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The Sadana Island shipwreck: an eighteenth-century AD merchantman off the Red Sea coast of Egypt

Cheryl Ward

Abstract

In 1995–8 the Institute of Nautical Archaeology (INA), in cooperation with the Supreme Council of Antiquities for Egypt (SCA), excavated an Ottoman period wreck at Sadana Island on the Red Sea coast of Egypt. The 50m long hull represents a form of wooden shipbuilding hitherto undocumented for this period. The finds included a large and diverse collection of Qing Dynasty Chinese export porcelain designed for an Islamic market, as well as coffee, aromatic resin, spices, earthenware water jars, green glass bottles and other remains of cargo dating to about 1765, from a time of changing trade patterns and renewed Ottoman interest in controlling Red Sea commerce. The location of the site demonstrates that Chinese porcelain and other goods were being transported by sea north of Jeddah, the port of Mecca, a point traditionally seen as the terminus of the sea trade from the Indian Ocean during this time. Commercial interaction on a global scale was common in the later eighteenth century, but this wreck represents a part of the world about which little is known; the origins of the ship are obscure, but her crew was Muslim. The project is also important as the first major shipwreck excavation to be undertaken in Egyptian waters.

Keywords

Sadana Island shipwreck; Egypt; Red Sea; Ottoman; Chinese porcelain; archaeobotany.

Introduction

Trade between Europe and Asia has been studied extensively, both historically and in archaeological excavations. Much less known or studied is the rich trade between early modern Asia and the Middle East. Direct trade routes were used infrequently, but there is no question that goods originating in China and India played a major role both within the Ottoman empire and between it and its neighbours. Ships typically obtained goods in China and south-east Asia, and transshipped cargoes at other centres such as Surat in India. From there, Indian, European, American, and other ships caught the spring



monsoons and carried locally produced spices and textiles, in addition to luxuries such as porcelain, to Red Sea ports.

Much of this trade was destined for the northern end of the Red Sea, usually via Jeddah, the port of Mecca. Large ships might sail there directly, or goods could be laden in smaller vessels from Mocha. Ships based at Suez monopolized trade coming into Egypt from the Red Sea; they sailed to Jeddah only once or twice a year. Despite the risks of sea travel and dangers of navigating the coral-lined shores of the Red Sea, it was still much cheaper and safer to send goods by sea rather than by land. Land routes are more often cited in modern studies (e.g. Raby 1986), but both historical and archaeological evidence suggests that the role of sea routes has been understated. The excavation of a 900 ton, 50m long ship of the second half of the eighteenth century permits us to examine a critical link in a chain of commerce that stretched half-way around the world in 1765.

The Sadana Island shipwreck

A 1994 shipwreck survey by the Institute of Nautical Archaeology (INA), in cooperation with the Supreme Council of Antiquities for Egypt (SCA), documented an Ottoman-period vessel near Safaga (Haldane 1994, 1996a). Qing Dynasty Chinese export porcelain attracted acquisitive visitors to the site, including a group that dived there more than 500 times in the early 1990s. Excavation between 1995 and 1998 provided information about the ship and its cargo (Haldane 1996a, 1996b; Ward 1998; see also the project website at <http://www.adventurecorps.com/sadana.html>). All artefacts are curated at the Alexandria Conservation Laboratory for Submerged Antiquities, a joint project of INA-Egypt and the SCA.

The Sadana Island shipwreck lies in 28–40m of water at the sandy base of a coral reef near a popular Red Sea diving resort. The ship sank and settled parallel to the reef with its bow pointed inland. It heeled onto its starboard side, and much of the port side broke away and is missing. Relatively deep sand covered about half of the hull. There were relatively few artefacts and no guns present despite good preservation of the hull itself. The ship's internal timbers lie just centimetres beneath the sand or are well exposed (Plate 1). Three grapnel anchors, each 4m long, mark the bow. The ship's frames can be traced continuously throughout the site's 50 × 20m area.

In 1995, the excavation team concentrated on establishing datum points for mapping the site and clearing its surface of portable artefacts to prevent further looting losses. After nearly 5,000 dives over three excavation seasons, the site is well documented. Large storage jars once clustered in the middle of the site and porcelain, glass and copper objects spread along its deeper boundary have been removed. The site's major feature is its largest artefact, the ship itself. Trenches set out along the top (28–30m deep) and bottom (32–36m deep) of the site intersect with three transverse trenches. In addition to recording timbers in these trenches, team members raised representative fragments for study and subsequently buried them on site.

Although more than 4,000 artefacts are now under conservation in the Alexandria laboratory, we know that much of the original cargo was lost to looting as well as to the natural processes of decay in the sea (Plate 2). Our 1996 discovery of about 200 stacked



Plate 1 Excavation near the junction of floor timbers and first futtocks (photo: M. Kato).

and shattered porcelain artefacts buried on the beach suggests that disturbance and artefact removal was fairly large scale. Subsequent conversations with members of the group and images from their dives confirmed this impression. Individual salvors independently described more than 12,000 porcelain objects removed or broken. Even the looting cannot entirely account for the ship's 'emptiness', however. Today, as in the past, pilgrim traffic is important in Red Sea shipping. Historical accounts document 400–500 pilgrims carried on ships the size of the Sadana wreck, but the paucity of personal possessions at Sadana (fewer than fifty objects) means that it was not carrying hundreds of passengers when it sank. Instead, it is probable that much of the vessel's final cargo was organic. Recovery of plant and animal remains is an integral part of our excavation and offers important evidence for this 'invisible' cargo.

Summary of finds

Earthenware and porcelain ceramic artefacts comprise the largest single group excavated to date. By the mid-eighteenth century, southern Chinese kiln centres had amassed centuries of experience in creating a special class of export wares for the Middle Eastern market. In Islam, cultural and religious injunctions against the representation of living creatures meant that most porcelain sold in the Middle East – including all but one cup on the Sadana wreck – featured floral or geometric designs (Fig. 1). Istanbul's Topkapi Saray Museum offers the closest comparative collection for the Sadana porcelain. Its holdings include most types found on the shipwreck (Haldane 1996a; Krahl and Ayers 1986). Monochrome glazed, enamelled, and underglaze blue painted export wares allow us to



Plate 2 Remains of porcelain cups shattered by unsanctioned visitors to the site. Ten wooden crates of about 1,000 cups each, packed in tea, were described to the author (photo: M. Kato).

look at the variety of Chinese porcelain known and used in the Ottoman world and to assess differences in Western and Middle Eastern markets. Chinese export wares were specially designed to suit the tastes of the world, from family coat-of-arms in Italy to dots on wares for North America and toiletry wares used both by former convicts and by the governors of Australia (Staniforth and Nash 1998).

By the eighteenth century, more than 3,000 kilns are reported from Jingdezhen in southern China. Porcelain styles produced there are similar to examples from the Sadana Island collection. A rich blue, cobalt oxide glaze was applied to the object's white body, often in a production line of individuals each of whom painted one small part of a design. Before firing, the object was coated with a transparent glaze that resulted in a lustrous finish. If additional colours were to be added, Forbes (1982: v-vi, 8) notes that the pieces were shipped to Canton for further elaboration.

About one-quarter of the excavated porcelain is decorated solely with cobalt blue underglaze. About 200 large, blue-and-white dishes decorated with a floral motif on the interior and two bare branches on the exterior measure either 34.4cm or 37.8cm in diameter (Plate 3). These dishes are the same size as those in the Topkapi collection and elsewhere (Krahl and Ayers 1986: 1026, no. 2208; Carswell 1995: 94). Often called *bakdounis* or 'parsley' dishes in Muslim lands, their decoration is usually described as 'peony scroll' in modern publications. Many different 'hands' can be seen at work in the dish patterns,

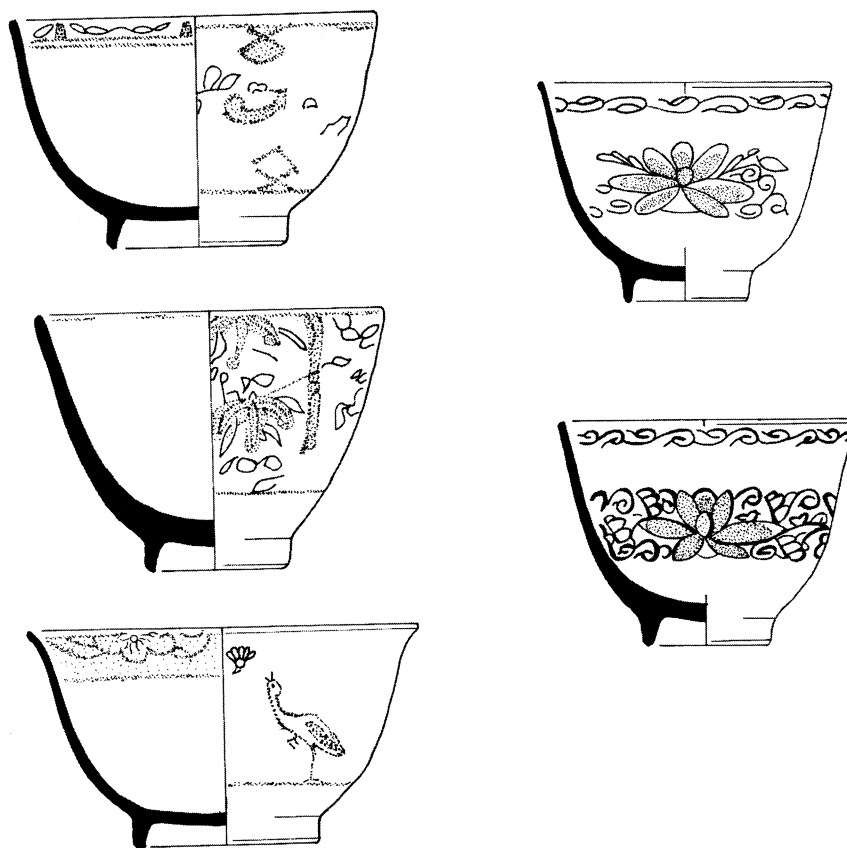


Figure 1 Porcelain cups from the Sadana Island shipwreck. ‘Ghosting’ is indicated by solid lines. Note the crane on the lower left cup (maximum diameter 7.8cm); it is the only living creature depicted in the Sadana porcelain collection (drawings: N. Piercy, L. Piercy and F. Heller).

and the Sadana Island collection will be invaluable in documenting variation within the type.

Small cups with no handles, intended for coffee, make up the next largest class of porcelain objects. Although images and reports from the unsanctioned site visitors document ten wooden chests, each holding about 1,000 porcelain cups packed in tea, we have recovered only about 300 cups in addition to bag upon bag of recently broken sherds. Some twenty different designs include cobalt blue, celadon and monochrome brown glazed examples, one brown glazed type having a quatrefoil medallion filled by an underglaze blue plum-family blossom. On many of the cups, only the underglaze blue decoration remains of a pattern once bright with enamelled colours such as red, gold, yellow, or green, a style sometimes called Chinese Imari or polychrome overglaze, or enamelled.

Enamel colours are rarely well preserved on pieces that come from the sea (Wästfeld et al. 1991; Zacharchuk and Waddell 1984; Staniforth and Nash 1998: 32). Enamel colours,

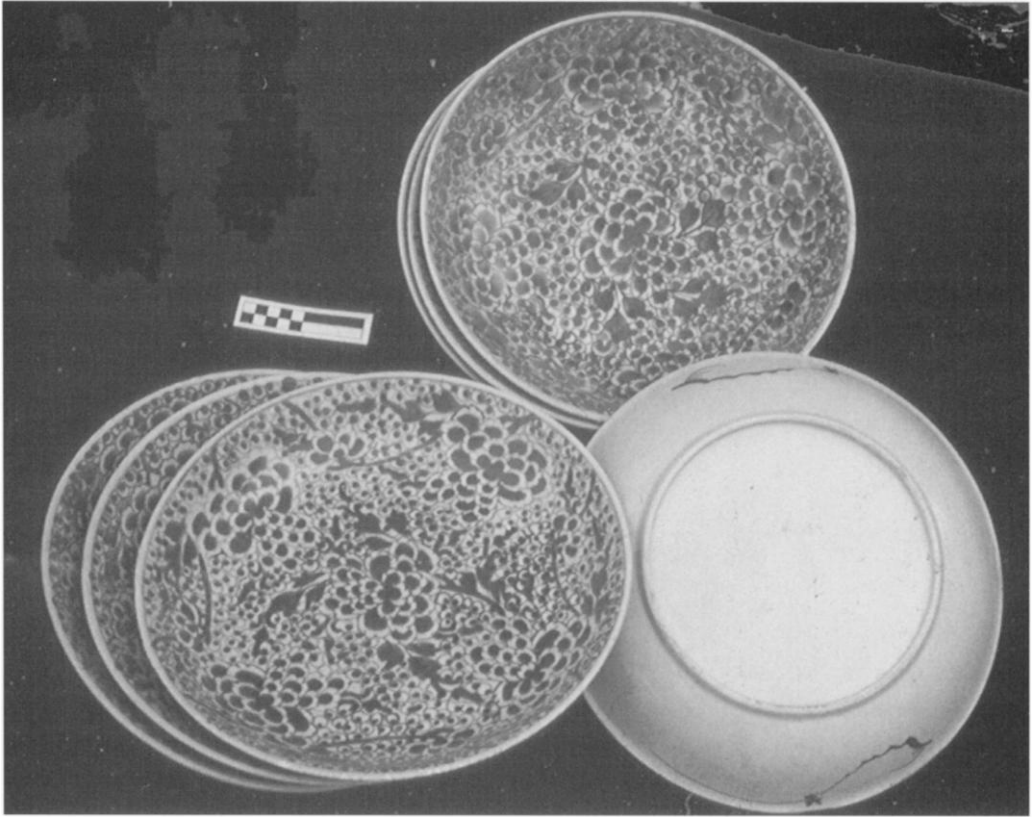


Plate 3 ‘Bakdounis’ or peony scroll dishes painted with cobalt oxide underglaze. Maximum diameter is 34.7cm (photo: D. Haldane).

because they were applied after primary firing, erode through continual exposure to water. As Netia Piercy’s illustrations show, patience and raking light permit rediscovery of the original enamelled design on the porcelains because the colours last long enough to protect the glazed surface from the effects of salt water. Tracing the designs must be done after the object has been desalinated and at least partially dried, so only some of the Sadana pieces have had their ‘ghosting’ defined. Intricate ghosting on several pieces again shows strong similarities with examples from the Topkapi collection.

For example, a Topkapi bowl with vine-leaf-shaped medallions and another with spiralling blue panels which have parallels at Sadana (Krahl and Ayers 1986: 1296, no. 3343; 1339, no. 3525) are dated to the second half of the eighteenth century and to 1730–60 respectively (Fig. 2). Topkapi Saray Museum bowl TKS 4099 and cover TKS 4062 feature day lilies and chrysanthemums in a framework of underglaze blue leaves, flowering grasses, and panels and, though 15 per cent larger, are otherwise almost identical to bowl 2–65 and its cover from Sadana (Fig. 2). The TKS pieces are dated to 1725–30, however, and the range of dates demonstrates some problems in dating eighteenth-century Chinese export wares (Krahl and Ayers 1986: 1216, no. 3011).

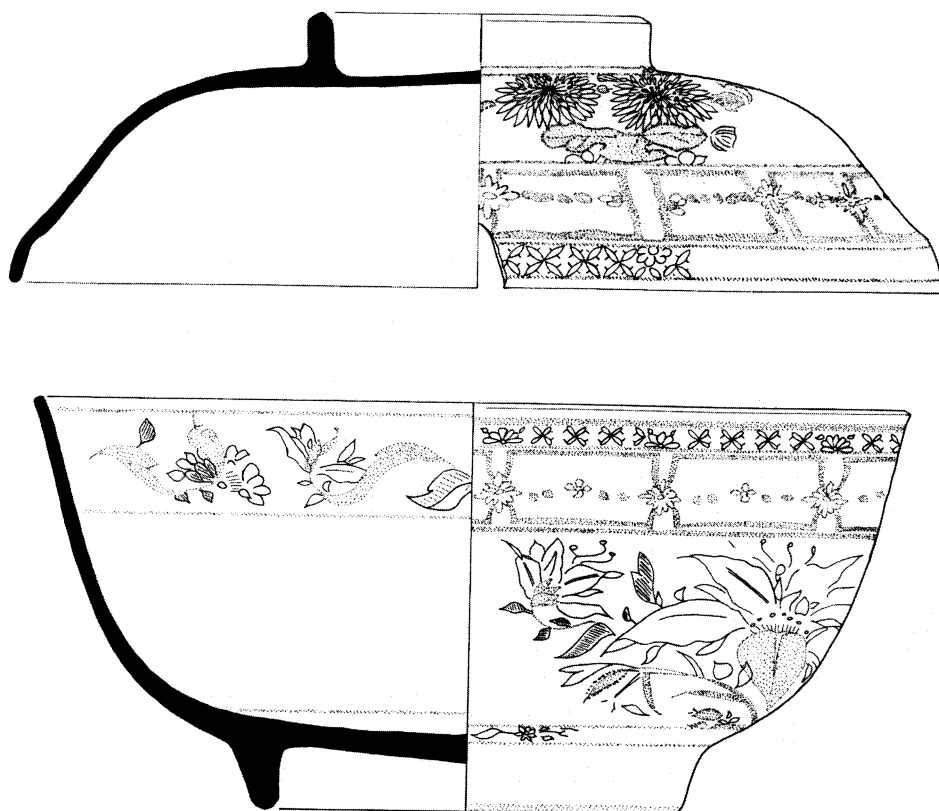


Figure 2 Bright colours, probably gold and scarlet, overlie the underglaze blue-and-white painted porcelain bowls from the shipwreck, including this lidded set. Day lilies and chrysanthemums remain only in the ghosted lines of the drawing (drawing: N. Piercy and F. Heller).

Specialist studies of porcelain contemporary with the collection recovered from the Sadana Island shipwreck produce dates that span a century. Porcelain wares from this period rarely bear reign marks providing precise dates (these are more common in the sixteenth and early seventeenth centuries). Well-dated collections such as the Sadana Island ship's cargo are particularly valuable because they can help to resolve new and existing questions about Qing Dynasty chronology. For example, some porcelain types are dated to the third quarter of the seventeenth century, and other pieces are dated to the first quarter of the eighteenth century. These dates are misleading. An inscription on a copper cooking basin found in 1998 includes the AH date 1178, equivalent to AD 1764, making that the earliest possible sinking date for the Sadana ship. It is unlikely that porcelain was made half a century or a century earlier and stored before being traded because of the tremendous and profitable market for export porcelain. The 1797 *Sydney Cove* wreck also includes export wares traditionally dated twenty-five to fifty years earlier than the ship's sinking (Staniforth and Nash 1998: 25), suggesting that reassessment of standard dates for eighteenth-century export wares is necessary.

Less finely made than the porcelain, but as varied, are more than 850 earthenware water vessels (*qulal*) of about thirty different designs and shapes (Fig. 3, left). About as many remain buried on the site. Some pieces seem to imitate the shapes of metal objects; others feature applied strips and dots of clay. Some shapes resemble waterpipe bowls or stemmed goblets; still others have sieves at the junction of neck and body to exclude flying insects. All are made of a thin, grey/brown fabric fired at high temperatures with significant inclusions. Shipped empty, in use the *qulal* functioned as miniature water coolers. When filled with water and exposed to air, the walls allowed evaporation to take place. This natural process cooled the remaining water, a practice common in warm climates today as in the past. *Qulal* seem to have a consistent body diameter despite differences in decoration. Although they may have been a low-cost item, they were packed carefully into spaces between framing timbers throughout the ship, from bow to stern, suggesting their importance in terms of cargo.

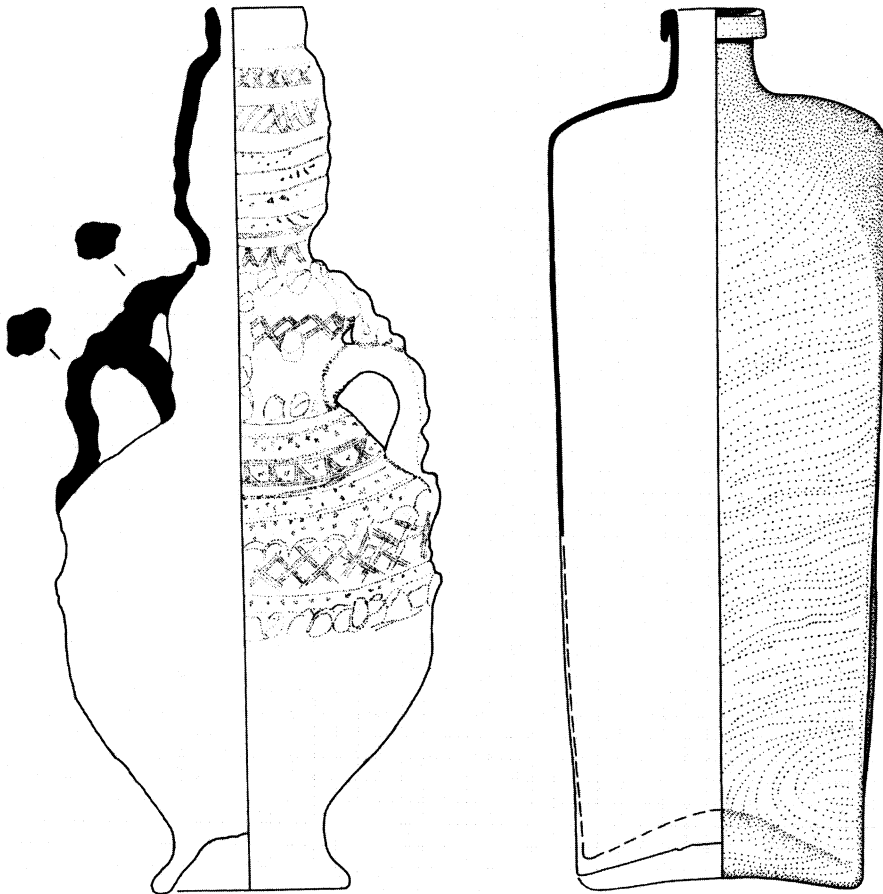


Figure 3 One of a variety of ceramic water vessels (left) and the best preserved green glass case bottle (right), both excavated from an area just forward of midships. Maximum jar height 28.8cm (INA staff drawings).

Jars glazed with either green or brown, large and small glazed and plain clay bowls and a yellow and brown glazed bowl with a central spiral and lotus-like blossoms on ‘arms’ extending from the centre illustrate a variety of shapes whose origin has not yet been determined. More than 40 *zila*’, storage jars about 90cm high of three slightly different types, were excavated in the central part of the ship. They almost certainly carried supplies of dry foods or water for the crew and passengers, and originally were closed with wooden lids, several of which have been recovered. Clay pipes, a red-slipped tobacco holder, incense burners, handled jars, and a small spouted pot also survived to help us document life aboard the Sadana ship.

Also on site, probably as cargo, are over four dozen broken green glass case bottles (Fig. 3, right) and a very few brown glass wine bottles. Large iron concretions, some resembling pintles and gudgeons, may be the remains of spare ship’s gear. Archaeologists also recovered copper food preparation and serving wares; these probably were used aboard the vessel. At least four were inscribed with their owners’ names and three with dates from the Islamic calendar.

Finds of large and small container lids, rope, wood, seeds, charcoal, and coconuts demonstrate the variety of organic materials so well preserved on site (Plate 4). These finds are especially important as we suspect that much of the ship’s original cargo was organic. Archaeobotanical studies contribute tremendously to our understanding of shipping activity from all periods because they provide hard evidence for cargo, shipboard life, trade routes and even seasonality (Haldane 1993).

Separating organic remains from sediment is a tedious but simple procedure accomplished through bucket flotation. Waterlogged remains are briefly suspended in a vortex created by swirling water with sediment in a bucket; the water and suspended remains are poured off through a set of sieves to trap seeds, leaves, charcoal, wood fragments, animal hairs, insects, and even small artefacts. Gross morphological features and sections of recovered seeds are compared with modern examples for identification just as pottery designs can be compared with one another. At Sadana Island, systematic examination of all jar contents and organic-rich deposits produced a range of species including pepper, cardamom, nutmeg, coriander, coffee beans, hazelnuts, coconuts, olive stones, fig and grape seeds, aromatic resin, weed seeds, and even a knotted leather bag from the ship’s last voyage. In addition, bones from several animals, including sheep or goat and domestic fowl, inform us about shipboard diet.

The presence of coffee beans and a highly aromatic, yellow resin in most areas of the site suggests that these were cargo rather than supplies for the crew. The resin has not yet been chemically identified; a large number of plant gums and resins were traded along the shores of the Indian Ocean and into the Red Sea. Frankincense, *luban* in Arabic, is perhaps the best known of these. Both fruits (bright red when ripe) and seeds, commonly known as beans, of *Coffea arabica* are abundant on the Sadana site.

The hull

The largest artifact at the Sadana Island site is the ship itself. Because the ship keeled over onto its starboard side, we can look at its interior construction relatively easily, once the



Plate 4 Organic finds included a unique bi-lobed coconut, or *coco de mer* (*Lodoicea maldivica*) from the Seychelles Islands (photo: M. Kato).

heavy sand overburden is removed. Study of the ship's construction details and features is producing a record of an unknown ship type. Despite a long history of contact between Europeans, Egyptians, and others who sailed the western Indian Ocean and Red Sea, separate shipbuilding traditions continued. The Sadana Island ship is an example of a type that is non-European, non-Arab, and non-Mediterranean. The massive timbers used to build it suggest ample supplies near its home shipyard; wood identification may help to pinpoint the geographical origin of hull components.

The hull is characterized by the use of massive timbers joined by iron fastenings. The ship's planking is fastened to frames and stringers at intervals of about 50cm. Frames and floor timbers are spaced somewhat further apart than those seen in other contemporary hulls, and the stringers that transverse the length of the hull from keel to upper deck are unusual for their robustness. Three levels of knees and deck beams indicate that the ship had three separate decks. A separate stowage compartment sectioned off by bulkheads



Plate 5 Hull construction features of the hold in the forward starboard quarter; timbers closest to the keel are at the top of the photograph (photo: M. Kato).

was documented just aft of midships; the large transport jars (*zila'*) seem to have been stored here. A portion of the forward starboard quarter was extensively reinforced (Plate 5); much of the excavated porcelain originated in this area.

Curiously, there were no guns on the ship. Its voyages were probably confined to the Red Sea, within the boundaries of the Ottoman empire, and it had no need to defend itself from either pirates or European merchant ships which had few compunctions about appropriating goods from other vessels in the western Indian Ocean. Fewer than a dozen lead musket balls, 1cm in diameter with sprues intact, comprise the entire excavated armament of this massive ship with its valuable cargo.

Discussion

The Sadana Island excavations have allowed us a far better understanding both of Red Sea trade and of a single ship representative of the largest type of ship active in the Ottoman Red Sea of the second half of the eighteenth century. An inscribed copper basin with a date equivalent to AD 1765 gives us a firm foundation for exploring the historical aspects of Red Sea trade during this period although slightly earlier documents are also important in its study.

The Sadana Island shipwreck reveals a mini-history of Red Sea trade that dovetails into the greater scheme of international commerce between East and West. Richard Kilburn, a private scholar who examined the papers of England's East India Company, shared an excerpt from a letter of instruction to the men who would purchase the cargo for the *Princess Amelia*. The supercargoes bought Chinese porcelain in Canton to be sold in Mocha, a principal port for Red Sea and East African traders, in the autumn of 1724.

CHINAWARE 300 to 350 chests. Tis impossible to give particular or full Instructions for providing this Article . . . One General Rule must always be observed, and that is, never to pack a peice of Ware that hath the figure of Humane Species, or any Animal whatsoever, and as formerly the Color'd ware prevailed, so it is more than probable that it still doth, the red and gold used to be most in esteems, & three quarters of the colour'd Sortments with one quarter of blew & white was the customary package of the whole parcel.

This letter could, with the exception of the amount of porcelain, be a description of the Sadana ship's porcelain cargo as it exists today. Mocha, *Princess Amelia's* destination, is one of two possible loading points for the ship, the other being Jeddah, the port of Mecca. By the second half of the eighteenth century, small ships regularly carried the goods of Mocha to Jeddah for further transshipment up the Red Sea.

Contemporary accounts of Mocha describe a busy harbour populated with 'English Free Merchants, Portugeuze, Banyans and Moors, and by Vessels from Bossorah, Persia and Muskat in Arabia petrea', all of whom sought to trade in coffee and 'some Drugs, such as Myrrh, Olibanum or Frankincense from Cassin, and Aloes Soccatrina from Socotra, liquid Storax, white and yellow Arsenick, some Gum Arabick and Mummy; with some Balm of Gilead, that comes from the Red Sea', according to Captain Alexander Hamilton, writing in 1723 (Hamilton 1723: 41–2).

Coffee, native to Ethiopia's Red Sea hills, reached Saudi Arabia by the thirteenth century, and was grown on hillside terraces in Yemen soon after that. For centuries, Alexandria's warehouses stocked European and Mediterranean cabinets with spices and luxuries from the east. Unhappy with paying premium prices and able successfully to reach eastern seas, Europeans began trading directly for cinnamon, nutmeg, cloves and mace in the late 1500s. The Dutch takeover of the main spice-producing islands around 1600 changed the face of world trade.

Egypt lost its monopoly on the 'fine spices' and began to focus on coffee, dominating the trade throughout the seventeenth century. Coffee still made up about two-thirds of the value of imports from the Red Sea during the eighteenth century, but its value

dropped rapidly with the approach of the nineteenth century and successful coffee cultivation in the Americas (Raymond 1973; Smith 1996; Hattox 1985).

Carsten Niebuhr's travel records in the Red Sea in 1762 and those of European consular visitors provide perspective on the Sadana Island ship's role in the region's commerce (Niebuhr 1772, 1774; Hansen 1964). Niebuhr describes the ships of the Red Sea, and notes that many were built in Suez shipyards of wood, iron and rope brought in from Cairo and Alexandria. Such ships could carry up to 1,000 tons, and as many as 600 passengers (typically pilgrims to Jeddah). Another traveller notes the presence of Arab-run ships that were of Indian construction and far more expensive to build than comparable Nile or Mediterranean ships. Between thirty and forty ships made the trip between Suez and Jeddah each year; of these, fifteen to twenty could carry more than 900 tons.

Yet another traveller points out that the French and other European traders sent the red dye cochineal, paper, European fabrics and foods, and bullion to the Red Sea in exchange for coffee, spices, drugs, myrrh and incense, Indian cotton fabrics and Chinese silk and porcelain. It is thus clear that the Sadana Island ship was headed north on its last voyage with a cargo intended for transshipment to Cairo and beyond.

The presence of large (30–50 metre long) porcelain-carrying shipwrecks at Sadana Island, Sharm el Sheikh (Raban 1971) and another looted site near Hurgada in the northern Red Sea suggests that there was a strong interest in moving Chinese porcelain and other goods by sea north of Jeddah, a point traditionally seen as the terminus of the sea trade from the Indian Ocean during this time (McGowan 1994; Raby 1986). Egyptians under Ottoman suzerainty controlled what was effectively internal trade until the late eighteenth century when European shipping began operating between Suez and Jeddah.

In the first part of the seventeenth century, Mocha and Jeddah were the destinations of ships from Arabia, East Africa, South-east Asia, and, especially, from both sides of the Indian peninsula in addition to Dutch and Portuguese controlled vessels (Brouwer 1991, 1992). Regional markets such as Jeddah or Mocha depended on foodstuffs, spices, drugs, incense and textiles for most of the value of trade they facilitated. Indian ships were known to carry goods north to Suez for French and other merchants periodically during the seventeenth and eighteenth centuries. In 1670 the *ra'is* Ahmed owned two Indian ships at Suez, and in 1682, port chronicles mention a *markab hindi*, or Indian sailing ship, anchored in the harbour there (Raymond 1973: 110, n. 5). In 1762, a foreign visitor noted that, of the fourteen ships that operated between Suez and Jeddah, most were built in Suez where the industry was flourishing, but, by the later eighteenth century, a French traveller commented that most Arab ships in the Red Sea were built in India (Raymond 1973: 110). For much of the seventeenth and eighteenth centuries, strong commercial ties existed between Egypt and India, and it would not be surprising to find that Indian shipbuilding techniques were adopted by local Egyptian builders.

Could the Sadana Island ship be Indian or of local Egyptian construction? We know only that it was not built according to traditional Mediterranean or European construction practices at the time. It does not closely resemble Dutch, Portuguese, or English ships active in the Indian Ocean, and it is unlike what we know of Indian Ocean sewn ships of the time. When the wood used in building the ship is identified, we may learn more about where the materials for shipbuilding came from, but in a wood-poor region such as the Red Sea, even wood was transported over long distances by ship, either from Alexandria

or from ports further to the east, so the material is not a reliable indicator of origin. Excavation at the site ended in 1998 but research into these questions continues. The ship's master and crew were Arabic speakers, and its cargo was destined for Muslim markets. As such, it is the first ship of this period to receive intensive archaeological study.

Acknowledgements

Excavation of the Sadana Island shipwreck by INA-Egypt took place between 1995 and 1998 in cooperation with Egypt's Supreme Council of Antiquities (SCA), under the direction of Abdul Nur el Din and Gaballah Ali Gaballah and with the assistance of the underwater section and its inspectors. The excavation was funded by generous gifts from corporate and private donors and through the participation of volunteers and INA-Egypt staff, and had grants from the Committee for Research and Exploration of the National Geographic Society, The Amoco Foundation, The John and Donnie Brock Foundation and The California Community Foundation; the project also had support from the Institute of Nautical Archaeology, the American Research Center in Egypt and the Egyptian Antiquities Project. Doug Haldane served as project director in 1998 and coordinates the conservation of artefacts from Sadana Island in the Alexandria Conservation Laboratory for Submerged Antiquities, a joint project of INA-Egypt and the SCA.

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