protrude from the edge of this basin.

Just east of the modern port, some 30 m offshore, lies a rock reef running parallel to the shore just off quarry 1. About 40 m east of the end of this lie a few cut blocks, though they form no distinct structure. It has been suggested that this reef was a harbour breakwater, but this is obviously not possible as the water between the reef and the shore is far too shallow. It is most likely the protective wall of the quarry.

By this quarry are a number of long cisterns cut in the rock of the cliff and a set of neat steps leading down into the quarry. Unfortunately the bottom steps are completely eroded away, making it impossible to draw any conclusions about sea level changes. The ancient harbour was found, after an underwater search, to be between the two small islands and the promontory of St Salsa (Fig. 5). This location was

proposed in 1894 by Gsell, but was rejected by everyone including Driolé, who dived on the site and described it saying "As an anchorage it is beneath contempt". This is undoubtedly a misappraisal as the quadrilateral formed by the islands and 4 moles which are described here would have provided a small and secure harbour for ships in ancient times.

The promontory of St Salsa has sheer rock cliffs and access to the water is now only possible at quarry 2 and the rock-cut quay. It is apparent that the cliff has been considerably eroded over the years and it is more than likely that the original access points and quays have fallen in the sea (Gsell, 1894).

The islands themselves, low and rocky, are about 150 m offshore and it is probable that the rubble line now apparent underwater to the south of them is the remains of an interconnecting mole. The southern edge of this line can be seen rising sharply off the bottom. Without a mole between the islands, heavy seas roll into the harbour when the wind is in the north. On island A, there is a rock-cut wall running east north-east for nearly 60 m which could have been the cutting and foundation for a sea wall built of stone blocks, a continuation of the mole connecting the islands. In the lee of this there is a small rectangular cutting in the rock, possibly the foundations of a small refuge or tower.

Other cuttings of interest on this island are a 40 cm square cut post, 70 cm high; long slots cut in

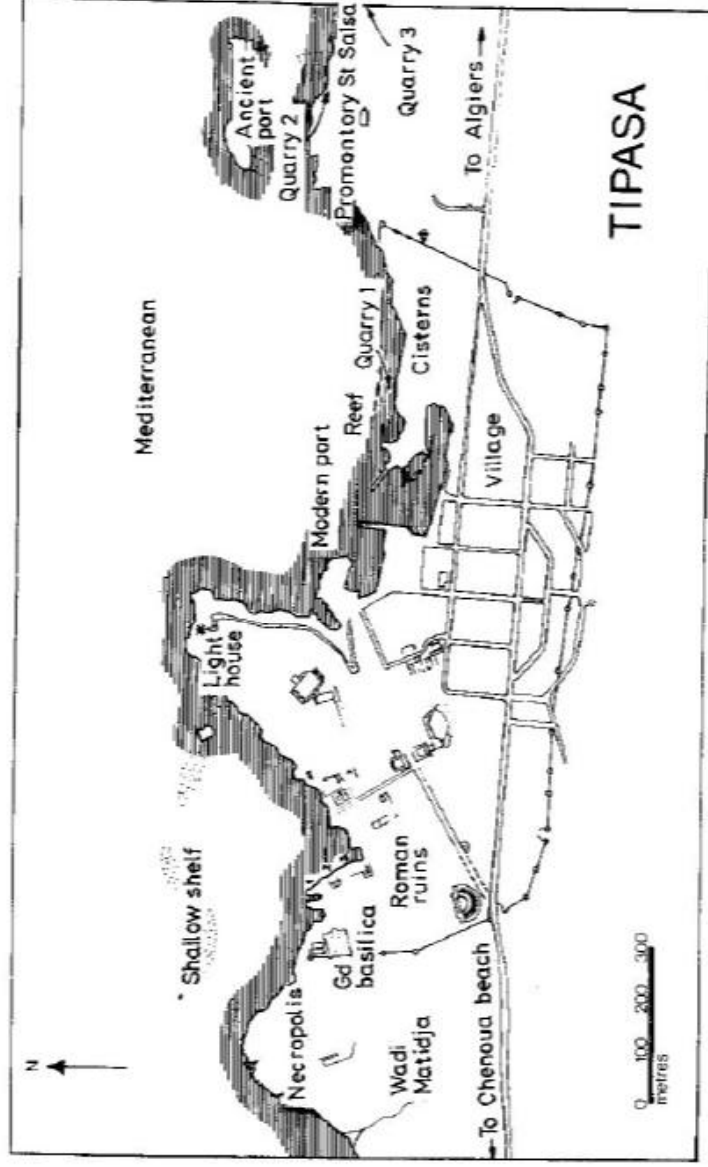


Fig. 4 Plan of modern village at Tipasa, showing the position of the ancient port.

the rock to a depth of 25 cm and numerous holes 20 cm square and about 30 cm deep.

The western part of the harbour is protected by mole 1 running from island A to within 40 m of the cliff, leaving an entrance 6 m deep. The eastern edge of this mole is clearly defined from the middle to the tip. As one approaches underwater from the east over a stony bottom, the edge of the mole rises at an angle of  $45^\circ$  to within 2.5 m of the surface. Towards the island where it is more difficult to detect the mole by levels, it can be distinguished by an abrupt change in bottom composition. Generally speaking, the composition is of uncut pieces of rock about 20 cm across, among which there are many sherds and a few small cut blocks. Towards the tip there are a number of larger cut blocks (see echo sounder profiles in Fig. 9).

On the eastern side, the second entrance to the harbour is between moles 2 and 3. Mole 2 is built southward from island B and its southern tip is marked by an enormous block of concrete in the form of a truncated wedge, approximately 10 m long, 3.7 m high, and mean width of 3 m. This lies on flat

sand, somewhat isolated from the main mole. Adjacent to it on the mole lie a pair of smaller blocks aligned east-west, slightly separated. The west side of the mole runs very wide and becomes indistinct as one nears the island, indicative of the prolonged action of east and north-east seas over the structure.

The builders of this side of the harbour took advantage of a shallow bank when building the seaward protection and if one follows its sloping edge southwards across the harbour entrance one arrives at mole 3, a short broad construction built off quarry 2. In fact, it is likely that most of the cut stone for the harbour came from this quarry and mole 3 would have been constructed by simply tipping the stone into the sea as soon as it was cut. This may explain why this mole has a larger proportion of cut blocks than the others. At its well-defined northern end these are very large ( $4 \times 1.1 \times 1.2$  m) but the average block size on this mole is about  $4 \times 0.5 \times 0.4$  m. On the other hand it is possible that mole 3 was a quay, a not unreasonable supposition since there are stone-cut steps out of the quarry for access.

Within the harbour itself there are two distinct

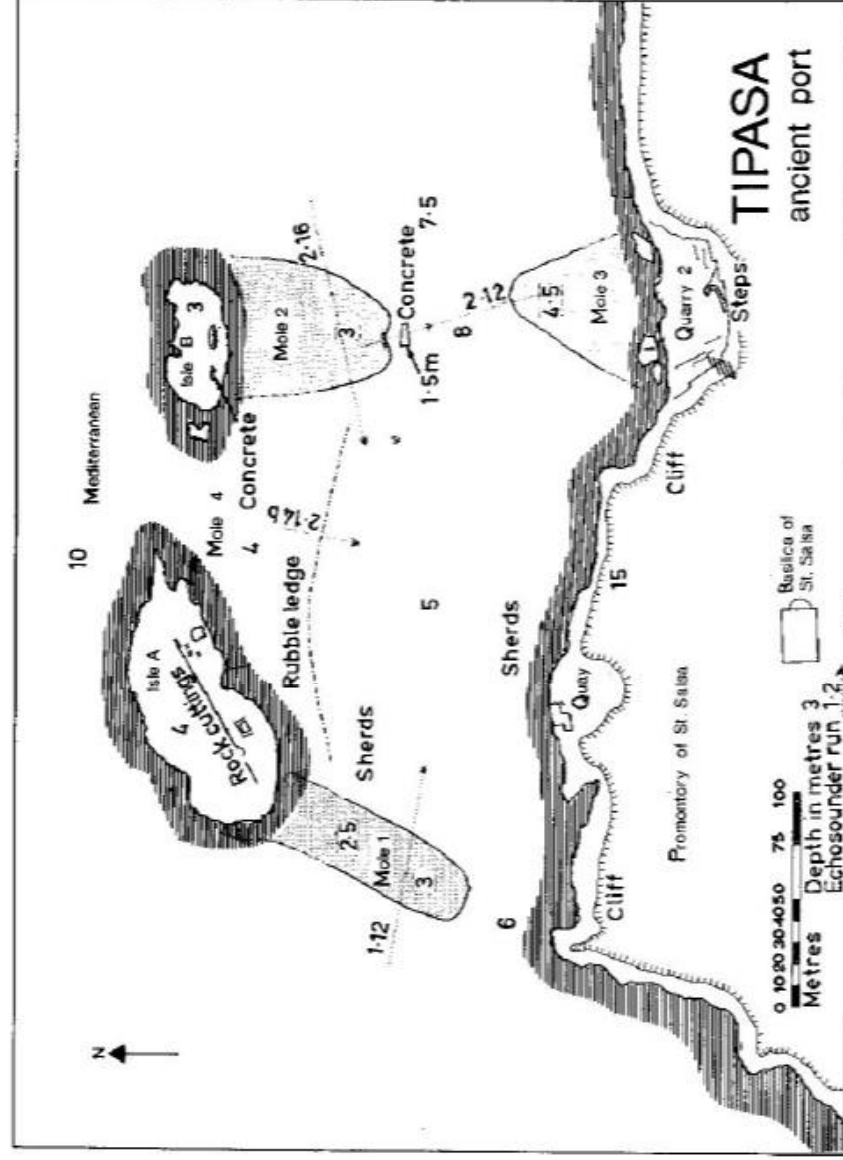


Fig. 5 The ancient port of Tipasa.

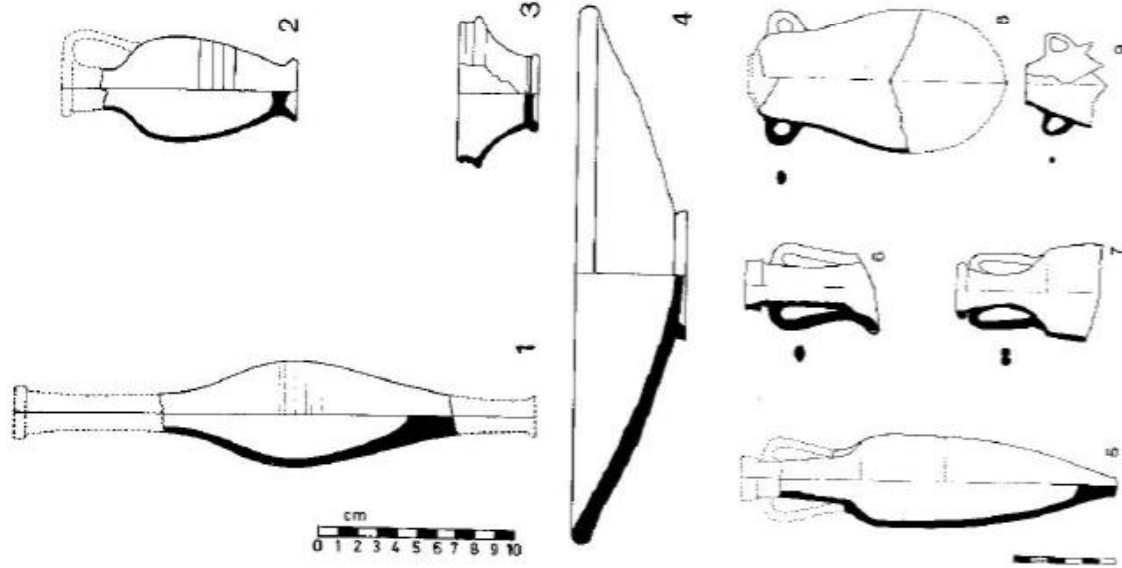


Fig. 6 Pottery from Tipasa harbour

1. Found under lee of western mole. Small flask, of a type common in Italy, 2nd century B.C.–1st century A.D.
2. Found under lee of western mole. Small jug which may have had one handle. Porous, pale grey fabric, of local Punic origin. 2nd–1st century B.C. (Cintas, *Ceramique Punique*).
3. Found in harbour North of the "quay". Cup fragment with illegible stamp in base. Hard cinnamon red fabric with orange-red glaze which is peeling. No decoration but finely made. Samian, first half of 1st century A.D. (The Athenian Agora Vol. V 9, 28).
4. Found under lee of western mole. Fragment of shallow dish in fine brown fabric. Local Punic ware, 2nd–1st century B.C. (S. Lancel, University of Grenoble, France).
5. Found under lee of western mole. Body of an Italic wine amphora. Dressel/Lamboglio 1C, probably late 1st century B.C. (N. Lamboglia, *Sulla Cronologia Delle Anfore Romane*, Rivista Di Studi Liguri, pp 248, Fig. 5).
6. Found under lee of western mole. Neck and handles of Italic amphora, possibly Lamboglio 2, 1st century B.C. (cf. *Cronologia op. cit.*, Fig. 18).
7. Found in centre of harbour, north of quay. Neck and handles of a pseudo-Koan amphora probably 1st century A.D. (Hawkes and Hull, *Camulodunum*, 183).
8. A.D. (Hawkes and Hull, *Camulodunum*, 183). Found in centre of harbour. Side of Punic storage amphora with small ear handle. Similar to others found in excavation at Tipasa in a 3rd to 2nd century B.C. context. (Lancel).
9. Found in centre of harbour. Fragment of Punic amphora with small handle. Variant of 8 above 3rd to 2nd century B.C. (Lancel).

found round the Basilica of St Salsa originally came, has been quarried to 25 cm below present sea level. *Conclusions*—The principal ancient harbour has been shown to lie to the east of the town of Tipasa in the lee of two small islands. It appears to have been used between the 4th century B.C. and the 3rd century A.D. Prior to this it is most likely that boats would be drawn up onto the Chenoua beach.

The level of quarry 3 indicates a minimum rise in relative sea level of about 0.5 m, for in order that the quarry should be self-draining and remain workable, it would be necessary for the floor to be at least 0.25 m above maximum sea level.

#### SIDI FERRUCH (*Obori*)

Roman remains lie on the point overlooking two small islands and a sandy bay. No signs were found of artificial protection in the area of the islands or of a deposit of 1st century amphoras which was reputed to lie in the turbulent waters of the bay (Salama, personal communication).

#### LA PEROUSE (*Rasgurtiae*)

The town is reputed to have had a port in Punic times and, later, was one of the Augustan strongholds. Except for the well preserved remains of the Roman baths excavated by P. Salama, there are few remains of interest near the shore. (Aerial photographs do show, however, that further excavations on land could be very fruitful).

There are two areas worth investigating, the shallow

Fig. 6 Pottery from Tipasa harbour.

areas where many sherds were found on the bottom (see Fig. 5). The remains of large amphoras and domestic pottery were found among the stones and fragmented sherds indicating, at preliminary appraisal, continuous harbour usage from the 4th century B.C. to at least the 3rd century A.D. (see Fig. 6).

Close examination of quarries 1 and 3, one near the modern harbour and the other about 500 m east of the ancient harbour, indicate a minimum rise of relative sea level of 0.5 to 1 m. The latter, in particular, from which many of the sarcophagi now



coast to the south of the village of La Perouse and the deeper water of the modern harbour which lies under Cap Matifou, overlooked by the Turkish Fort (Fig. 7). The fleet of Emperor Charles V of Spain is known to have foundered off Cap Matifou on the 26th October 1541.

It was impossible to carry out any serious work at the site, owing to the presence of a naval base on the point, where the remains of the harbour are thought to lie. Casual investigation with snorkels (all that was possible) revealed that for a kilometre south of the modern port the water is generally shallow and there are no signs of harbour works. Chardon's map (1900) shows two "paved roads" entering the water but although giving the appearance of blocks, these are undoubtedly natural rock formations. One feature (A), a 4 m square foundation in 20 cm of water, lying 20 m offshore, may on the other hand be artificial.

Another curious feature (B) remains unexplained. This is a hook-shaped spine of rock running 50 m out to sea with a cut channel running transversely through it. Its appearance on an aerial photograph resembles a jetty, but it is solid rock and the water inside it is only a metre or so deep.

Although the Roman town seems to have stretched for about 1 km south of the town of La Perouse, it is unlikely there was a harbour in this area. This part of the coast was closely inspected up to 200 m offshore and nothing artificial was found, not even the cut

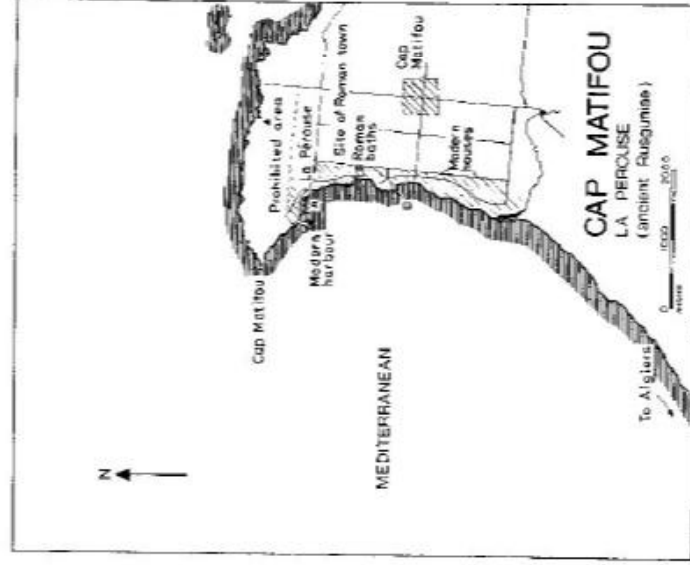


Fig. 7 Plan of the harbour at Cap Matifou.

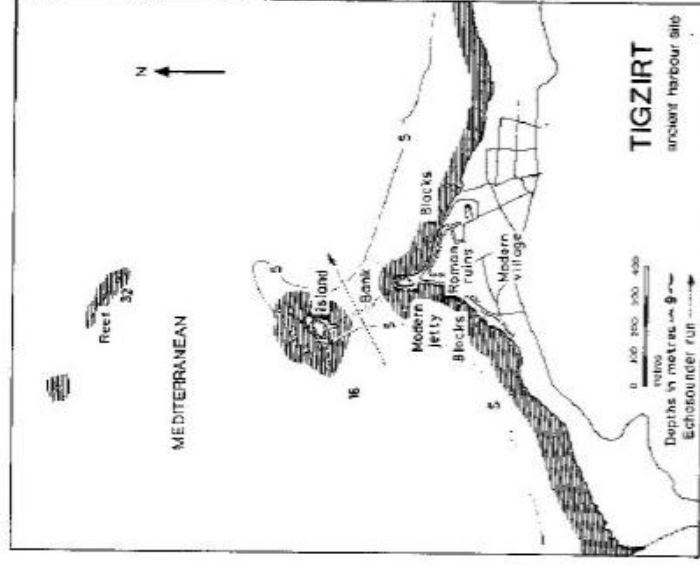


Fig. 8 The ancient harbour site at Tizirt.

stones and columns reported by Chardon (1900).

The modern harbour is built in the best geographical location and in the only deep water near the Roman town. It is unlikely that any port here in ancient times would have been at all extensive (Salama, personal communication) but undoubtedly, if any remains exist, they are in the prohibited area near the modern harbour where, in past years, a considerable quantity of amphoras has been found underwater.

There was no conclusive evidence to suggest that there had been any rise in sea level.

#### COURBET MARINE (*Rusubbicari Matidae*)

The few Roman remains reported in the 19th century by Gsell (1911) have disappeared beneath the modern village and any harbour works beneath the modern jetties which serve the sardine factory.

#### CAP DJINET (*Cissy*)

The site offers natural protection from east winds. Gsell (1911) reported a Roman basalt quarry here, and a concrete jetty for loading. No sign could be found of a jetty. Near the shore on the cape there is another quarry which is still being worked today.

#### TIGZIRT (*Rasucuru*—Gavault, Gsell; *Iomium*—Salama)

This site (Fig. 8) has been studied in some detail by Gavault (1897). A considerable amount of excavation has taken place on the peninsula overlooking the small offshore island. The remains of baths, a Basilica

and a temple may be seen today. Although Gavault never believed that Tizirt had a port of any size, he suggests that the island was connected to the mainland by a paved causeway which served as a quay for unloading either from the east or the west.

There is a distinct bank between the island and the headland. About a dozen cut blocks were found on this bank, which is only 1.5 m below the surface at its shallowest point. Its profile shows well on the echosounder trace (Fig. 9). The area is thickly covered with Poseidonia weed, making underwater search very difficult. On the island itself there is a cistern whose vaulted roof has collapsed, a column and numerous blocks and sherds. Perhaps there is more, but nothing else could be seen because of the dense prickly pear. To the east and west of the island, natural reefs extend some way underwater. On the east the water is shallow and nothing artificial could be seen. To the south-west, 40 m from the island, there are a few small regular blocks among the huge boulders which form the reef on this side.

Barbier maintained that there was a great port to the west of the island sheltered by an L-shaped jetty 170 m long in 1.6 m of water. Unfortunately, as Gavault (1897) puts it, there remains no trace of this "cyclopean work". It seems likely that the large natural reef to the west of this island could have caused this speculation. Gavault also suggests that the real harbour for Tizirt was below Taksebt at Sidi Khraled (q.v.), 6 km to the east.

Firm evidence today is slight, but it would seem highly likely that the island was connected to the mainland by a causeway in ancient times. The echosounder profile, the blocks and the signs of habitation on the island help to substantiate this. The harbour would not have been large, simply a quay of blocks offering protection from east and west.

#### TAKSEBT (SIDI KHRALED) (*Rusippir*)

The Roman town lies on top of the hill at 250 m. If, as seems reasonable, it was served by a small harbour, then Sidi Khraled is a natural choice. An enormous reef runs 1,000 m north-east from the point on which lies a small necropolis with sarcophagi showing in the cliff face. A search within the area sheltered by this reef revealed a few cut blocks in the shallows.

#### AZZEFOUN (PORT GUYDON, MERS EL FAHM) (*Rusazus*)

The Roman town of Rusazus (Azzefoun) lies some 4 km from Port Guydon, at a height of 425 m commanding the bay. It was one of the colonies founded by Augustus in 33 B.C. and its varied remains include baths and part of an aqueduct. It is known to have had a port (Julien, 1931) which is to be expected as land communications are difficult in the mountainous Kabylie district encircling the site.

The remains of a mole have been reported by Gsell (1911). It can only be assumed that they lie beneath the modern construction at Port Guydon as no sign of them was found, apart from some lumps of concrete lying on the foreshore.

#### BEJAJA (BOUGIE) (*Saldæ*)

The shelter here is about the best on the coast, and what must have been an ancient port (see Gsell, 1911) is now covered by a modern oil installation.

#### CAP AOKAS (*Musubium*)

Musubium is reputed to lie near Cap Aokas at the foot of the Roman road leading to Sitifis (Setif) (Gsell, 1911; Salama, personal communication) and is thought to have been a port for the export of corn to Rome. This site faces a long shady beach, with no shelter whatsoever. It is suggested either that the alluvial plain covers the port, or that the corn was shipped from Saldæ (q.v.). There was no sign underwater of any harbour works off Cap Aokas.

#### ZIAMA (*Choba*)

The land site is of small extent lying just east of the Wadi Ziama and only parts of the town walls remain to be seen today. The position given by Gsell (1911) for the harbour, just under the town wall to the east of the site, is highly improbable, owing to the shallow water and quantity of rocks in the area. There was no sign underwater of any construction in this area.

The probable position for the harbour is in the lee of the island Mansouriah some 2 km east of the land site. This island, lying off a rocky point, has a few small remains and on it some sherds of late Roman date were found. It is possible that the island was joined to the shore, but if so the signs are scant. A few morsels of concrete lie under the jetty, and a few irregular blocks lie close by.

A few sherds were found in the shoal between the point and the island; these included the side of an amphora of Punic shape, and another neck of common Roman type. The depth of water to the island is about 1 m 50.

The shelter afforded by the island is naturally good and would probably have been adequate for a small coastal town such as Ziama.

#### DJIDJELLI (*Igiltit*)

There is known to have been a port of some sort here as Theodosius, a Roman general, landed here in 373 A.D. (Julien, 1931). Delamare supposes the ancient harbour to have been beneath the modern one which is very extensive though lightly used. It lies in a bay opening to the east and is protected to the north by a jetty built on a substantial reef. To the east it is protected by another jetty. A chart of 1850 shows only the line of the reef, to the north, and no harbour works. According to Beerbrugger the remains of a jetty could be seen in 1867 protecting the bay to the

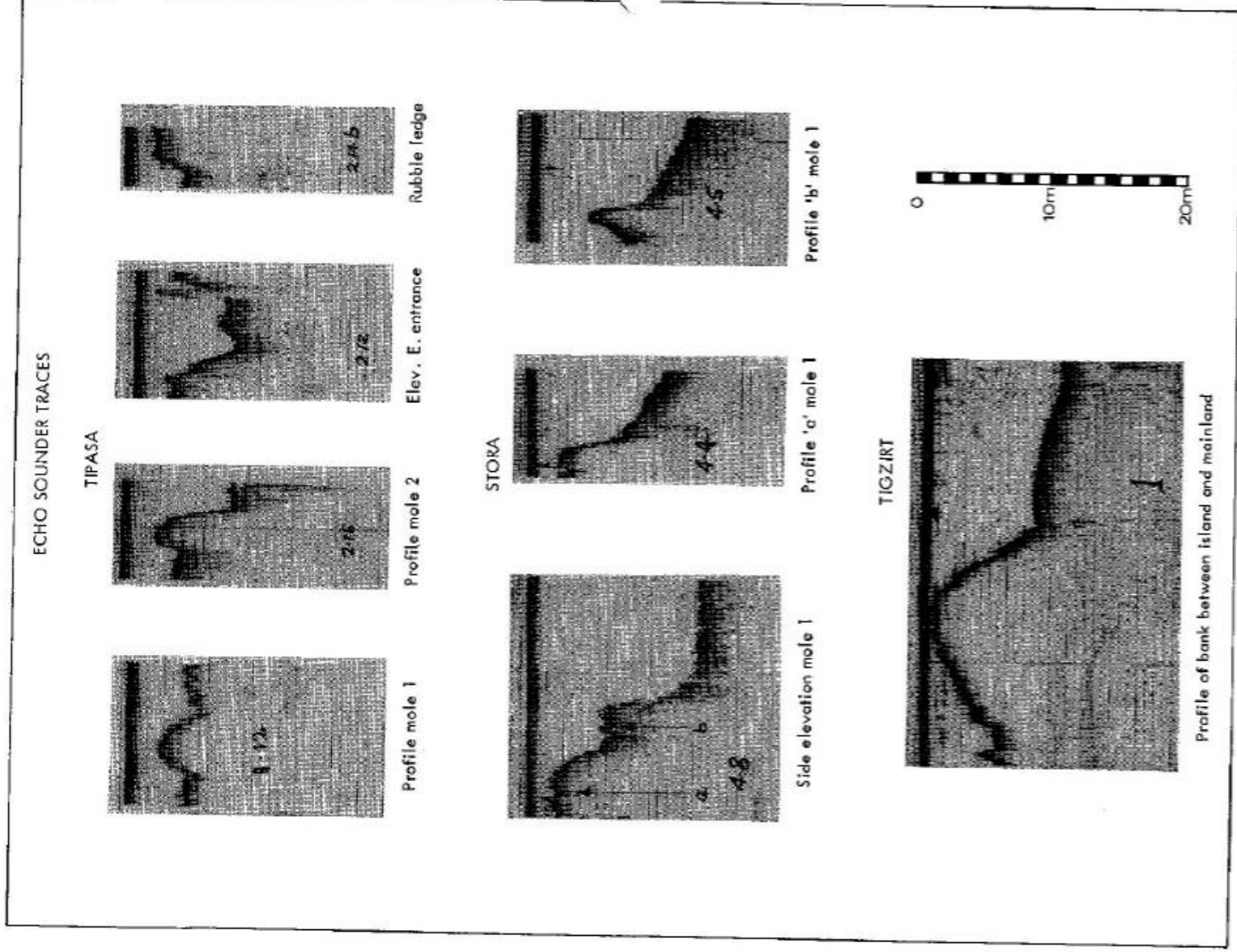


Fig. 9 Echo tracings from Tipasa, Stora and Tigzirt.

east. It is strange that this does not appear in the early chart.

Upon investigation, no sign could be seen of any early construction and so the theory of Delamare seems quite plausible. A jetty to the north would have had a good foundation on the reef but the harbour-works to the east are more a matter of conjecture.

#### MERDJI (*Ticca*)

This is a site of slight significance and from Gsell's account appears to have silted up. The site was not visited.

#### COLLO (*Chullia*)

Finds at the site, which is now covered by the modern village of Collo, date back to the 3rd and 4th centuries B.C. (Gsell, 1929); the town itself was one of the Augustan colonies, and formed a confederation with Rusicade (q.v.) and Cirta. The ancient harbour was important for the export of purple dye. The Pilot states the "Baie de Collo is one of the best open anchorages in Algeria".

The small modern harbour, for the export of cork, is very well protected from north and west winds by land and from the east by a jetty some 150 m long running due south from an extensive concrete wharf. The jetty ends in 14 m of water, and so its base is necessarily broad, comprising modern concrete blocks and rubble. Since the task of building a jetty in this, the most obvious position, would not be lightly undertaken, it is likely that any existing remains would be used as a basis for the subsequent construction. This could be why there are no remains of an ancient jetty to be seen underwater today.

In Punic times Baie des Jeunes Filles, just to the north of the town, could well have been used for beaching small craft, for its long sandy beach is protected on all sides but the north-east.

#### STORA (*Rusicade*)

*Introduction*—The ancient town of Rusicade is commonly associated with modern Skikda (Phillippeville) but without elaborate construction this part of the bay is not suitable for a harbour. The headland at Stora, 3 km to the north-west, offers a good natural protection and it was here that artificial harbour-works were found underwater, indicating perhaps that the ancient port was here, and not off the town (Fig. 10).

There is no doubting the importance of Rusicade as a port in antiquity, for from the Roman conquest, if not earlier, it was the port for Cirta, present day Constantine, one of the main Roman centres in this area. Under the Roman Empire the grain exports became of paramount importance and the town is referred to in inscriptions in Rome and Africa as a corn port.

After the Vandal conquest the site remained unoccupied, due to the difficulty of defending it, until

it was rediscovered by Marechal Valée in 1838 during the French conquest. The expansion under the French produced a flourishing modern port at Skikda, but Stora, where Roman granaries can be seen, remains unspoiled, to provide evidence of the role that Rusicade played in the corn trade.

*Search*—The site of Stora is dominated above water by the lighthouse and associated buildings that cover the small offshore island (Ilot des Singes). This islet points east-south-east from a steep-to shore. Protection is complete to the west and north-west and apart from a small gap between the mainland and the island, to the north and north-east. Protection from the east is less convincing but the salience of Cap de Fer protects the entire gulf from the build up of sea in an east wind, and there appears to be little danger from that quarter, except in severe conditions. The anchorage is excellent in 10–15 m; the bottom is stony sand.

Access by land is limited to a rock-cut track along the hillside and must have been similar in ancient times. Traces of ancient concrete were seen among the rocks below the track, and may be remains from a previous track.

Below water (Fig. 9), lie two distinct areas of blocks. To the south they form a distinctive bank (1) which appears to have been a quay or wharf. Three small blocks of concrete (2) Fig. 10, lie on this construction. East of the islands the blocks are less numerous (3), and the purpose they served is obscure, as there are barely sufficient to have reached the surface in the original construction. Between this latter area and the islet were found three large masses of concrete (4) thought to have been Roman, that appear to have toppled from an earlier structure on the island where the lighthouse now stands.

South of this complex the seabed is flat and sandy; in places are areas of bare stones among which were found a considerable number of sherds. Examples of these were not removed but both Punic and Roman types were seen, similar to those raised at Tipasa.

*Conclusions*—It is thought that the stones on the sea bed may have been ballast, discharged in the anchorage by ships waiting to load grain, and that the blocks are remains of quays or wharves where vessels might tie up for loading. Perhaps Stora bay was used as an anchorage while boats awaited fine weather when they could unload at Rusicade itself.

#### DJEBEL FILFILLA

The marble quarries here were of some importance in antiquity, and nearby might be expected to lie a small port. The area could not readily be approached by land, but by all accounts the creek to the east of Ras Fifilla is a possible site for harbourworks, which might provide evidence on the importance of the quarries in the marble trade. It is not known to what extent the marble was exported.

**SIDI BOU MEROUANE, EL MERSA (*Calucitanis*)**

A few scattered remains lie on a point that projects into the sea close to the small village of El Mersa. The opinions of Gsell and Salama are that this was *Calucitanis*. This may also be the site of Gavetto, where Shaw (1738) makes note of a small port. The entire area is very shallow and sandy; an unsuccessful attempt has been made to form a harbour by sinking steel barges in the bay. Nothing remains of any ancient port.

**(*Paratitanis*)**

The location of this site is far from clear, though Gsell (1911) reports fairly extensive remains. A mosaic has recently been reported by the side of the sea at *Paratitanis* (*Fasti Archeologici* ix 5301). This site shares with *Calucitanis* the possibility of identity with the Gavetto of Shaw.

**CAP DE FER (*Zacca*)****SIDI AKKACH (*Maharar*)**

These sites were not visited owing to the difficulty of access and uncertainty of location. They are thought to be of only slight significance.

**CHETAIBI, (HERBILLON, MERSA TOUKOUCH) (*Tacatua*)**

The bay here affords splendid natural protection to the north and west. The modern part comprises two parallel jetties, one of which serves the small fishing community, the other a granite crushing plant. The granite quarries here have been worked from Roman times, and a port must have been required.

The only Roman remains to be seen at the site lie 2 km to the south on a north-east facing coast with no suitable places for an ancient harbour, which was most probably under the modern one.

**HIPPONE (*Hippo Regius*)**

The site of Hippo Regius lies about a mile inland today, due to the silting of the river Seybouse. The harbour is universally thought to be beneath this alluvium, and was not investigated.

**EL KOLEA (LA CALLE) (*Tuniza*)**

The modern port of La Calle dates from the middle ages when it was used as a centre for coral and sponge fishing. Little is known of its position in ancient times, though it is felt to have been of slight importance.

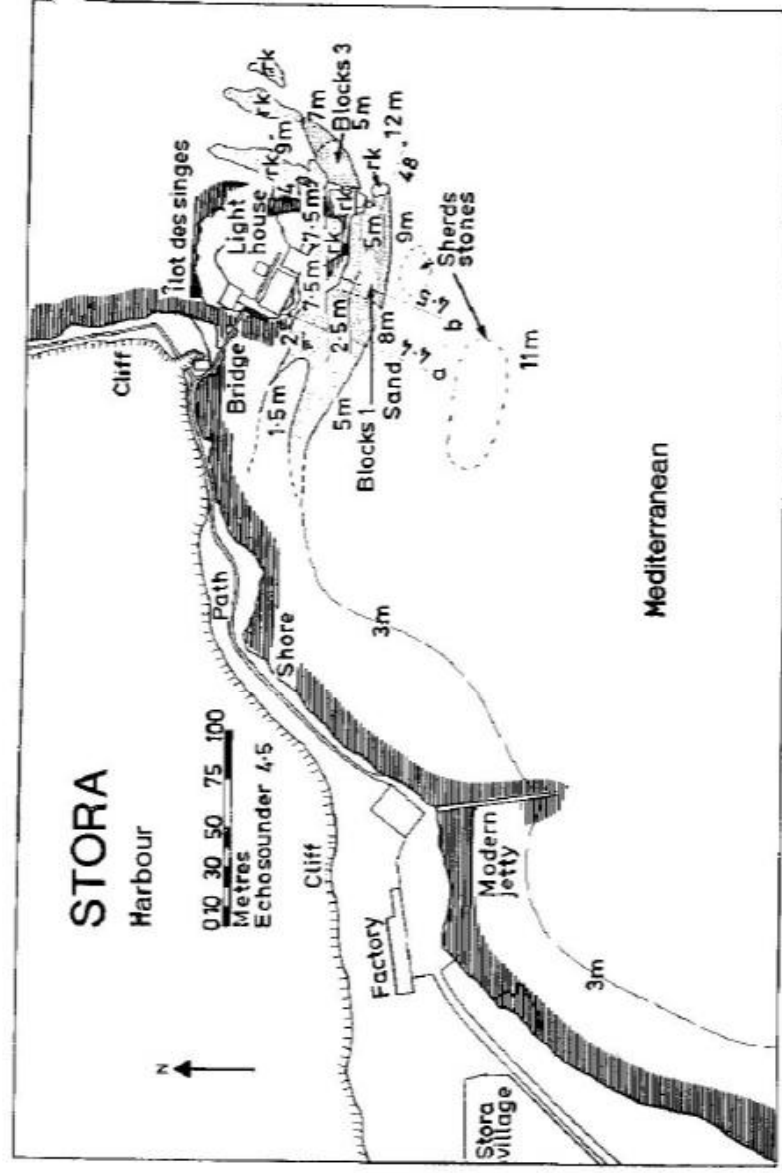


Fig. 10 Plan of the modern harbour at Stora showing the position of the underwater constructions.

A brief search underwater to the west of the town in the lee of the Ile Maudite, where Delamare puts the ancient port, revealed no signs of it. Some protection may be found to the south of this island, but the water is shallow and rocky in places, making it unsuitable for a permanent haven. It could be that Delamare confused the name of this island with that of the main island round the corner to the east which now forms part of the modern port. No diving was carried out in the area of the rather shallow modern port.

#### TABARKA (*Tabarka*)

The town was of some size in ancient times, and was an important port for the exportation of Numidian marble from the quarries at Simitu (Salama, personal communication.) Cagnat states that the harbour was between the mainland and the island and Berard (1950) describes jetties and a mole to the east of the island. The Pilot of 1951 says that the island is connected with the mainland at its southern end by a shallow bar on which is a rubble breakwater with a 65 ft wide boat passage through it.

Since 1951 the gap in the breakwater has been closed, and the harbour has sanded up, with an average water depth of about 2 m. The shore on the south of the island has advanced up to 10 m from what was obviously the shore line quite recently. A few modern jetties protrude from the sand.

To replace the now useless old harbour a new one is in the process of being constructed to the east of the island over Berard's jetties, and it is improbable that anything further will be added to our knowledge of Tabarka harbour.

#### KORBA (*Curubis*)

A brief visit showed the site to face a long sandy beach with no shelter or noteworthy feature upon it. It is improbable that this held a harbour of any significance.

#### KELIBIA (*Clupea*)

The harbour lies under the shadow of the Turkish Fort on Ras Mustafa. In the last two years a modern fishing port has been built by extending the 150 metre mole which protected the original port from the east and by building southerly and westerly jetties. Within this modern harbour, some 200 m from the base of the easterly mole, lie the remains of a jetty consisting of blocks and concrete. On the shore there is a large block of concrete protruding from the low cliff. Unfortunately now that the harbour is almost totally enclosed there has been considerable growth of weed

which obscures the end of this possibly ancient jetty and makes visibility underwater very poor.

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#### BIBLIOGRAPHY

References mentioned in the text, and other important works.

- BERARD, V. (1850) *Description des Côtes de l'Algérie*, Paris
- CHARDON (1900) *Fouilles de Rasguniaë*, Paris
- DIOLE, P. (1952) 4,000 Years Under the Sea. Sidgwick & Jackson, London 1954 (translation of *Promenades d'Archéologie Sous-marine*, Michel, Paris 1952)
- GAVAULT, P. (1897) *Etudes sur les ruines Romaines de Tigzirt*, Leroux, Paris
- GSELL, S. (1894) *Tipasa*, Mélanges de l'Ecole Française à Rome
- GSELL, S. (1911) *Atlas Archéologique de l'Algérie*, Fontemoing, Paris
- GSELL, S. (1929) *Histoire Ancienne de l'Afrique du Nord*, Hachette, Paris
- GSELL, S. (1952) *Cherchel, Antique Iol—Caesarea*, Imprimerie Officielle à Alger
- JULIEN, C. A. (1931) *Histoire de l'Afrique du Nord*, Payot, Paris
- LACOSTE, L. and QUEMARD, C. (1933) *Les Ports Antique d'Algérie*. Société des éditions Géographiques Maritimes et Coloniales, Paris 1933, extract from Revue Maritime December 1932
- LEHMANN-HARTLEBEN, K. (1923) *Die Antike Hafenanlagen des Mittelmeeres*, Klio, Leipzig
- MEDITERRANEAN PILOT (1951) Eighth Edition, Hydrographic Dept, Admiralty 1951
- RAVOISIE, A. (1840) *Exploration Scientifique en Algérie, Beaux Arts*, Vol. 111, Paris
- SALAMA, P. (1951) *Les voies romaines de l'Afrique du Nord*, Service Cartographique de l'Algérie, Alger
- SALAMA, P. (1968) personal communication
- SHAW, T. (1738) *Travels in Barbary 1719-1731*, London