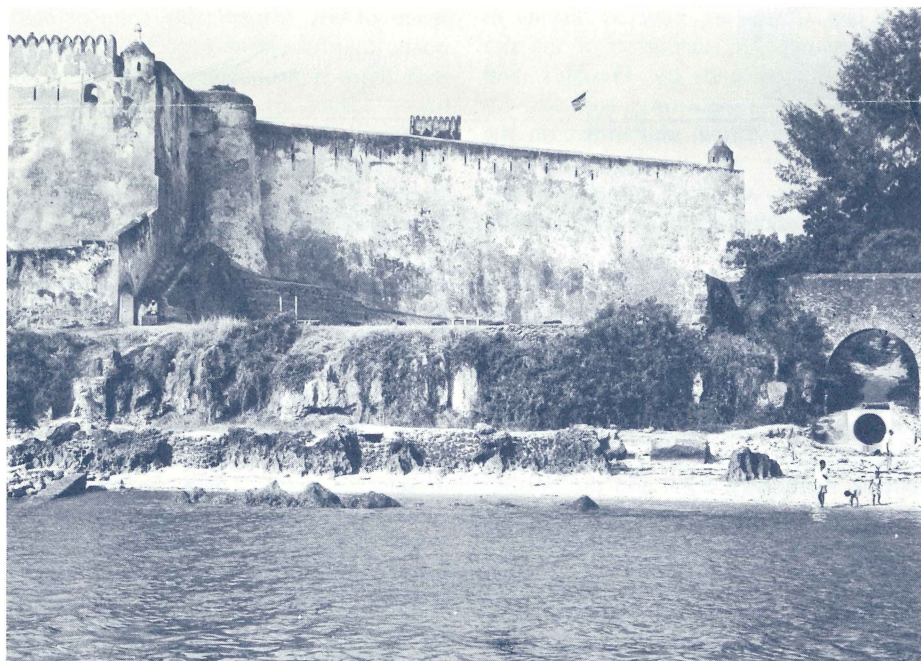


The Mombasa Shipwreck



Robin Piercy

Fig. 1. Fort Jesus from the wreck site.

AINA staff members Donald A. Frey and Robin Piercy visited Mombasa, Kenya, in January, 1976, to investigate a wreck site thought to be of a Portuguese ship which sank in 1697. Under the auspices of the Fort Jesus Museum, Mombasa, the work was made possible by a grant from the National Geographic Society. The author and Dr. Frey also wish to thank the following for their generous help and hospitality: National Museums of Kenya; Provincial Commissioner Coast, Mr. Eliud Mahihu; Mombasa Club; Bahari Club; Divecon, Neville Chittick; Alan Alder; Tony Dunne; Kevin Patience; Car and General Ltd.; the 1971 survey team for permission to reproduce in part their survey plan; and Mr. James Kirkman.

Through the good offices of Dr. E.T.

Hall, Research Laboratory for Archaeology, Oxford, Dr. Frey was able to spend several days at the Oxford Computer Center. In 1971, he developed a computer program at Oxford to analyze magnetometer data from archaeological land sites. This was adapted to accept underwater data and produced the overall picture of magnetic disturbances on the Mombasa site, as shown in Fig. 5.

Mr. Piercy has prepared the following report for AINA members.

Kenya, 1976

Hamo Sassoan, Curator of the Fort Jesus Museum, met Don and me when the overnight train from Nairobi pulled into the Mombasa train station. The train is a splendid relic of East African

colonial travel, with plush leather seats and white-coated attendants. Hamo took us to the Mombasa Club, which was to become our headquarters for the next 20 days. This was very convenient, as the Club overlooks the site and is adjacent to Fort Jesus.

Mombasa is a thriving commercial center, with a natural deep water harbor, protected by treacherous coral reefs at its narrow mouth. As I write, there are two modern freighters stuck fast on the reefs, awaiting salvage. The harbor is divided in two by a large island on which the bulk of the town lies; to the south is the new commercial port, and to the north, the old dhow harbor. The latter is still used by local sailing traders, and, in the spring of each year, by the dhows of Arabia. During our visit we were fortunate to see several of these magnificent craft beating up the narrow creek under full sail. Like much in the world, tradition has given way to progress, and many dhows are now powered by huge diesel engines. They no longer need to rely on monsoon winds to blow them on their trade routes.

Kenya, 1697

Fort Jesus was built by the Portuguese in the late 16th century to secure their trade routes to the east. It sits on a low cliff overlooking the confluence of the two harbor creeks and guards the narrow harbor entrance. It was here, in 1697, that the *Santo Antonio de Tanna*, an armed merchant ship from Portuguese Goa in India, sailed in response to a request for assistance sent by the beleaguered garrison defending the Fort against an Arab siege.

The Fort, in desperate straits and almost totally reduced in numbers by

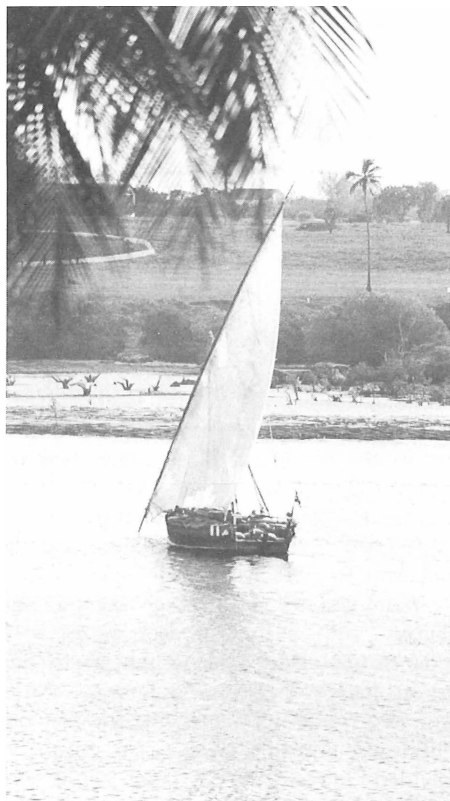


Fig. 2. Trader from Lamu beats up the creek.

Robin Piercy

plague, was resupplied in September, 1697, by the *Santo Antonio*. The ship, according to Portuguese records, was moored directly below the Fort and endured heavy fire from enemy batteries. Because of the danger, an unsuccessful attempt was made to change her moorings. But in September her cables parted and the ship became stranded on the northeast reef, losing her rudder in the process. She later refloated and was moored again close to the Fort. At some time after October 20, she finally sank. As yet we know nothing of the circumstances of her sinking. We do know, however, that the crew of the ill-fated ship joined the defending garrison in the Fort. They gallantly held out for nearly a year before being forced to surrender, overcome by sickness rather than the attackers' military genius.

Diving on the Wreck

In the late 1960's, two local divers, Conway Plough and Peter Phillips separately discovered the remains of a wooden hull lying in about 15 meters of

water to the north of the Fort. Further investigations, with local volunteers, showed that the site could be that of the *Santo Antonio de Tanna* (see James Kirkman, "A Portuguese wreck off Mombasa, Kenya." *International Journal of Nautical Archaeology*, Vol. 1, 1972, pp. 153-157). Certainly the material recovered indicated a ship of Portuguese origin. The finds included a brass breach-loading cannon with insignia, grenades, salt glaze ware, some very fine Chinese porcelain, and Siamese black glaze jars. These are now on display in the Museum. Our evaluation of the site was greatly helped by Plough's and Phillips's careful recording and also by their nylon base line, still intact on the bottom. During our stay we spoke with many of the original volunteers and were very encouraged by their ready offers of assistance.

At high water the deepest and shallowest points on the wreck site were recorded as 20 m. and 12 m. respectively. The water temperature of the Indian Ocean, just south of the equator, is always warm. Wet suits were necessary only as protection against accidental contact with sharp coral and the poisonous spines of stone fish. Consequently, we were able to spend a considerable time on the bottom.

Preliminary work on the site consisted of laying down five additional nylon lines parallel to the original base line. These were set at 3 meter centers and had 21 buntings tied at 2 meter intervals along their length. Thus we had effectively gridded an area 15 x 44 meters into 2 x 3 meter rectangles. (See Fig. 4: the small vertical numbers on the right side indicate the grid lines, with 4 being the original base line.) We had hoped to cover the site photographically with at least one 2 x 3 meter grid rectangle per exposure. This would have ensured good coverage and overlap for a simple photo-mosaic. But after several attempts at all stages of the tide, we were foiled by the unpredictable visibility. The nylon grid lines, however, proved invaluable in orienting ourselves in these poor conditions. We found visibility was best on the rising tide an hour before, and during, high water.

With the approach of spring tide, clarity increased enormously, reaching an estimated 10 m. on one occasion.

A plan of the site, made in 1971, is the basis for the plan produced in Figure 4. Two distinct rows of massive frames curving toward each other could be followed along the silty sea bed. By projecting the curves on paper, it was possible to estimate the ship to be approximately 38 m. in length, with a beam of 8 m. Unfortunately it was not possible to verify this due to the absence of any recognizable stem or stern posts. Careful visual inspection indicated that there is probably no more than the lower 1.5 m. of hull remaining. This is covered by sand and fine broken coral and appears to be well preserved. Hull strakes 10 cm. thick are fastened to frames 22 cm. square, set solidly side by side, with no space between the frames; these in turn are covered by ceiling planks 4 cm. thick and 22 cm. in width. According to a previous analysis, the timber used in the construction is predominantly teak.

In the course of our survey, we opened a number of small trial trenches in selected areas. These, in addition to those of previous years, indicate that below the thin silt overburden there may lie many well preserved objects. Amidships we uncovered a layer of ballast stones nearly one meter thick. The extent of this layer was not determined, but it is conceivable that it covers a great proportion of the ship's bilge.

As our investigations continued, it became evident that because the hull lay on a steep slope, much of the upperworks and associated material would have fallen outwards down the hill. Heavy objects such as cannon would have been among the first to have broken free and fallen through weakened bulwarks. Because of their weight, they would have been quickly and deeply buried in the silt.

Looking for Metal

In the course of discussions with Divecon, a local diving company, arrangements were made for the hire of their Elsec metal detector. This proved

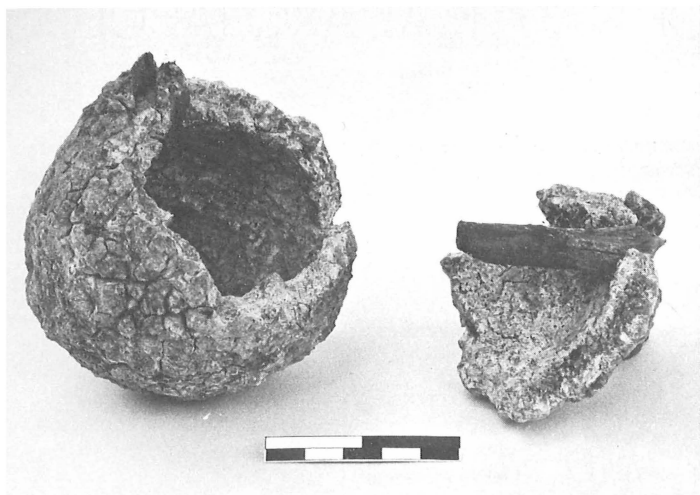


Fig. 3a. Iron hand grenade with wooden peg.

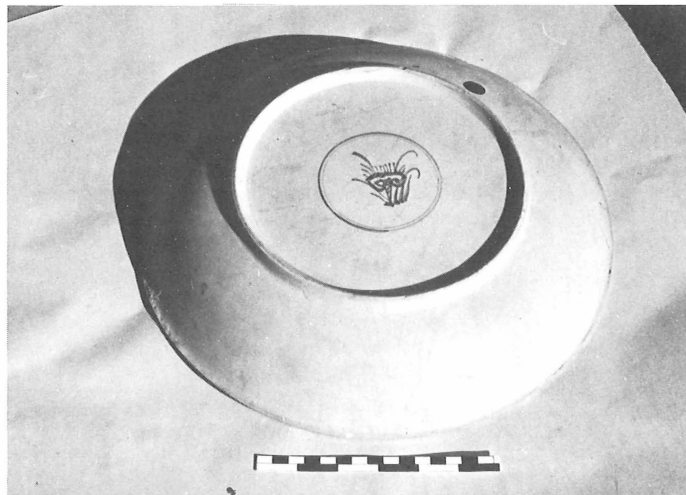


Fig. 3b. K'ang-hsi porcelain plate.

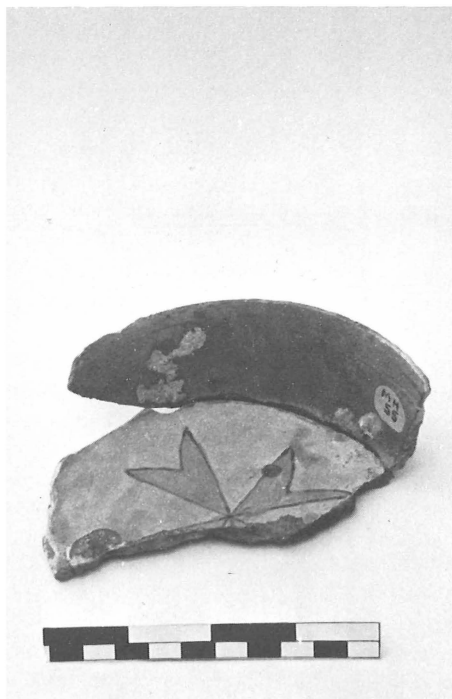


Fig. 3c. Portuguese plate with Maltese cross.



Fig. 3d. Bronze cannon with arms of Portugal and date 1678.

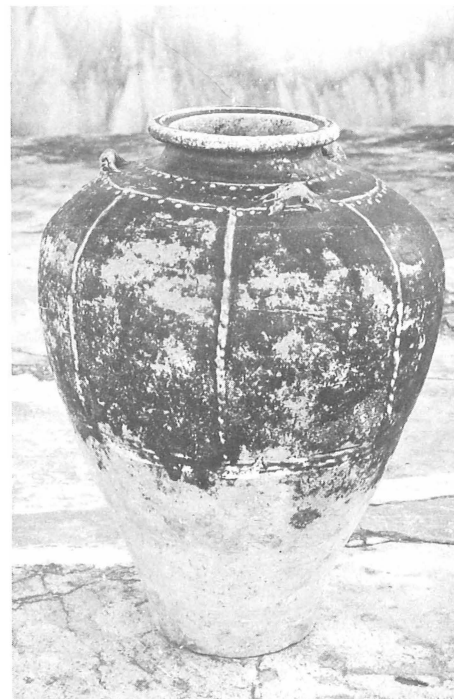


Fig. 3e. Kalong (Siamese) jar, 54 cm. high.

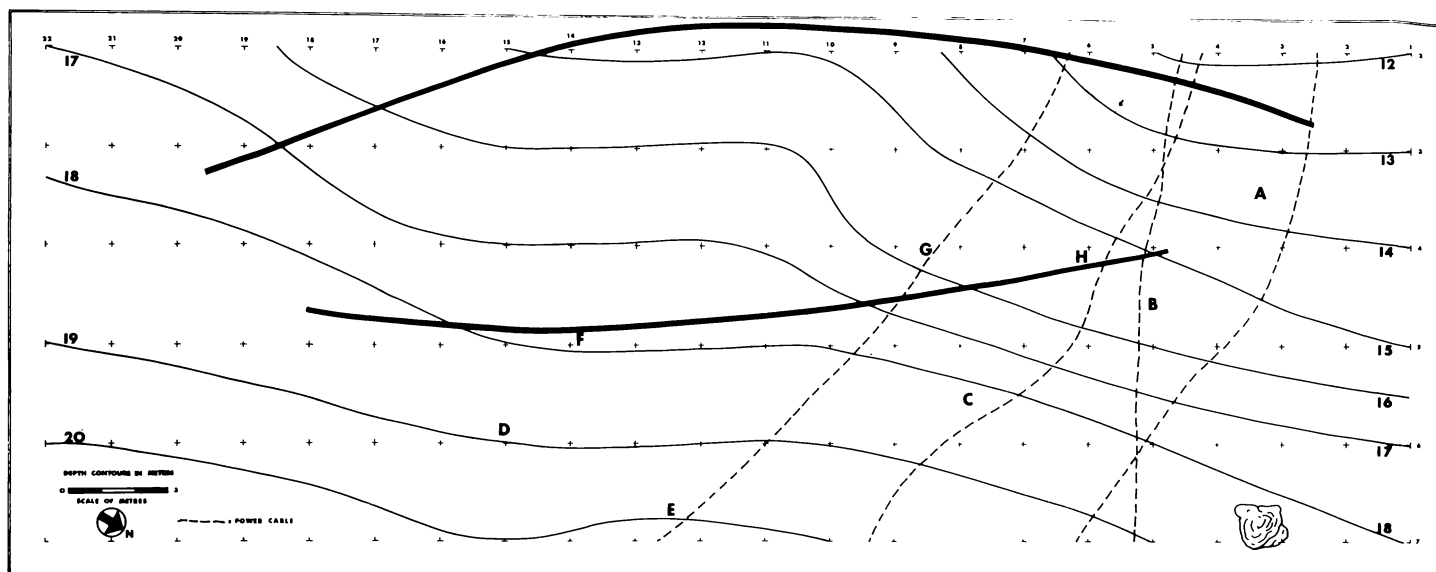


Fig. 4. Site plan showing the outline of the hull. Key to small finds: A. 1971 excavation area; B. Bronze cannon; C. Large glazed jars; D. Copper bucket; E. Large glazed jar; F. Olive jar and chain mail; G. Chinese Porcelain plates; H. Half an hour glass.

to be of considerable value in the location of both ferrous and non-ferrous metal targets. It was unfortunate that the northern end of the site, an area of special interest, was crossed by no less than four submarine power cables. The resident engineer from the East African Power Company informed us that these cables carried most of the power for Mombasa Island. Later we confirmed that live cables do, indeed, create electronic interference! Away from the cables, however, the relative absence of signals and the small number of targets indicated little metal. Downslope from the hull, a few cannonballs and grenades were found in conjunction with several large iron concretions.

Divecon kindly gave us the use of their proton magnetometer, boat, and underwater telephone; we were thus able to complete a thorough investigation of the whole site. The magnetometer's detector head, having been designed for towing behind a boat, was extremely cumbersome when operated by hand. We eventually mounted the sensor on a wooden pole with a float to achieve neutral buoyancy. A diver, wearing aluminum tanks and carrying a minimum of ferrous metal, was able to

position the unit with relative ease. When the detector head was on station, the diver signaled with a marker buoy to the surface operator to commence or finish readings. The nylon grid lines provided the survey base. In one day readings at more than 140 stations, covering the entire site, were made in less than two and a half hours.

A proton magnetometer is unaffected by non-ferrous metals, and measures minute variations in the earth's magnetic field with extreme accuracy. These changes can be brought about by an object as small as a cannonball buried several feet under the sand. A cannon or similar large conglomeration of ferrous metal can be detected many feet away. It would show as a large change in field on a magnetic contour map of the site. With the magnetometer, we were able to eliminate the interference caused by submarine cables on the earlier metal detector survey.

The data produced some interesting anomalies (Fig. 5). These targets were deep beneath the sand and covered by a chaotic jumble of ship's timbers. So substantial were they in both size and quantity that we were unable to excavate further in the time available.

Looking Ahead

While no stratified evidence was found to prove beyond doubt that the wreck was the Portuguese *Santo Antonio de Tanna*, the information we collected strongly reinforces that possible identification. Teak was plentiful in India and often used in shipbuilding. The solid construction and size of the hull are similar to merchant ships of that period, armed with 40 guns. The lack of cannon on board can be explained by the ship's having sunk rather slowly, and there having been time to remove them. They would have been more than useful in the defense of the beleaguered Fort.

Little is known of early Portuguese shipboard life in the Indian Ocean, and excavation will shed light on that subject. Many interesting objects can be anticipated, and it is likely that a thorough investigation of the hull will prove to be of great interest. The good condition of the wood beneath the sand should yield considerable information about the techniques of Portuguese ship construction of the period. In the past, AINA staff members have been able to produce ships' lines and reconstructed

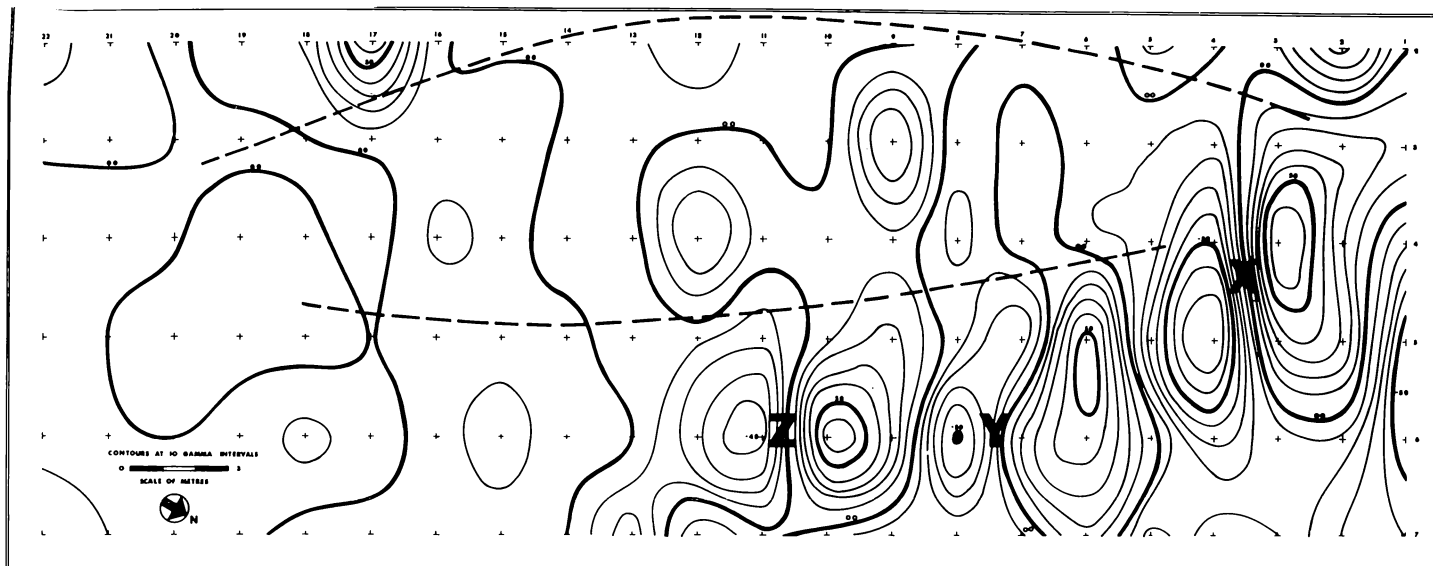


Fig. 5.
Magnetic contour map showing disturbances (X, Y, and Z) large enough to be buried cannon or a mass of iron shot. All gamma contours should be multiplied by 10.

hulls from considerably less evidence than that preserved by the Mombasa wreck (see AINA Newsletter, Vol. 1, No. 2, "New Lines of the Yassi Ada Byzantine Ship").

The discovery of this ship, the ear-

liest known preserved wreck on the East African coast, has raised a good deal of local interest. At this time, plans are going ahead for AINA staff to direct an excavation early in 1977. We look forward eagerly to our return to Mombasa

and our many new friends there, in particular Mr. and Mrs. Hamo Sassoon and Conway Plough, who gave us so much of their time.

— Robin C. M. Piercy



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The American Institute of Nautical Archaeology is a nonprofit scientific/educational organization whose purpose is to gather knowledge of man's past as left in the physical remains of his maritime activities and to disseminate this knowledge through scientific and popular publications, seminars, and lectures. The AINA Newsletter is published periodically by AINA and is distributed to its members and Supporting Institutions to inform them of AINA's current activities.

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