

ANNEX 17
TO
EXHIBIT A

Bronze pintle and copper tubing from HMS *Pandora*, Great Barrier Reef, 1791:
Henderson, G., 'Finds from the Wreck of HMS *Pandora*', *International Journal of
Nautical Archaeology* 9.3, 1980.

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Notes and News

Finds from the wreck of *HMS Pandora*

HMS Pandora was wrecked on the Great Barrier Reef in August 1791 while *en route* from Tahiti to England. When the vessel struck she was bringing back to England for trial a number of captured mutineers from William Bligh's *HMS Bounty*. The survivors recorded that the *Pandora* sank in 15 fathoms of water, several miles from a small sand cay at a location subsequently named Pandora Entrance off the Queensland coast of Australia.

In November 1977 a wreck was discovered during a search by private divers in the vicinity of Pandora Entrance. The wreck, lying in 15 fathoms of water, was believed to be the *Pandora*, and this prompted the Federal Government of Australia to proclaim its Historic Shipwrecks Act 1976 to apply to waters off the Queensland coast. At the time of finding, divers raised a small number of artefacts from the wreck to assist in identification of the site.

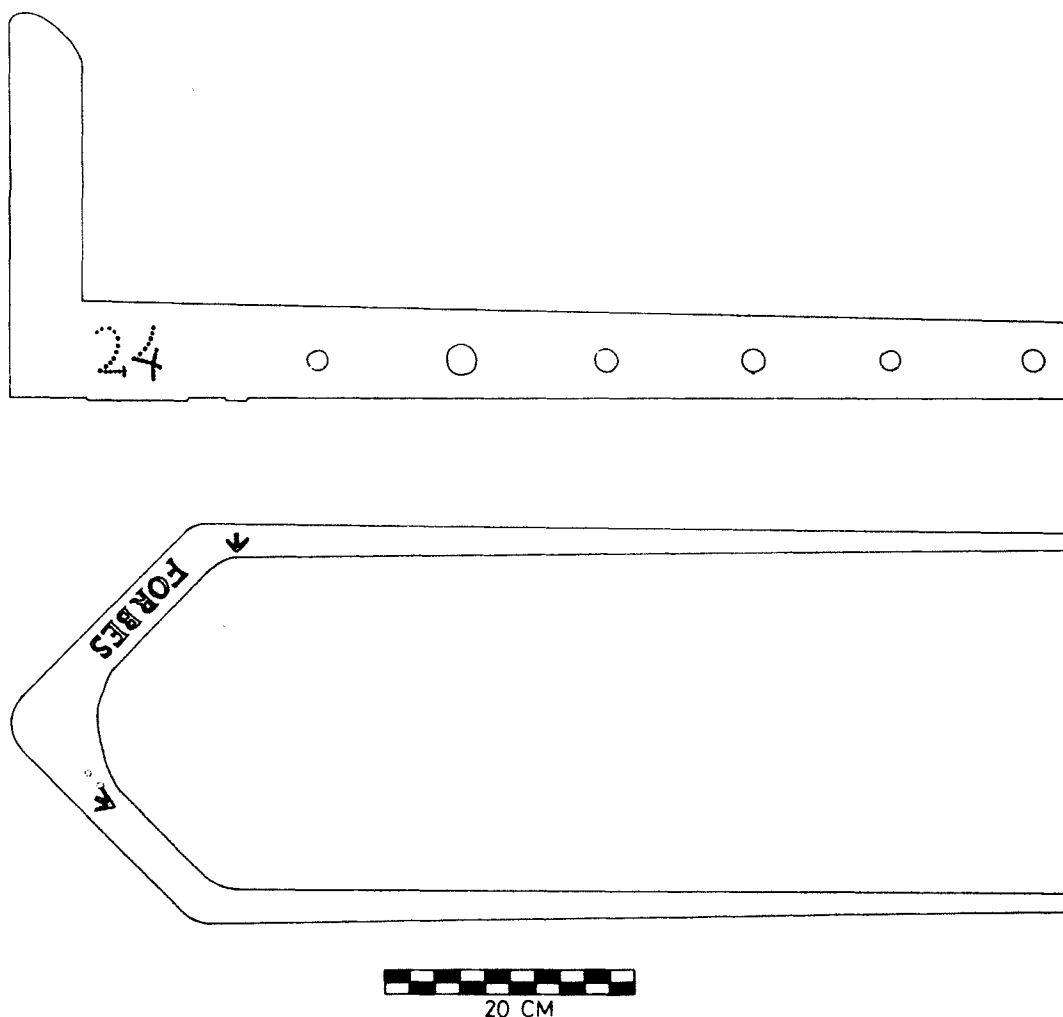


Figure 1. Detail of the cleaned pintle showing markings. Photo: Pat Baker.

In April, 1979, on behalf of the Federal Government's Department of Home Affairs, the author examined the artefacts previously raised and conducted a brief survey of the wreck itself. Details of this survey, and the arguments supporting the conclusion that the

wreck is indeed the *Pandora*, are being published elsewhere (Henderson, 1980). The purpose of this article is to describe briefly the artefacts raised during the two expeditions which have so far visited the site.

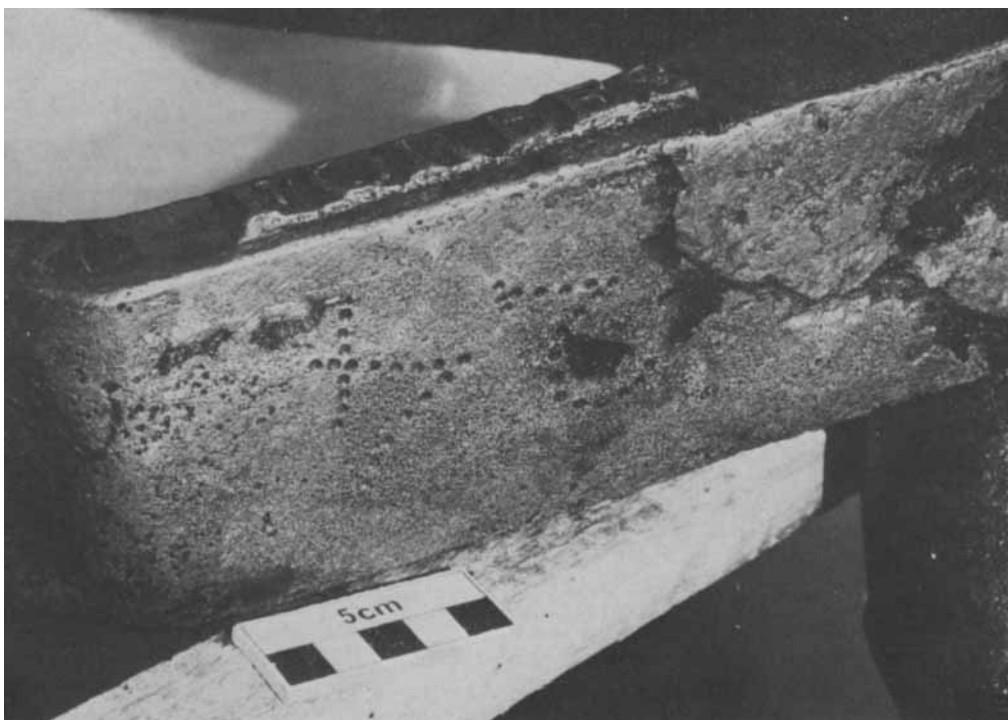


Figure 2. Detail of punched numeral 24. Photo: Pat Baker.



Figure 3. Spectacle plate from the rudder. Photo: Pat Baker.

Copper rudder pintles

Two rudder pintles were raised from the site at the time of finding, and more pintles or gudgeons were seen protruding from the seabed. One of the pintles from the 520 ton, 24-gun *Pandora* is currently housed in the Queensland Maritime Museum. It has a pin diameter of 0.06 m. The hole on a gudgeon from the 28-gun frigate *HMS Success* (504 tons) stranded at Fremantle in 1829 (Henderson, 1974) was 0.065 m diameter, very close to that observed on the pintle from the *Pandora*. The item has not yet undergone cleaning or conservation procedures and it is not known whether any markings are present beneath the concretion.

The second pintle (Fig. 1) raised from the site has undergone treatment at the Western Australian Museum's Department of Materials Conservation. On cleaning it proved to have been well preserved and bore a number of significant markings:

1. The presence of two raised broad arrow marks shows that the pintle was made for the British Government, and indicates that the wreck is that of a British naval vessel.
2. A series of small dots have been punched into the piece to form the number 24 (Fig. 2). The *Pandora* was a 6th rate, but there was some variety of type within this rating. The number of guns was therefore a more precise way for those in the ship-building industry to refer to a particular class of vessel. *Pandora* was a 24-gun, 6th rate, and the number on the pintle would refer to this class.
3. The name 'Forbes' (Fig. 3) in raised lettering appears very clearly on the pintle. A typically Scottish name, it may be expected that it refers to either a copper founder or other contractor who supplied the pintle to the Navy.
4. Two punched dots, of larger diameter than those forming the number 24, appear on the lower edge of the pintle. It is likely that this denotes the second pintle position on the rudder.

The overall length of this pintle is 0.85 m, and the pin diameter is 0.058 m. It has longer jaws than the pintle at the Queensland Maritime Museum, and would have had a lower position on the rudder.

Spectacle plate

The upper tiller position on a ship's rudder was of little use as a jury rig, because if the rudder

sustained action damage, it would almost certainly be below this position, and the rig would then be useless. On *HMS Victory* (Bugler, 1966) excellent jury steering arrangements were fitted and could be rigged very quickly even when the upper part of the rudder has been shot away. A special bronze spectacle plate with a band 0.558 m (internal width) by

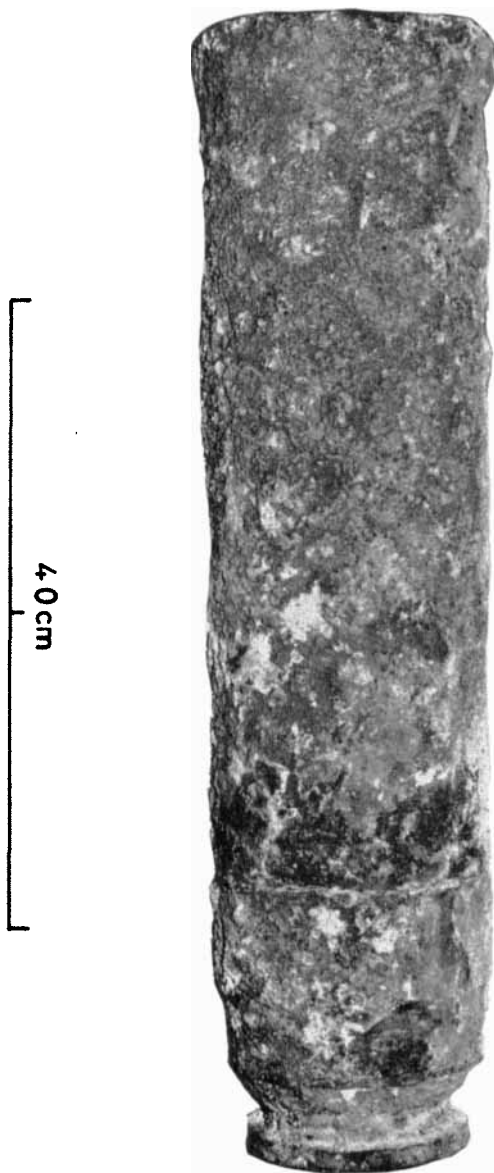


Figure 4. Section of copper tubing from the bottom section of a pump. Photo: Pat Baker.

0.762 m (arm length) containing two spectacle extensions with 0.038 m diameter eyes was provided 7.239 m above the heel of the rudder. Ropes were rigged and shackled to the spectacle plate eyes. These ropes were then led inboard on each side of the ship through shackles secured to the hull and the manned tackles inboard, thus improvising a simple and effective secondary steering arrangement.

A similar but slightly smaller piece, with a band 0.409 m by 0.698 m and eyes of approximately 0.022 m, was found in 1977 on top of the shallow reef adjacent to the *Pandora* wreck site. When the *Pandora* struck the shallow reef, damage was incurred to the sternpost and the rudder, resulting in sections being torn away (Thomson, 1915). The presence of the spectacle plate on top of the reef indicates that the damage extended to the higher sections of the rudder.

Copper pump chamber

Large ships of the late 18th century carried four main pumps and had bilge pumps as well. Smaller ships had two, placed on either side of the mast. Small pumps were fitted for other purposes such as wash pumps. The common pump was a long wooden tube whose lower end rested upon the ship's bottom, between the timbers in the well. Falconer (1780) wrote that common pumps were very rarely used in ships of war, unless of the smallest size. The most useful pump was the chain pump, which was universally used in the navy by that date. The machine consisted of a chain, to which, at certain distances apart, a number of plates were attached. Working on a sprocket wheel, the chain passed downward through a tube, the 'back-case', and returned upward through another tube, called the 'round chamber' bringing the water up from the well in a continuous stream.

The *Pandora* is known to have carried both chain pumps and common or hand pumps. On the night of the ship's loss, Captain Edwards wrote in his log:

'Soon after the ship was over the reef one of the chain pumps gave way by the chains breaking and a little before midnight one of (the) hand pumps was rendered useless for some time by the spear box breaking' (Thomson, 1915).

Several sections of common pumps have been observed on the wreck site. A section of heavy gauge copper tubing from the lower part of a common pump was raised, and a section of

larger diameter copper tubing was left on the site.

Steel (1805) gives the following tabled information for several of his vessels:

	36-gun frigate	330-ton merchant
To be fitted with pumps		
In number	2	2
Size, if copper	1 ft	7 in
Size, if chain	7 in	
And two wood pumps with brass chambers, size	7 in	

Steel's table may indicate increased utilization of copper in pumps of English vessels over the years 1780–1805.

The copper pump chamber section raised from the wreck site is 0.73 m in length, with an internal diameter of 0.17 m (6.7 in). The lower end of the tube has a shoulder and an everted lip to facilitate the connection with the lowest section or nozzle of the pump (Fig. 4). At the time of raising, divers reported seeing indications of canvas near the shoulder



Figure 5. An earthenware jar bearing an applied plaque. Photo: Pat Baker.

of the tube, and this may originally have facilitated the sealing of the connection. A similar connecting metal piece with shoulder and lip (pipe diameter of 0.123 m) has been found on a wreck site in Western Australia dating to about 1810 (Henderson, 1980).

Copper fastening bolt

A single copper fastening bolt was raised from the wreck at the time of finding. This piece, 0.99 m in length, was located close to the pintles seen on the site. Copper fastenings were generally used below the waterline of British naval vessels after about 1780 (Macintyre & Bathe, 1968).

Earthenware storage jar

Three large jars of apparently similar shape have been observed on the site and one of these was raised when the wreck was found (Fig. 5). This jar 0.75 m high, shows no sign of glazing and is made of pink earthenware. It has a thickened rim and two vestigial arched handles enclosing, on at least one side (the other remaining obscured by coralline encrustation at present), an applied plaque with the raised letters T M F under a Lorraine cross (Fig. 6).

Similar jars of west Mediterranean origin have been found in Britain (Ashdown, 1972) and the United States (Hume, 1970) and have been dated to the second half of the 18th century, being common in the period 1745–80. Jars bearing the initials T M F are to be found at Edinburgh and Derbyshire in the British Isles. Ashdown (pers. comm. 1979) sees the historical and archaeological evidence pointing to Tuscany in Northern Italy as the place of



Figure 6. Detail of the plaque beneath the arched handle. Photo: Pat Baker.

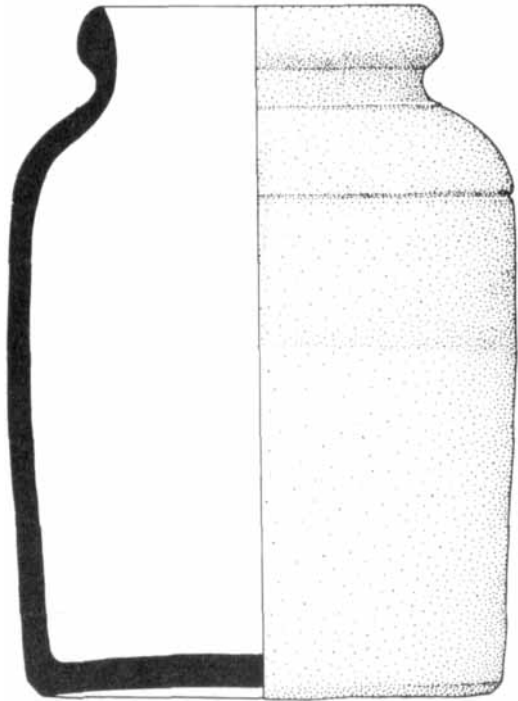


Figure 7. A saltglazed jar raised from the wreck. Drawing: Myra Stanbury.

manufacture: Tuscany belonged to the House of Lorraine between 1737–1859, and later in the 19th century many of the jars bore Tuscan potters' marks. Ashdown calls them north Italian oil jars but acknowledges a variety of functions. Chapman (1775) shows similar jars, described as water beakers, situated immediately below the quarter deck of his privateer frigate.

The peculiar nature of the *Pandora's* mission required that a large quantity of fresh water be readily available in the vessel for the extended crew and the breadfruit plants. The *Pandora* is known to have called on its outward voyage at Santa Cruz, Tenerife, for water and wine, and at Rio de Janeiro to complete her water. Santa Cruz seems a likely place for the vessel to have picked up Italian jars. However, they are known to have been available in Britain and may have been supplied before the *Pandora* commenced her voyage. Among the alterations made to the *Pandora* in fitting out for the voyage was: