

# MEMOIRS OF THE QUEENSLAND MUSEUM

BRISBANE

© Queensland Museum  
PO Box 3300, South Brisbane 4101, Australia  
Phone 06 7 3840 7555  
Fax 06 7 3846 1226  
Email [qmlib@qm.qld.gov.au](mailto:qmlib@qm.qld.gov.au)  
Website [www.qm.qld.gov.au](http://www.qm.qld.gov.au)

National Library of Australia card number  
ISSN 0079-8835

## NOTE

Papers published in this volume and in all previous volumes of the *Memoirs of the Queensland Museum* may be reproduced for scientific research, individual study or other educational purposes. Properly acknowledged quotations may be made but queries regarding the republication of any papers should be addressed to the Editor in Chief. Copies of the journal can be purchased from the Queensland Museum Shop.

A Guide to Authors is displayed at the Queensland Museum web site

**A Queensland Government Project**  
Typeset at the Queensland Museum

ILLUSTRATED CATALOGUE OF ARTEFACTS FROM THE HMS *PANDORA*  
WRECKSITE EXCAVATIONS 1977-1995

JANET CAMPBELL AND PETER GESNER

Campbell J. & Gesner, P. 2000 06 03: Illustrated catalogue of artefacts from the HMS *Pandora* wrecksite excavations 1977-1995. *Memoirs of the Queensland Museum, Cultural Heritage Series* 2(1): 53-159. Brisbane. ISSN 1440-4788.

HMS *Pandora* was wrecked east of Cape York, Queensland, in 1791 after recapturing some of the HMS *Bounty* mutineers. This catalogue lists and comments on the artefacts recovered at the time of discovery of the shipwreck in 1977, and during the Queensland Museum's first five archaeological expeditions to the wrecksite between 1983 and 1995. □ *HMS Pandora, maritime archaeology, artefacts, shipwreck, HMS Bounty, material culture.*

*Janet Campbell, Queensland Museum, PO Box 3300 South Brisbane 4101; Peter Gesner, Museum of Tropical Queensland, 78-102 Flinders Street, Townsville 4810, Australia; 12 December 1999.*

TABLE OF CONTENTS

|  |    |  |         |
|--|----|--|---------|
| <b>INTRODUCTION</b> . . . . .                  | 54 | CREAMWARE . . . . .                        | 99      |
| <b>THE SHIP</b> . . . . .                      | 54 | SLIPWARE . . . . .                         | 107     |
| FASTENINGS . . . . .                           | 54 | WHITE GLAZED EARTHENWARE . . . . .         | 107     |
| COPPER AND COPPER ALLOY                        |    | EARTHENWARE POTS . . . . .                 | 107     |
| FASTENINGS . . . . .                           | 54 | OIL JARS . . . . .                         | 109     |
| WROUGHT IRON FASTENINGS . . . . .              | 57 | OTHER EARTHENWARE CONTAINERS. . . . .      | 109     |
| RIGGING . . . . .                              | 61 | STONEWARE . . . . .                        | 111     |
| STEERING GEAR . . . . .                        | 61 | GLASS . . . . .                            | 112     |
| SHIP'S PUMPS . . . . .                         | 67 | <b>UTENSILS AND ACCESSORIES</b> . . . . .  | 120     |
| MISCELLANEOUS . . . . .                        | 71 | SHARPENING . . . . .                       | 120     |
| <b>SHIP'S FURNITURE AND FITTINGS</b> . . . . . | 72 | WATER FILTRATION . . . . .                 | 120     |
| SLATE . . . . .                                | 72 | COOKING . . . . .                          | 121     |
| BRICKS . . . . .                               | 72 | <b>CLOTHING AND ACCESSORIES</b> . . . . .  | 122     |
| WINDOW GLASS . . . . .                         | 72 | BUCKLES . . . . .                          | 122     |
| COUNTERWEIGHTS . . . . .                       | 74 | BUTTONS . . . . .                          | 122     |
| GREAT CABIN FIREPLACE . . . . .                | 74 | TOILETRY ARTICLES . . . . .                | 124     |
| BRODIE STOVE . . . . .                         | 79 | <b>POLYNESIAN OBJECTS</b> . . . . .        | 125     |
| METAL SHEETING . . . . .                       | 79 | MATERIAL CULTURE . . . . .                 | 125     |
| HINGES, DRAWER HANDLES,                        |    | ADZE BLADES . . . . .                      | 127     |
| DOOR FITTINGS AND LOCKS . . . . .              | 79 | FISHHOOKS . . . . .                        | 128     |
| PLUMBING . . . . .                             | 81 | STONE POUNDERS . . . . .                   | 130     |
| <b>WEAPONS AND ACCESSORIES</b> . . . . .       | 81 | OCTOPUS LURE COMPONENTS . . . . .          | 130     |
| AMMUNITION AND ACCESSORIES . . . . .           | 81 | TAHITIAN MOURNING GOWN                     |         |
| FIREARMS . . . . .                             | 82 | COMPONENTS . . . . .                       | 131     |
| ORDNANCE . . . . .                             | 84 | ETHNOGRAPHIC SHELL OBJECTS . . . . .       | 132     |
| GUNNER'S EQUIPMENT . . . . .                   | 87 | SHARK TOOTH . . . . .                      | 133     |
| BLADED WEAPONS . . . . .                       | 88 | WOODEN WAR CLUBS . . . . .                 | 133     |
| <b>TOOLS AND INSTRUMENTS</b> . . . . .         | 88 | QUIVER CAP . . . . .                       | 133     |
| INSTRUMENT GLASS . . . . .                     | 88 | <b>NATURAL HISTORY SPECIMENS</b> . . . . . | 135     |
| NAVIGATIONAL INSTRUMENTS . . . . .             | 88 | <b>MISCELLANEOUS OBJECTS</b> . . . . .     | 138     |
| TOOLS . . . . .                                | 90 | PIPES . . . . .                            | 138     |
| MEDICAL/PHARMACEUTICAL . . . . .               | 90 | GLASS BEADS . . . . .                      | 138     |
| FISHING TECHNOLOGY . . . . .                   | 94 | FACETTED STONE . . . . .                   | 139     |
| WRITING AND DRAWING . . . . .                  | 95 | BOTANICAL REMAINS . . . . .                | 139     |
| TIME KEEPING . . . . .                         | 98 | FAUNAL REMAINS . . . . .                   | 139     |
| <b>DOMESTIC EQUIPMENT</b> . . . . .            | 99 | MINERALS . . . . .                         | 139     |
| FOOD AND DRINK (CONSUMPTION                    |    | <b>UNIDENTIFIED OBJECTS</b> . . . . .      | 139-144 |
| AND STORAGE) . . . . .                         | 99 | <b>LITERATURE CITED</b> . . . . .          | 145     |
| BLUE AND WHITE EARTHENWARE . . . . .           | 99 |  |         |

## INTRODUCTION

This catalogue lists the artefacts retrieved from the wreck of the HMS *Pandora* by the Queensland Museum during the first five excavation seasons (1983, 1984, 1986, 1993 and 1995). It also includes the artefacts (MA numbers 1-9) collected when the wreck was discovered in 1977 and the initial exploratory survey in 1979. The objects have been divided into eleven general, functional groupings, based on the types of artefacts in the assemblage and on the categories used by the Rijksmuseum (Amsterdam) to order the finds of the VOC shipwreck, *Hollandia* (1743) (Kist et al., 1992: 276). They are: the ship; ship's furniture and fittings; weapons and accessories; tools and instruments; domestic equipment; utensils and accessories; clothing and accessories; Polynesian objects; natural history specimens; miscellaneous objects; and, unidentified objects.

All artefacts have undergone conservation treatment and have been accessioned into the collection of the Maritime Archaeology Section of the Queensland Museum at the Museum of Tropical Queensland, Townsville. Some objects are on permanent or semi-permanent loan to other institutions including the Queensland Maritime Museum, Fiji Museum and Rotuma Museum.

Each object or a group of like objects (such as sheathing tacks or lead shot) has a unique accession number with the prefix of 'MA'.

Analysis of this collection is still in an early stage. Many of the items catalogued have not yet been researched and have simply been described and illustrated.

**MEASUREMENTS.** Imperial measurements were used in the building and equipping of the *Pandora*. In this catalogue, all objects have been described using metric measurements and where appropriate, imperial equivalents are also given. This is primarily to assist in the comparison of the *Pandora* material, especially ship's fastenings, with 18th century documentation.

Some objects recovered are broken, badly corroded, or otherwise incomplete. In many cases it is not possible to ascertain original dimensions and, as such, a dimension maybe preceded by a '>' sign indicating that it can be positively determined that the size of the object was greater than that given.

**ILLUSTRATIONS.** Not all objects are illustrated herein. Only representative illustrations for object classes have been included.

**TABLES.** Data of some similar artefacts have been presented in tables, following a generic description. Any unique features are noted in a 'comments' column.

**GRID COORDINATES.** The *Pandora* wrecksite was excavated using a grid system of two metre squares (see Gesner, 2000, this issue). These grid squares were orientated in relation to a permanently fixed datum point and level (0.0). As each object was excavated its position was measured in three planes, relative to the datum point (X, Y and Z coordinates). The X and Y coordinates for each item have been listed in Appendix 1.

**ABBREVIATIONS.** Acc. No.=accession number; N.R.=no record; B.A.=broad arrow; L.=length; W.=width; Th.=thickness; Diam.=diameter; Ht.=height; Wt.=weight; O.D.=outer diameter; I.D.=inner diameter; mm=millimetres; D.=depth; Cwt=hundredweight; Qtrs=quarters; Lbs=pounds; in=inches; ft=feet.

## THE SHIP

### FASTENINGS

#### COPPER AND COPPER ALLOY FASTENINGS

**Clench Bolts.** A long, through fastening with one end riveted over a washer or a clench ring (de Kerchove, 1961: 152). This class of bolt was used for securing all permanent features of the ship's hull such as the fore and aft deadwood, main frames, keel and keelson, and hull planking (Coleman, pers. comm. 1999). The *Pandora*'s clench bolts vary in length but display common features (Table 1). Bolts are made of copper and are round in cross-section. Both ends are splayed through deformation of hammering; one through driving the bolt through several timbers, the other through locking onto a clench ring, often displaying a small lip. The driven ends appear more upset with fissures in the metal surface.



FIG. 1. Copper bolt stamped with 'Roe & Co', MA625.

TABLE 1. Clench bolts (cf. McKay & Coleman, 1992: 9, table 2).

| Acc. No. | L.                                |      | Diam.                         |    | Markings<br>B.A.=broad arrow | Clench Ring |         |        | Comments   |
|----------|-----------------------------------|------|-------------------------------|----|------------------------------|-------------|---------|--------|--|
|          | ft                                | mm   | in                            | mm |                              | I.D. in     | O.D. in | Th. in |  |
| 5        | 3' 3 <sup>5</sup> / <sub>8</sub>  | 1004 | 1 <sup>1</sup> / <sub>4</sub> | 32 |                              |             |         |        |  |
| 627      | 3' 2 <sup>1</sup> / <sub>4</sub>  | 968  | 1 <sup>1</sup> / <sub>4</sub> | 32 |                              | 1 3/8       | 2 1/8   | 1/4    |  |
| 620      | 2' 6 <sup>1</sup> / <sub>2</sub>  | 773  | 1 <sup>1</sup> / <sub>4</sub> | 32 | B.A.                         | 1 1/4       | 1 7/8   | 1/4    |  |
| 642      | 2' 6 <sup>3</sup> / <sub>8</sub>  | 771  | 1 <sup>1</sup> / <sub>4</sub> | 32 | B.A.                         | 1 1/4       | 1 7/8   | 1/4    |  |
| 681      | 2' 6 <sup>1</sup> / <sub>4</sub>  | 766  | 1 <sup>1</sup> / <sub>4</sub> | 32 | B.A.                         | 1 3/8       | 2 1/8   | 1/4    | Bent shank   |
| 781      | 2' 5 <sup>3</sup> / <sub>8</sub>  | 744  | 1 <sup>1</sup> / <sub>4</sub> | 32 | B.A.                         | 1 3/8       | 2 1/8   | 1/4    |  |
| 621      | 2' 4                              | 709  | 1 <sup>1</sup> / <sub>4</sub> | 32 | Poss. B.A.                   | 1 1/4       | 2 1/8   | 1/4    |  |
| 625      | 2' 3 <sup>3</sup> / <sub>4</sub>  | 703  | 1 <sup>1</sup> / <sub>4</sub> | 32 | Roe & Co                     | 1 1/4       | 2 1/8   | 1/4    | (Fig. 1)   |
| 616      | 2' 2 <sup>5</sup> / <sub>8</sub>  | 674  | 1 <sup>1</sup> / <sub>8</sub> | 29 | B.A.                         | 1 1/8       | 1 7/8   | 1/4    |  |
| 1111     | 2' 1 <sup>1</sup> / <sub>2</sub>  | 646  | 1 <sup>1</sup> / <sub>8</sub> | 29 | Poss. B.A.                   | 1 1/8       | 1 7/8   | 1/4    | Bent shank (Fig. 2)                                      |
| 612      | 2' 1 <sup>1</sup> / <sub>8</sub>  | 636  | 1 <sup>1</sup> / <sub>4</sub> | 32 | B.A.                         | 1 3/8       | 2 1/8   | 1/4    |  |
| 1600     | 2' 1 <sup>1</sup> / <sub>8</sub>  | 636  | 1 <sup>1</sup> / <sub>8</sub> | 29 | B.A.                         |             |         |        |  |
| 636      | 2' 1/4                            | 614  | 1 <sup>1</sup> / <sub>8</sub> | 29 | Roe & Co                     | 1 3/8       | 2 1/8   | 1/4    |  |
| 635      | 1' 10 <sup>1</sup> / <sub>2</sub> | 570  | 1 <sup>1</sup> / <sub>4</sub> | 32 | B.A.                         | 1 3/8       | 2 1/8   | 1/8    | Bent shank   |
| 1573     | 1' 10 <sup>1</sup> / <sub>8</sub> | 561  | 1 <sup>1</sup> / <sub>4</sub> | 32 |                              |             |         |        | Metal very smooth & soapy texture; no wrought lines      |
| 1601     | 1' 9 <sup>7</sup> / <sub>8</sub>  | 554  | 1 <sup>1</sup> / <sub>8</sub> | 29 | B.A.                         |             |         |        | Bent shank   |
| 639      | 1' 9 <sup>3</sup> / <sub>4</sub>  | 551  | 1 <sup>1</sup> / <sub>4</sub> | 32 | Roe & Co                     | 1 3/8       | 2 1/8   | 1/4    | Saucer head diam. 35mm (1 3/8").                         |
| 679      | 1' 9 <sup>1</sup> / <sub>4</sub>  | 539  | 1 <sup>1</sup> / <sub>8</sub> | 29 |                              | 1 1/4       | 1 3/4   | 1/8    |  |
| 637      | 1' 8                              | 509  | 1 <sup>1</sup> / <sub>4</sub> | 32 |                              | 1 1/4       | 2 1/8   | 1/4    | One end hammer splay very pronounced diam. 54mm (2 1/8") |
| 1595     | 1' 7 <sup>3</sup> / <sub>4</sub>  | 501  | 1                             | 25 |                              | 1           | 2 1/8   | 1/8    | Bent shank   |
| 662      | 1' 7                              | 482  | 1 <sup>1</sup> / <sub>4</sub> | 32 | Poss. B.A.                   | 1 1/4       | 2 1/8   | 1/4    | Bent shank   |
| 628      | 1' 6 <sup>1</sup> / <sub>8</sub>  | 460  | 1 <sup>1</sup> / <sub>8</sub> | 29 |                              | 1 1/4       | 1 7/8   | 1/4    | Ring edge rounded  |
| 28       | 1' 2 <sup>1</sup> / <sub>8</sub>  | 358  | 5/8                           | 16 | Roe & Co                     | 5/8         | 1 1/4   | 1/8    |  |
| 652      | 1' 2 <sup>1</sup> / <sub>8</sub>  | 358  | 5/8                           | 16 | Roe & Co                     | 5/8         | 1 1/4   | 1/8    | Bent shank   |
| 680      | 1' 5/8                            | 320  | 5/8                           | 16 | Roe & Co                     | 5/8         | 1 3/8   | 1/8    |  |

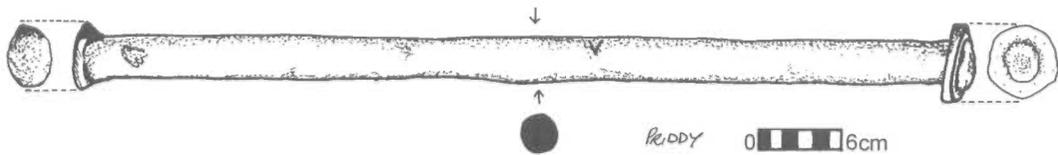


FIG. 2. Clench bolt with broad arrow, MA1111.

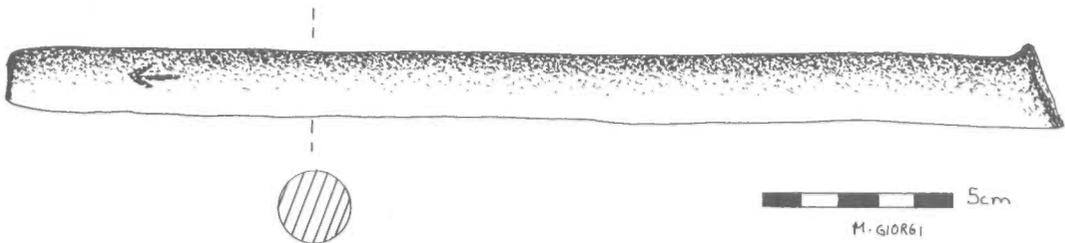


FIG. 3. Short bolt with stamped broad arrow, MA23.

TABLE 2. Short bolts.

| Acc. No. | L.  |                                  | Diam. mm | Markings<br>B.A.=broad arrow | Comments   |
|----------|-----|----------------------------------|----------|------------------------------|--|
|          | mm  | in                               |          |                              |  |
| 767      | 386 | 1' 3 <sup>3</sup> / <sub>4</sub> | 19       |                              | Splayed end, blunt point   |
| 739      | 396 | 1' 3 <sup>5</sup> / <sub>8</sub> | 16       |                              | Shank tapers to 13mm (1/2") point; clenched ring O.D. 44mm (1 <sup>3</sup> / <sub>4</sub> "), I.D. 19mm (3/4"), Th. 3mm (1/8") |
| 1175     | 329 | 1' 7/8                           | 16       |                              | One end evidence hammering; other end blunt finish   |
| 1657     | 273 | 10 <sup>3</sup> / <sub>4</sub>   | 19       |                              | One end evidence hammering; other end blunt  |
| 23       | 273 | 10 <sup>3</sup> / <sub>4</sub>   | 19       | B.A.                         | One end evidence hammering; other end blunt (Fig. 3)   |
| 16       | 231 | 9 <sup>1</sup> / <sub>8</sub>    | 19       |                              | Blunt both ends  |
| 15       | 218 | 8 <sup>5</sup> / <sub>8</sub>    | 19       | B.A.                         | One end evidence hammering; other end blunt  |
| 1484     | 139 | 5 <sup>1</sup> / <sub>2</sub>    | 19       |                              | Rudder nail; tapers to chisel point; saucer head diam. 32mm (1 <sup>1</sup> / <sub>4</sub> ") (Fig. 4)                         |

Most bolt shanks display wrought lines that may be the product of post-depositional corrosion forces. Some are marked with either a broad arrow or the maker's mark, 'Roe & Co.'. No bolt displays both marks. Clench rings are copper

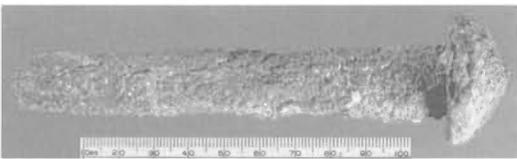


FIG. 4. Rudder nail, MA1484.

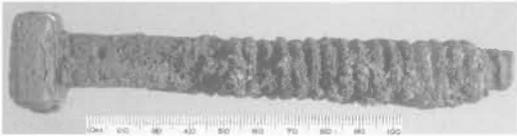


FIG. 5. Screw bolt, MA1530.

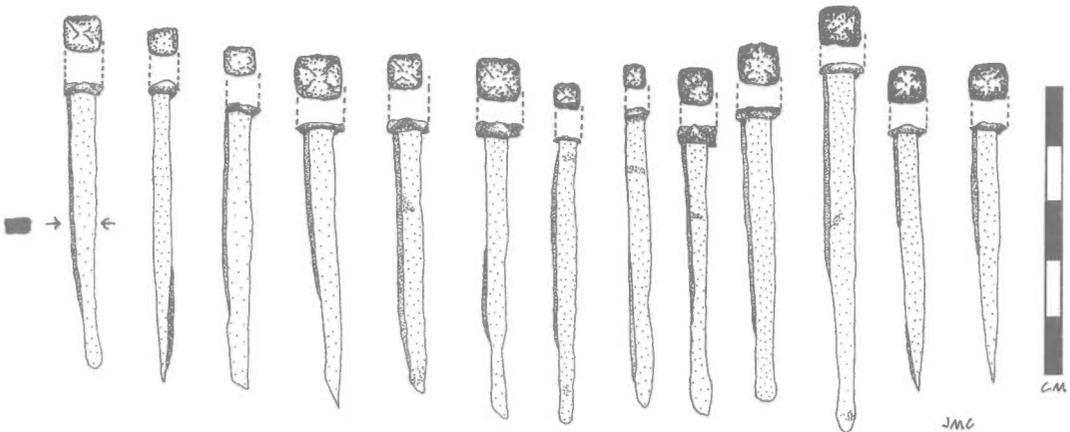


FIG. 6. Rose-headed nails, MA332.

alloy discs showing no markings nor signs of bevelling (cf. Stanbury, 1994: 16).

Copper bolts were an innovation of late 18th century shipbuilding, introduced to replace wrought iron hull fastenings which corroded through electrolysis — caused by another 18th century innovation, copper sheathing. At the time of the *Pandora's* construction in 1778 copper bolts were being trialed. The vessel was possibly one of eight frigates to be experimentally fastened with copper bolts by order of a Navy Board warrant of 8 January 1777 (McKay & Coleman, 1992: 8). (To compare the *Pandora* copper bolts with those of other 24-gun ships see table 2, McKay & Coleman, 1992: 9).

**Short Bolts.** Relatively short, round, driven bolts which, unlike true clenched bolts, are not 'through' fasteners (although MA739 was used with a clenched ring) (Table 2). They may or may not have a pre-formed head. All show evidence of hammering at one end only, the other end blunt.

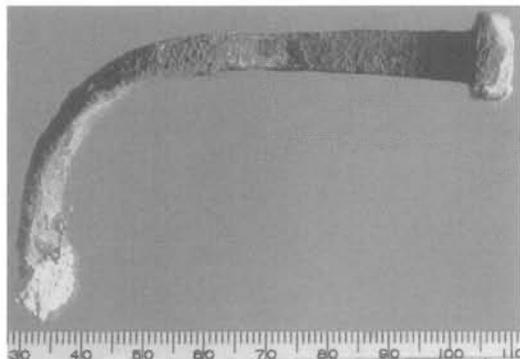


FIG. 7. Rose-headed spike, MA1655.

MA739 has a taper at the driven end to 13mm ( $1/2$ ""). No manufacturer's marks observed but two bolts have a broad arrow. (see McCarthy, 1996: 189 for a full discussion of these fasteners). Also included is MA1484 which conforms closely to Falconer's description of a rudder nail: 'about five inches in length, with a full head' (Falconer, 1815: 291).

**Screw Bolts.** Bolts with a square head and a threaded cylindrical shank.

MA1530: Shank L. 159mm ( $6\frac{1}{4}$ ""). Shank diam. 16mm ( $5/8$ ""). Head 29mm<sup>2</sup> ( $1\frac{1}{8}$ "<sup>2</sup>) (Fig. 5).

MA1531: Shank L. 179mm ( $7\frac{1}{16}$ ""). Shank diam. 13mm ( $1/2$ ""). Head 29mm ( $1\frac{1}{8}$ "<sup>2</sup>).

**Nails.** MA332: Thirteen rose-headed nails with square shanks tapering to rounded flat tips. Lengths between 48mm ( $1\frac{7}{8}$ "") and 64mm ( $2\frac{1}{2}$ ""). Head diam. 3mm ( $1/8$ "") to 6mm ( $1/4$ ""). Found inside a single concretion (Fig. 6).

**Spike.** MA1655: Rose-headed spike with a square shank and a chisel point (cf. McCarthy, 1996: 187). L. 115mm ( $4\frac{1}{2}$ ""). Square shank 10mm ( $3/8$ ""). Broad arrow on shank (Fig. 7).

**Keel Staple.** MA251: Badly abraded and worn strap probably due to post depositional tumbling. Recovered from the reef top where the *Pandora* first struck. L. >168mm ( $6\frac{5}{8}$ ""). Maximum W. >19mm ( $3/4$ "") (Fig. 8).

**Sheathing Tacks.** Copper alloy sheathing tacks and nails, used to fasten copper sheet sheathing to the ship's hull.

A total of 118 copper alloy sheathing tacks and nails are listed (number of tacks in parentheses):

MA19 (10), 510 (1), 622 (1) (Fig. 9A), 623 (1), 705 (1), 754 (9) (Fig. 9B), 768 (1), 1034 (1), 1073 (1), 1078 (1), 1079 (1), 1080 (1), 1087 (3), 1096 (1), 1106 (1), 1115 (1), 1117

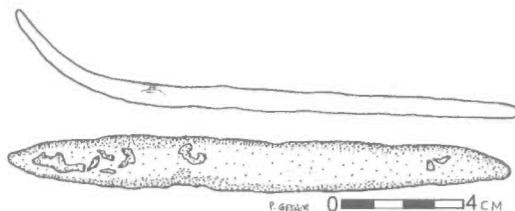


FIG. 8. Keel staple, MA251.

(1), 1137 (1), 1138 (1), 1145 (1), 1146 (1), 1148 (1), 1149 (1), 1150 (1), 1188 (1), 1230 (1), 1233 (4), 1234 (2), 1237 (1), 1257 (1), 1271 (1), 1284 (1), 1315 (2), 1317 (1), 1321 (1), 1324 (1), 1342 (1), 1350 (1), 1384 (1), 1425 (3), 1436 (1), 1461 (7), 1494 (8), 1532 (3), 1577 (1), 1703 (2), 1733 (2), 4004 (1), 4007 (2), 4051 (1), 4054 (1), 4089 (1), 4096 (1), 4097 (1), 4125 (6), 4134 (1), 4156 (6), 4163 (1), 4181 (6).

Tacks all have a large flat countersunk head and a square shank that tapers to a sharp point. Lengths range between 29mm ( $1\frac{1}{8}$ "") and 64mm ( $2\frac{1}{2}$ "").

#### WROUGHT IRON FASTENINGS

Fastenings, brackets, braces, straps, bands and a multitude of fittings were used throughout the ship and in the construction of many items of equipment. While wrought iron does not survive well in seawater, in the early stages of the corrosion process, products from the iron combine with calcium carbonate to produce a hard

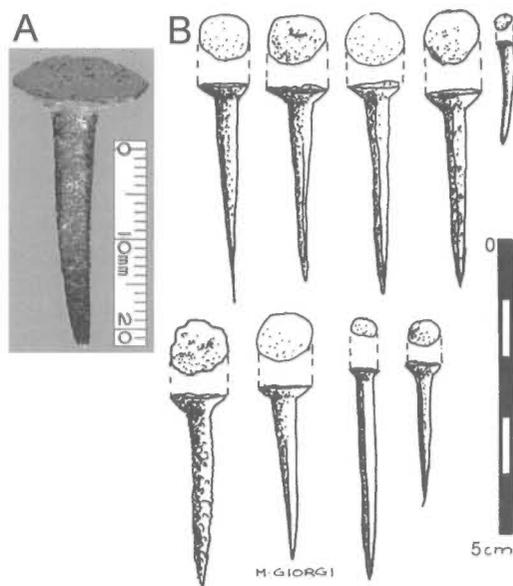


FIG. 9. Sheathing tacks; A, MA622; B, MA754.

TABLE 3. Round bolts.

| Acc. No. | Description   | L.  |                                   | Shank Diam. |                                | Head Diam.      |                                |
|----------|---|-----|-----------------------------------|-------------|--------------------------------|-----------------|--------------------------------|
|          |   | mm  | in                                | mm          | in                             | mm              | in                             |
| 151      | Impression; bolt fragment; pointed end; some degraded iron remains                        | 434 | 1' 5 <sup>1</sup> / <sub>8</sub>  | 22          | 7/8                            |                 |                                |
| 300      | Impression; complete bolt; flat head; most iron remains                                   | 348 | 1' 13 <sup>3</sup> / <sub>4</sub> | 19          | 3/4                            | 38              | 1 <sup>1</sup> / <sub>2</sub>  |
| 303      | Impression; bolt fragment   | 200 | 7 <sup>7</sup> / <sub>8</sub>     | 19          | 3/4                            |                 |                                |
| 304      | Impression; bolt fragment   | 82  | 3 <sup>1</sup> / <sub>4</sub>     | 35          | 1 <sup>3</sup> / <sub>8</sub>  |                 |                                |
| 307      | Impression; bolt fragment   | 251 | 9 <sup>7</sup> / <sub>8</sub>     | 19          | 3/4                            |                 |                                |
| 318      | Impression; bolt fragment   | 168 | 6 <sup>5</sup> / <sub>8</sub>     | 22          | 7/8                            |                 |                                |
| 320      | Impression; bolt fragment   | 101 | 4                                 | 25          | 1                              |                 |                                |
| 323      | Impression; bolt fragment; flat head; fragment of wood surround; some iron remains        | 174 | 6 <sup>7</sup> / <sub>8</sub>     | 19          | 3/4                            | 28              | 1 <sup>1</sup> / <sub>8</sub>  |
| 325      | Impression; bolt fragment; flat head; shank bent; taper; fragment of wood surround        | 168 | 6 <sup>5</sup> / <sub>8</sub>     | 6           | 1/2                            | 27              | 1 <sup>1</sup> / <sub>16</sub> |
| 328      | Cast; bolt fragment; broken both ends   | 89  | 3 <sup>1</sup> / <sub>2</sub>     | 25          | 1                              |                 |                                |
| 329      | Cast; complete bolt; flat head; pointed end (Fig. 10)                                     | 336 | 1' 11 <sup>1</sup> / <sub>4</sub> | 19          | 3/4                            | 38              | 1 <sup>1</sup> / <sub>2</sub>  |
| 330      | Impression; bolt fragment   | 130 | 5 <sup>1</sup> / <sub>8</sub>     | 19          | 3/4                            |                 |                                |
| 336      | Impression; bolt fragment; clench ring diam. 70mm (2 <sup>3</sup> / <sub>4</sub> "        | 520 | 1' 8 <sup>1</sup> / <sub>2</sub>  | 32          | 1 <sup>1</sup> / <sub>4</sub>  | 69              | 2 <sup>3</sup> / <sub>4</sub>  |
| 338      | Impression; bolt fragment; flat head  | 159 | 6 <sup>1</sup> / <sub>4</sub>     | 22          | 7/8                            | 30              | 1 <sup>3</sup> / <sub>16</sub> |
| 524      | Impression; bolt fragment; flat head  | 117 | 4 <sup>5</sup> / <sub>8</sub>     | 25          | 1                              | 30              | 1 <sup>3</sup> / <sub>16</sub> |
| 540      | Impression; bolt fragment   | 590 | 1' 11 <sup>1</sup> / <sub>4</sub> | 22          | 7/8                            |                 |                                |
| 542      | Impression; bolt fragment; fragment wood of surround                                      | 260 | 10 <sup>1</sup> / <sub>4</sub>    | 25          | 1                              |                 |                                |
| 546      | Impression; bolt fragment; flat rounded head  | 50  | 2                                 | 12          | 1/2                            | 16              | 5/8                            |
| 547      | Impression; bolt fragment; fragment of wood surround                                      | 241 | 9 <sup>1</sup> / <sub>2</sub>     | 28          | 1 <sup>1</sup> / <sub>8</sub>  |                 |                                |
| 574      | Impression; bolt fragment; flat rounded head  | 222 | 8 <sup>3</sup> / <sub>4</sub>     | 19          | 3/4                            | 56              | 2 <sup>1</sup> / <sub>4</sub>  |
| 575      | Impression; bolt fragment; button head  | 270 | 10 <sup>5</sup> / <sub>8</sub>    | 17          | 1 <sup>1</sup> / <sub>16</sub> | 6               | 1/4                            |
| 583      | Impression; bolt fragment; taper; clench ring diam. 47mm (1 <sup>7</sup> / <sub>8</sub> " |     |                                   | 19          | 3/4                            | 44              | 1 <sup>3</sup> / <sub>4</sub>  |
| 584      | Cast; bolt fragment; flat rounded head; shank bent; fragment of wood surround             | 146 | 5 <sup>3</sup> / <sub>4</sub>     | 25          | 1                              | 32              | 1 <sup>1</sup> / <sub>4</sub>  |
| 599      | Impression; bolt fragment; blunt point  | 79  | 3 <sup>1</sup> / <sub>8</sub>     | 17          | 1 <sup>1</sup> / <sub>16</sub> |                 |                                |
| 606      | Impression; bolt fragment; flat rounded head  | 80  | 3 <sup>1</sup> / <sub>8</sub>     | 22          | 7/8                            | 24              | 15/16                          |
| 614      | Cast; bolt fragment   | 41  | 1 <sup>5</sup> / <sub>8</sub>     | 19          | 3/4                            |                 |                                |
| 626      | Impression; bolt fragment   | 101 | 4                                 | 15          | 5/8                            |                 |                                |
| 651      | Impression; bolt fragment; flat rounded head  | 168 | 6 <sup>5</sup> / <sub>8</sub>     | 19          | 3/4                            | 30              | 1 <sup>3</sup> / <sub>16</sub> |
| 653      | Impression; bolt fragment   | 307 | 12 <sup>1</sup> / <sub>8</sub>    | 27          | 1 <sup>1</sup> / <sub>16</sub> |                 |                                |
| 664      | Impression; bolt fragment   | 140 | 5 <sup>1</sup> / <sub>2</sub>     | 22          | 7/8                            |                 |                                |
| 1024     | Impression; bolt fragment   |     |                                   | 19          | 3/4                            |                 |                                |
| 1025     | Impression; bolt fragment; fragment of wood surround                                      | 70  | 2 <sup>3</sup> / <sub>4</sub>     | 22          | 7/8                            |                 |                                |
| 1028     | Impression; bolt fragment; some iron remains  | 270 | 10 <sup>5</sup> / <sub>8</sub>    | 27          | 1 <sup>1</sup> / <sub>16</sub> |                 |                                |
| 1036     | Cast; bolt fragment; flat head (Fig. 11)  | 316 | 12 <sup>1</sup> / <sub>2</sub>    | 17          | 1 <sup>1</sup> / <sub>16</sub> | 27              | 1 <sup>1</sup> / <sub>16</sub> |
| 1047     | Impression; bolt fragment   | 230 | 9 <sup>1</sup> / <sub>16</sub>    | 22          | 7/8                            |                 |                                |
| 1048     | Impression; bolt fragment; rounded head   | 140 | 5 <sup>1</sup> / <sub>2</sub>     | 22          | 7/8                            | 28              | 1 <sup>1</sup> / <sub>8</sub>  |
| 1049     | Impression; bolt fragment; pointed end  | 124 | 4 <sup>15</sup> / <sub>16</sub>   | 22          | 7/8                            |                 |                                |
| 1064     | Impression; bolt fragment; both ends blunt  | 218 | 8 <sup>5</sup> / <sub>8</sub>     | 14          | 9/16                           |                 |                                |
| 1081     | Impression; complete bolt; flat rounded head both ends                                    | 282 | 11 <sup>1</sup> / <sub>8</sub>    | 30          | 13/16                          | 55 (both heads) | 23/16                          |
| 1126     | Impression; bolt fragment; flat rounded head  | 218 | 8 <sup>5</sup> / <sub>8</sub>     | 22          | 7/8                            | 30              | 1 <sup>3</sup> / <sub>16</sub> |
| 1199     | Impression; bolt fragment; blunt end  | 130 | 5 <sup>1</sup> / <sub>8</sub>     | 19          | 3/4                            |                 |                                |
| 1201     | Impression; bolt fragment; shank bent; one end blunt                                      | 540 | 1' 9 <sup>1</sup> / <sub>4</sub>  | 19          | 3/4                            |                 |                                |
| 1203/1   | Cast; bolt fragment; square rove washer; rove th. 10mm (3/8") (Fig. 12)                   |     |                                   | 23          | 15/16                          | 60              | 2 <sup>3</sup> / <sub>8</sub>  |
| 1205     | Impression; bolt fragment   | 116 | 4 <sup>5</sup> / <sub>8</sub>     | 14          | 9/16                           |                 |                                |

TABLE 3 (cont.)

| Acc. No. | Description   | L.  |                                  | Shank Diam. |                                | Head Diam. |                                |
|----------|---|-----|----------------------------------|-------------|--------------------------------|------------|--------------------------------|
|          |   | mm  | in                               | mm          | in                             | mm         | in                             |
| 1215     | Impression; bolt fragment; blunt end  | 339 | 1' 1 <sup>3</sup> / <sub>8</sub> | 22          | 7/8                            |            |                                |
| 1296     | Impression; bolt fragment   | 200 | 7 <sup>7</sup> / <sub>8</sub>    | 19          | 3/4                            |            |                                |
| 1386     | Impression; bolt fragment   |     |                                  | 25          | 1                              |            |                                |
| 1408     | Impression; bolt fragment; both ends blunt  | 210 | 8 <sup>1</sup> / <sub>4</sub>    | 17          | 1 <sup>1</sup> / <sub>16</sub> |            |                                |
| 1411     | Cast; bolt fragment; flat round head  | 193 | 7 <sup>5</sup> / <sub>8</sub>    | 22          | 7/8                            | 35         | 1 <sup>3</sup> / <sub>8</sub>  |
| 1419     | Impression; bolt fragment; rounded head; fragments of wood surrounds                    | 130 | 5 <sup>1</sup> / <sub>8</sub>    | 30          | 1 <sup>3</sup> / <sub>16</sub> | 55         | 2 <sup>3</sup> / <sub>16</sub> |
| 1442     | Impression; bolt fragment; clenched ring diam. 42mm (1 <sup>5</sup> / <sub>8</sub> " )  |     |                                  | 19          | 3/4                            | 41         | 1 <sup>5</sup> / <sub>8</sub>  |
| 1459     | Impression; bolt fragment; clenched ring diam. 39mm (1 <sup>9</sup> / <sub>16</sub> " ) |     |                                  | 14          | 9/16                           | 39         | 1 <sup>9</sup> / <sub>16</sub> |
| 1491     | Impression; bolt fragment; rounded head   | 124 | 4 <sup>7</sup> / <sub>8</sub>    | 27          | 1 <sup>1</sup> / <sub>16</sub> | 33         | 1 <sup>5</sup> / <sub>16</sub> |
| 1517     | Cast; bolt fragment; clenched ring diam. 78mm (3" )                                     | 73  | 2 <sup>7</sup> / <sub>8</sub>    | 27          | 1 <sup>1</sup> / <sub>16</sub> |            |                                |
| 1524     | Impression; bolt fragment; shank bent; rounded head                                     | 219 | 8 <sup>5</sup> / <sub>8</sub>    | 19          | 3/4                            | 22         | 7/8                            |
| 1542     | Impression; bolt fragment; flat head  | 219 | 8 <sup>5</sup> / <sub>8</sub>    | 24          | 1 <sup>5</sup> / <sub>16</sub> | 36         | 1 <sup>7</sup> / <sub>16</sub> |
| 1686     | Impression; bolt fragment; rounded head   | 165 | 6 <sup>1</sup> / <sub>2</sub>    | 19          | 3/4                            | 30         | 1 <sup>3</sup> / <sub>16</sub> |
| 3001     | Impression; bolt fragment   | 403 | 1' 3 <sup>7</sup> / <sub>8</sub> |             |                                |            |                                |
| 3002     | Impression; bolt fragment   | 241 | 9 <sup>1</sup> / <sub>2</sub>    | 30          | 1 <sup>3</sup> / <sub>16</sub> |            |                                |
| 3009     | Impression; bolt fragment   | 190 | 7 <sup>1</sup> / <sub>2</sub>    | 25          | 1                              |            |                                |
| 3014     | Impression; bolt fragment   | 170 | 6 <sup>11</sup> / <sub>16</sub>  | 22          | 7/8                            |            |                                |

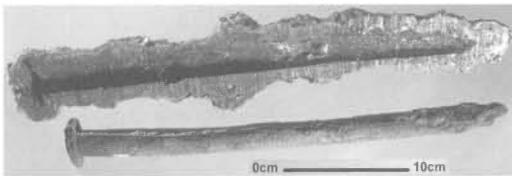


FIG. 10. Wrought iron round bolt and cast, MA329.

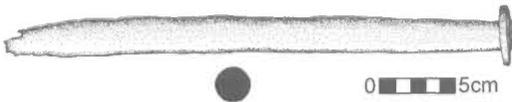


FIG. 11. Wrought iron round bolt, cast, MA1036.

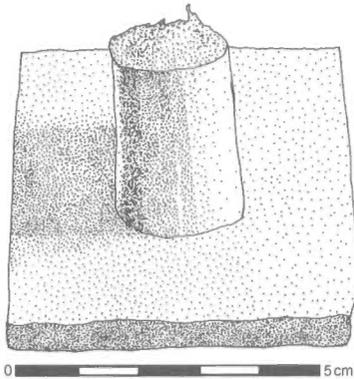


FIG. 12. Segment of a wrought iron round bolt with a square rove washer, MA1203/1.

encapsulating concretion over the iron's exterior. These 'concretions' frequently contain degraded iron in the form of a thick black sludge and can preserve an impression of the object's original shape. Much of the wrought iron record from the *Pandora* is preserved in the form of concretions that contain an object impression, or casts (a silicone or resin cast of the impression the object made in the concretion). In all tables listing wrought iron objects, it will be indicated whether the item is a negative concretion impression or a cast.

**Round Bolts.** Wrought iron round bolts came in a variety of forms according to their use. Some were clenched like the copper clenched bolts and others had square iron plates called 'roves' rather than clenched rings. They could also be fore-locked for easy removal or driven into a blind hole like a large nail (McCarthy, 1996: 188). According to Steel:

... bolts were cylindrical or square pins of iron or copper, of various forms, for fastening and securing the different parts of the ship, the guns ... The figure of those for fastening the timbers, planks, hooks, knees, crutches, and other articles of a similar nature, is cylindrical, and their sizes are adapted to the respective objects which they are intended to secure (Steel, 1805: 10).

Included in this grouping (Table 3) are fragmentary remains of round-sectioned wrought iron which, although of similar diameter, may or may not be the remains of bolts. Recording of

TABLE 4. Eye bolts.

| Acc. No. | Comments  | L.  |                                    | Shank diam. |       | O.D. |                                | I.D. |                                 |
|----------|---|-----|------------------------------------|-------------|-------|------|--------------------------------|------|---------------------------------|
|          |   | mm  | ft                                 | mm          | in    | mm   | in                             | mm   | in                              |
| 123      | Impression; eye & fragment shank  |     |                                    | 25          | 1     | 78   | 3 <sup>1</sup> / <sub>16</sub> | 27   | 1 <sup>1</sup> / <sub>16</sub>  |
| 310      | Cast; complete bolt; blunt end (Fig. 13)  | 335 | 1' 13 <sup>1</sup> / <sub>16</sub> | 25          | 1     | 95   | 3 <sup>3</sup> / <sub>4</sub>  | 46   | 1 <sup>13</sup> / <sub>16</sub> |
| 528      | Impression; eye bolt fragment; broken at top shaft  |     |                                    | 25          | 1     | 101  | 4                              | 52   | 2 <sup>1</sup> / <sub>16</sub>  |
| 529      | Impression; eye bolt fragment; broken at top shaft  |     |                                    | 25          | 1     |      |                                |      |                                 |
| 578      | Impression; eye bolt fragment; broken at top shaft  |     |                                    |             |       | 62   | 2 <sup>7</sup> / <sub>16</sub> | 40   | 1 <sup>9</sup> / <sub>16</sub>  |
| 1032     | Cast; complete eye bolt; clench ring diam. 44mm (1 <sup>3</sup> / <sub>4</sub> ") (Fig. 14)               | 344 | 1' 1 <sup>9</sup> / <sub>16</sub>  | 22          | 7/8   | 101  | 4                              | 60   | 2 <sup>3</sup> / <sub>8</sub>   |
| 1261     | Impression; eye bolts; short shaft; clench ring incomplete, diam. 55mm (2 <sup>3</sup> / <sub>16</sub> ") | 101 | 4                                  | 20          | 13/16 |      |                                |      |                                 |
| 1366     | Impression; eye bolt fragment; broken top shaft   |     |                                    | 19          | 3/4   | 79   | 3 <sup>1</sup> / <sub>8</sub>  | 52   | 2 <sup>1</sup> / <sub>16</sub>  |
| 1490     | Impression; eye bolt fragment; broken top shaft   |     |                                    |             |       | 84   | 3 <sup>5</sup> / <sub>16</sub> | 51   | 2                               |

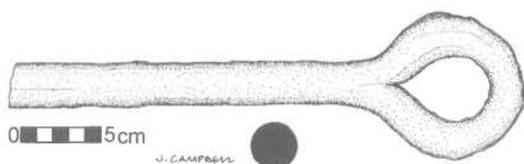


FIG. 13. Eye bolt, MA310.

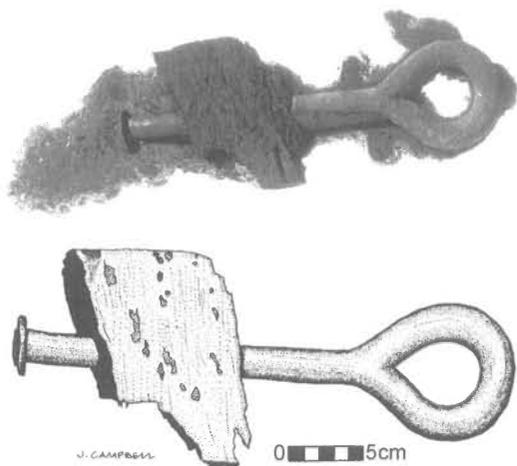


FIG. 14. Eye bolt with a clench ring still attached to a timber fragment, MA1032.

some dimensions was considered to be misleading. No markings were observed.

**Eye Bolts.** Special purpose fastening wrought with an eye at the end of the shank to accommodate tackle (McCarthy, 1996: 192). Apart from size variation, the eye bolts listed in Table 4 are of a standard form. The shanks and eye metal are round in cross-section, the eyes are teardrop

TABLE 5. Ring bolts.

| Acc. No. | Comments  | O.D. |                                | I.D. |                                 |
|----------|---|------|--------------------------------|------|---------------------------------|
|          |   | mm   | in                             | mm   | in                              |
| 546      | Cast; ring bolt fragment; attached to a possible eye of an eye bolt           | 130  | 5 <sup>1</sup> / <sub>8</sub>  | 92   | 3 <sup>5</sup> / <sub>8</sub>   |
| 1661     | Cast; ring bolt fragment; attached to a possible eye of an eye bolt (Fig. 15) | 112  | 4 <sup>7</sup> / <sub>16</sub> | 98   | 3 <sup>7</sup> / <sub>8</sub>   |
| 1643     | Cast; ring bolt fragment; attached to a possible eye of an eye bolt.          | 81   | 3 <sup>3</sup> / <sub>16</sub> | 68   | 2 <sup>11</sup> / <sub>16</sub> |
| 548      | Impression; ring bolt fragment  | 40   | 1 <sup>9</sup> / <sub>16</sub> | 24   | 1 <sup>5</sup> / <sub>16</sub>  |

shaped and some have clench rings in place. Recovered as concretions, they are either an impression or a cast. No tackle was found in association and no markings were observed.

**Ring Bolts.** Eye bolts fitted with a ring in the eye and used, among other functions, for hooking on tackle and passing lashings (McEwen & Lewis, 1953: 51). Bolts listed in Table 5 are similar in form but vary in size. Rings are circular and the metal is round in cross-section. All except MA548 were excavated attached to the eye of a possible eye bolt. Rings were recovered in a concreted state, and so are either an impression in concretion or a cast.

**Square-shanked Spikes and Bolts.** Spikes are large, square-sectioned nails for fastening thick planking (McCarthy, 1996: 186) while bolts are can be '... square pins of iron ... for fastening and securing different parts of the ship' (Steel, 1805: 10). The artefacts in Table 6 have been defined as spikes if there is a discernible nail-like taper along the length, and a bolt if the only variation in shank measurement is at the end where it narrows to a point. All were recovered as concretions. In many cases the shank has broken.



FIG. 15. Ring bolt, MA1661.

No markings were observed. Unless otherwise stated, lengths are a minimum.

**Threaded Bolt.** MA1203/2: Threaded bolt fragment. A short length of shank survives. Shank diam. 16mm ( $\frac{5}{8}$ " (Fig. 16).

**Bands.** Many fragments of wrought iron bands or straps were excavated. A variety of sizes reflects their diverse shipboard functions, for example barrel staves, mast and yard straps. Many contain holes for attachment purposes. All were found inside concretions and exist as an impression only. Fragments are listed by accession number.

MA326, 337, 502, 518, 526, 583, 640, 646, 648, 650, 659, 1015, 1125, 1170, 1174, 1196, 1197, 1200, 1216, 1229, 1262, 1297, 1329, 1334, 1379, 1400, 1410, 1454, 1472, 1495, 1515, 1598, 1683, 1711, 1759, 1783, 1784, 4002, 4006.

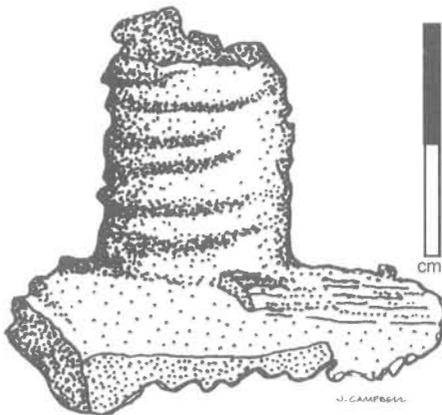


FIG. 16. Threaded bolt fragment, MA1203/2.

TABLE 6. Square-shanked spikes and bolts.

| Acc. No. | Comments   | L.  |                 | Sides        |                                    |
|----------|--|-----|-----------------|--------------|------------------------------------|
|          |  | mm  | in              | mm           | in                                 |
| 68       | Impression; bolt fragment; clenched ring diam. 55mm ( $2\frac{3}{16}$ "); tapers to point    |     |                 | 25           | 1                                  |
| 305      | Impression; bolt fragment  | 130 | $5\frac{1}{8}$  | 5            | $\frac{3}{16}$                     |
| 313      | Impression; bolt fragment  | 40  | $1\frac{9}{16}$ | 5            | $\frac{3}{16}$                     |
| 316      | Impression; spike fragment; square head 27mm <sup>2</sup> ( $1\frac{1}{16}$ " <sup>2</sup> ) | 135 | $5\frac{5}{16}$ | 15           | $\frac{9}{16}$                     |
| 324      | Impression; spike fragment   | 81  | $3\frac{3}{16}$ | 8            | $\frac{5}{16}$                     |
| 339      | Impression; spike fragment   | 52  | $2\frac{1}{16}$ | 13           | $\frac{1}{2}$                      |
| 340      | Impression; bolt fragment; blunt end   | 44  | $1\frac{3}{4}$  | 8            | $\frac{5}{16}$                     |
| 503      | Impression; spike fragment; round-headed spike; head diam. 20mm ( $\frac{3}{4}$ ")           | 147 | $5\frac{7}{8}$  | 15           | $\frac{9}{16}$                     |
| 544      | Impression; bolt fragment; blunt end   | 101 | 4               | 13           | $\frac{1}{2}$                      |
| 714      | Impression; spike fragment; round-headed; head diam. 18mm ( $1\frac{1}{16}$ ")               | 179 | $7\frac{1}{16}$ | 5            | $\frac{3}{16}$                     |
| 1062     | Impression; spike fragment; small round head. diam. 14mm ( $\frac{9}{16}$ ")                 | 75  | $2\frac{5}{16}$ | $5 \times 8$ | $\frac{3}{16} \times \frac{5}{16}$ |

MA1328: Angled band fragment. Longer arm L. >260mm ( $10\frac{1}{4}$ "). Shorter arm L. >80mm ( $3\frac{1}{8}$ "). Th. 64mm ( $2\frac{1}{2}$ ") (Fig. 17).

**Port Lid Hinges.** MA504: Port lid hinge with straight, tapered sides. Hinge strap broken. No evidence of possible ring bolt for port lid tackle attachment. Four wrought iron fastening nails of different sizes are equidistantly spaced along hinge, ranging in length from 11mm ( $\frac{7}{16}$ ") to 21mm ( $1\frac{3}{16}$ "). Bolt attached to a port hook (hinged end). Wrought iron very degraded. Bolt L. 152mm (6") and diam. 16mm ( $\frac{5}{8}$ "). No evidence of a clenched ring. Strap L. >501mm ( $19\frac{3}{4}$ "). Strap maximum W. 65mm ( $2\frac{9}{16}$ "). Strap Th. 32mm ( $1\frac{1}{4}$ ") (Fig. 18A).

MA537: Port lid hinge (cast) with straight but tapered sides. Hinge (strap) broken. No evidence of a possible ring bolt for port tackle attachment. Three wrought iron fastening nails of different sizes are equidistantly spaced along the hinge, ranging in length from 40mm ( $1\frac{9}{16}$ ") to 101mm

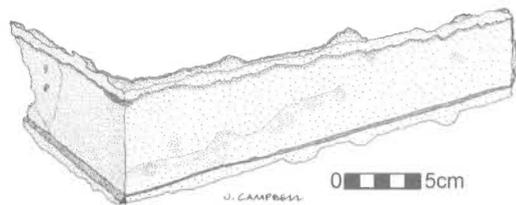


FIG. 17. Wrought iron band fragment, MA1328.

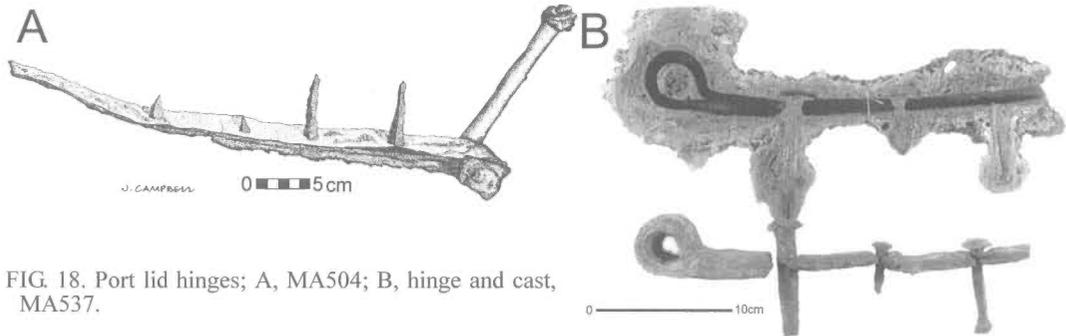


FIG. 18. Port lid hinges; A, MA504; B, hinge and cast, MA537.

(4"). The port hook is empty and the bolt is missing. Strap L. 287mm ( $11\frac{5}{16}$ "). Strap W. 56mm ( $2\frac{1}{4}$ "). Strap Th. 22mm ( $\frac{7}{8}$ ") (Fig. 18B).

#### RIGGING

**Block Components.** Blocks were used in 18th century shipping to lift or pull heavy objects. A block consisted of one or more wooden sheaves, wooden cheeks, a pin of wood or iron, bronze coaks and in some cases wooden planking. The sheave and planking were cut from fine-grained and very dense hardwood such as *Lignum vitae* (*Guaiaecum officinale*). For maximum strength the wood grain ran perpendicularly to the face of the sheave. Coaks were bronze plates through which the pin was inserted. They were inset into the centre of the sheave and were flush with the surface. The *Pandora* coaks display some markings, including letters and numbers. No broad arrows are evident.

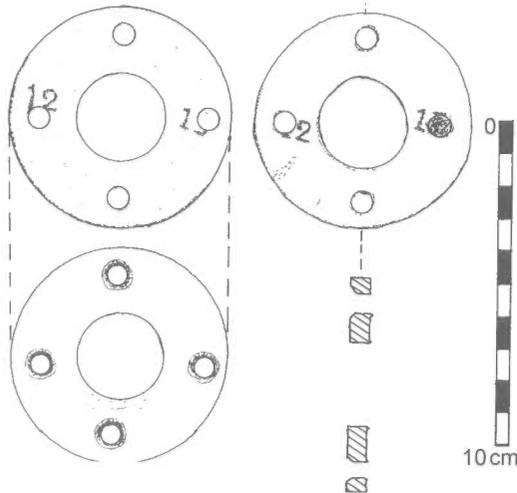


FIG. 19. Round-flanged bronze coaks from a double pulley block, MA18.

Walter Taylor Jr and Company supplied rigging blocks to the Royal Navy from 1770 to 1806. Despite this virtual monopoly, there appeared to be little uniformity of design (Coleman, 1999b: 1). The few block and block components excavated from the *Pandora* to date tend to reflect this.

While the blocks described below are subsumed under 'Rigging', they were not necessarily used as such. The context of some blocks suggests that they were probably used for other purposes, for instance, in association with the tackle required for the tiller (McKay & Coleman, 1992: 72) or as parts of the tackle associated with a carriage gun. In many cases only individual parts of pulley blocks have been excavated. For example there are several single sheaves that may have originally been part of double, treble or larger blocks. There are also several single coaks.

MA18: Double pulley block consisting of two sheaves planked with rectangular wooden end plates inset with round-flanged bronze coaks. All components are degraded. Each coak has the numbers '12' and '13' stamped into one surface.

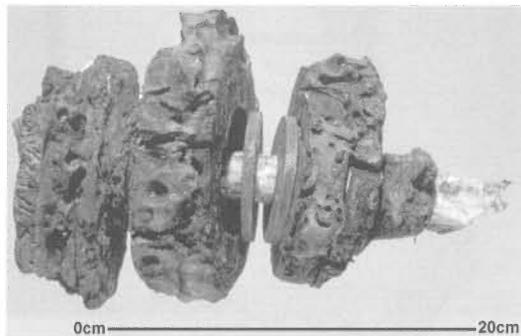


FIG. 20. Double pulley block, MA18.

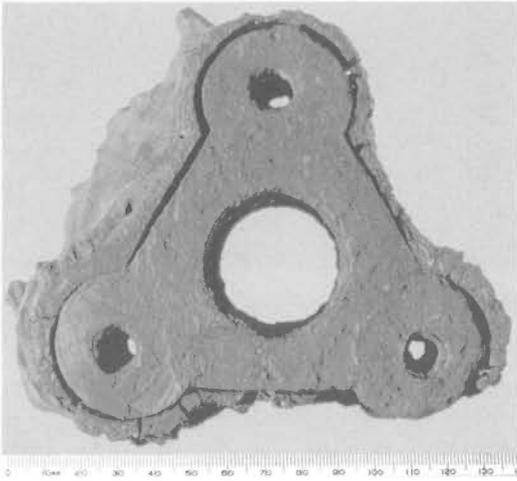


FIG. 21. Three-lobed bronze coak from a single pulley sheave, MA31.

An iron pin (now cast) has one square end. There are remnants of wooden cheeks. Sheave diam. >145mm. Sheave Th. >25mm. Planking 99 × 45 × 17mm. Coak O.D. 65mm. Coaks have four attachment holes, diam. 5mm. Pin diam. 23mm. Pin end 25mm<sup>2</sup> (Figs 19 & 20).

MA31: Single degraded sheave with three-lobed bronze coaks inset into each surface. Sheave diam. >120mm. Sheave Th. >65mm. Axle hole diam. 28mm (Fig. 21).

MA52: Single sheave planked with rectangular wooden end plates inset with two round-flanged bronze coaks. All components are degraded. One coak has '14' and '15' stamped into one surface while the other coak has '14', 'I' and 'R' stamped into one surface. An iron pin (now cast) has one square end. Sheave diam. >75mm. Sheave Th. >27mm. Rectangular planking >110 × >50 × >22mm. Coak O.D. 74mm. Coaks have four attachment holes, diam. 6mm. Pin diam. 34mm. Pin end 30 × 28mm.

MA309: Single degraded sheave inset with two round-flanged bronze coaks. Both coaks have '10' and '11' stamped into one surface. An iron pin (now cast) has a square end. Sheave diam. >150mm. Sheave Th. >30mm. Coak O.D. 56mm. The coaks have three attachment holes diam. 4mm. Pin diam. 23mm. Pin end 23mm<sup>2</sup>.

MA322: Single sheave with indentations for coaks. Coaks missing. All components are degraded. Sheave diam. >82mm. Coak inset surface O.D. 47mm. Axle hole diam. 19mm. Coaks have three attachment holes diam. 3mm.

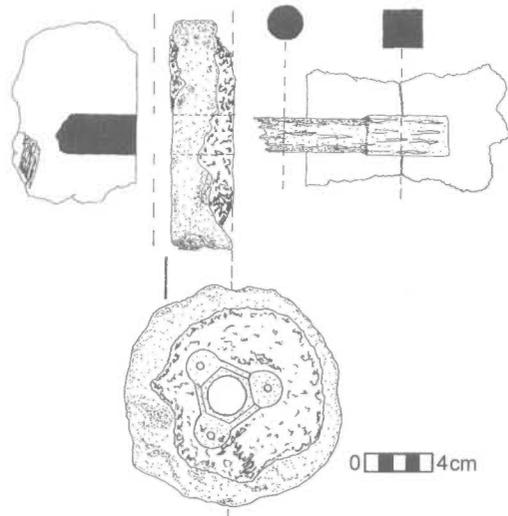


FIG. 22. Single sheave with three-lobed bronze coaks, MA1030.

MA1030: Single sheave inset with two three-lobed bronze coaks. All components are degraded. Coaks wedged in situ and partially covered in concretion with the letters 'P' and 'A' stamped into one surface of one coak. Sheave diam. >60mm. Sheave th. >30mm. Coak maximum W. 78mm. Coaks have three attachment holes diam. 7mm. Axle opening diam. 27mm (Fig. 22).

MA1035: Single degraded sheave inset with two round-flanged bronze coaks. Coaks wedged in situ. Exposed surfaces show no evidence of markings. Sheave diam. >120mm. Sheave th. >28mm. Coak O.D. 58mm. Coaks have three fastening holes, diam. 4mm. Axle hole 19mm.

MA1052: Single degraded sheave inset with two round-flanged bronze coaks. No markings on the coaks. Sheave diam. >90mm. Coak O.D. 67mm. Coaks have three attachment holes diam. 4mm. Axle hole diam. 25mm.

MA1270: Single degraded sheave. No evidence of planking or coaks. Sheave diam. >119mm. Sheave th. >19mm. Axle hole diam. >28mm.

MA1344: Single sheave attached to a bronze pin and octagonal plate. Pin round in cross-section with a square head and a blunt tip. A small hole through the end of the pin to accommodate a fastening toggle. Toggle missing. Possibly a roller from the *Pandora's* tiller sweep. Sheave diam. 90mm. Sheave th. 40mm.

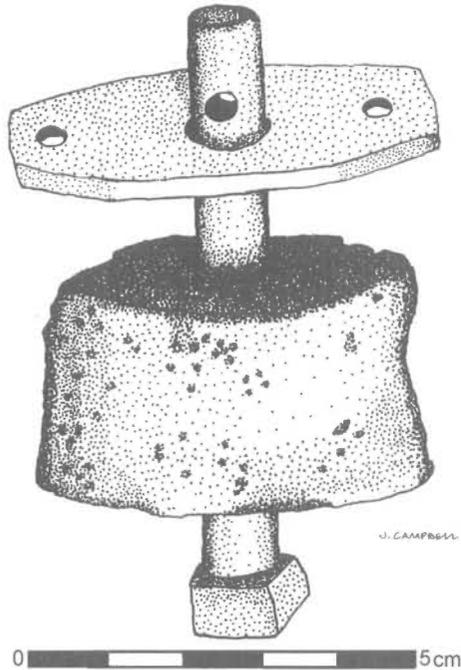


FIG. 23. Tiller sweep roller, MA1583.

MA1503: Single sheave attached to a bronze pin and octagonal plate. Pin round in cross-section with a square head and a blunt tip. A small hole through the end of the pin to accommodate a fastening toggle. Toggle missing. Possibly a roller from the *Pandora's* tiller sweep. Sheave diam. 66mm. Sheave Th. 38mm. Pin diam. 16mm. Pin L. 127mm. Pin head 22mm<sup>2</sup>.

MA1571: Single sheave inset with two three-lobed bronze coaks. All components degraded. Remains of one cheek. Coaks wedged in situ and partially covered by concretion. No markings visible. Sheave diam. >213mm. Sheave th. >30mm. Coak maximum W. 78mm. Coaks have three attachment holes, diam. 8mm. Axel hole diam. 23mm.

MA1583: Single sheave attached to a bronze pin and octagonal plate. Pin round in cross-section with a square head and a blunt tip. A small hole through the end of the pin to accommodate a fastening toggle. Toggle missing. Possibly a roller from the *Pandora's* tiller sweep. Sheave diam. 78mm. Sheave th. 35mm. Pin L. 119mm. Plate L. 55mm. Plate maximum W. 35mm. Sheave pin diam. 17mm (Fig. 23).

MA1675: Single degraded sheave. No surface markings to indicate the presence of coaks or

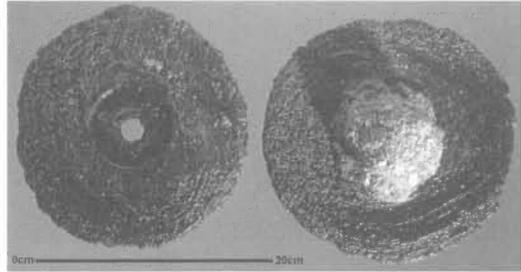


FIG. 24. Two sheaves from a double pulley block, MA3013.

plates. Sheave diam. >90mm. Sheave th. 19mm. Sheave axel hole diam. 22mm.

MA1693: Single sheave planked with rectangular wooden end plates riveted crosswise. All components are degraded. No marks or indentations to suggest the presence of coaks. Remains of a wrought iron pin. Sheave diam. >95mm. Sheave Th. >20mm. Pin diam. >20mm.

MA3013: Double pulley block with indentations for round-flanged coaks. All components are degraded. Coaks missing. Remains of a wrought iron pin. Sheave diam. >190mm. Sheave th. >30mm. Axel opening diam. 22mm (Fig. 24).

MA4019: Single sheave. No marks or indentations to suggest the presence of coaks or planks. Sheave degraded, diam. >55mm. Sheave th. >20mm. Axel opening diam. 24mm.

**Coaks.** Several single bronze coaks have been recovered. Coaks were inset into the surfaces of wooden sheaves as bearings to support the sheave pin.

MA109: Round-flanged bronze coak with no surface markings and three attachment holes. Coak diam. 47mm. Axel opening diam. 20mm. Coak attachment holes diam. 3mm.

MA126: Round-flanged bronze coak with no surface markings and three attachment holes. Coak diam. 47mm. Axel opening diam. 21mm. Coak attachment holes diam. 3mm.

MA501: Round-flanged bronze coak with no surface markings and three attachment holes. Coak diam. 58mm. Axel opening diam. 22mm. Coak attachment holes diam. 3mm (Fig. 25A).

MA556: Round-flanged bronze coak with no surface markings and three attachment holes. Coak diam. 46mm. Axel opening diam. 23mm. Coak attachment holes diam. 4mm.

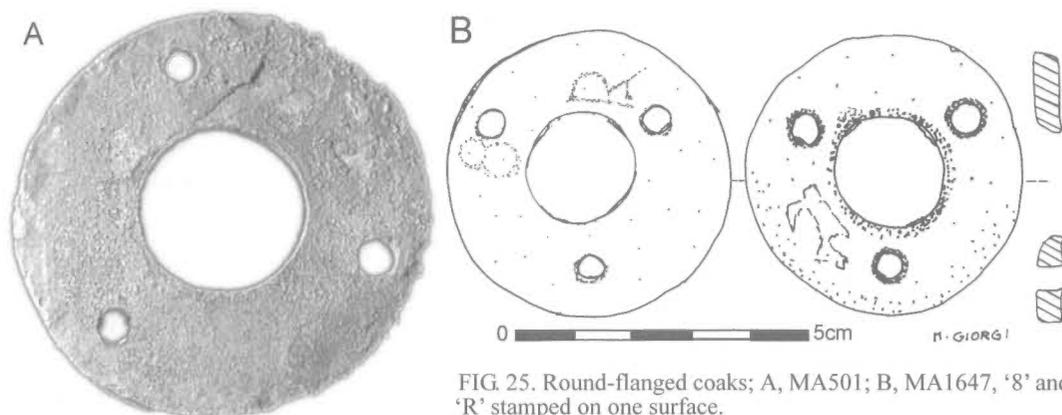


FIG. 25. Round-flanged coaks; A, MA501; B, MA1647, '8' and 'R' stamped on one surface.

MA1647: Round-flanged bronze coak with 8' and R' stamped into one surface. Coak diam. 47mm. Axle opening diam. 19mm (Fig. 25B).

MA4172: Round-flanged bronze coak with three attachment holes. Coak diam. 58. Axle opening diam. 20mm. Attachment hole diam. 6mm.

**Thimbles, Hooks and Chains.** MA541: Wrought iron thimble fragment. Impression in concretion. L. 83mm ( $3\frac{1}{4}$ ""). Diam. opening 22mm ( $\frac{7}{8}$ "").

MA682: Wrought iron elongated cable loop impression. Metal round in cross-section. Overall L. 470mm ( $1'6\frac{1}{2}$ ""). Chain maximum W. 130mm ( $5\frac{1}{8}$ ""). Diam. of metal 30mm ( $1\frac{3}{16}$ ""). Thought to be toe link from a set of chains with a section of chain bolt and part of the middle link (McCarthy, 1983: 9) (Fig. 26).

MA775: Wrought iron elongated cable loop fragment. Impression in concretion. Metal round

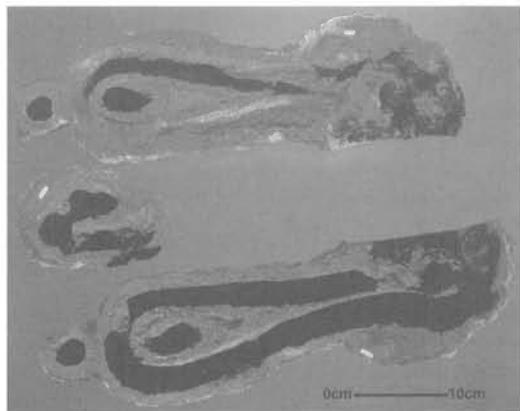


FIG. 26. Casts of wrought iron cable loops, MA682.

in cross-section. Overall L. 480mm ( $1'6\frac{15}{16}$ ""). Chain diam. 29mm ( $1\frac{1}{8}$ "").

MA1367: Wrought iron hook attached to thimble. Impression in concretion. Vestiges of rope roved around the thimble. Thimble diam. 65mm ( $2\frac{9}{16}$ ""). Hook L. 150mm ( $5\frac{15}{16}$ ""). Hook diam. 20mm ( $1\frac{3}{16}$ "") (Fig. 27).

#### STEERING GEAR

MA4: Rudder pintle. Cast from bronze. Five equidistant attachment holes run down each arm. Overall L. 785mm ( $2'7$ ""). Arm W. 55mm ( $2\frac{3}{16}$ ""). Overall W. 340mm ( $1'1\frac{3}{8}$ ""). Diam. of the fourth hole from the distal end of both arms is 25mm

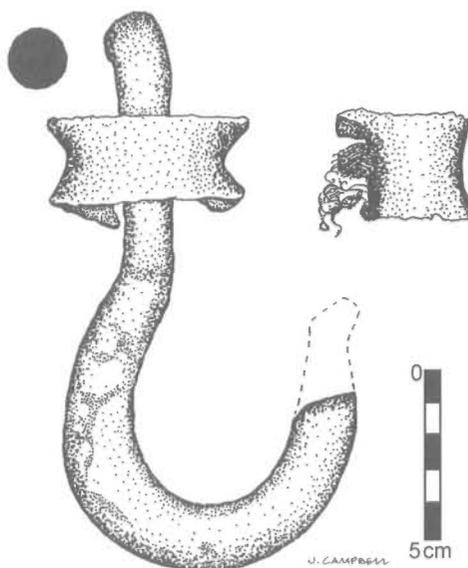


FIG. 27. Wrought iron hook attached to a thimble, MA1367.

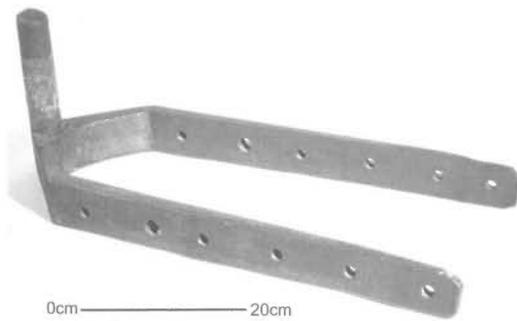


FIG 28. Rudder pintle, MA4.

(1"). Remaining attachment holes have a diam. of 18mm ( $\frac{3}{4}$ "). Pintle pin L. 300mm ( $11\frac{13}{16}$ "). No markings. Found on the reef flat where the *Pandora* first struck (Fig. 28).

MA6: Rudder pintle. Cast from bronze. Six equidistant attachment holes run down each arm. Overall L. 850mm ( $2' 9\frac{7}{16}$ "). Arm W. 75mm ( $2\frac{15}{16}$ "). Diam. of the fourth hole from the distal end of both arms is 25mm (1"). The remaining attachment holes have a diam. of 17mm ( $1\frac{1}{16}$ "). Pintle pin L. 300mm ( $11\frac{13}{16}$ "). Several markings including 'Forbes' stamped into one arm, the number '24' punched in separate dots near the crown end and a broad arrow stamped into the other arm. Recovered from the reef flat where the *Pandora* first struck (Fig. 29A, B).

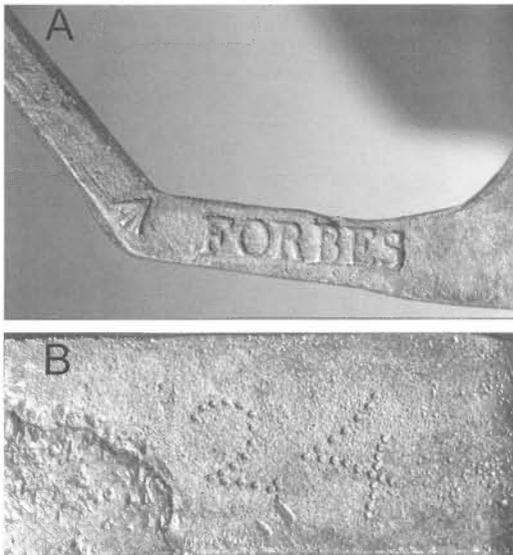


FIG 29. Rudder pintle, MA6. A, 'Forbes' and broad arrow markings; B, '24' punched marking.

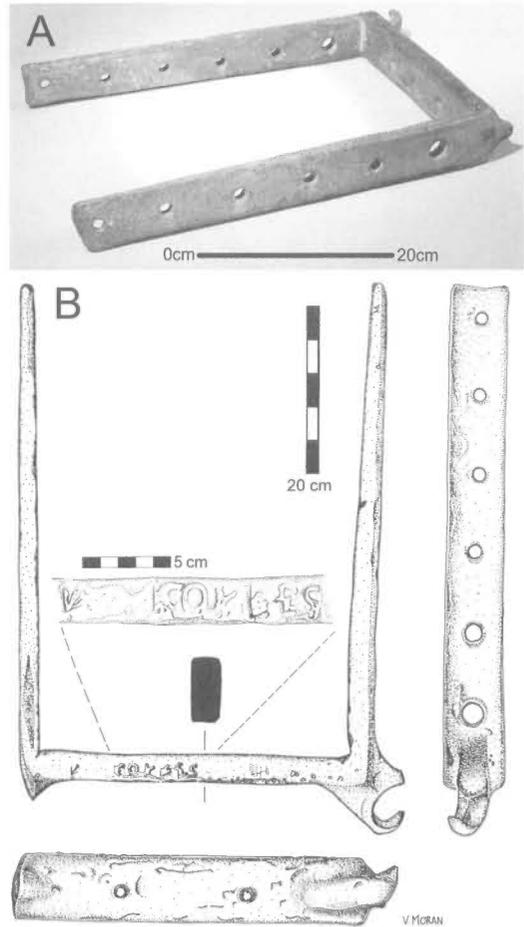


FIG 30. A, B, spectacle plate, MA1.

MA1: Spectacle plate. Cast from bronze. Most of the two spectacle loops have broken off and half of the one that remains is worn smooth. Six equidistant attachment holes run down each arm. The bridging arm contains two attachment holes. The width of the arms gradually narrows away from the spectacles. Overall L. 630mm ( $2' \frac{3}{4}$ "). Maximum W. 380mm (1' 3"). Attachment hole diam. 22mm ( $\frac{7}{8}$ "). Marks include 'Forbes' and a broad arrow stamped into one arm. Recovered from the reef flat where the *Pandora* first struck (Fig. 30A, B).

MA200: Pintle pin. Heavily degraded. Circular shank with rounded point at one end. L. 205mm (8"). Diam. 37mm ( $1\frac{7}{16}$ "). Recovered from the reef flat where the *Pandora* first struck.



FIG. 31. Pump chamber and pump pulley wheel in situ.

SHIP'S PUMPS

**Cole/Bentinck Chain Pump.** The Cole/Bentinck chain pump was developed by William Cole and Captain Bentinck in 1768. It was considered an improved version of earlier chain pumps (Oertling, 1982: 116). There were two of this type on the *Pandora*. They operated from the same crank and were positioned in the midships area (McKay & Coleman, 1992: 78-9). The drive wheels from both chain pumps were found exposed on the surface of the seabed. One was recovered in 1983. Due to the position of this drive wheel it is probable that it is part of the portside pump (Coleman, pers. comm., 1994). Concreted around the drive wheel was a section of pump chain including one disc assembly. The pump chambers have also been sighted on the seabed at midships and appear to have toppled over and fallen out of the hull. Thus, the cisterns are likely to lie well outside the confines of the hull remains in an area which has yet to be excavated. Pump components are described below (Fig. 31).

**Cole/Bentinck Chain Pump Components.** MA140/1: Drive wheel segment. A section of one

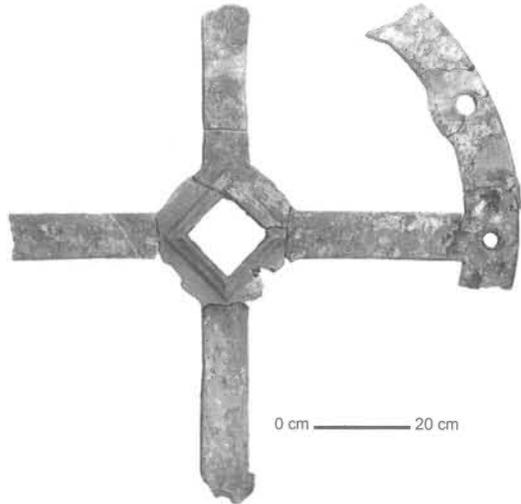


FIG. 32. Drive wheel from Cole/Bentinck chain pump, MA140/1.

side remains. Cast from iron, it has four equidistant spokes radiating from a central hub section. This section has a  $64\text{mm}^2$  ( $2\frac{1}{2}$ "") opening surrounded by a reinforcing boss to receive the axel shaft. There are circular holes in the outside rim to take the wrought iron rods that formed the sprocket upon which the chain was engaged. Wheel diam. 610mm (2'). Spoke W. 50mm (2"). Rim W. 56mm ( $2\frac{1}{4}$ ""). Hole diam. 18mm ( $1\frac{1}{16}$ "") (McKay & Coleman, 1992: 79) (Fig. 32).

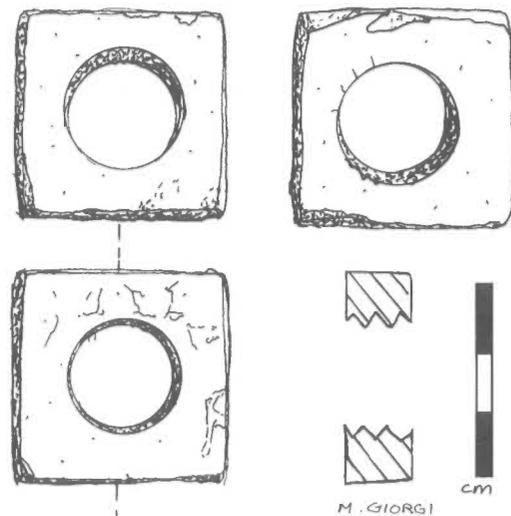


FIG. 33. Brass nuts from the spreader rods of Cole/Bentinck chain pump, MA140/2.



FIG. 34. Leather pump disc from the chain links of Cole/Bentinck chain pump, MA140/3.

MA140/2: Twenty square brass nuts. Nut 34mm<sup>2</sup> (1<sup>5</sup>/<sub>16</sub>"<sup>2</sup>). Threaded opening diam. 17mm (1<sup>1</sup>/<sub>16</sub>"). Fastened wrought iron spreader rods to the wheel (McKay & Coleman, 1992: 78-9) (Fig. 33).

MA140/3: Pump disc fragment. Leather disc shaped with a rectangular opening in the centre to admit the chain link. (McKay & Coleman, 1992: 79). Gasket diam. 115mm (4<sup>1</sup>/<sub>2</sub>"). Rectangular opening 14mm (9/16") x 57mm (2<sup>1</sup>/<sub>4</sub>"). Originally one of two layers of leather which were sandwiched between upper and lower iron plates (Fig. 34).

MA140/4: Four cotter keys made from sheet copper fashioned into L shapes. Tangs bent outward and slightly twisted. Used to secure the pins attaching the chain links together. Maximum W. 10mm (3/8") (Fig. 35).

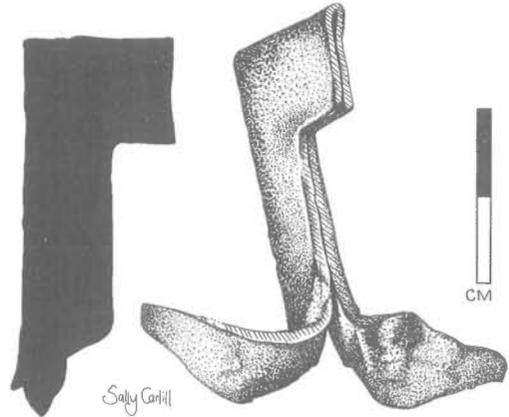


FIG. 35. Cotter key from the chain links of Cole/Bentinck chain pump, MA140/4.

MA140/5: Centre link from the pump chain. Cast from iron. Rounded at each end and concave on the long edges. A single protrusion on one edge to engage the drive wheel. Hole at both ends for accommodating the pins that held the links together. Overall L. 215mm (8 1/2"). Pin opening diam. 18mm (1<sup>1</sup>/<sub>16</sub>") (Fig. 36A).

MA140/6: Outer link from the pump chain. Cast from iron. Rounded at both ends and concave on

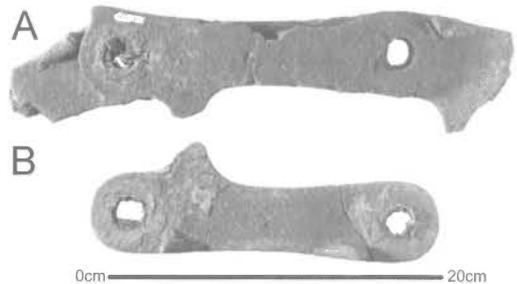


FIG. 36. Links from the chain of Cole/Bentinck chain pump. A, centre link, MA140/5; B, outer link, MA140/6.

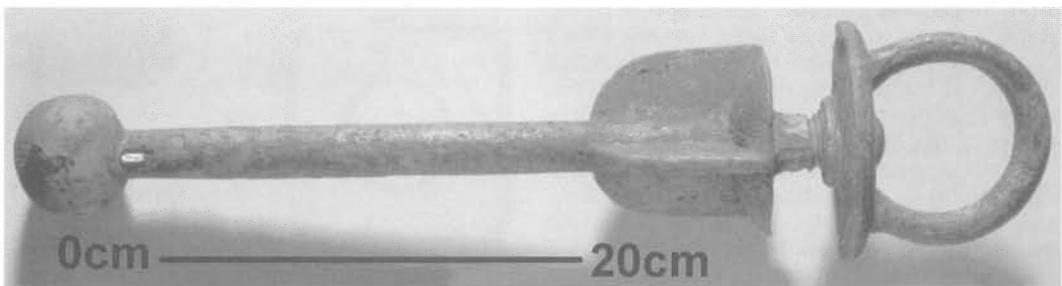


FIG. 37. Pendulum valve from a Taylor's Common pump, MA500/1.

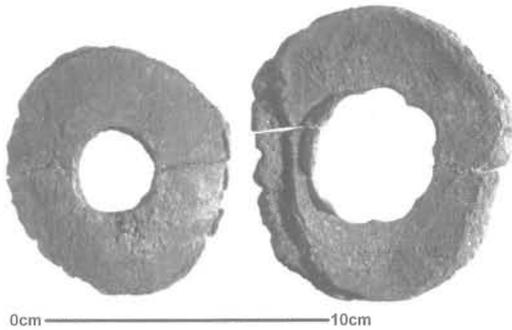


FIG. 38. Leather washers from pendulum valve of Taylor's Common pump, MA500/2.

the long edges with a pointed protrusion to engage the rods of the drive wheel. Ends have two flat shoulders either side. Broad arrow horizontally stamped in the end nearest the protrusion. Overall L. 215mm (8 1/2"). Link th. 9mm (3/8"). Link W. in centre 39mm (1 9/16") (Fig. 36B).

**Taylor's Common Pump.** The Taylor's Common pump was a simple device used to remove bilge

water. Many attempts were made in the late 18th century to improve the common pump. One such attempt was the pump developed by Walter Taylor in 1789. During the *Pandora's* refit at Chatham in 1790, Collins and Broughton & Co of Lambeth supplied pumps to the yard fitted with 'Taylor's Brakes'. Although no contemporary drawings of a Taylor's pump survive, it is likely that the pump components recovered from the *Pandora* are of this model (Coleman, 1988a: 204).

MA500/1: Pendulum valve from a common pump. Cast in bronze in two parts. It bears the stamped letters 'CBA' and the place of manufacture — 'Lambeth' on the top surface. The lower half has three fins to guide it into position. On the top surface of the lower part is a threaded spigot into which leather washers were placed. Remnants of nine washers were adhering to the pendulum when the valve was recovered. The top part has a cast disc with an eye for 'hooking out' screws onto the spigot (Coleman, 1988a: 202). Overall L. 455mm (17 15/16"). Cylindrical shank W. 23mm (1 5/16"). Used as a stop valve in the bottom of a pump chamber (Fig. 37).

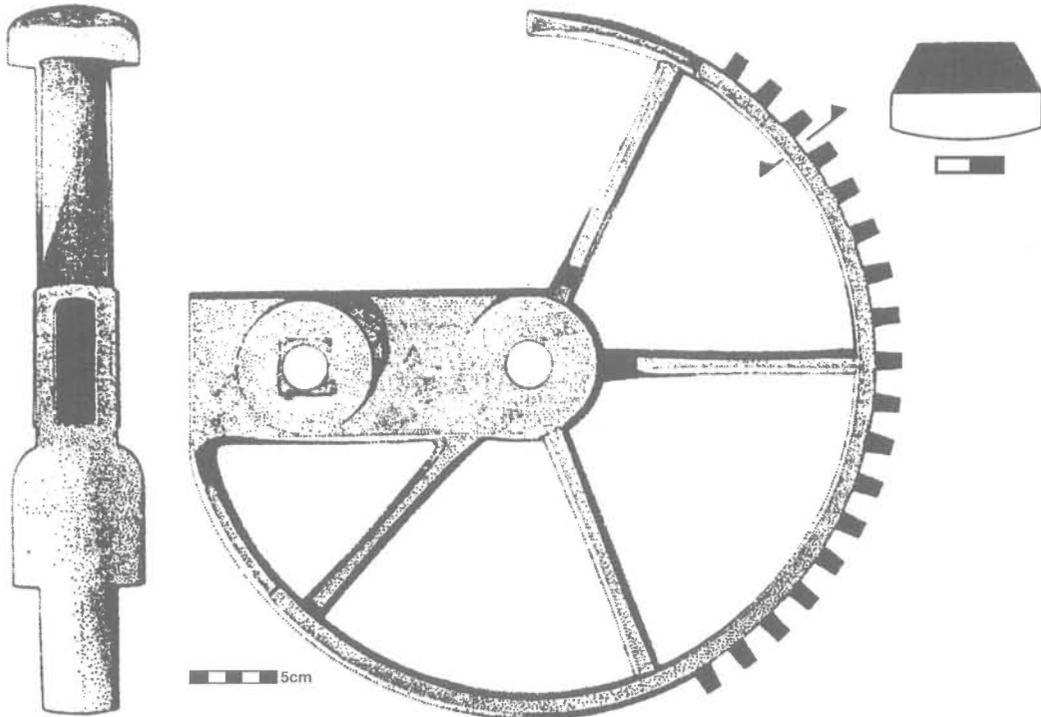


FIG. 39. Bronze quadrant from Taylor's Common pump, MA1094.

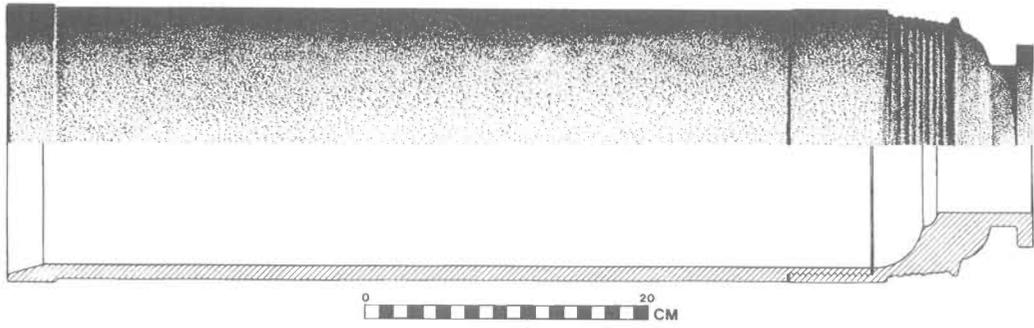


FIG. 40. Bronze pump chamber from Taylor's Common pump, MA2.

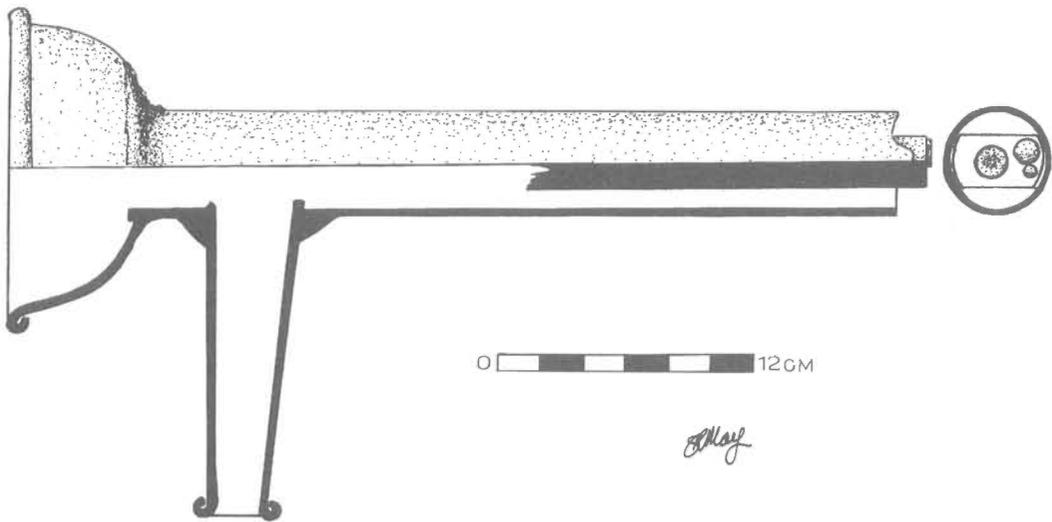


FIG. 41. Portable hand pump, MA202.

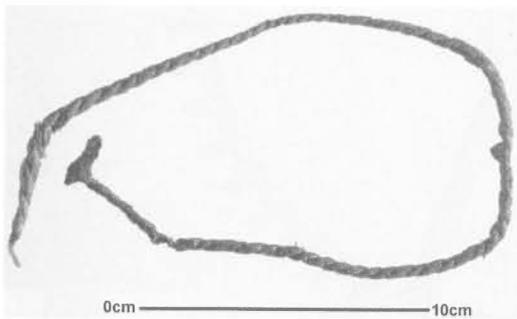


FIG. 42. Strands of thin rope from a carronade, MA4194.



FIG. 43. River-washed ballast pebbles, MA4154.

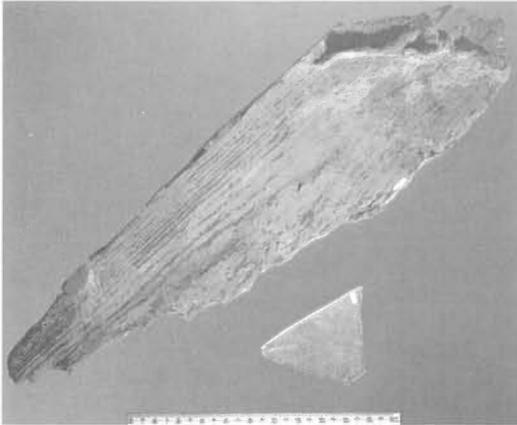


FIG. 44. Section of planking, MA1026.

MA500/2: Leather washers from the pendulum valve. Nine leather washer fragments have been recovered. Washer O.D. 100mm (4"). Washer I.D. 45mm (1<sup>3</sup>/<sub>4</sub>"). Washer th. 5mm (3/16"). Originally found in position attached to the pendulum's threaded spigot. Two washers are illustrated (Fig. 38).

MA1094: Cast bronze quadrant stamped with the letters 'CBA' and 'Lambeth'. In the centre of the wheel there is a rectangular socket designed to accommodate a brake handle. When depressed by the crew, the brake handle rotated the wheel and acted on a spear arrangement forcing the piston to rise bringing water to the top of the tube. O.D. 400mm (1' 3<sup>3</sup>/<sub>4</sub>") (Fig. 39).

MA2: Pump chamber cast from bronze in two pieces. No markings. Overall L. 722mm (2' 4<sup>7</sup>/<sub>16</sub>"). O.D. 175mm (6<sup>15</sup>/<sub>16</sub>"). I.D. 96mm (3<sup>13</sup>/<sub>16</sub>") (Fig.40).

**Hand Pump.** MA202: Portable copper hand pump. Upper section only. Consists of a cup soldered onto a hollow cylinder. The spout is soldered onto the main funnel. The rolled lip on the spout would once have secured a leather or canvas hose. While most of the plunger has not survived, vestiges of metal and wood remain in the cylinder. L. 410mm (1' 4<sup>3</sup>/<sub>4</sub>"). Funnel cup diam. 137mm (5<sup>3</sup>/<sub>8</sub>"). Shaft diam. 44mm (1<sup>3</sup>/<sub>4</sub>"). Used for decanting casks or barrels (Fig. 41).

#### MISCELLANEOUS

**Rope.** MA1367: Rope fragment, found wrapped around a wrought iron thimble.

MA4192, MA4194 (Fig. 42): Strands of thin rope. Possibly two ply jute. Found tied around the carronade (MA4190).

TABLE 7. Slate fragments.

| Acc. No. | Comments   | L.   | W.  | Th. |      |
|----------|--|------|-----|-----|------|
|          |  | mm   | mm  | mm  | in   |
| 738      | Fragment; two bevelled edges                         | >75  | >60 | 4   | 3/16 |
| 773      | Fragment   | >160 | >12 | 4   | 3/16 |
| 1519     | Fragment; bevelled edge (Fig. 45)                    | >210 | >60 | 4   | 3/16 |
| 4008     | Fragment   | >130 | >80 | 4   | 3/16 |
| 4025     | Fragment; curved edge; nail hole diam. 3mm (Fig. 46) | >324 | >95 | 4   | 3/16 |

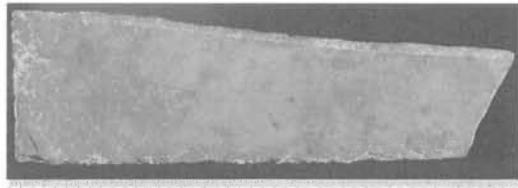


FIG. 45. Segment of slate cut to size with a bevelled edge, MA1519.

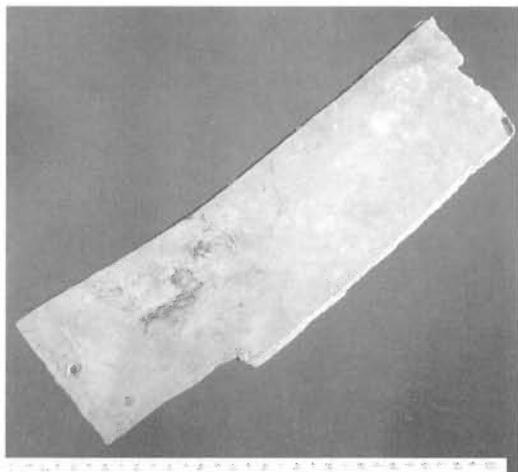


FIG. 46. Segment of slate cut to size with nail hole, MA4025.

MA4197: Thick rope. Short strands only. Possibly jute. Diam. 12mm (1/2").

**Ballast.** A collection of river-washed pebbles was recovered. They have an average width of 30mm and are intermediate to basic volcanic rock (Delaney, pers. comm., 1995). The *Pandora's* log (Adm. MS 180) records that shingle ballast was replaced by coals before the voyage, but it is possible that these pebbles were missed during replacement and remained in the hold.

TABLE 8. Bricks.

| Acc. No. | Comments                        | L.  |                                | W.  |    | D. |                               |
|----------|---------------------------------|-----|--------------------------------|-----|----|----|-------------------------------|
|          |                                 | mm  | in                             | mm  | in | mm | in                            |
| 37       | Complete common brick           | 231 | 9 <sup>1</sup> / <sub>16</sub> | 102 | 4  | 63 | 2 <sup>1</sup> / <sub>2</sub> |
| 95       | Two fragments of same brick     |     |                                | 100 | 4  | 63 | 2 <sup>1</sup> / <sub>2</sub> |
| 125      | Complete common brick (Fig. 47) | 234 | 9 <sup>1</sup> / <sub>4</sub>  | 102 | 4  | 62 | 2 <sup>1</sup> / <sub>2</sub> |



FIG. 47. Common brick, MA125.

MA50, 64, 508, 511, 531, 567, 579, 700, 706, 724, 760, 783, 1068, 1147, 1223, 1752, 4131, 4154 (Fig. 43), 4184, 4206.

**Planking.** MA1026: A segment of wooden planking. L. >510mm. W. >135mm. Th. >23mm (Fig. 44).

### SHIP'S FURNITURE AND FITTINGS

#### SLATE

Several fragments of slate are listed in Table 7. Slate was probably used as roofing material on the quarter galleries (McKay & Coleman, 1992: 41, C3/2). A nail hole in one end of MA4025 (Fig. 46) suggests that it was used for this purpose. Other slate fragments indicate alternative functions, for example, the two bevelled edges of the fragment MA738 suggest a wooden frame and a possible use as a writing slate.

#### BRICKS

Bricks were used on board wooden ships to insulate timbers and other woodwork from heat generated by fires. The bricks excavated from the *Pandora* to date are known as common bricks (cf. Hume, 1985: 81) (Table 8). They were made of fine-grained, low-fired red clay. No marks are evident however they are worn on all surfaces. They were possibly used as temporary deck insulation wherever the armourer set up his forge or when brazier-type 'airing' stoves were set up below decks (R. Coleman, pers. comm., 1999).

### WINDOW GLASS

**Intact Panes.** Several intact panes of window glass and many fragments were recovered (Table 9). While the majority of intact panes are rectangular, a few are trapezoidal. It is possible that trapezoidal panes were used in the quarter gallery (cf. McKay & Coleman, 1992, 24 dwg. A3/1) or outer sash windows on the stern gallery (cf. McKay & Coleman, 1992: 41 dwg. C3/3). Rectangular panes were used in the stern gallery's centre windows and internally in cabin doors. It is also likely that the *Pandora* was carrying spare sheets of glass in the hold for the vessel's own use as well as the planned *Bounty* refit. Many panes were possibly shattered at the time of the sinking.

Most panes are translucent, however some are clear. The majority are colourless, but there are examples with grey or green tinges. In the late 18th century, pane glass was manufactured using either the broad or crown technique. Imperfections and bubbles in broad technique glass are often in straight lines. Imperfections in glass



FIG. 48. Glass sheet, MA619.

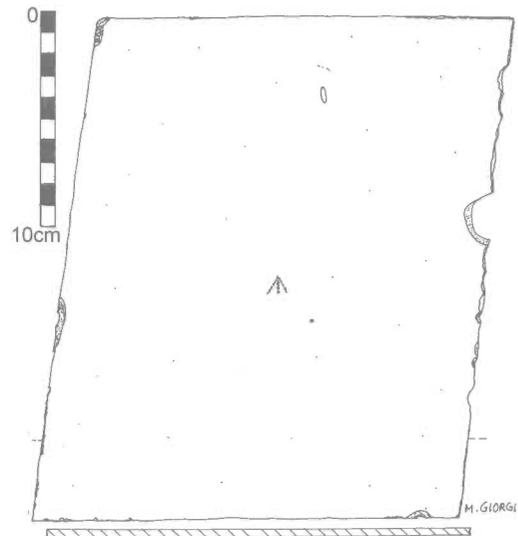


FIG. 49. Trapezoidal pane of glass with a scratched broad arrow, MA1085.

TABLE 9. Intact window pane glass.

| Acc. No. | Comments   | Markings<br>B.A.=broad arrow                     | L.  |                                  | W.  |                                 | Th. |                                |
|----------|--|--|-----|----------------------------------|-----|---------------------------------|-----|--------------------------------|
|          |  |  | mm  | in                               | mm  | in                              | mm  | in                             |
| 30       | Rectangular; colourless; translucent; pronounced scalloped edge possibly due to trimming pane to fit | B.A.   | 183 | 7 <sup>3</sup> / <sub>16</sub>   | 142 | 5 <sup>5</sup> / <sub>8</sub>   | 4   | 3 <sup>1</sup> / <sub>16</sub> |
| 619      | Rectangular pane of unusual thickness; green-tinged; clear (Fig. 48)                                 | B.A.   | 200 | 7 <sup>15</sup> / <sub>16</sub>  | 180 | 7 <sup>1</sup> / <sub>16</sub>  | 7   | 1 <sup>1</sup> / <sub>4</sub>  |
| 1006     | Rectangular; green-tinged; translucent   | B.A.   | 400 | 1' 3 <sup>3</sup> / <sub>4</sub> | 215 | 8 <sup>1</sup> / <sub>2</sub>   | 4   | 3 <sup>1</sup> / <sub>16</sub> |
| 1085     | Trapezoidal; colourless; translucent (Fig. 49)   | B.A.   | 200 | 7 <sup>15</sup> / <sub>16</sub>  | 140 | 5 <sup>9</sup> / <sub>16</sub>  | 3   | 1 <sup>1</sup> / <sub>8</sub>  |
| 1129     | Trapezoidal; colourless; clear   | Two scratched attempts at B.A.; on one surface   | 230 | 9 <sup>1</sup> / <sub>16</sub>   | 200 | 7 <sup>15</sup> / <sub>16</sub> | 4   | 3 <sup>1</sup> / <sub>16</sub> |
| 1283     | Trapezoidal; colourless; translucent   | B.A.   | 245 | 9 <sup>11</sup> / <sub>16</sub>  | 210 | 8 <sup>1</sup> / <sub>4</sub>   | 4   | 3 <sup>1</sup> / <sub>16</sub> |
| 1305     | Trapezoidal; colourless; clear   | Two scratched attempts at B.A.; on both surfaces | 210 | 8 <sup>1</sup> / <sub>4</sub>    | 200 | 7 <sup>15</sup> / <sub>16</sub> | 3   | 1 <sup>1</sup> / <sub>8</sub>  |
| 1306     | Rectangular; colourless; translucent (Fig. 50)   | B.A.   | 245 | 9 <sup>11</sup> / <sub>16</sub>  | 200 | 7 <sup>15</sup> / <sub>16</sub> | 4   | 3 <sup>1</sup> / <sub>16</sub> |
| 4000     | Rectangular; green tinge; clear  | B.A.   | 245 | 9 <sup>11</sup> / <sub>16</sub>  | 210 | 8 <sup>1</sup> / <sub>4</sub>   | 4   | 3 <sup>1</sup> / <sub>16</sub> |

manufactured using the crown technique tend to be curved (Hume, 1985: 235). Although the panes excavated to date all display imperfections and bubbles, the small size of individual sheets makes it difficult to assign with certainty any sheet to either technique. Individual panes display a uniform thickness (although this varies from pane to pane) with no sign of warping or crookedness. One anomalous pane (MA619) has a thickness of 7mm (1/4") and possibly had an entirely different use on board. All intact panes have a crudely scratched broad arrow.

**Pane Fragments.** 151 fragments of possible window glass are listed below. Some accession numbers represent more than one fragment. Pane

thickness ranges between 2mm (1/16") and 5mm (3/16").

MA22, 27, 30, 46, 60, 82, 128, 143, 156, 513, 522, 576, 594, 611, 624, 634, 655, 668, 699, 704, 713, 721, 732, 748, 772, 1026, 1051, 1057, 1058, 1082, 1089, 1105, 1107, 1127, 1133, 1134, 1141, 1177, 1253, 1258, 1264, 1282, 1301, 1323, 1349, 1374, 1375, 1376, 1385, 1390, 1395, 1402, 1417, 1427, 1445, 1452, 1457, 1493, 1496, 1507, 1521, 1528, 1556, 1579, 1605, 1615, 1633, 1650, 1679, 1692, 1694, 1698, 1702, 1736, 1769, 1777, 4009 (2), 4022, 4037, 4080, 4124, 4023, 4026, 4060, 4061, 4062, 4068, 4070, 4088, 4108, 4109, 4110, 4119, 4127, 4135, 4136, 4152, 4169, 4174, 4175.

TABLE 10. Lead counterweights.

| Acc. No.      | Wt.<br>kg | L.  |         | W. |         | Th. |        |
|---------------|-----------|-----|---------|----|---------|-----|--------|
|               |           | mm  | in      | mm | in      | mm  | in     |
| 512 (Fig. 51) | 3.65      | 277 | 10 7/8  | 52 | 2 1/16  | 25  | 1      |
| 519           | 3.81      | 290 | 11 7/16 | 42 | 1 11/16 | 28  | 1 1/8  |
| 527           | 3.90      | 290 | 11 7/16 | 50 | 2       | 25  | 1      |
| 1670          | 4.15      | 330 | 13      | 30 | 1 3/16  | 30  | 1 3/16 |

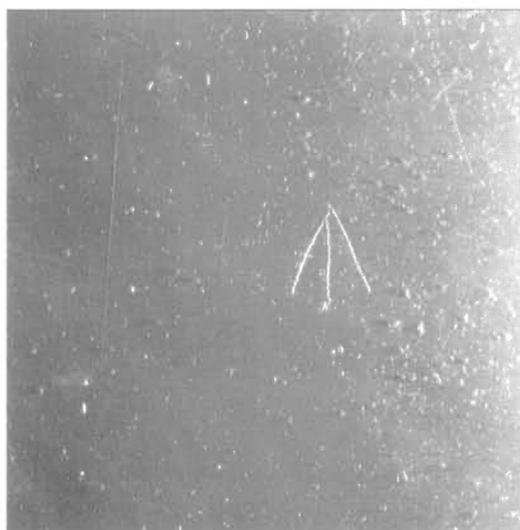


FIG. 50. Detail of a scratched broad arrow, MA1306.



FIG. 51. Lead counterweight, MA512.

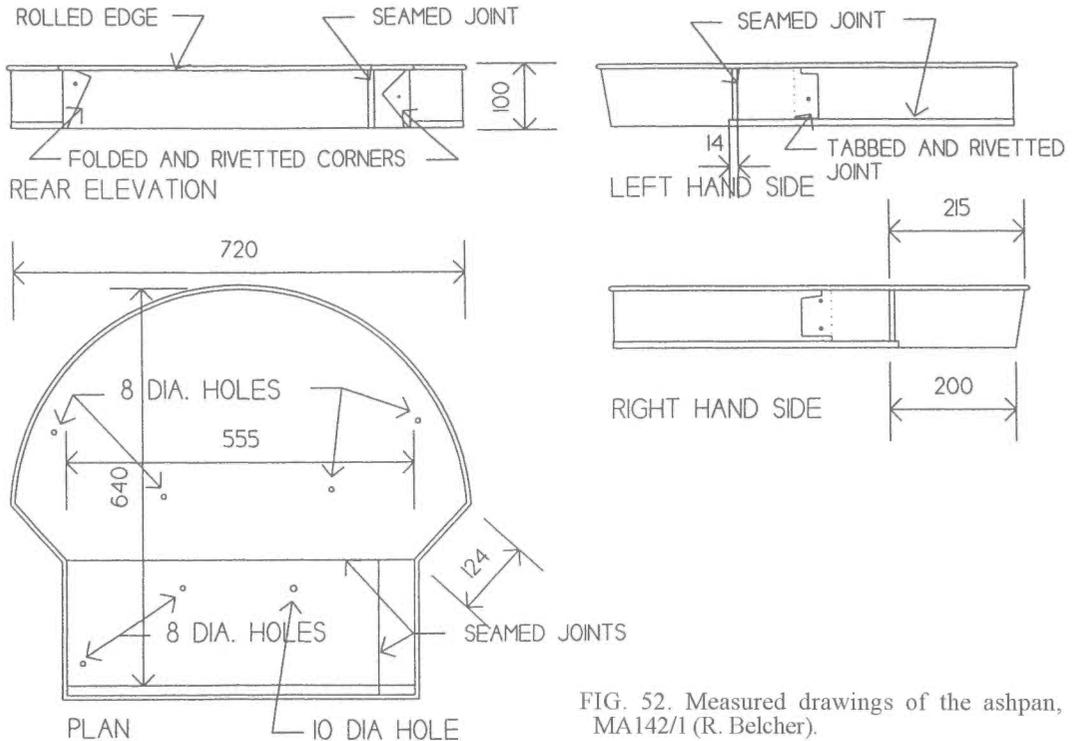


FIG. 52. Measured drawings of the ashpan, MA142/1 (R. Belcher).

#### COUNTERWEIGHTS

Four counterweights were excavated to date (Table 10, Fig. 51). Cast in one piece from lead, they are bar-shaped with bevelled corners. At one end there is a rounded point with a central hole for receiving an attachment rope. They have no surface markings. These were possibly used in the sash windows of the stern but could have had other uses on board such as the weights in a dumb waiter.

#### GREAT CABIN FIREPLACE

In 1984 a brass bulkhead fireplace was retrieved from the stern area of the *Pandora*. (MA780.) While archival information relating to this type of fireplace has not yet been found, it was most probably specifically designed and manufactured for use on board ships. It is thought to be the personal property of Captain Edwards and part of the furniture he installed in the Great Cabin prior to the *Pandora*'s final voyage. Upon his return to England, Edwards listed over £500 worth of personal property lost with the ship. Among the description of items lost was cabin furniture worth £150 (Adm. MS 180).

A fibre-optic photograph of the interior of an

18th century scale-model of the *Royal George* shows a similar type of fireplace erected against the bulkhead of the Admiral's cabin (cf. Lavery, 1988: 73).

A replica of the *Pandora*'s fireplace has been installed in the *Endeavour*, recently built in Fremantle, Western Australia. Another replica has been manufactured for installation in Admiral Nelson's cabin on HMS *Victory* in Portsmouth (Peter Goodwin, pers. comm., 1996).



FIG. 53. Ashpan, MA142/1.

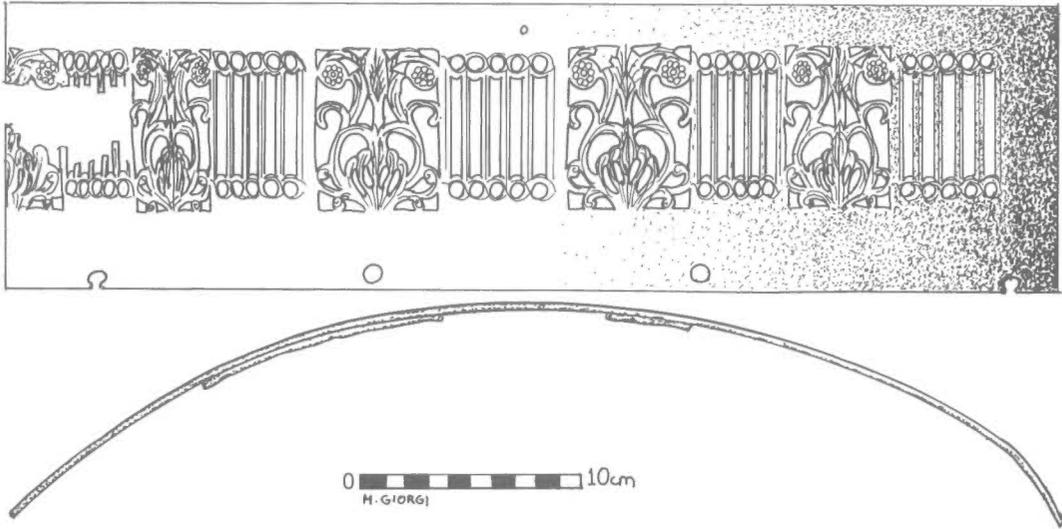


FIG. 54. Ornate fascia from ashpan, MA142/2.

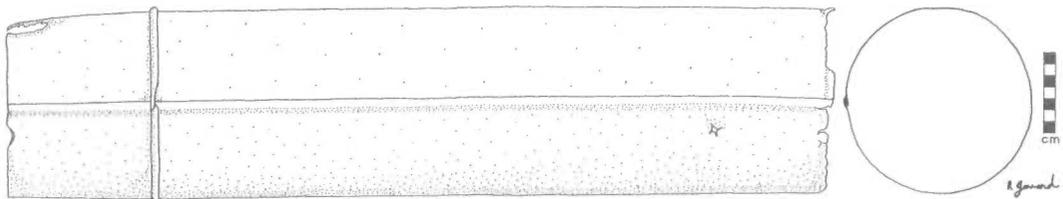


FIG. 55. Chimney flue section, MA579.

The fireplace and parts associated with it are described below.

MA142/1: Copper alloy ashpan from the cabin fireplace. Made from sheet copper with a rolled edge. The pan consists of two sections, one rectangular and the other semicircular. Attached around the face of the curve is a decorative fretwork fascia. Remnants of iron strengthening straps are evident on the under surface of the pan. Semicircular section diam. 300mm (11<sup>7</sup>/<sub>8</sub>" ). L. 730mm (3' 4<sup>3</sup>/<sub>4</sub>" ). Rectangular section 190 × 550mm (7<sup>1</sup>/<sub>2</sub>" × (1' 9<sup>11</sup>/<sub>16</sub>" ). Strap W. 38mm (1<sup>1</sup>/<sub>2</sub>" ). Sides 25mm (1" ) (Figs 52, 53).

MA142/2: Ornate fretwork fascia strips on the ashtray. Made in two sections from copper alloy, the fascia is curved in line with the shape of the ashtray. The fretwork shows a repetitive stylised floral design interspersed with vertical lines and circles. L. 549mm (1' 9<sup>5</sup>/<sub>8</sub>" ). W. 125mm (4<sup>15</sup>/<sub>16</sub>" ). Attachment holes run across the top and bottom. Th. 7mm (5<sup>1</sup>/<sub>16</sub>" ) (Fig. 54).



FIG. 56. Decorative top from an andiron leg, MA580.

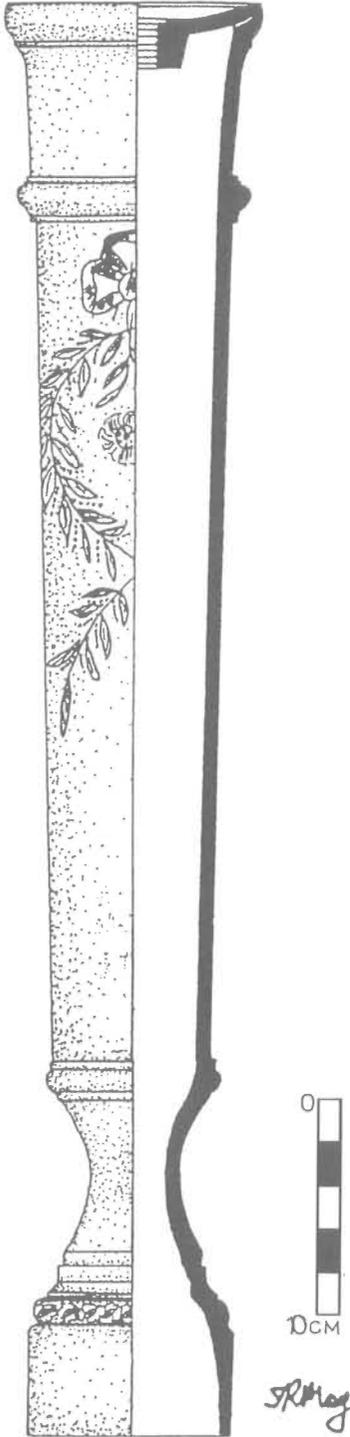


FIG. 57. Andiron leg, MA581.

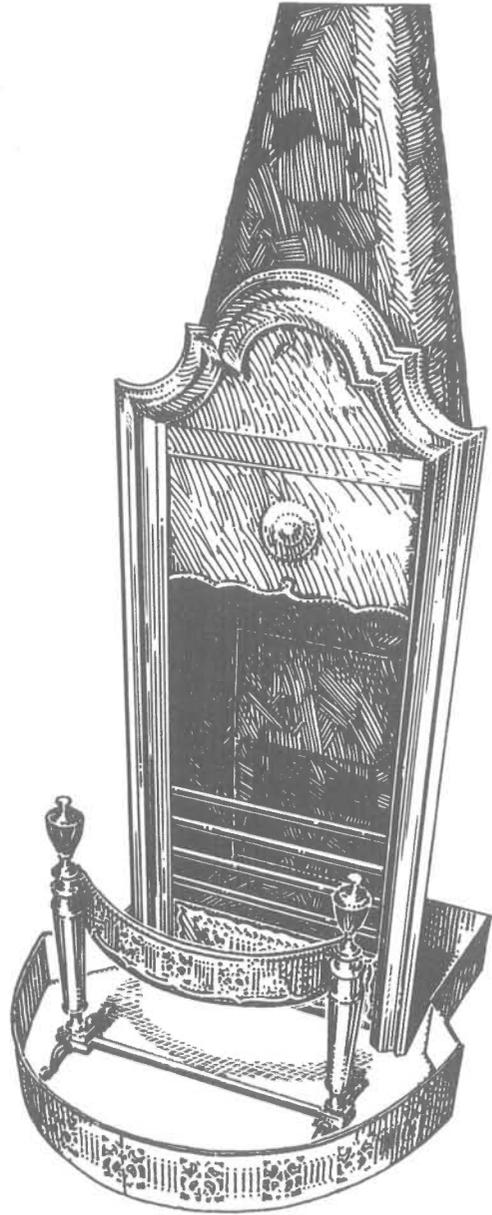


FIG. 58. Reconstruction of complete fireplace, MA780.

MA571, MA579: Chimney flue fragment from the cabin fireplace. Consists of a hollow cylindrical tube made from copper alloy sheeting with a vertical soldered seam. A horizontal fold over the seam runs parallel with one end. L. 740mm ( $2' 5\frac{3}{16}''$ ). Bore diam. 162mm ( $6\frac{3}{8}''$ ) (Fig. 55).

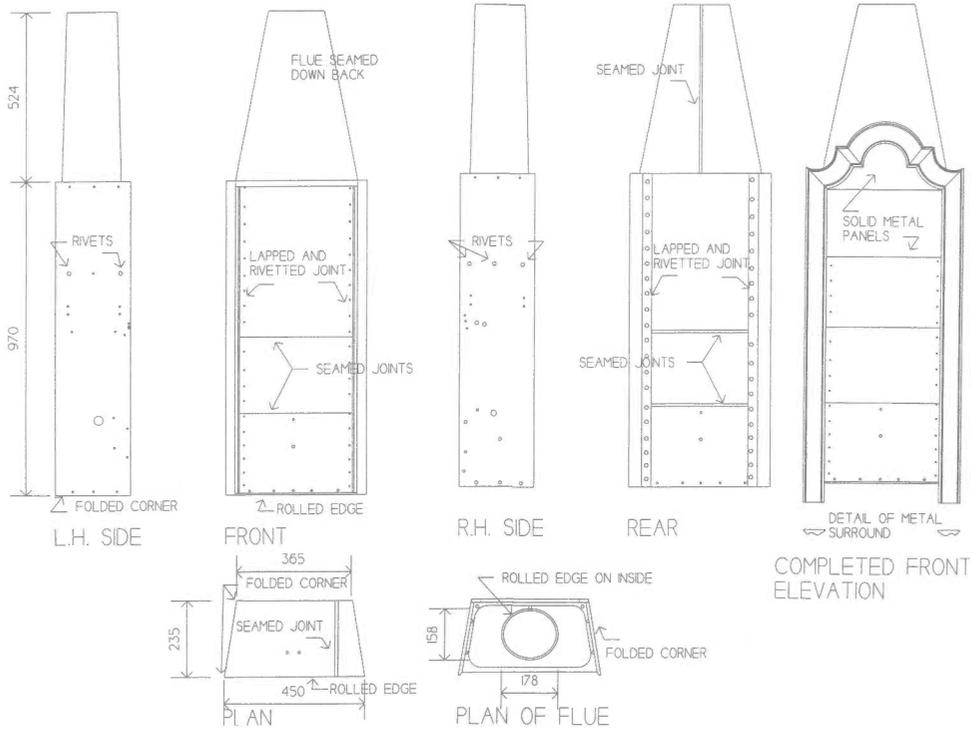


FIG. 59. Measured drawings (in mm) of the fireplace, MA780 (R. Belcher).



FIG. 60. Fireplace, front, side, and ornate detail of front, MA780.

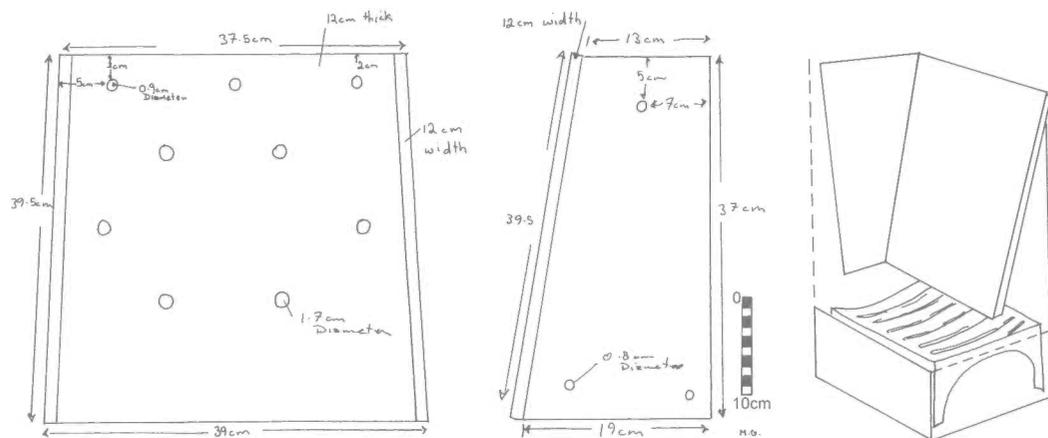


FIG. 61. Back and side plates for fireplace, MA780.

MA580: Urn-shaped brass finial. Cast in two vertical halves. Most likely the decorative top of an ornate andiron leg. Neo-classically embellished with festoons and stylised floral patterns. Silver-soldered and threaded. Ht. 124mm ( $4\frac{7}{8}$ " ). Diam. 59mm ( $2\frac{5}{16}$ " ) (Fig. 56).

MA581: Hollow brass andiron leg. Consists of a square top tapering into a cylindrical neck and then widening out to a long tapered shank. It has a flat base with a central threaded opening. Shank is embellished with the neo-classical motifs

including a ribbon bow, a foliate garland and a flower. Beading occurs on the front and two sides only. L. 328mm ( $12\frac{15}{16}$ " ). Threaded opening diam. 24mm ( $1\frac{5}{16}$ " ). A similar andiron leg was recovered from the wreck of HMS *Sirius* (1790) (cf. Stanbury, 1994: 44) (Fig. 57).

MA617: Copper alloy sheet fragments. Rolled into a cylindrical shape. Possibly part of a chimney flue. Th. 1mm ( $\frac{1}{16}$ " ). Joined with tin solder down one side.

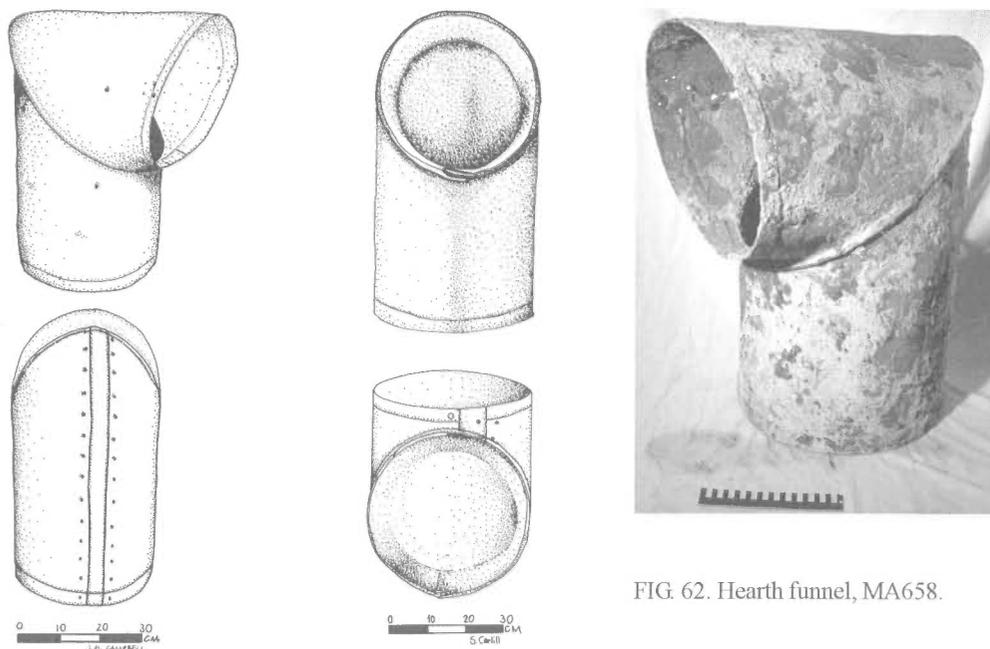


FIG. 62. Hearth funnel, MA658.

MA723: Brass base plate for the andiron leg. Square plate raised on three sides. Fourth side contains a central cut out rectangular section. Central opening in the plate is roughly 22mm<sup>2</sup> (7/8"). Plate 53mm (2 1/8") × 52mm (2 1/16"). Plate Th. 14mm (9/16").

MA780: Bulkhead fireplace. Made from brass with brass rivets. Remnants of a wrought iron grate together with side and backing plates were found inside the fireplace. Drilled holes for attachment screws can be seen on the back and sides of the fireplace. The backing plate was set at an angle inside the fireplace, presumably to reduce heat against the back of the fireplace and to radiate heat upward (Figs 58-61).

MA1739: Section of a chimney flue. Slightly tapered rolled tube of copper alloy. L. 330mm (1' 1"). Metal Th. 2mm (1/16"). Diam. 50mm (2").

#### BRODIE STOVE

In 1790 the *Pandora* was fitted with a Brodie stove for use in the galley (McKay & Coleman, 1992: 11). The Brodie stove was patented by Alexander Brodie in 1780 (McKay & Coleman, 1992: 11). The design was an improvement on an earlier ship's galley stove and was approved for use in the Royal Navy in 1780 (Lavery, 1988: 199). The *Pandora*'s Brodie stove has not been recovered and is visible on the sea floor in the bow area of the wrecksite. It is one of the few instantly recognisable features of the wreck. The hearth funnel (cowl) is the only component retrieved to date, and given the extremely fragile and friable state of the stove's remains, attempts to raise it in the future are not being considered.

MA658: Hearth funnel or cowl. L-shaped section of rolled copper alloy sheeting. Two separate cylindrical sections are attached to each other with a crimped join and copper alloy rivets. Both sections are cut on an angle to form a mitred join. The diameter of each of the cylinders is 217mm (8 9/16"). There are small rivet holes on the body of the cowl which would once have supported handles. These were a convenience for rotation of the hot cowl depending on the direction of the wind (McKay & Coleman, 1992: 11) (Fig. 62).

#### METAL SHEETING

**Copper Sheeting.** Fragments of thin copper sheet (listed below) were either once part of copper artefacts, such as cooking utensils and funnels, pieces of the chimney flue associated with the cabin fireplace or miscellaneous sheets used for various purposes, eg. trade or repairs.

MA118, 553, 586, 595, 598, 759, 1038, 1235, 1252, 1380, 1397, 1464, 1481, 1559, 1737, 4001, 4007, 4012, 4018, 4044, 4058.

**Lead Sheeting.** Lead sheeting was used to line special compartments of the vessel. For example, according to the specifications for a 24-gun ship, the floor of the filling room and the walls of the bread room were lined with lead sheeting (ADM/168/147). Fragments of lead sheeting are listed below. Many have attachment holes along one or more edges.

MA523, 538, 530, 538, 539, 543, 545, 563, 597, 600, 601, 613, 698, 718, 764, 765, 766, 1002, 1044, 1095, 1208, 1260, 4166.

**Hull Sheathing.** The *Pandora* was sheathed with copper at the time of building in 1778/1779. The standard copper sheet was 4' × 14" (1219 × 356mm). Each sheet over-lapped the next above and the next aft by 19mm (3/4") (Lavery, 1988: 63). In 1789 the *Pandora* was re-sheathed and the copper taken one strake (row of sheet) higher fore and aft in preparation for the South Pacific voyage (McKay & Coleman, 1992: 8).

MA1599: Copper hull sheathing fragment. Roughly triangular in shape with a row of nail holes along each edge. Distance between each nail hole 30mm. L. 450mm. W. 260mm at the apex. Th. 2mm.

#### HINGES, DRAWER HANDLES, DOOR FITTINGS AND LOCKS

MA147: Copper alloy cabinet latch. Consists of a rectangular plate with one raised side. One hole at each end for attachment to a cabinet. Three rectangular openings and one central hole. L. 62mm. W. 31mm. Hole diam. 4mm. Metal Th. 2mm (Fig. 63).

MA725: Copper alloy escutcheon. Oval-shaped with four equidistant attachment holes. L. 45mm. W. 35mm. Th. 2mm (Fig. 64).

MA1118: Wood fragment with a large keyhole and vestiges of a wrought iron lock. Possibly part of a door or chest. W. 120mm (Fig. 65).

MA1171: Copper alloy cabinet handle. Consists of three parts; (1) elaborately cast bale handle with bulbous centre section; (2) circular plate (collar) with a 5mm square hole in the centre for the post fastening; (3) post with a threaded screw and a rounded, decorated head. Embossed bead pattern around the edge of plate (Fig. 66).

MA1424: Copper alloy latch. Consists of four parts including a back plate, a latch, a loop handle and a washer. (1) back plate 91 × 23mm containing five holes. (2) latch L. 95mm. W. 20mm.

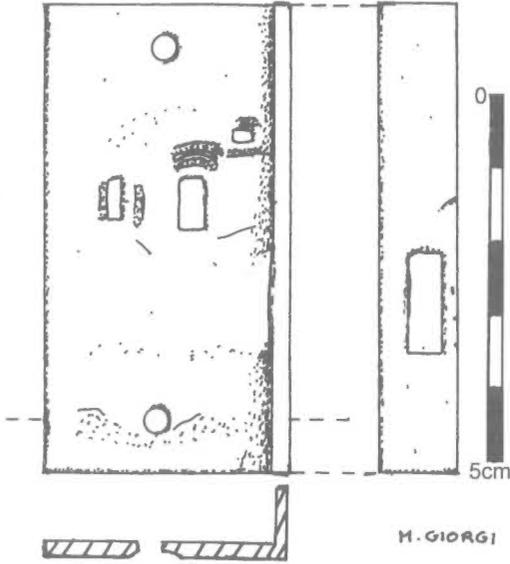


FIG. 63. Cabinet latch, MA147.

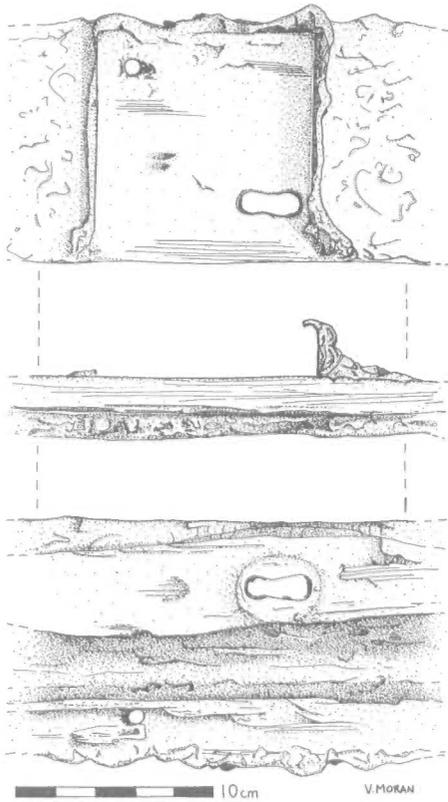


FIG. 65. Wood section with keyhole and lock remnants, MA1118.

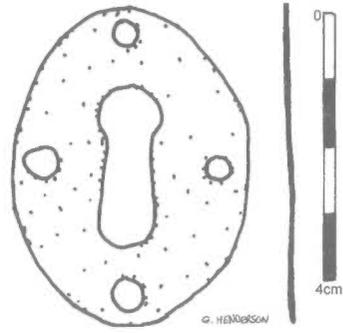


FIG. 64. Escutcheon, MA725.



FIG. 66. Cabinet handle, MA1171.

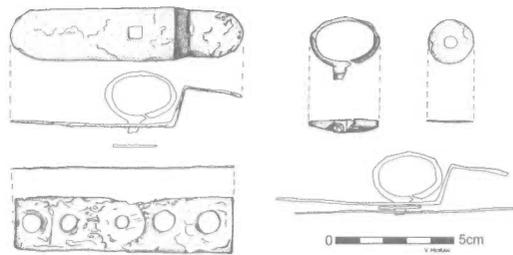


FIG. 67. Copper alloy latch, MA1424.

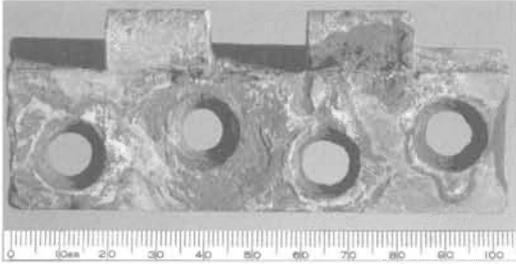


FIG. 68. Plain hinge, MA1485.

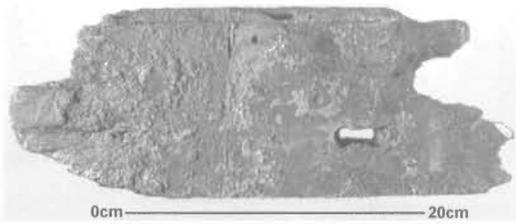


FIG. 69. Segment of wood with remains of a lock, MA1516.

Square opening 5mm<sup>2</sup>. (3) loop handle L. 30mm. Metal Th. 3mm. (4) washer O.D. 18mm. I.D. 5mm (Fig. 67).

MA1485: Plain copper alloy hinge. Four holes for screw fastenings. L. 104mm. W. 32mm (Fig. 68).

MA1516: Wood fragment with a large keyhole and vestiges of a wrought iron lock. One edge bevelled. L. 320mm. W. 125mm. Timber Th. 28mm. Keyhole L. 34mm (Fig. 69).

MA1562: Two plain copper alloy brass hinges. Two attachment holes on each wing. Hinge L. 26mm. Hinge W. 12mm.

MA1594: Plain copper alloy bale handle fragment with bulbous central section. L. 55mm. Diam. 3mm (Fig. 70).

MA1786: Bag shaped iron padlock with the remains of a round cross-sectioned hasp. W. 90mm. L. 121mm. Th. 15mm (Fig. 71).

MA4159: Copper alloy hinges attached to a section of wood. Two attachment holes on each wing. Possibly once part of a small box or instrument case. L. 20mm. W. 9mm (Fig. 72).

PLUMBING

MA4198: Brass spigot. Pipe bore diam. 20mm (Fig. 73).



FIG. 70. Plain bale handle, MA1594.



FIG. 71. Bag shaped iron padlock, MA1786.



FIG. 72. Two hinges attached to a segment of wood, MA4159.

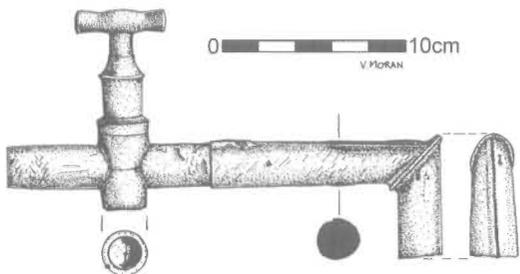


FIG. 73. Brass spigot, MA4198.

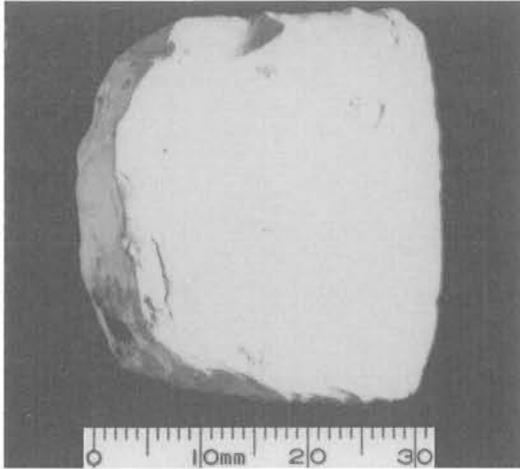


FIG. 74. Gun flint, MA1040.

## WEAPONS AND ACCESSORIES

### AMMUNITION AND ACCESSORIES

**Gun Flints.** MA1040, MA1779: Two chert gun flints. Early wedge shape (Delaney, 1989: 115). Approximately the same size. Possibly quarried in Kent (Lotbiniere, 1984: 207). W. 38mm. L. 32mm (Fig 74).

**Shot (Iron).** MA146: Canister or case shot. A concreted collection of twenty cast iron balls of shot. The shape of the shot concreted together suggests that they were once inside a canister. Nothing of the canister remains. Iron filings were found between the shot. The rough cylindrical shape of the concreted shot has a diameter of 120mm. This suggests that they were to be used in the 18-pounder carronades. Individual shot diam. 38mm. Individual shot Wt. 81g (Fig. 75).

MA308: Cast iron cannonball. Spherical with one flattened side. The 90mm diameter suggests that this shot was for use in one of the 6-pounder long guns (cf. Stanbury, 1994: 78). Wt. 2200g.

**Shot (Lead).** Listed below are 136 pieces of cast lead shot. The shot is spherical and varies in diameter and weight. Diameters range between 7mm and 17mm and weights between 14g and 28g or (0.5 to 1 ounce). Chemical analysis of this collection identified the major element as lead, with traces of antimony (Queensland Government Chemical Laboratory, 1984). Most accession numbers contain several individual shot.

MA42, 43, 92, 153, 174, 1055 (Fig. 76), 1211, 1212, 1314, 1538, 1611, 1677, 1772, 4043, 4131, 4196.

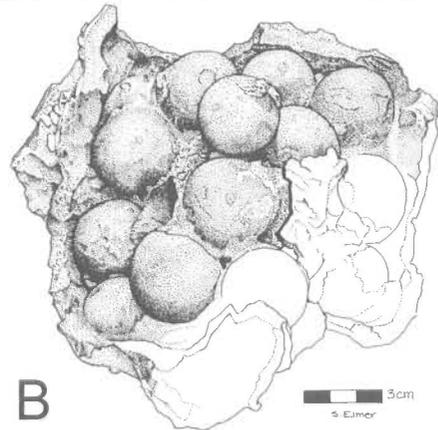
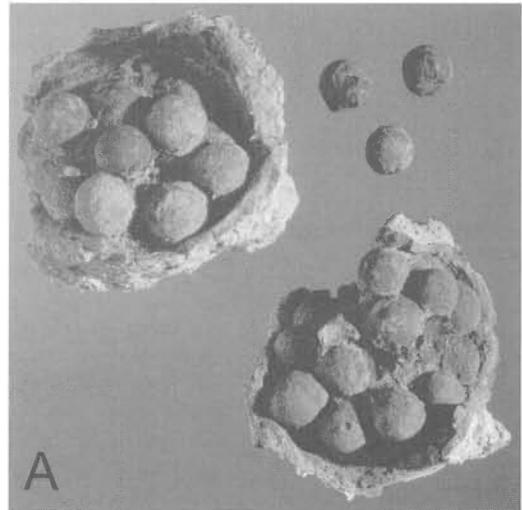


FIG. 75. A, B, cannister shot, MA146.

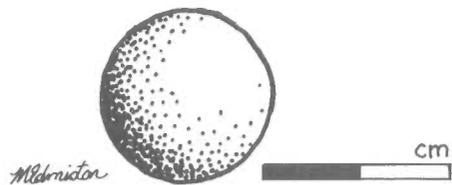


FIG. 76. Musket ball, MA1055.

## FIREARMS

MA84: Brass butt plate fragment from a Long Land Pattern musket. Broken at the point where the metal bends around the butt. L. 127mm. W. 51mm. Attachment hole diam. 9mm. Th. 9mm (Fig. 77A).

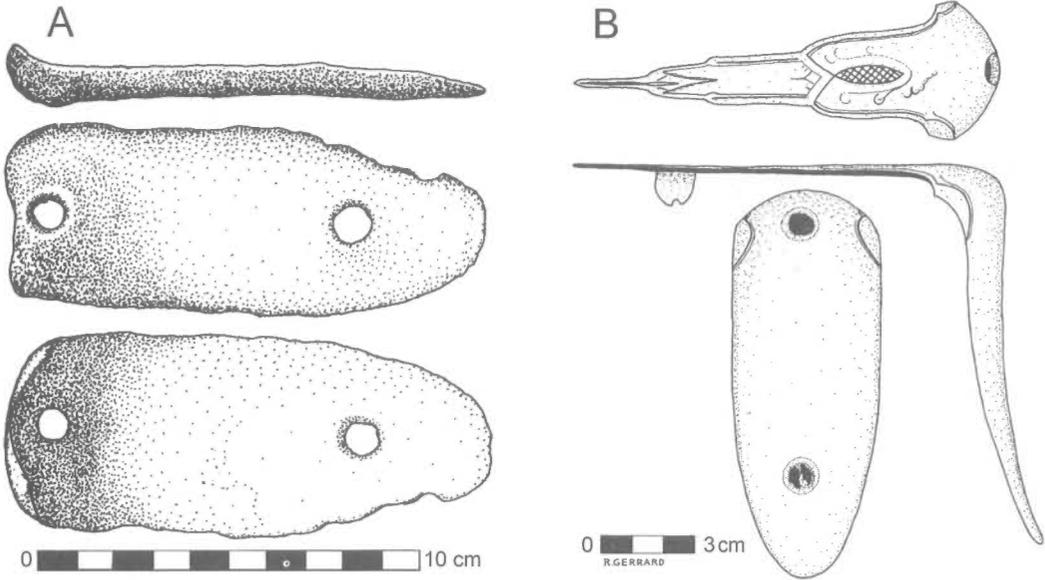


FIG. 77. Brass butt plates; A, MA84; B, MA1013.

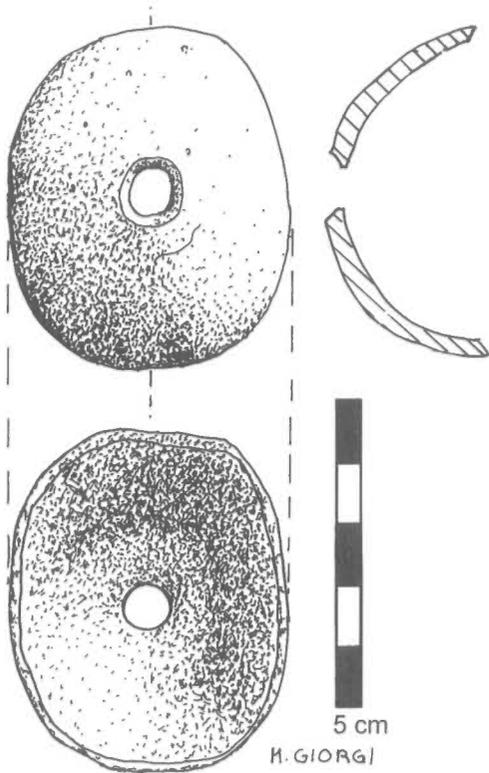


FIG. 78. Brass butt cap, MA1286.

MA1013: Brass butt plate from a musket. Engraved surface decoration. Possibly the personal property of an officer. L. 140mm (Fig. 77B).

MA1286: Brass butt cap from a flintlock pistol. Maximum diam. 48mm. Metal th. 5mm. Attachment hole diam. 8mm (Fig. 78).

**Gun Barrels.** MA629/1: Bronze blunderbuss barrel. Threaded at one end and with a slight bell mouth. An impressed leaf decoration at the threaded end. Reinforcing bands are spaced along the barrel. Two oval marks are the proof marks of the London Company of Gun Makers. Between the oval marks is John Richards' mark, a gun maker in London between 1781-1821. Barrel L. 411mm. Bore diam. 32mm (Fig. 79).

**Trigger Guards.** Three similar brass trigger guards were recovered.

MA85: Series of impressed lines on the underside of one tang. L.180mm. W. 25mm (Fig. 80).

MA1241: Very abraded. Impressed lines on underside of one tang still evident. L.125mm. W.19mm.

MA1357: One impressed line on the underside of one tang. L.175mm. W. 25mm.

**Pistol.** MA1627: Concreted flintlock pistol. This object is still undergoing conservation treatment

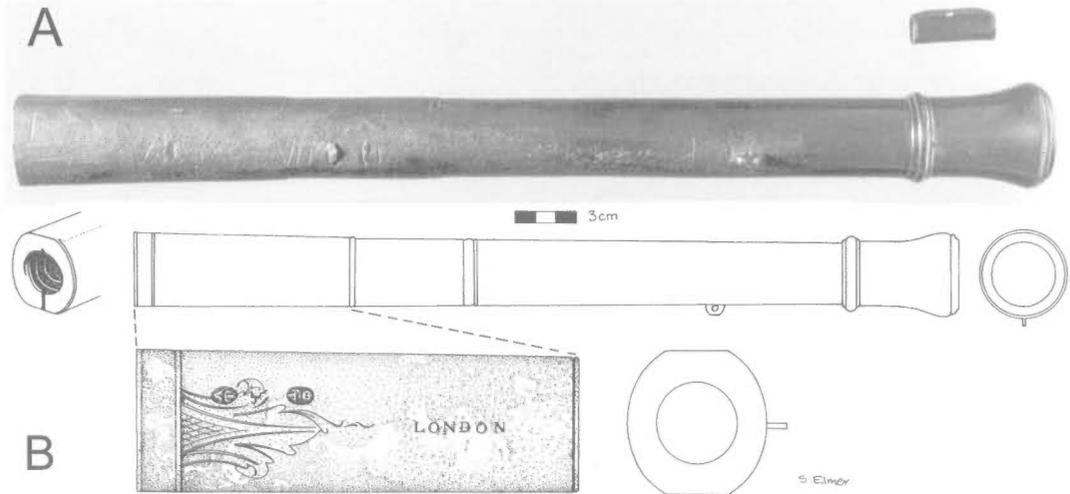


FIG. 79. A, B, bronze blunderbuss barrel, MA629.

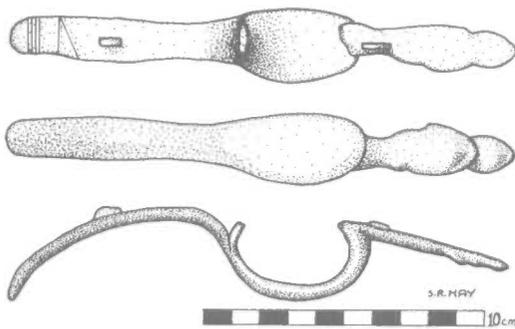


FIG. 80. Trigger guard, MA85.



FIG. 81. A, concreted pistol, MA1627; B, X-ray.

at the Western Australian Maritime Museum's Conservation Department. Figure 81A and B shows the concretion and an X-ray revealing some internal detail.

**Ramrod Retainer.** MA629/2: Brass ramrod retainer possibly from a blunderbuss. L. 33mm. Diam. 11mm (Fig. 82).

**Side Plate.** MA4040: Brass side plate from a Long Land Pattern musket. Curved ornate shape with two attachment holes. No markings on the plate. L. 165mm (Fig. 83).

#### ORDNANCE

**Cannon.** MA148: Cast iron long gun. Standard George III 6-pounder carriage gun. L. 1981mm (6' 6") from the muzzle to the back of the breech ring. The weight is marked in figures '18 0 19' (18cwt, 0qtrs and 19lbs) (2,035lbs or 923kg). The left trunnion bears the stamped letters 'WC' identifying the founder as Samuel Walker and

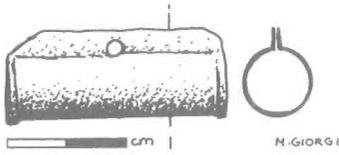


FIG. 82. Ramrod retainer, MA629/2.

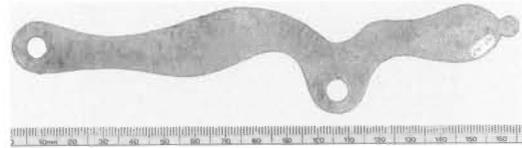


FIG. 83. Side plate, MA4040.

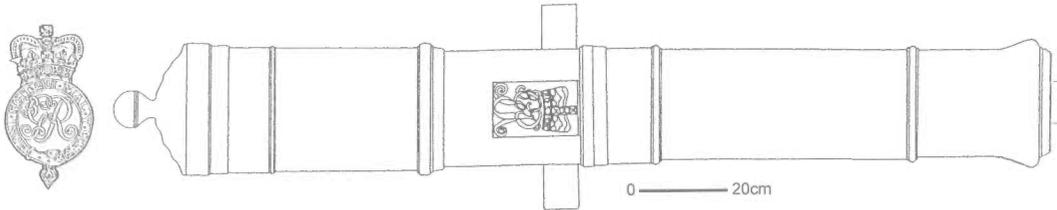


FIG. 84. George III 6-pounder carriage gun, MA148.

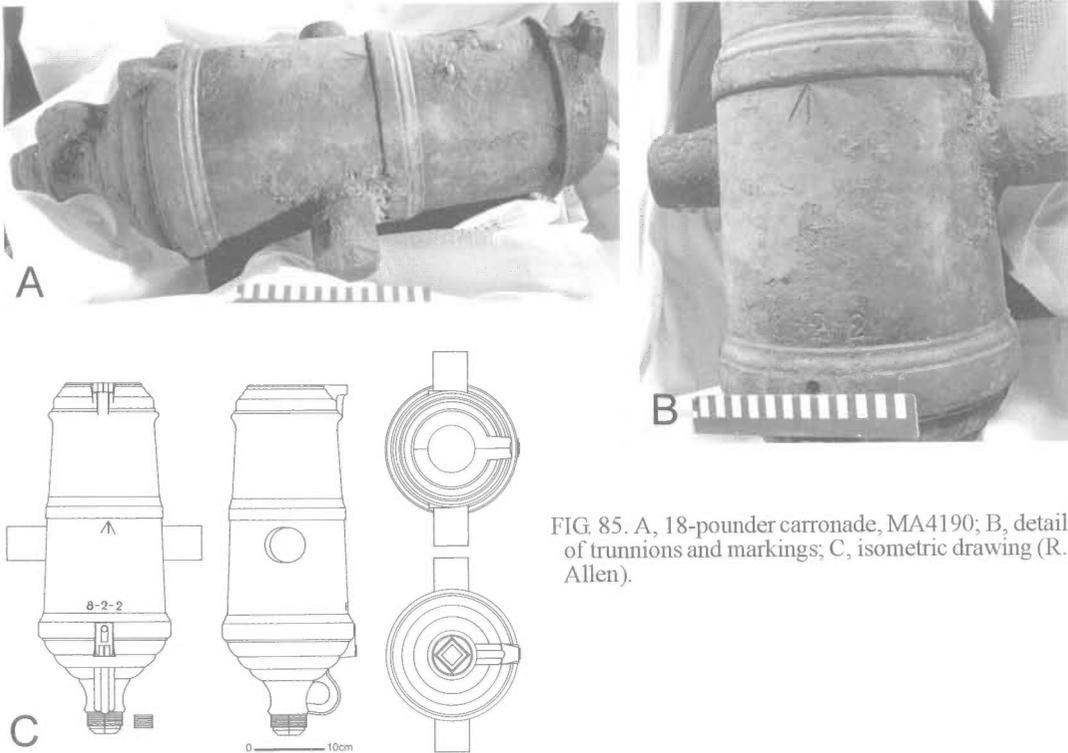


FIG. 85. A, 18-pound carronade, MA4190; B, detail of trunnions and markings; C, isometric drawing (R. Allen).

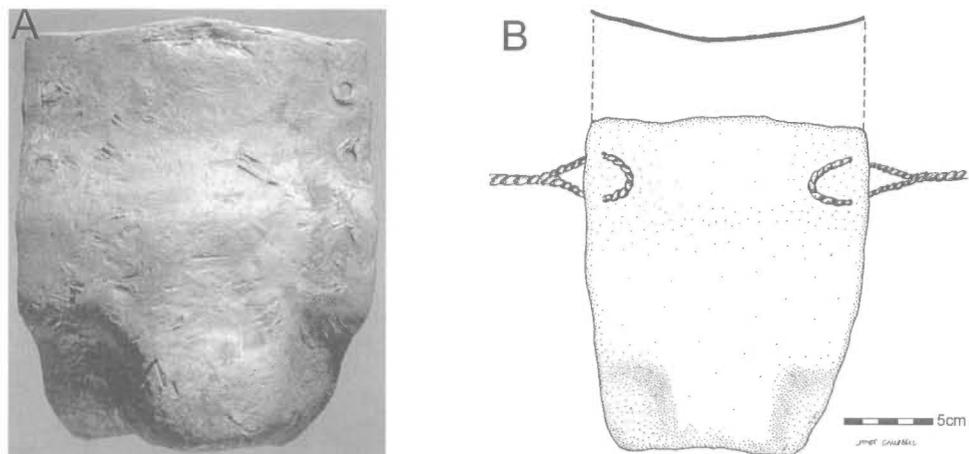


FIG. 86. A, vent patch, MA4188; B, detail of how vent patch was found attached to the carronade.

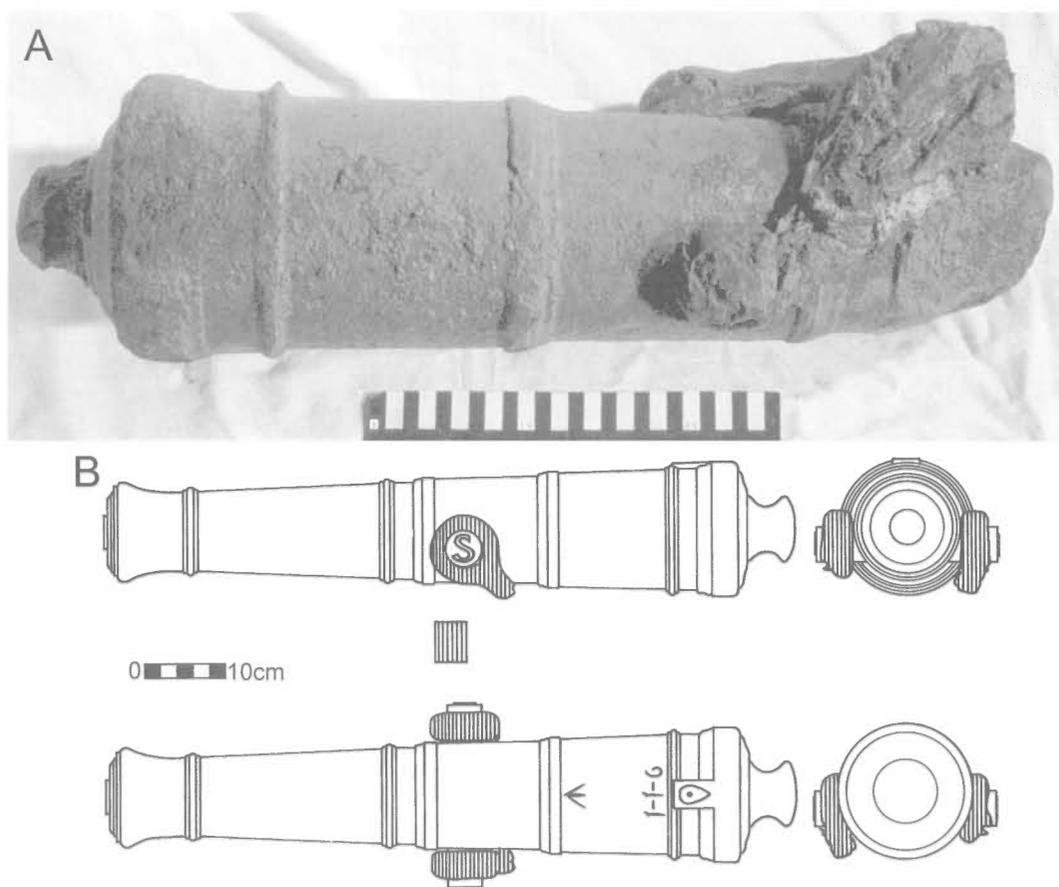


FIG. 87. Swivel guns; A, incomplete gun, MA784; B, gun with remnants of wrought iron yoke, MA4028 (R. Allen).

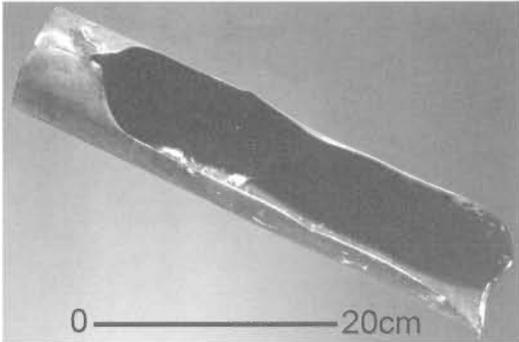


FIG. 88. Powder ladle, MA4203.

Company (Kennard, 1988: 150). The right trunnion bears the numeral 20, probably denoting a batch number. The number 8 stamped in front of the first reinforcing ring denotes the order of casting within the batch. This was to comply with the Ordnance Board's demand in 1786 for a method of identifying cannon and numbering each in the order of casting (McKay & Coleman, 1992: 10) (Fig. 84).

**Carronade.** MA4190: Cast iron 18-pounder carronade. L. 1014mm (3'4"). Bore diam. 133mm (5 1/4"). Trunnion diam. 100mm (3 3/4"). Width across the gun to the distal points on the trunnion 530mm (1' 8 3/4"). The weight is marked in figures '8 2 2' (8 cwt, 2qtrs, and 2lbs). The only other mark evident is a broad arrow. Except for trunnion markings, MA4190 is nearly identical to the two carronades retrieved from the wreck of HMS *Sirius* (1788) (Stanbury, 1994: 74-75). This carronade was probably manufactured after 1781. In that year the Navy Board recommended that carronades be lengthened from about 2' 4" (710mm) to more than 3' (915mm). This was so that their muzzles would protrude from the ship's sides and reduce the danger of setting fire to the rigging or the sails (McKay & Coleman, 1992: 10) (Fig. 85).

**Vent Patch.** MA4188: Lead vent cover or patch. Found in position on the carronade (MA4190). Four fastening holes were used to secure the vent to the carronade with lengths of twine or rope. Fragments of twine are found attached to the vent patch suggesting that the rope was originally spliced back to form a loop. The ends of each loop could presumably be tied together around or under the cascabel. Vent patch L. 185mm. W. 155mm. Th. 4mm. Attachment hole diam. 6mm (Fig. 86A, B).

**Swivel Guns.** MA784: Cast iron swivel gun. Remnants of a wrought iron yoke still attached to the trunnions. Wrought iron tiller remains attached to the cascabel. Broken at the muzzle end. The weight is marked in figures '1 1 20' (1cwt, 1qtr, 20lbs). The only other mark evident is a broad arrow. Recovered from the reef flat where the *Pandora* first struck. Length from the cascabel base to muzzle >610mm (Fig. 87A).

MA4028: Cast iron swivel gun. Remnants of a wrought iron yoke still attached to the trunnions. Wrought iron tiller remains attached to the cascabel. The letters 'B' and 'S' are stamped on the right and left trunnion respectively. These markings indicate the Bowling Ironworks which operated in Bradford by Sturgess and Company (Kennard, 1988: 143). The weight marks stamped on the top surface are difficult to read but appear to indicate a weight of 1cwt and 6qtrs. A broad arrow is also stamped on the top surface. There are five reinforcing rings. Remnants of a tampion of turned wood with a lip were found in the muzzle. L. 850mm (2' 9 1/2"). Bore diam. 43mm. W. between trunnions 224mm (8 3/4"). Diam. of the cascabel 77mm (7") (Fig. 87B).

GUNNER'S EQUIPMENT

**Ladle.** MA4203: Powder ladle. Consists of a single sheet of copper alloy rolled to form a cylinder and joined with copper alloy rivets. Remains of a wooden handle. Designed to slide into the bore of a cannon to remove the charge in the case of a misfire. L. 410mm. The ladle's diam. of 82mm suggests it was for use in the 6-pounder cannon (Fig. 88).



FIG. 89. Lion-head pommel, MA4161.

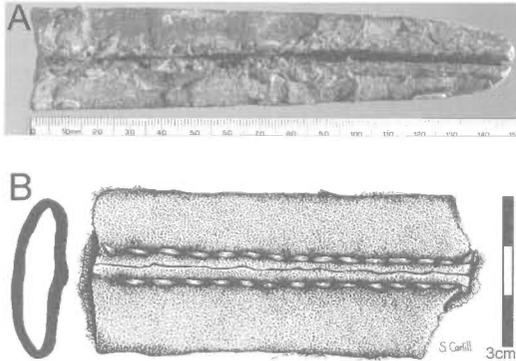


FIG. 90. Scabbard fragments; A, MA1619; B, MA4157.

### BLADED WEAPONS

**Sword Components.** MA1077: Wooden grip from a sword hilt. Hourglass shape. L. 162mm. Maximum W. 20mm. Minimum W. 13mm.

MA1597: Wooden grip from a sword hilt. The shaft is round in cross-section with blunt ends. L. 110mm. Diam. 25mm.

**Pommel.** MA4161: Brass lion-head pommel from a sword hilt. L. 40mm. Diam. 23mm (Fig. 89).

**Scabbard Fragments.** Leather fragments from scabbards (listed below) are longitudinally stitched. Maximum W. 35mm.

MA1103, 1457, 1619 (Fig. 90A), 1626, 1645, 1696, 4157 (Fig. 90B), 4189.

**Scabbard Studs.** MA568, 727, 1607: Three brass scabbard studs of British design. Used for attachment to the frog of a cross belt (cf. Neumann & Kravic, 1989: 39). L. 53mm. W. 11mm (Fig. 91A, B).

### TOOLS AND INSTRUMENTS

#### INSTRUMENT GLASS

Fragments of possible instrument glass are listed below. Fragments are of uniform thickness (1mm), colourless and transparent with no imperfections. Some have a ground curved edge suggesting that they were originally part of the circular glass face of an instrument, for example a compass. No surface markings observed.

MA604, 3 fragments, 105 × 90, 90 × 55, 80 × 40 (Fig. 92); MA1050, fragment with a curved ground edge, 90 × 165; MA1616, 2 fragments, 70 × 16, 55 × 5; MA1778, fragment, 160 × 125; MA4111, fragment, 59 × 43;

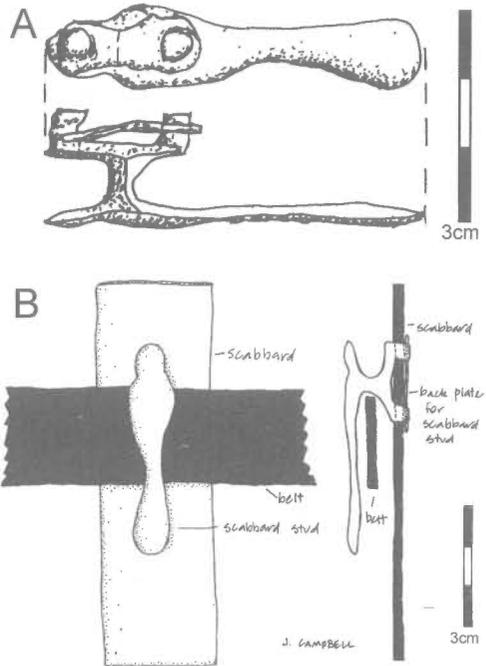


FIG. 91. A-B, MA568; A, scabbard stud; B, detail showing a scabbard stud attached to a belt.

MA4121, fragment, 149 × 48. All measurements are in mm.

#### NAVIGATIONAL INSTRUMENTS

**Telescopes.** MA569: Brass telescope. The wooden stock has been fitted during restoration by the Western Australian Maritime Museum due to the disintegration of the original. One lens only in situ. Inner tube diam. 18mm. Outer tube diam. 22mm. Lens diam. 16mm. L. 250mm. (Fig. 93A, B). This telescope is similar to the telescope used by William Bligh which is held at the State

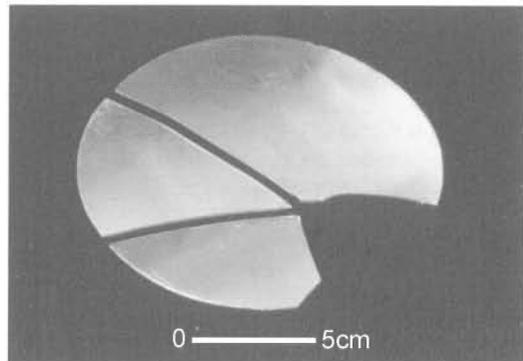


FIG. 92. Fragments of instrument glass, MA604.

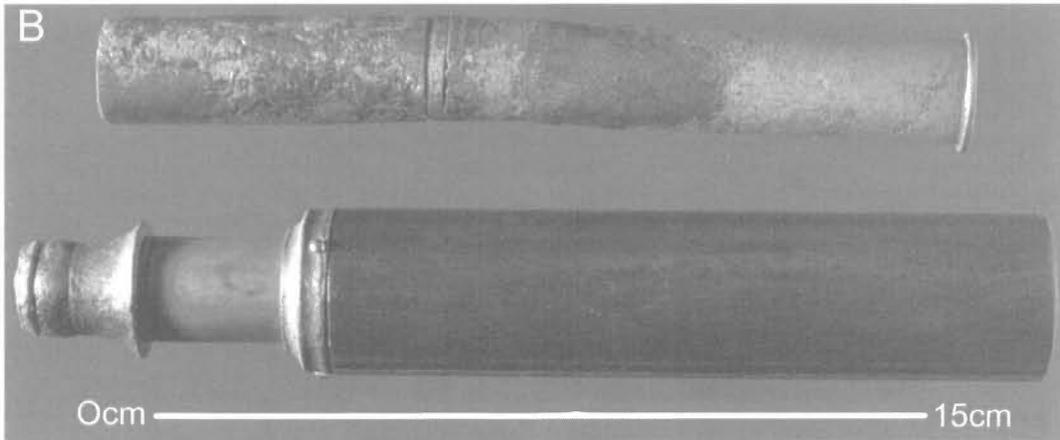
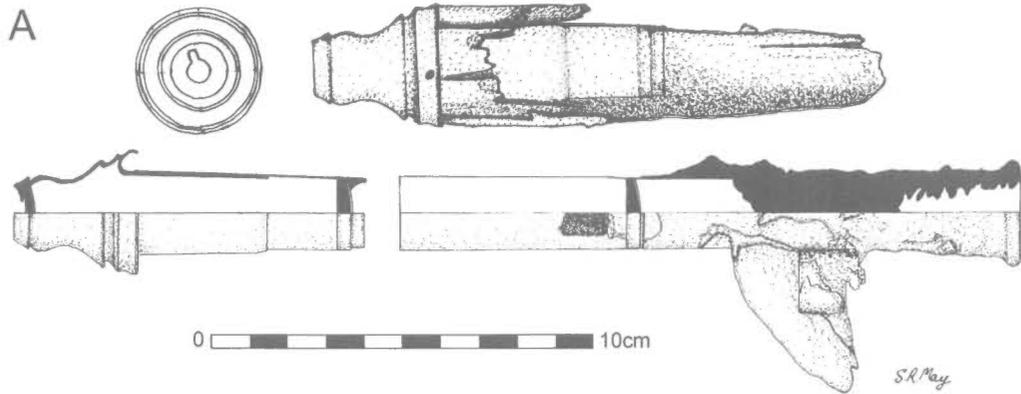


FIG. 93. A, drawing showing telescope with concretions, MA569; B, restored telescope.

Library of NSW (R. Coleman, pers. comm., 1999). Bligh's telescope is in a mahogany case and was made by Troughton, London.

MA4079: Pocket style brass telescope (cf. Neumann & Kravic, 1975: 259). Still in a concreted state. L. 166mm. Maximum diam. 58mm. Figure 94A, B shows the concretion and an X-ray revealing some internal detail.

**Dividers.** MA4115: Proximal fragment of a set of brass dividers. L. 15mm (Fig. 95).

**Quadrant Components.** MA1281: Incomplete brass octant. Proximal segments of both radial arms survive and proximal segment of index arm and index mirror. Radial arms were possibly made from mahogany. No markings observed (Fig. 96).

MA4082, 4144: Two octant index mirrors. Ground-edged squares of colourless glass. No mirrored surface remains. Diam. 25mm<sup>2</sup>. Th. 4mm (Fig. 97).

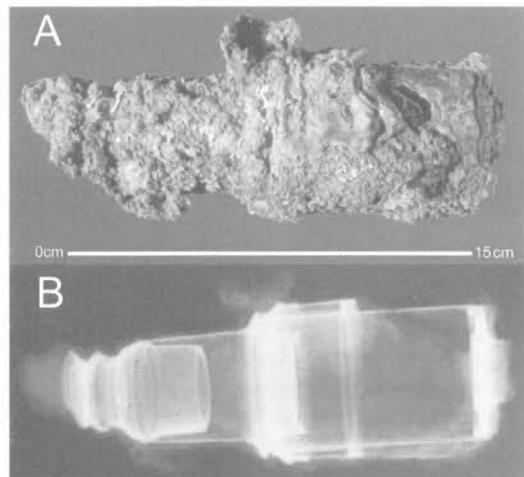


FIG. 94. A, concreted pocket-style telescope, MA4079; B, X-ray.

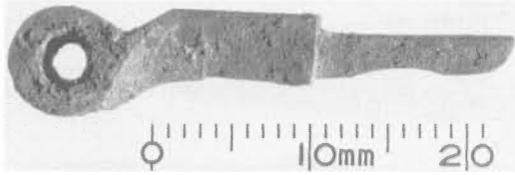


FIG. 95. Segment of a set of dividers, MA4115.

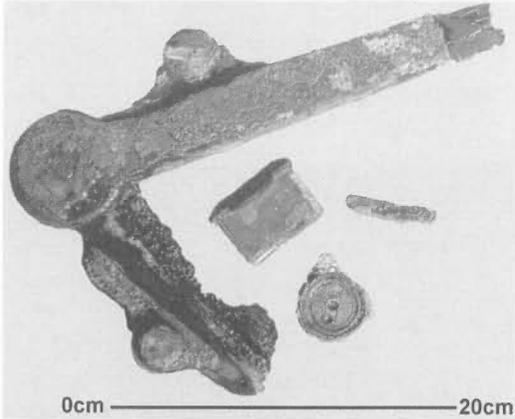


FIG. 96. Incomplete octant, MA1281.

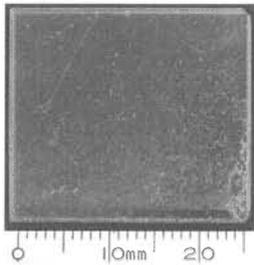


FIG. 97. Octant index mirror, MA4082.

MA4092: Brass attachment plate for the index or horizon mirror of an octant. Diam. 22mm. Ht. 13mm (Fig. 98).

**Sandglasses.** A variety of different sized sandglass ampoules and many fragments have been recovered (Table 11). The sandglass or hourglass consisted of two mouthblown globular ampoules joined at flanged lips by a narrow channel, sealed with wax or resin and secured by fine cord (L'Estrange & Turner, 1980: 15). They were supported by wooden frames.

Sandglasses were used to measure intervals of time before clocks were reliable (Jones & Smith, 1985: 107). Common measures of time included 60, 45, 30, 15 minute timer sets and 30 second

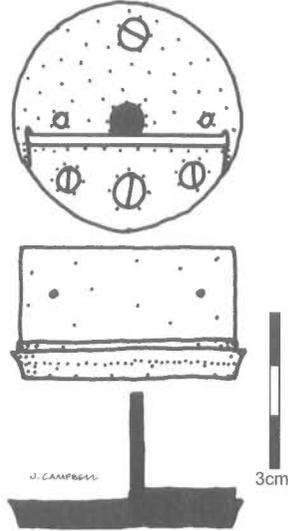


FIG. 98. Attachment plate for horizon or index mirror, MA4092.

sets. The length of time the contents took to empty from one ampoule into the other was determined by the diameter of the hole between the flasks and the grain size of the contents rather than the size of the ampoule (L'Estrange & Turner, 1980: 15).

No frames or parts of frames have been recovered. Ampoules excavated are made from fine, green-tinged or colourless, translucent glass. They have flanged lips, a globular shape, no shoulders and a conical push-up (Fig. 99).

#### TOOLS

**Axe.** MA573: Boarding axe. Wrought iron axe head (now cast) still attached to a fragment of a wooden handle. Commonly referred to as a British naval boarding axe (Neuman & Kravic, 1975: 25). Similar in shape to an ice pick with a narrow blade and a pointed poll. Axe head L. 220mm. Blade W. 85mm (Fig. 100).

**Handles.** MA1287: Wooden axe handle. Tapered at both ends. L. 200mm. Maximum W. 35mm.

MA1388: Wooden handle. Remains of a wrought iron strap running up the shank on both sides. Tapered shank, round in cross-section. L. 125mm. Shank diam. 25mm (Fig. 101A).

MA1588: Wooden handle possibly from a boarding axe. Remains of a wrought iron strap running up the shank on both sides. Tapered shank, round in cross-section, flattening into a

TABLE 11. Sandglass ampoules and fragments.

| Acc. No. | Comments  | Ht. (mm) | Body Diam. (mm) | Bore Diam. (mm) | Resting place Diam. (mm) | Lip Diam. (mm) |
|----------|---|----------|-----------------|-----------------|--------------------------|----------------|
| 554      | Base fragment   |          |                 |                 | 47                       |                |
| 743      | Base fragment   |          |                 |                 | 65                       |                |
| 1086     | Body fragment   |          |                 |                 |                          |                |
| 1112/1   | Intact ampoule (Fig. 99)  | 110      | 90              |                 | 55                       |                |
| 1112/2   | Intact ampoule  | 68       | 55              | 11              |                          |                |
| 1113/1   | Body & neck fragment  |          |                 | 7               |                          |                |
| 1113/2   | Base fragment   |          |                 |                 | 37                       |                |
| 1474     | Body fragment   |          |                 |                 |                          |                |
| 1499     | Neck fragment; green tinged   |          |                 | 8               |                          | 21             |
| 1548     | Ampoule fragment; includes base, part of body and neck              |          |                 | 11              | 63                       | 22             |
| 1591     | Intact ampoule  | 105      | 85              | 12              | 50                       |                |
| 1618     | Base fragment   |          |                 |                 | 55                       |                |
| 1695     | Base fragment; green-tinged glass; conical off-centre basal profile |          |                 |                 | 38                       |                |
| 1720     | Ampoule fragment; green-tinged; conical base                        |          |                 | 8               |                          | 28             |
| 4046     | Body fragment   |          |                 |                 |                          |                |
| 4057     | Intact ampoule  | 65       |                 |                 | 48                       |                |
| 4076/1   | Base fragment   |          |                 |                 | 68                       |                |
| 4076/2   | Base fragment   |          |                 |                 | 76                       |                |
| 4077     | Base fragment   |          |                 |                 | 102                      |                |
| 4078     | Neck fragment   |          |                 | 12              |                          | 33             |
| 4085     | Base fragment   |          |                 |                 |                          |                |
| 4086     | Base fragment   |          |                 |                 | 32                       |                |
| 4118     | Base fragment   |          |                 |                 | 52                       |                |
| 4126/1   | Base fragment   |          |                 |                 | 66                       |                |
| 4126/2   | Base fragment   |          |                 |                 | 42                       |                |
| 4126/3   | Body fragment   |          |                 |                 |                          |                |
| 4137     | Base fragment   |          |                 |                 | 56                       |                |
| 4149     | Body fragment   |          | 40              |                 |                          |                |
| 4150     | Base fragment   |          |                 |                 | 34                       |                |
| 4164     | Base fragment   |          |                 |                 |                          |                |

wedge shape at the head. Shank L. 150mm. Shank diam. 26mm (Fig. 101B).

MA4132: Wooden handle possibly from a table knife. Shank oval in cross-section. Shank L. 95mm. Shank diam. 14mm.



FIG. 99. Sandglass ampoule, MA1112/1.

MEDICAL/PHARMACEUTICAL TECHNOLOGY

**Syringe.** MA74: Ivory syringe with a wooden plunger. Three parts survive including: 1) a central cylinder (body); 2) a removable threaded disc at each end; and, 3) a plunger. The (ivory) plunger shaft was broken at the base of the thread where it joined the ivory knob. No needle was recovered. This type of syringe was not intended for subcutaneous injections but rather for aural, nasal and urethral use. The needle is missing but was possibly a rounded ivory component rather than a metallic one (Bennion, 1979: 169). Body L. 80mm. Plunger shaft. L. 91mm (Fig. 102).

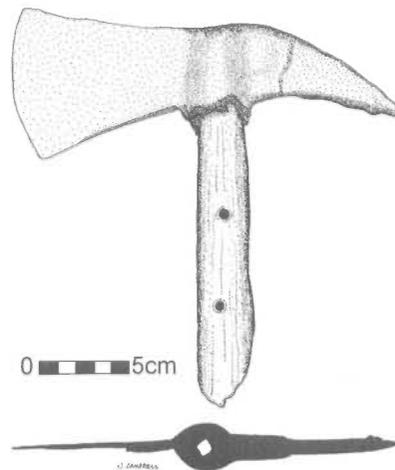


FIG. 100. Boarding axe, cast of head, MA573.



FIG. 101. Wooden handles; A, MA1388; B, MA1588.

**Mortar.** MA93: Marble mortar with four equidistant 'ears' spaced around the rim. One ear has a pouring groove on its upper surface. A deep-etched groove encircles the bowl, visually separating the body from the base. The pitted and scratched inner surface of the bowl suggests the action of a pestle. A pestle has not been recovered. Mortar Ht. 75mm. Base diam. 75mm. Rim O.D. 156mm (Fig. 103).

**Tourniquet Clamp.** MA102: 'Petit type' brass tourniquet clamp. This type of screw compressor was invented in France in 1718 and named after Jean-Louis Petit (Bennion, 1979: 179). Tourniquet clamps were a standard item in a naval surgeon's equipment chest during the second half of the 18th century and throughout the 19th century. Most frequently used to prevent blood loss during amputations. This clamp consists of a threaded screw and a winder in one part and two rectangular plates with extending flanges. The lower plate has two holes at each end. The upper plate has one hole at each end. These two plates are for threading a linen strap. No part of the strap survives. L. 80mm (Fig. 104).

The tourniquet clamp was found in association with other medical and pharmaceutical equipment, for example the syringe (MA74) and the marble mortar (MA93), in an area of the wrecksite known to correspond with the forward port cabin on the *Pandora's* lower deck. According to the Admiralty's establishments' (i.e. instructions regulating the allocation of spaces and cabins on board naval vessels), this cabin was assigned to a senior warrant officer

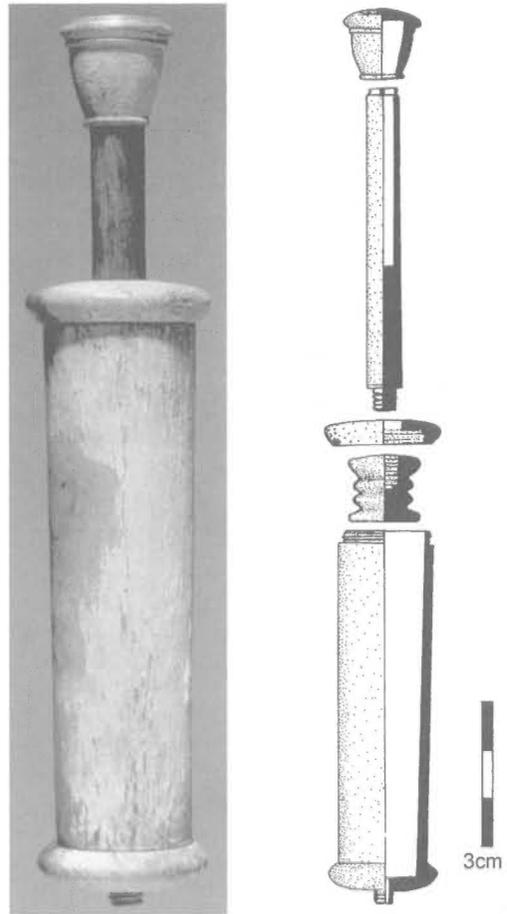


FIG. 102. Ivory syringe, MA74.



FIG. 103. Marble mortar, MA93.

TABLE 12. Three apothecary bottles. Made of colourless glass, square bodies with rounded corners, sloping shoulders, flat bases, short, cylindrical necks and flared lips.

| Acc. No. | Comments  | Ht. (mm) | Base Diam. (mm <sup>2</sup> ) | Rim O.D. (mm) | Bore Diam. (mm) | Neck Diam. (mm) |
|----------|---|----------|-------------------------------|---------------|-----------------|-----------------|
| 83       | Neck and shoulder broken; glass stopper in place        | 67       | 21                            | 27            |                 |                 |
| 1664     | Intact bottle (Fig. 105C).                              | 65       | 22                            | 22            |                 | 12              |
| 1765     | Intact bottle; black staining inside (not yet analysed) | 67       | 22                            |               | 20              | 14              |



FIG. 104. 'Petit type' tourniquet clamp, MA102.

(probably the surgeon). It is therefore likely that the clamp was part of the surgeon's equipment. Ironically, some years later the *Pandora's* surgeon, George Hamilton possibly required a

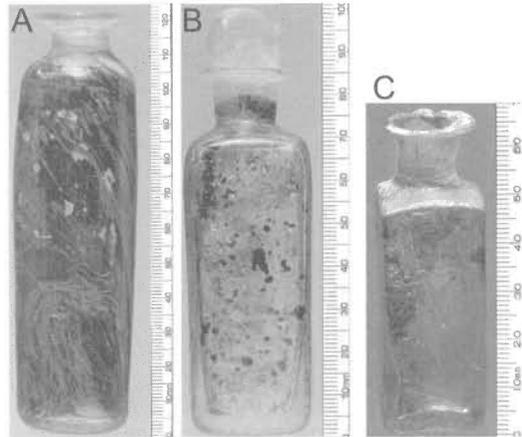


FIG. 105. A, glass bottle with cork stopper, MA49. B, glass bottle with glass stopper, MA132. C, glass bottle, MA1664.

similar clamp. He was badly wounded and had to have his left arm amputated in hostilities against the French Navy off Corsica in 1794.

**Apothecary Containers.** An assortment of medicine containers has been excavated including vials and bottles in a variety of colours and shapes, described below. Table 12 describes three similar apothecary bottles.

MA49: Intact bottle with cork stopper in place. Made of colourless glass, this bottle consists of a cylindrical body tapering slightly at either end, a short, narrow neck and wide lips. A black residue staining the inside of the bottle could only be identified as an organic material (Queensland Government Chemical Laboratory, 1984). The cork stopper is cylindrical with a flat top. Ht. 120mm. Base diam. 31mm. Neck diam. 12mm. Body diam. 12mm (Fig. 105A).

MA91, MA107: Bottle fragments from two similar containers. (1) (MA91) Lip and part of neck only. (2) (MA107) Base only. This type of bottle is wide-mouthed with a square body, rudimentary neck and pronounced curved lips. Made from pale green glass, the wide lips of these jars were possibly covered in parchment paper

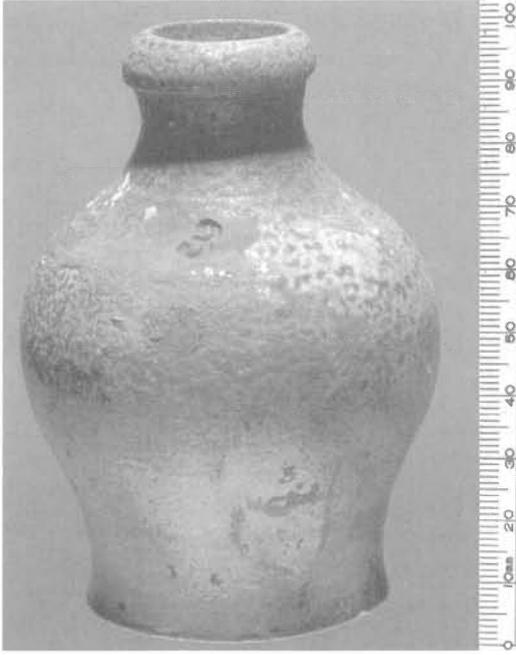


FIG. 106. Stoneware pot, MA4016.

fastened with string. Some intact examples are housed at the Semmelweis Museum of Medical History, Budapest (Antall, 1981: plate 67). Bottle base 88mm<sup>2</sup>.

MA132: Intact bottle with glass stopper in place. Made of colourless glass, this bottle has a square body with rounded corners, a short neck and wide flat lips. The glass stopper is flat and oblong with a ground shank. The dark brown residue coating the inside was identified as clove oil and is still pungent (Queensland Government Chemical Laboratory, 1984). Ht. 109mm. Base 25mm<sup>2</sup>. Neck diam. 13mm. Bore diam. 11mm. Lip diam. 22mm (Fig. 105B).

MA4016: Small stoneware pot with a brown salt glaze. The pot was wheel thrown and has a bulbous belly, flat base, narrow neck and a thick pronounced lips. It still contains mercury. An apothecary's measure '3' is impressed into the surface of the belly. No other surface markings. Ht. 90mm. Lip diam. 29mm. Bore diam. 21mm (Fig. 106).

#### FISHING TECHNOLOGY

Three similar groups of lead objects possibly associated with fishing technology have been classified below by form. They include cast lead weights, flattened lead rolls and cylindrical lead

rolls. It is thought they were used as weights for fishing nets or net lines.

**Cast Lead Weights.** Sixty-one similar sized cast lead cylinders (listed below). Cast in halves then joined lengthways with tin solder. Cylinder L. 41mm. Bore diam. 17mm. Wall Th. 5mm. Wt. 137g (5oz). Some accession numbers represent more than one cylinder.

MA577, 630, 654, 666, 685, 692, 701, 702, 703, 710, 756 (Fig. 107), 1124, 1136, 1140, 1153, 1154, 1155, 1194, 1259, 1302, 1303, 1322, 1447, 1448, 1539, 1662, 1771.

**Flattened Lead Rolls.** Ten flattened lead rolls (listed below). Cut from sheet lead then rolled and flattened. One side just overlaps the other so, unlike the cast lead weights, there is no soldered join. They vary in size and the extent of their flattening. The sheet thickness in all cases is 3mm. Average weight is 58g (2oz). Although they are thought to be associated with fishing nets, it is possible the rolls were used for trading purposes. Archival information from other British 18th century Pacific voyages suggests they may have been used to acquire much needed fresh water and provisions (see below under cylindrical rolls).

MA609, 105312 (Fig. 108); MA1245/1, 105316; MA1245/2, 105318, MA1245/3, 70322; MA1361, 75320; MA1401, 103320; MA1488, 94320; MA1773/1, 84319, MA1773/2, 82320; MA1773/3, 84321; MA1773/4, 79319. All measurements are in mm, L.3W.

**Cylindrical Lead Rolls.** Seven cylindrical lead rolls (listed below). Made from sheet lead, they have been rolled several times but not flattened. The shape is the same in all cases but dimensions



FIG. 107. Four cast lead cylinders, MA756.

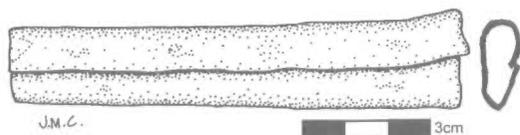


FIG. 108. Flattened lead roll, MA609.

vary. Lead sheet thickness is 2mm. They may have had alternative uses to fishing. It is possible that they were off-cuts from larger sheets of lead, which were kept to be used for patching or other miscellaneous purposes and were rolled for storage. Alternatively they may have been used for trading purposes to obtain fresh provisions and water during the *Pandora's* months in Polynesia. The latter is suggested by a letter to Sir Joseph Banks written on 4th April 1790 by Archibald Menzies, who accompanied George Vancouver's 1791 voyage to the north west coast of America, listing trading articles such as tin sheets (ML microfilms, Banks' papers FM4 23).

MA644, 120 × 45 (Fig. 109); MA733, 112 × 38; MA1139, 140 × 38; MA1209, 80 × 35; MA1228, 125 × 37; MA1290, 80 × 35; MA1291, 117 × 39. All measurements in mm, L. × W.

**Fishing Floats.** Six wooden blocks of similar form (Table 13). These blocks are roughly square with rounded corners. All have a slightly off-centre circular opening. The timber has not been identified but appears to be a softwood. They were possibly used as floats for fishing nets.

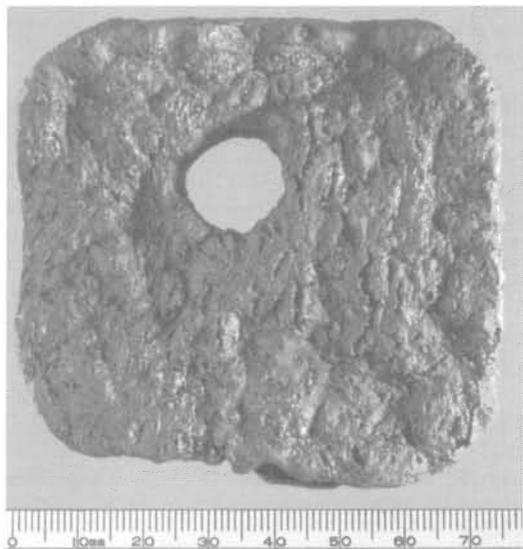


FIG. 110. Wooden fishing float, MA1743.

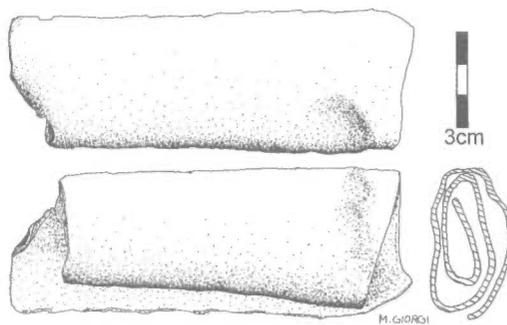


FIG. 109. Cylindrical lead roll, MA644.

### WRITING AND DRAWING

**Ink wells and Sanders.** MA1665: Intact sander, also known as a shaker. Made of colourless glass (Fig. 111A). Square bodied with flat chamfers, faceted shoulders and a flat base with pontil (B, B<sup>1</sup>). A copper alloy screw-top lid (C, C<sup>1</sup>) encases a copper alloy perforated cup (D). The screw top has three prongs extending down the inside. Used from the 17th century until 1870 when blotting paper was finally accepted as a replacement. Possibly part of a matching set from a lap desk or a travelling writing case (cf. Colvill, 1971: 402). Ht. 23mm. Base 36mm<sup>2</sup>. Bore diam. 22mm. Lip diam. 25mm. Lid diam. 30mm. Lid D. 9mm. Cup diam. 20mm. Cup D. 11mm.

MA1729: Sander or inkwell. Made of colourless glass. Lid is missing. It is square bodied with flat chamfers, faceted shoulders and a flat base with a pontil. Similar shape to MA1665 (above). Possibly part of a matching set from a wooden lap desk (cf. Covill, 1971: 402). Ht. 25mm. Base 41mm<sup>2</sup>. Bore diam. 22mm. Lip diam. 24mm.

MA4050: Inkwell. Made of colourless glass. Lid is missing. It is flat based with a conical body tapering inwards to a short cylindrical neck with flared lips. Black residue on inside surface as yet unanalysed. Ht. 54mm. Base diam. 43mm. O.D. lips 19mm. Bore diam. 10mm (Fig. 112).

TABLE 13. Wooden fishing floats.

| Acc. No.        | Sides (mm) | Depth (mm) | Opening Diam. (mm) |
|-----------------|------------|------------|--------------------|
| 1547            | 80 x 70    | 6          | 14                 |
| 1549            | 902        | 18         | 15                 |
| 1743 (Fig. 110) | 702        | 11         | 16                 |
| 1745            | 80 x 70    | 20         | 15                 |
| 4083            | 98 x 78    | 12         | 15                 |
| 4133            | 100 x 98   | 35         | 18                 |

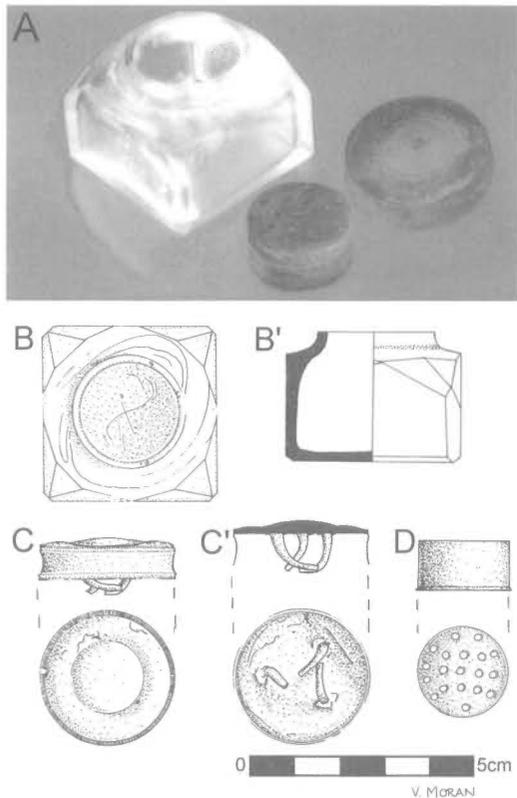


FIG. 111. Sand shaker, MA1665.

**Instrument Case (Etui).** MA71: Brass container consisting of a case with a cap and a glass vial inside. The case contains a metal plate inserted just below the upper rim. This plate has three openings. The central opening is aligned with the mouth of a glass vial. The remaining two openings, on either side of the central opening were intended to receive instruments or implements, for example quills or lancets, but were empty when excavated. The cap slides over the case with a friction fit. It was found associated with medical and pharmaceutical implements and has therefore been attributed to the *Pandora's* surgeon, George Hamilton.

The ovoid end plate of the case has two rows of (letter) markings cut into the surface. The top line is a single letter 'I' or 'L'. The bottom line contains an 'M' (or 'H') and the letters 'Y C C C K'. The meaning of these marks has not been deciphered. It is thought they are the maker's initials (Y K) and perhaps a serial number (Roman CCC indicating the number 300). It has

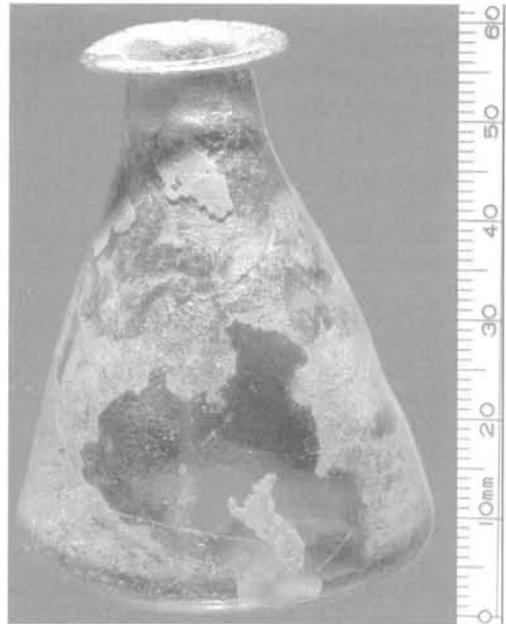


FIG. 112. Inkwell, MA4050.

also been suggested that the letters may be Cyrillic. Case L. 121mm. Case W. 31mm.

The vial is made of pale green glass. It has a rectangular body with rounded corners and a short, cylindrical neck with a flush rim and a cork in situ. There was no trace of contents. This case may have held writing implements and an ink container. Alternatively it may have been used to keep surgical instruments or toiletry items. Vial Ht. 58mm. Bore diam. 9mm (Fig. 113A, B & C).

**Pencil.** MA81: Sliding pencil. Made from wood and graphite. The pencil consists of a cylindrical shaft in two parts, fitting together through an internal groove running the length of the shaft to hold the graphite in position. The groove is dovetailed to accept the corresponding joint. The graphite is square-sectioned and shows use-wear (used for writing). The pencil worked mechanically as a result of the lead protruding beyond the end of the wooden top. Pencil L. 176mm. Shaft diam. 7mm (Fig. 114).

A sliding pencil design was patented in December 1783 by Jonas Jonas, a London pencil maker who had the only patent pertaining to lead pencils during the period 1744 to 1790. The *Pandora* pencil has similarities to the Jonas patent although it is simpler in design. It is possible that this pencil reflects a simplification on that patent design (Coleman, 1999a: 9).

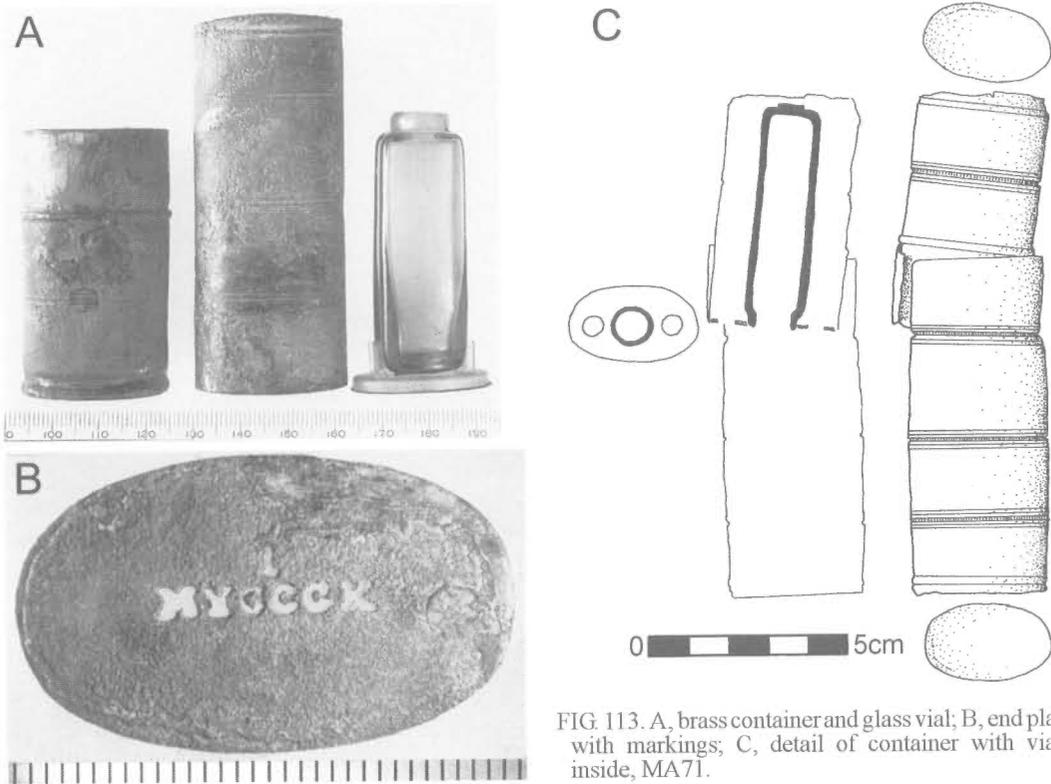


FIG. 113. A, brass container and glass vial; B, end plate with markings; C, detail of container with vial inside, MA71.

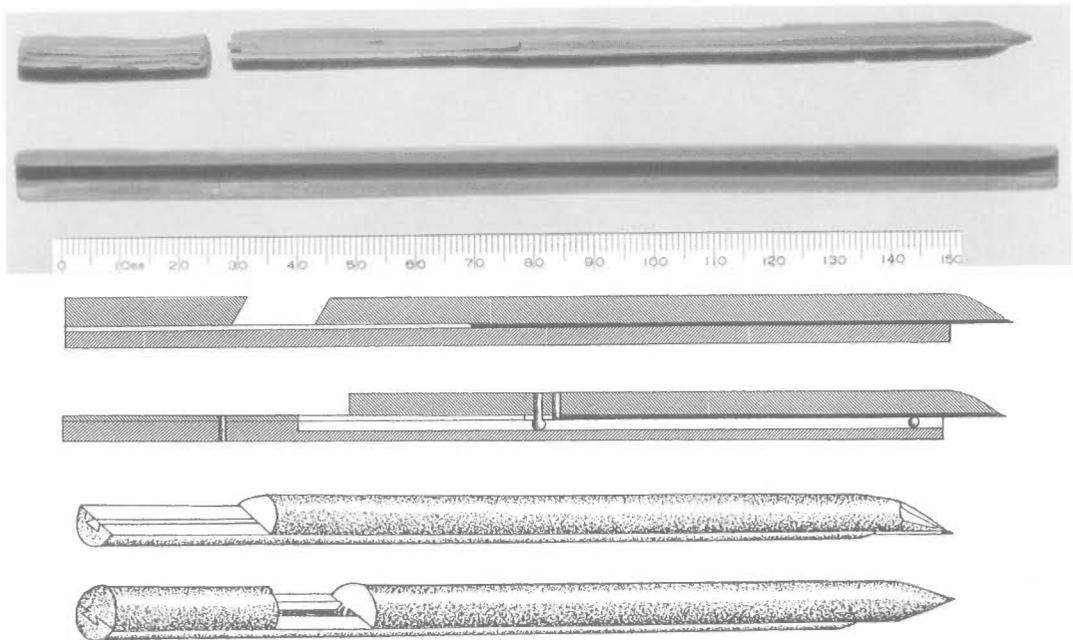


FIG. 114. Sliding pencil, MA81.

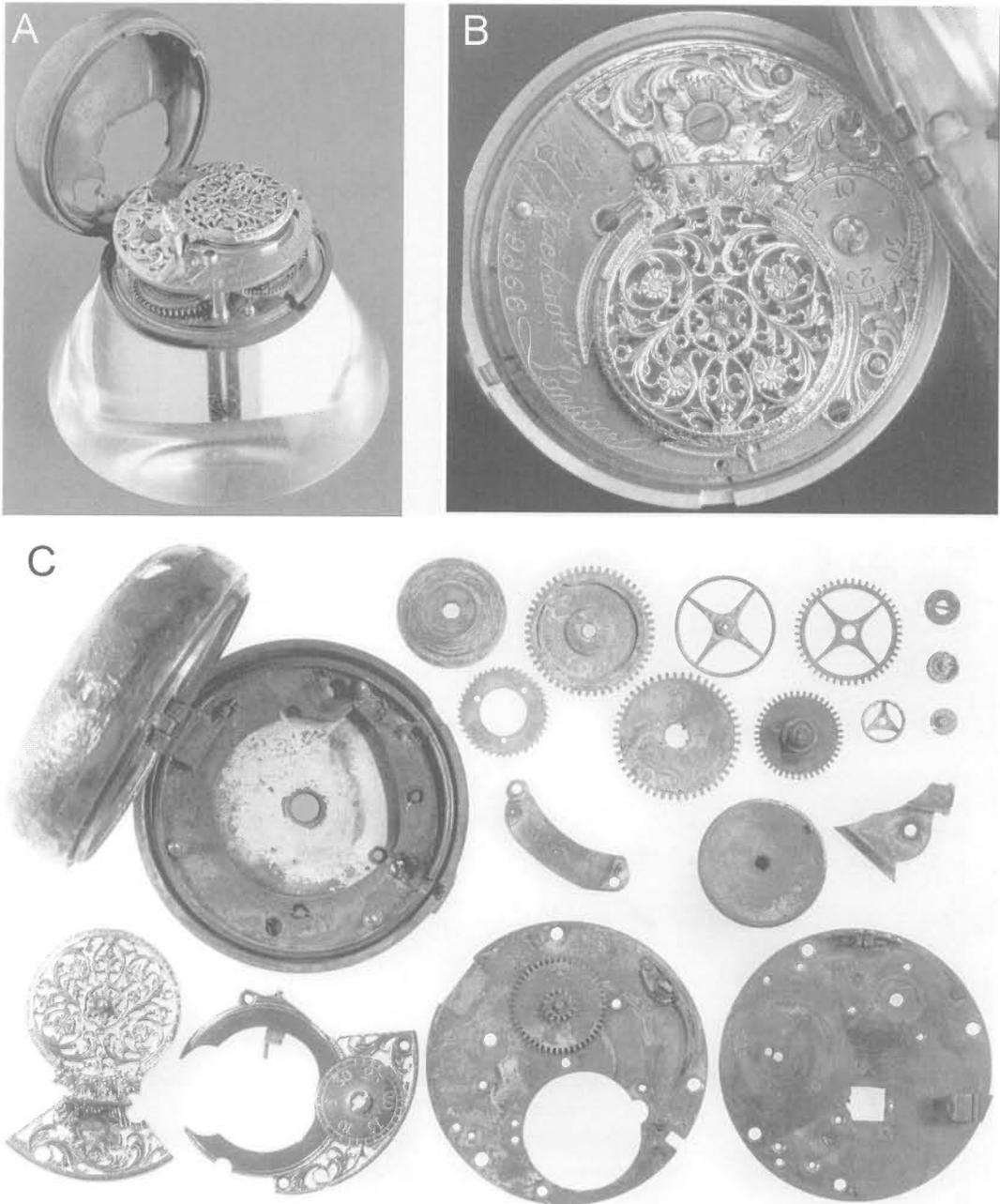


FIG. 115. Pocket watch, MA110; A, restored watch; B, makers signature 'J & J Jackson, London'; C, movement components during conservation treatment.

#### TIME KEEPING

*Pocket Watch.* MA110: Silver pair-cased pocket watch. Signed 'J & J Jackson, London' and

numbered '9866' with a 1786 hallmark. While the outer case was too corroded to restore, impressions of hallmarks (a king's head, a lion and a heart shape) were discerned within the layer of

corrosion products. Also an impression of the casemaker's initials 'J R' (James Richards). The casemaker's initials are also discernible on the inner case. The inner case was found to be largely intact, with a bezel on which a domed glass cover was hinged. The dial is of white enamel. The dial markings are no longer apparent due to corrosion. A substantial part of the movement was found to be intact, however the arbors, pinions, balance, balance spring and verge staff have corroded completely (Carpenter, 1985: 563). Case diam. 56mm. Case Th. 26mm.

The watch has been attributed to the *Pandora's* surgeon, George Hamilton as it was found in association with medical implements and in a section of the shipwreck thought to be the surgeon's cabin. Conserved and restored by the Western Australian Maritime Museum (Fig. 115).

## DOMESTIC EQUIPMENT

### FOOD AND DRINK (CONSUMPTION AND STORAGE)

#### BLUE AND WHITE EARTHENWARE

MA1276: Teabowl fragment. Segment of a rim. Hand painted in underglaze blue. A chinoiserie pattern on one surface and a repetitive floral design on the other. 70 × 65mm (Fig. 116A).

MA1470: Teabowl. Largely intact with part of the rim missing. Transfer printed in underglaze blue. Chinoiserie house and pagoda motifs on the well and on the outside of the bowl. The rim border consists of a continuous band of geometric, floral and star motifs. No maker's mark. Foot rim diam. 38mm. Bowl diam. 80mm (Fig. 116B, C).

MA1511: Saucer fragment. Transfer printed in underglaze blue on the face of the saucer only. A chinoiserie design depicting a pagoda, houses, trees in blossom and a sampan. The rim border consists of geometric, butterfly and floral motifs as well as an upper frame in a fishroe pattern. No maker's mark. Saucer diam. 123mm. Saucer D. 28mm. Foot rim diam. 67mm (Fig. 117).

MA1622: Saucer. Chipped rim, but otherwise intact. Transfer printed in underglaze blue on the face of the saucer only. A Chinoiserie design depicting a pagoda, houses and trees in blossom and a sampan. The border consists of geometric, butterfly and floral motifs as well as an upper frame in a fishroe pattern. No maker's mark. Saucer diam. 125mm. Saucer D. 33mm. Single foot rim 72mm (Fig. 118).

MA1673: Saucer fragment. Segment of a rim. Transfer printed in underglaze blue. Repetitive geometric and floral motifs on both surfaces. 80 × 32mm.

MA3003: Saucer. Heavily chipped rim. Transfer printed in underglaze blue on the face of the saucer only. The well depicts either a couple with a child in a cradle, or sharing fruit from a basket, sitting under a tree in a rural landscape. Whatever the moral intended, the couple's appearance, dress and the buildings in the background reveal a European setting. This indicates that European features in transfer printed designs may be an earlier development than suggested. Blue and white transfer printed earthenware is commonly thought to have commenced in the transitional period (1800-1815) (Coysh & Henrywood, 1982: 9). The well is bordered by two bands of diamond patterning separated by a filigree-like motif. No maker's mark. Saucer diam. 110mm. Single foot rim diam. 74mm (Fig. 119).

MA3005: Saucer. Hand painted in underglaze blue on the face of the saucer only. Chinoiserie design depicting a teahouse or pavilion in a lakeside or riverine setting with reeds and a single willow tree. There is evidence of gilt enrichment which is almost entirely worn off. An 'S' is painted onto the base. The design is typical of the Caughley chinoiseries, of which ten at least were variations on the perennial theme of islands, pagodas and willow trees (cf. Watney, 1973: 120). The Caughley works were owned and operated by Thomas Turner, who also operated a London warehouse called the 'Salopian China Warehouse'. Thus, Caughley wares are often referred to as 'Salopian' (Litchfield, 1971: 54-6). Saucer diam. 164mm. Ht. 38mm. Single foot rim diam. 90mm (Fig. 120).

#### CREAMWARE

**Royal Pattern.** A number of items from a dinner service design known as Royal Pattern. The Royal Pattern design was distinguished by the rim style. The design was first listed in the Leeds Pottery Pattern Book in 1783. It has been suggested that this pattern was created at the request of George III (Hume, 1985: 125). Alternatively it is possible that the manufacturers created the name Royal Pattern to make the design more marketable (B. Rooke, pers. comm., 1995).

Royal pattern dinner plates, soup plates and bread and butter plates have been recovered. Both footed bases and flat bases are represented. Several pieces are marked with a stamped 'X', 'I'

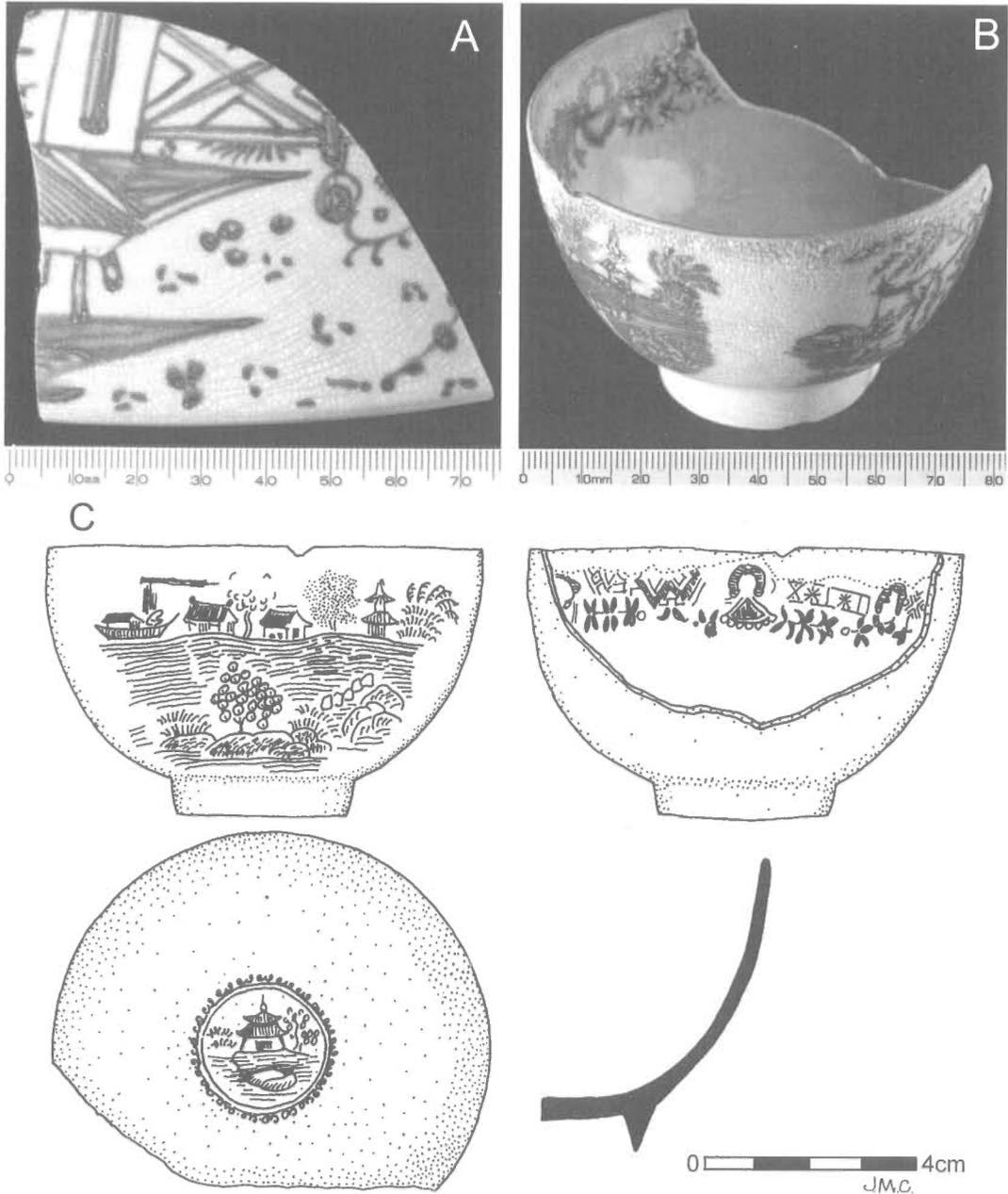


FIG. 116. A, blue and white teabowl fragment, MA1276; B, C, blue and white teabowl, MA1470.

or 'H'. These are the only maker's marks encountered to date.

Some of the examples recovered from the shipwreck have a letter (either a 'C' or a 'W') crudely scratched into the base. The 'C' was

initially interpreted as an indication that they were the property of the *Pandora's* second lieutenant, Robert Corner. There was some justification for this interpretation because the first examples were found in an area in the wreck thought to correspond with the aft starboard



FIG. 117. Blue and white saucer, MA1511.

cabin, assigned by standing Admiralty orders (the establishments) to one of the commissioned officers. However, upon recovery of creamware with a scratched 'W' during a later expedition (Fig. 121), from the same grid square, it was obvious that another interpretation should be sought as none of the *Pandora's* officers' or midshipmen's names corresponded. It was subsequently suggested that in the 18th century Royal Navy crockery may have been purchased collectively by the officers prior to the commencement of voyages for use in the Great Cabin (the captain's cabin) or for use in the ward room.

If this practice was followed on the *Pandora*, then the crockery intended for use in the Great

Cabin could possibly have been marked with a 'C' and the ward room crockery possibly marked with a 'W'. The marks would have been scratched on by the steward as an aid to help him identify the right dinner set (Fallowfield, pers.comm. 1993). This suggestion can be further supported by taking into account that none of the *Pandora* officers or midshipmen's surnames started with a 'W'. Alternatively, the 'W' can be read as an 'M', in which case it may be an indication that the crockery was the property of midshipman Richard Matson (Fig. 127).

**Dinner plates.** The plates conform to a traditional dinner plate shape with the standard Royal Pattern rim. The plate diameters are approximately



FIG. 118. Blue and white saucer, MA1622.

245mm while the base diameters are approximately 130mm. Two different styles of base have been identified: footed and flat. Some have maker's marks or owner's marks on the underside.

MA40: Segment of a rim and base.

MA751: Section of a flat base. Random scratch marks on the well possibly due to the action of cutlery.

MA1469: Section of a rim and flat base.

MA1564: Intact plate with flat base. 'C' crudely scratched into the base (Fig. 122).

MA1572: Largely intact plate with a section of a rim missing. Footed base with a crudely scratched 'C'.

MA4022: Section of a rim.



FIG. 119. Blue and white saucer, MA3003.



FIG. 120. Blue and white saucer, MA3005.

MA4029: Largely intact plate with a section of the rim missing. Flat base. Random scratch marks on the well possibly due to use-wear.

MA4064: Rim fragment. L. 190mm. W. 40mm.

MA4106: Section of a flat base with a crudely scratched 'C'.

MA4167: Intact plate. 'C' scratched into the base.

**Soup Plates.** Royal Pattern soup plates are similar to the dinner plate but have a deeper well.

The diameters are approximately 243mm and widths are 30mm. D. 30mm. Both examples recovered so far have a footed base.

MA1091: Rim fragment. 94 × 33mm.

MA1312: Largely intact. Section of rim missing. 'I' stamped into base (Fig. 123).

MA1482: Largely intact. 'C' crudely scratched into the base (Fig. 124).

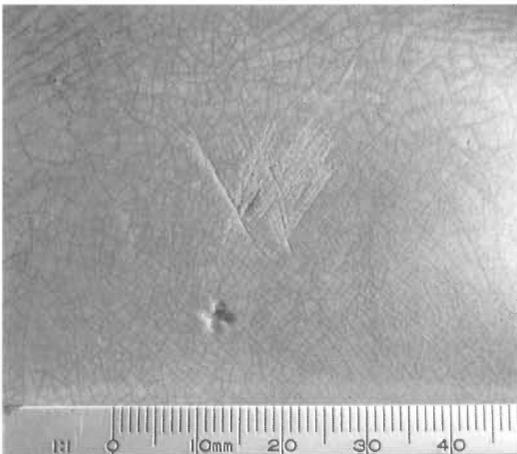


FIG. 121. Royal pattern dinner plate with a stamped 'x' and a scratched 'W' on the base.

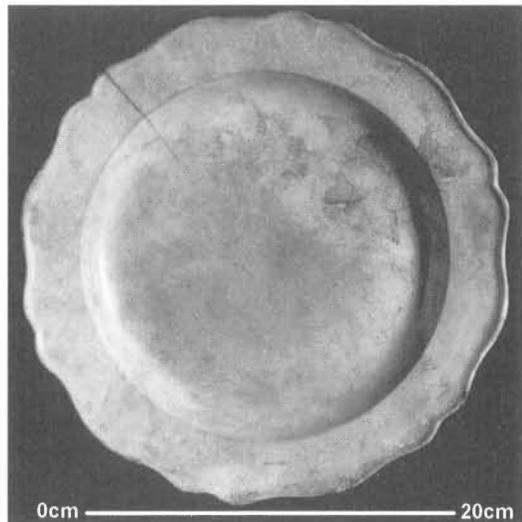


FIG. 122. Royal pattern dinner plate, MA1564.

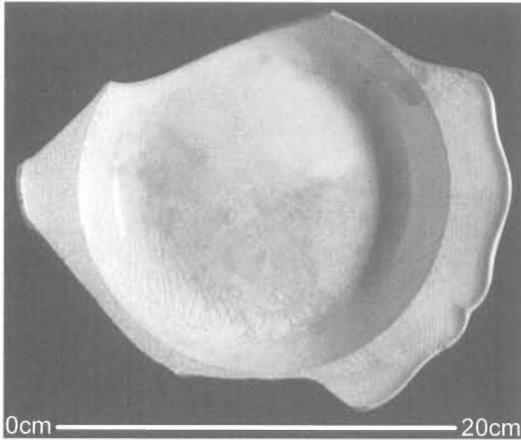


FIG. 123. Royal pattern soup plate, MA1312.

MA4139: Several sections of the rim missing. 'I' stamped into base (Fig. 125A, B).

**Bread and Butter Plates.** Bread and butter plates from the same table service design are listed below. The plates resemble in form the Royal Pattern dinner plate but on a smaller scale. Overall diameter approximately 200mm. Base diameters are approximately 145mm.

MA1354: Section of a flat base with a stamped 'H' (Fig. 126A, B).

MA4030: 'W' or 'M' crudely scratched into a footed base (Fig. 127).

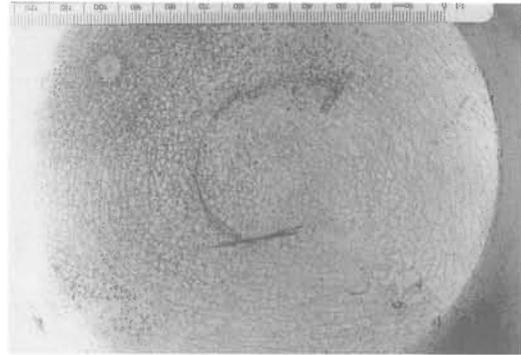


FIG. 124. Royal pattern soup plate with a scratched 'c' on the base, MA1482.

Royal Pattern creamware fragments: MA135, 555, 607, 689, 711, 1090, 1191, 1220, 1279, 1285, 1292, 1295, 1337, 1363, 1398, 1433, 1446, 1455, 1467, 1479, 1568, 1617, 1649, 1667, 1775, 4031, 4047, 4081, 4087, 4105, 4107, 4183.

**Other Creamware (excluding Royal Pattern).**

MA750: Bowl fragment. Segment of a pronounced curved rim and body. Glazed on both surfaces. 125 × 90mm (Fig. 128).

MA1072: Vase-like container. Broken at the neck. Globular body with a narrowing neck and a squat cylindrical pedestal base with a flat, indented basal profile. No decoration or marks. No handles. Possibly used as a carafe. Ht.

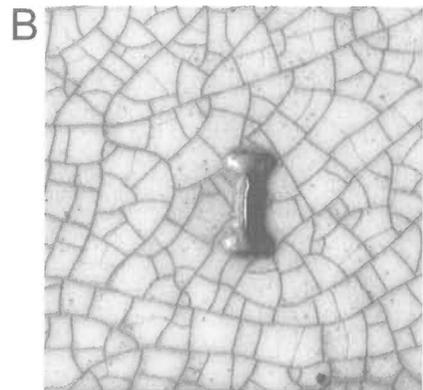
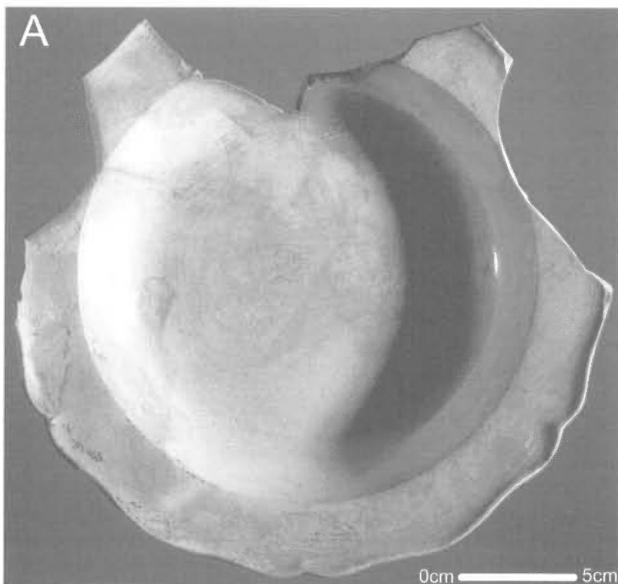


FIG. 125. A, Royal pattern soup plate with a stamped 'I' on the base, MA4139; B, detail of stamped 'I'.

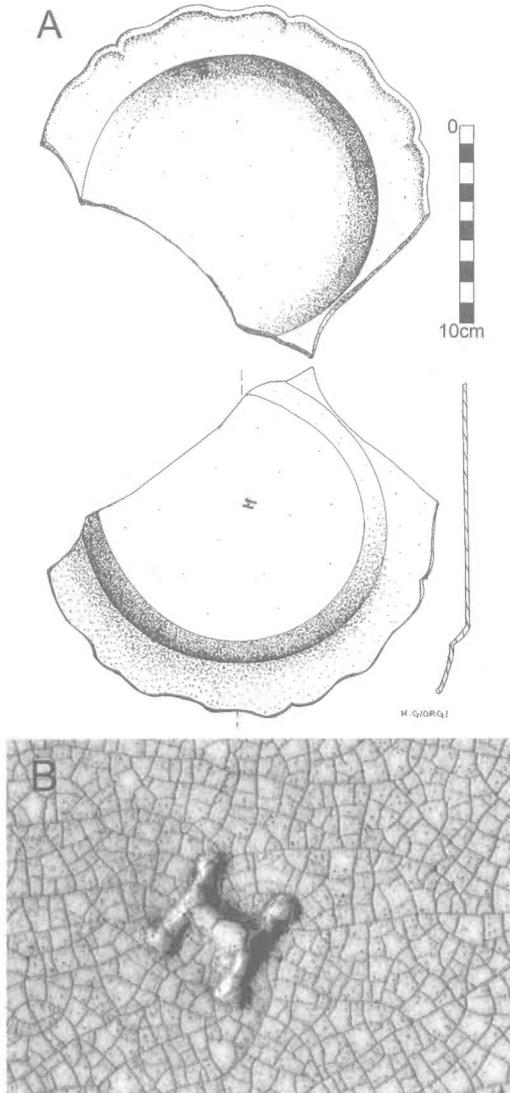


FIG. 126. Royal pattern bread & butter plate with a stamped 'H' on the base, MA1354; B, detail of stamped 'H'.

240mm. Maximum body diam. 140mm. Base diam. 98mm. (Fig. 129).

MA1187: Container fragment. 90 × 38mm.

MA1227: Platter fragment. Segment of rim and body. Plain, flat rim with no decoration. Random scratches on the well of the platter possibly indicate use-wear. 125 × 40mm.

MA1231: Platter fragment. Random scratches on well possibly indicate use-wear. 165 × 75mm.



FIG. 127. Incomplete royal pattern bread & butter plate with a scratched 'w' on the base, MA4030.

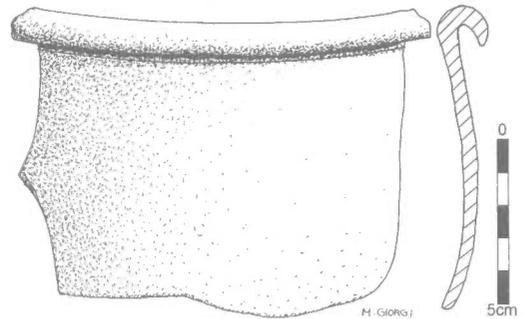


FIG. 128. Creamware bowl fragment, MA750.

MA1242: Platter. Several fragments of the rim are missing. Elliptical shape with a flat plain rim and flat base. Random scratches on well of platter possibly indicate use-wear. 'C' crudely scratched onto the base. L. 358mm. W. 291mm (Fig. 130).

MA1313: Container fragment. Segment of a flat base. No decoration. 85 × 40mm.

MA1426: Plate fragment. Segment of a rim. No decoration. Rim W. 22mm.

MA1502: Bowl fragment. Pronounced curved rim. No decoration. 175 × 90mm.

MA1534: Bowl fragment. Pronounced curved rim. No decoration.

MA1537: Plate fragment. Segment of a plain rim. No decoration. 65 × 50mm.

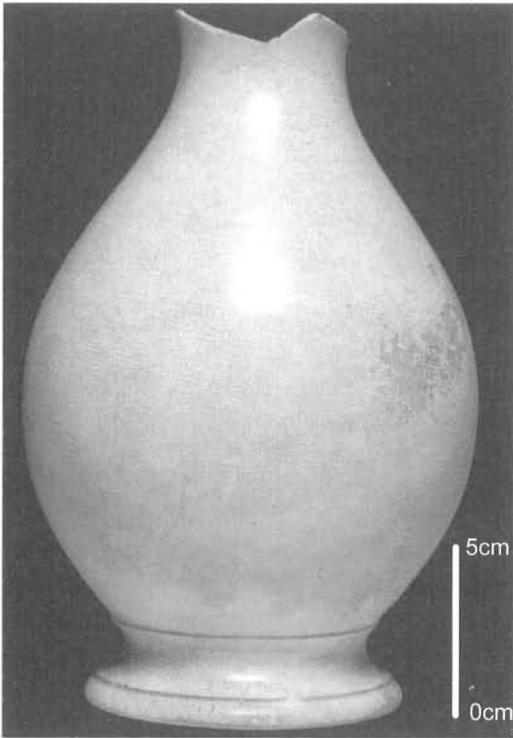


FIG. 129. Vase-like container, MA1072.

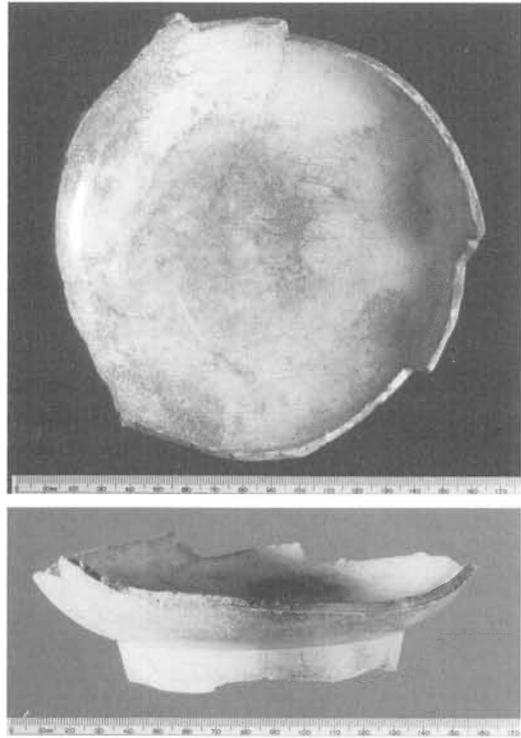


FIG. 131. Creamware bowl base fragment, MA4013.

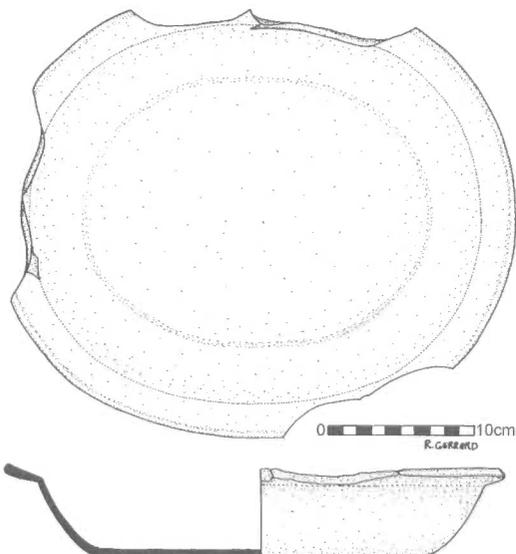


FIG. 130. Incomplete creamware platter, MA1242.

MA1649: Container fragment. Pronounced curved rim.

MA4013: Bowl fragment. Segment of a base and body. W. 155mm. Pedestal base diam. 95mm (Fig. 131).

MA4022: Bowl fragment. Segment of a footed base. 55 × 33mm.

MA4033: Bowl fragment. Part of a plain rim. 72 × 47mm.

***Creamware Jars.*** MA1429: Jar with a cylindrical body, a flat base and a slight inward taper towards a prominent rolled rim. Possibly used as a container for jams or preserved fruits, for example, prunes or cherries (Genet, et al., 1974: 209). Ht. 86mm. Base diam. 82mm (Fig. 132).

MA1625: Jar with a cylindrical body, a flat base and a prominent rolled rim. No inward taper. Segment of the rim missing. Possibly used as a container for jam or preserved fruits (Genet, et al., 1974: 209). Ht. 92mm. Base diam. 90mm (Fig. 133).

MA4168: Jar fragment. Cylindrical body and rolled rim or lip. 90 × 72mm.



FIG. 132. Incomplete creamware jar, MA1429.

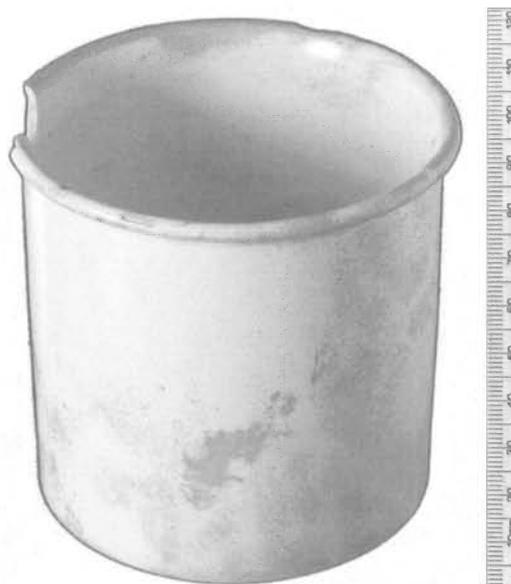


FIG. 133. Creamware jar, MA1625.

#### SLIPWARE

MA1728: Drinking mug with looped handle. Bulbous body and footed base. Red bodied clay coated with clear lead glaze on all surfaces except the base. A white pipeclay underglaze decoration on the body consists of two wavy lines. A scratched well indicates use-wear, possibly the stirring action of a metal spoon. Ht. 76mm. Base diam. 50mm. Rim diam. 73mm (Fig. 134). A similarly shaped mug appears in one of Lt Gabriel Bray's drawings of life on board HMS *Pallas* during a voyage to West Africa in 1774 (cf. Quarm, 1995: 39).

#### WHITE GLAZED EARTHENWARE

MA252: Bowl fragment with blue stripe on rim. 100 × 62mm (Fig. 135).

MA1300: Bowl fragment with blue stripe on rim. 135 × 60mm.

#### EARTHENWARE POTS

A number of intact, wheel-thrown earthenware pots and pot fragments are listed. These pots are all similar in form but display individual size variations. They are lead glazed on all surfaces with a variety of colour tones from amber to dark brown. The colour of the clay (known from the many fragments) varies from a deep brick red to a light orange. A small percentage are matt finished. The smaller pots are generally squat

with a round body in cross-section slightly tapering inwards towards the base. The larger pots do not taper. All pots have a flat base with diameters varying from 70mm to 80mm. They have sloping shoulders and a short narrow necks which widen out into a downward sloping rim. Rim diameters are on average 35mm. Heights are from 100mm to 140mm. The liquid capacity varies from approximately 290ml to 450ml. Most jars and pots are without surface decoration. One pot appears to have thumb nail imprints which is possibly an attempt at decoration. The variations are most apparent in the overall size of the pots and the height of the neck ranging from 2mm to 9mm (average neck height being 5mm).

During the 1997 *Pandora* field expedition, two pots were retrieved with their corks in situ. In November 1998, the contents of one of these pots was removed and examined. An unidentified, faintly resinous odour escaped the jar. The contents were a pale yellow liquid, a hardened brown coloured material and a thick sludge filling the bottom of the pot. These have not been chemically analysed. Subsequent excavation of the *Pandora* has continued to produce similar earthenware pots including several more with corks in situ.

Captain Edwards' log recorded 380 pots of spruce essence taken on board the *Pandora* in September 1790 (Adm. MS 180 Naval Historical



FIG. 134. Drinking mug, MA1728.

Library). This suggests the probable use for this large collection of earthenware pots (Fig. 136).

Essence of spruce was used in the brewing of spruce beer, a common anti-scorbutic beverage for British servicemen in the late 18th century (Farmer & Farmer, 1989: 50). Also referred to as Polish or Prussian beer, the name spruce beer is not necessarily indicative of the fact that the bark, leaves or shoots of spruce trees were the main ingredients. Possibly the name derives from a practice originating in Prussia (or 'Pruce'), where a cheap beer was brewed made from the bark and shoots (the German 'sproess') of evergreen trees (Kendrick, 1989: 4). The practice of boiling 'spruce' was well established on 18th century Pacific voyages. For example, on Cook's second and third voyages mention is made of the collection and boiling of spruce ashore by some of the *Resolution's* crew at Dusky Bay (Hoare, 1982: 265) and Ship Cove (Queen Charlotte Sound) respectively, in New Zealand (Holmes, 1982: 24).

An advertisement in the *London Daily Universal Register* (13th April 1785) gives some details about the trade in, and distribution of spruce essence pots.

Thomas Bridge, the Patentee, takes the liberty to inform the Public that he has lately landed a Quantity of fine fresh Essence, with which, as well as the beer made therefrom, they may be supplied at short notice, and most reasonable terms. The Patentee, finding that various frauds have been practiced in the sale of the essence ... that several Persons have, and are now selling, a spurious as well as a damaged essence, with which they have imposed on the Public, not only in quality, but Price, he therefore begs the Public to take notice, that the True Essence of Spruce is now only to

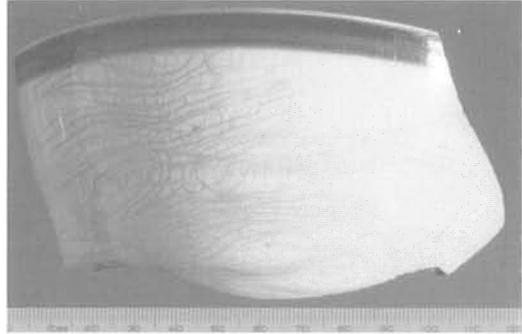


FIG. 135. White bowl rim with blue stripe, MA252.

be had of the Patentee THOS BRIDGE, No 21 Bread Street, London; and by his Appointment of Mr John Burgess, Oilman, No 107, in the Strand; Mr John Richmond, Richmond Street, Leicester Fields; Mr John Lamb, in Bond street and no where else in London, in Pots, at 3s. 6d, 5s and 9s and that each Label will have the name Thomas Bridge, wrote thereon with his own Hand.

No research has been conducted to determine who supplied the Victualling Board with the essence of spruce pots taken on board the *Pandora* for the voyage.

Seventy intact earthenware pots are listed below. Some accession numbers represent more than one pot: MA13, 14, 154, 552, 665, 670, 671, 673, 708, 747, 1092, 1164, 1165, 1183, 1184, 1218, 1219, 1225, 1226, 1246, 1289, 1309, 1310, 1326, 1341, 1353, 1356, 1368, 1371, 1373, 1414, 1415, 1416, 1438, 1439, 1440, 1449, 1451, 1473, 1475, 1477, 1480, 1483, 1501, 1505, 1506, 1540, 1546, 1552, 1553, 1554, 1576, 1578, 1585, 1586, 1587, 1629, 1701, 1715, 1716, 1717, 4032, 4055, 4071, 4100.



FIG. 136. Earthenware pots.

TABLE 14. Earthenware pots exhibiting slight variations.

| Acc. No. | Comments  | Ht. (mm) | Diam. (mm) |
|----------|---|----------|------------|
| 672      | Rudimentary design of impressed half-ellipses (possibly thumb nail prints) and dots encircle belly (Fig. 137) | 110      | 78         |
| 1278     | Series impressed parallel lines encircle the belly  | 109      | 78         |
| 1543     | Flanged lips 9mm wide   | 100      | 78         |
| 1590     | Larger than the rest of the type; lip broken prior to glazing.  | 119      | 89         |

Pots exhibiting variations are presented separately in Table 14.

Earthenware pot fragments: MA135, 144, 592, 608, 610, 615, 674, 709, 715, 734, 745, 755, 758, 761, 782, 1059, 1075, 1084, 1173, 1298, 1381, 1441, 1450, 1463, 1478, 1533, 1558, 1612, 1652, 1653, 1683, 1684, 1700, 1748, 4063, 4073, 4148.

#### OIL JARS

Three large low-fired earthenware jars have been recovered from the bow area of the wrecksite (Table 15). They are similar in shape but vary in size. Wheel-thrown, these jars were made in two parts and joined at the shoulder. They have a flat base that tapers towards a rounded shoulder. A truncated neck is topped by a

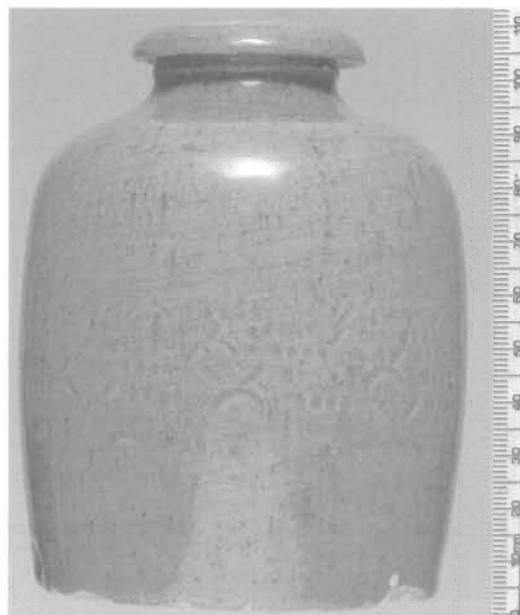


FIG. 137. Earthenware pot decorated with simple pattern of half-ellipses and dots, MA672.

TABLE 15. Oil jars

| Acc. No. | Comments  | Ht. (mm) | Belly Diam. (mm) | Outer rim Diam. (mm) | Bore Diam. (mm) |
|----------|---|----------|------------------|----------------------|-----------------|
| 3        | Merchant's mark 'T.M.F.'; two-barred cross motif (Figs 138A & B)  | 775      | 520              | 301                  | 200             |
| 138      | Merchant's mark 'T.M.F.'; two-barred cross motif.   | 770      | 560              | 278                  | 216             |
| 139      | Merchant's mark 'T.M.F.'; two-barred cross motif; fingerprint depressions in clay surface (Fig. 139A & B) | 785      | 554              | 290                  | 194             |

folded rim that contains an internal, recessed ledge providing a rest for the lid. Although no lids have been recovered from the wreck, such jars were known to have been sealed with circular lids of the same clay with three depressions as finger grips on the upper surface (Ashdown, 1972: 148). The jars are unglazed and the clay is light orange in colour. Capping the shoulder on both sides is a vestigial crescent-shaped handle. Below the handles all three jars have an applied plaque bearing identifying merchant's marks. No marks are apparent on the base.

These oil jars were probably a product of Lucca, Italy (Coleman, pers. comm., 1996). On the *Pandora's* last voyage they contained olive oil. This was issued to the crew as a substitute for butter which could not be preserved for the duration of a long voyage in tropical latitudes. Similar jars have been recovered from other wrecks of 18th century Royal Navy vessels and have been identified as Iberian in origin. For example, a similar oil jar was recovered from the wreck of HMS *Swift* (1763) lost at Puerto Deseado, Argentina in 1770 (cf. Murray, 1993: 53-55). A document in the Public Records Office (Kew) describes the following alterations to the *Pandora* prior to departure to the South Pacific

A small place to be berthed in with thin slats, close forward between decks for the stowage of oil jars, and such irregular formed things, as would occasion considerable breakage if stowed in the hold (Adm / A / 2831).

#### OTHER EARTHENWARE CONTAINERS

MA695: Jar with a thick rim and a narrow neck. A bulbous body tapers towards a flat base. The loop handle (broken) has attachment points at the shoulder and at the widest point of the body. Made from unglazed terracotta, the decoration consists of two impressed lines encircling the neck under the rim. The jar's contents were identified as a mixture of *Piper nigrum* (black

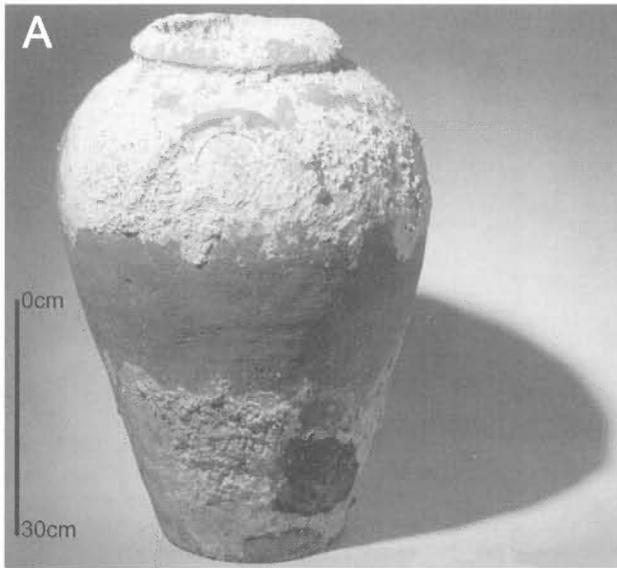


FIG. 138. A, oil jar still lightly covered in concretion, MA3; B, detail of oil jar showing vestigial handle and merchant's mark.

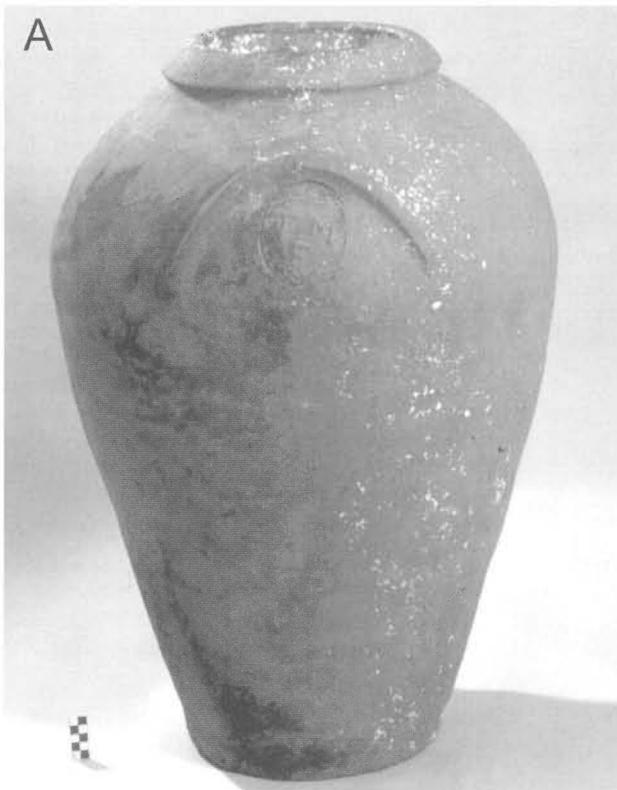


FIG. 139. A, oil jar, MA139; B, detail of oil jar showing vestigial handle and merchant's mark.

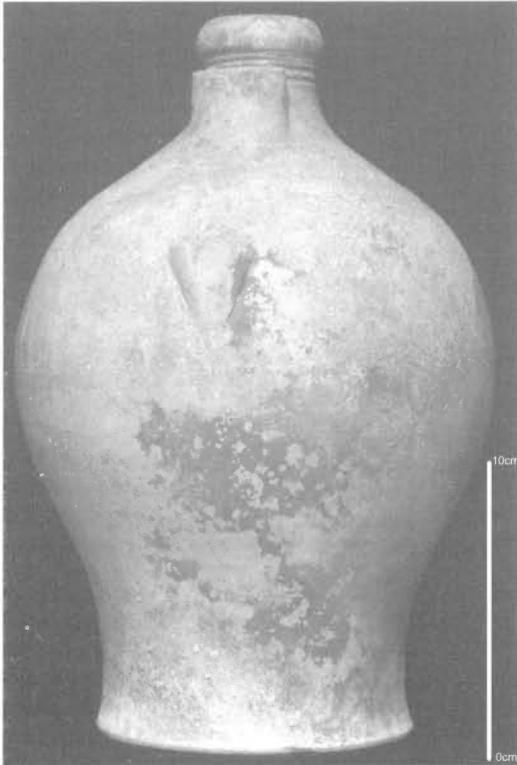


FIG. 140. Urn-shaped earthenware jar, MA695.

pepper) and *Coriander satium* in approximately equal parts (Queensland Herbarium, 1985). Ht. 250mm. Belly diam. 150mm. Base diam. 108mm. Bore diam. 43mm (Fig. 140).

MA752: Course earthenware container fragment. Segment of a thick rolled rim attached to a lugged handle. A horizontal line is incised into the body under the handle. External surface is unglazed. A green and amber streaky lead glaze covers the internal surface. Handle W. 20mm. Rolled rim W. 10mm (Fig. 141).

MA1053: Course earthenware fragment. Segment of a vestigial handle evident. Possibly part of the body of an earthenware jar. Terracotta coloured matt glaze on the external surface. Unglazed on the internal surface. 190 × 107mm.

MA1142: Course earthenware fragment. A segment of the rim only. Red clay with a clear lead glaze. Decoration consists of incised vertical lines fanning out from the rim (Fig. 142).

MA1608: Course earthenware fragment. A segment of the body attached to an arched handle.



FIG. 141. Segment of rim and handle of an earthenware container, MA752.

Red clay with a clear glaze on the outside surface. Unglazed interior surface.

#### STONEWARE

**Jars.** Intact, stoneware storage jars are listed in Table 16. They are cylindrically shaped with sloping shoulders, thick rims and flat bases. Decoration consists of a varying number of incised, parallel grooves. These grooves encircle the jars at different points. External glazes also vary. None have internal glazing. Rim thickness is on average 11mm. The variations are described below. One was excavated with a cork stopper in situ but no contents were found. No maker's marks are present. In the 17th century salt-glazed



FIG. 142. Rim fragment from an earthenware jar showing decoration, MA1142.

TABLE 16. Stoneware jars.

| Acc. No. | Comments   | Ht. (mm) | Base Diam. (mm) | Rim O.D. (mm) |
|----------|--|----------|-----------------|---------------|
| 32       | Two decorative lines at the top of the body and the shoulder; clear salt glaze on the body and a dripping brown salt glaze above (Fig. 144)  | 215      | 165             | 125           |
| 33       | Three decorative lines at the shoulder and another one at the neck; clear salt glaze on the body   | 215      | 165             | 120           |
| 35       | Three decorative lines, one at the shoulder and two mid body; clear salt glaze on the lower body; mottled brown glaze on the upper body  | 140      | 115             | 95            |
| 36       | Three decorative lines on the body and one at the neck; tan coloured salt glaze; cork stopper in situ; Cork diam. 110mm, Cork Th. 30mm (Fig. 143A & B)   | 175      | 135             | 122           |
| 45       | Two decorative lines, one at the shoulder and one at the neck; grey/brown salt glaze; found with a paste-like substance identified as lead sulphide (Queensland Government Chemical Laboratory Report, 1984) | 70       | 40              | 70            |
| 57       | Two decorative lines, one at the neck and one at the shoulder; brown mottled glaze on the shoulder and clear salt glaze below (Fig. 145)   | 270      | 195             | 130           |
| 65       | Three decorative lines at the shoulder   | 355      | 240             | 155           |
| 69       | One decorative line at the shoulder and one at the neck; mottled tan salt glaze on the top half of the body (Fig. 146)   | 280      | 205             | 123           |
| 116      | Three decorative lines at the shoulder and one below the rim; brown salt glaze on the upper body and clear below   | 230      | 165             | 115           |
| 149      | Three decorative lines at the shoulder; grey salt glaze  | 175      | 135             | 106           |
| 687      | Two decorative lines on the body and one at the neck; mottled dark brown salt glaze on the top half of body and tan glaze below (Fig. 147)   | 192      | 155             | 111           |

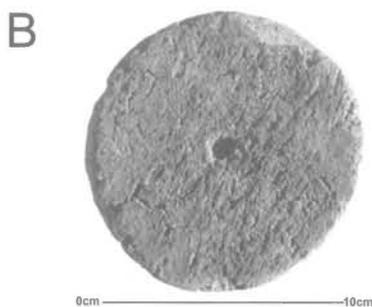
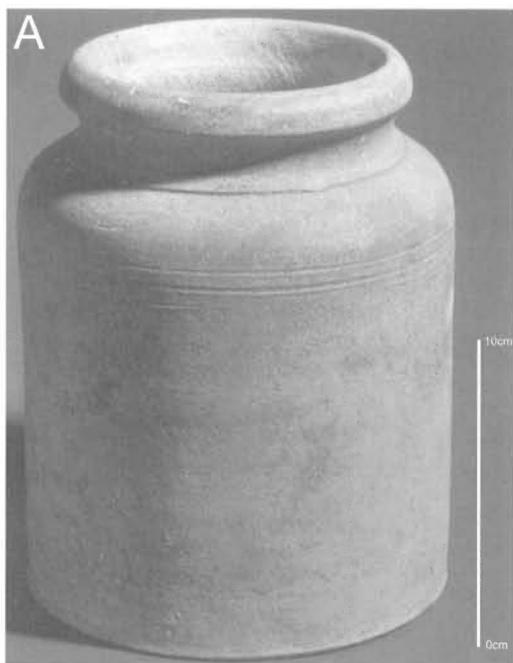


FIG. 143. A, stoneware jar, MA36; B, cork from same jar.

MA1463: Container fragment. Segment of body. Brown salt-glaze.

MA4207: Container fragment. Brown salt-glaze. 22 × 10 × 5mm.

#### GLASS

*English 'Wine' or 'Beer' Bottles.* A number of cylindrical bottles and many fragments are listed in Table 17. They are of the type generally referred to as English 'wine' or 'beer' bottles. This generic type was widely used throughout the 18th and 19th centuries as containers for a variety of liquids particularly for alcoholic or non-alcoholic beverages (Jones, 1986: 17). The *Pandora* examples are all within the 'quart' size range, i.e. between 675-1250ml (cf. Jones & Smith, 1985: 14). The bottle nomenclature

stoneware was produced in the Rhine area. However by the 18th century this type of stoneware was produced in London, Fulham and Bristol among other places in England (Hume, 1985: 112).

*Stoneware Fragments.* MA41: Two grey salt-glazed fragments. No decoration or marks. (1) 120 × 50 × 5mm and (2) 30 × 28 × 5mm.



FIG. 144. Stoneware jar, MA32.

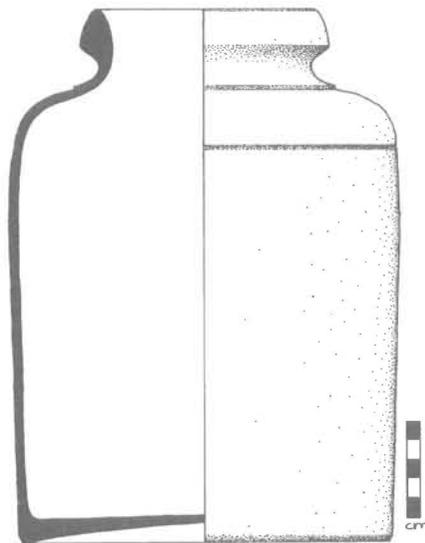


FIG. 145. Stoneware jar, MA57.

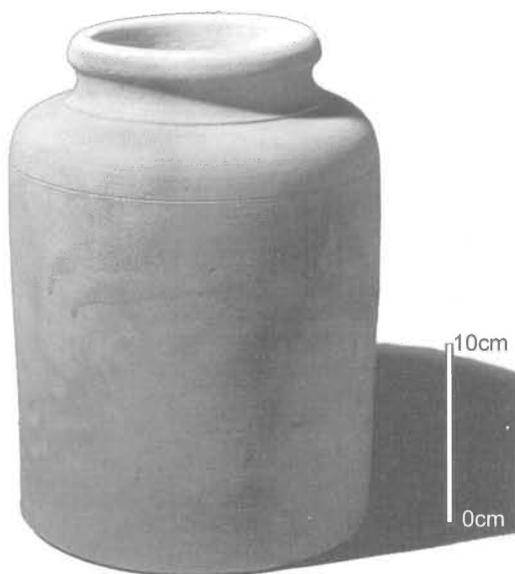


FIG. 146. Stoneware jar, MA69.



FIG. 147. Stoneware jar, MA687.

developed by Jones (1986: 34) has been used in the following descriptions.

**English 'Wine' or 'Beer' Bottle Fragments.**

MA48: Bottle fragment. Push-up base. Light green glass. Base diam. 100mm.

MA76: Bottle fragment. Push-up base. Dark green glass. Base diam. 88mm.

MA108: Bottle fragment. Push-up base. Light green glass. Base diam. 80mm.

MA570: Bottle fragment. Segment of a push-up base and lower body. Light green glass. Base diam. 85mm.

TABLE 17. Intact English 'wine' or 'beer' bottles.

| Acc. No. | Comments    | Basal profile | Shoulder    | Neck                | String rim               | Rim O.D. (mm) | Ht. (mm) | Base diam. (mm) |
|----------|-------------|---------------|-------------|---------------------|--------------------------|---------------|----------|-----------------|
| 591      | (Fig. 148A) | Dome-shaped   | Rounded     | Tapered             | Up-tooled flattened side | 41            | 270      | 92              |
| 667      | (Fig. 148B) | Dome-shaped   | Rounded     | Bulged              | V-tooled                 | 38            | 245      | 102             |
| 696      | (Fig. 148C) | Conical       | Rounded     | Roughly cylindrical | Up-tooled                | 35            | 245      | 98              |
| 697      | (Fig. 148D) | Dome-shaped   | Sloped down | Tapered             | V-tooled                 | 42            | 265      | 85              |
| 1010     | (Fig. 148E) | Dome-shaped   | Rounded     | Bulged              | Up-tooled flattened side | 38            | 235      | 98              |
| 1029     |             | Dome-shaped   | Sloped down | Tapered             | Up-tooled flattened side | 37            | 235      | 95              |
| 1144     | (Fig. 148F) | Dome-shaped   | Rounded     | Tapered             | V-tooled                 | 35            | 230      | 98              |

MA587: Bottle fragment. Segment of a push-up base and body. Green glass. Base diam. 85mm.

MA1104: Bottle fragment. Segment of a push-up base and body. Dome-shaped basal profile. Dark green glass. Base diam. 100mm. Push-up depth 45mm.

MA1412: Bottle fragment. Segment of a base and lower body. Green glass. Base diam. 98mm.

MA1421: Bottle fragment. Segment of a push-up base and body. Base diam. 93mm. Ht. 103mm.

MA1512: Three bottle fragments. Segments of a push up base, neck and body. Dark green glass. Diam. 88mm.

MA1636: Bottle fragment. Segment of a tapered neck. Dark green glass.

**Globular Bottles.** MA712: Globular bottle fragment. Segment of neck and flared shoulder. Roughly cylindrical neck and V-tooled string rim. Mouthblown dark green glass. Remains of a cork stopper in situ. Lips O.D. 30mm. Bore diam. 19mm (Fig. 149A).

MA720: Intact globular bottle. Mouth-blown dark green glass. Elongated ovoid base with a pontil. Tapered neck. Possibly a French wanded bottle which would have originally been encased in wicker or rush (cf. Hume, 1985: 70). Ht. 175mm. Resting point L. 140mm. Neck diam.

25mm. Lips O. D. 25mm. Bore diam. 17mm (Fig. 149B).

**Case Gin Bottles.** Seven intact case bottles are listed in Table 18. Case is a generic term for this bottle type. The shape was determined by the way they were packed in square compartmentalised cases (Jones & Smith, 1985: 15). Case bottles are square bodied with rounded corners and horizontal shoulders. The body narrows slightly towards an indented base with a pronounced pontil. The glass is olive green and varies in thickness from 1-4mm. The neck is short, narrow and roughly cylindrical with wide, everted lips. Case bottles were widely used during the 18th century, although not exclusively as gin containers (Jones & Smith, 1985: 15).

The dimensions of intact examples vary slightly. However, they are all consistent with the 'quart' sized bottle. Although case bottles of varying sizes have been found on other sites in 18th century contexts (Smith & Jones, 1985:15), only the 'quart' size has been found on the *Pandora* in the stern section to 1995. A one 'gallon' sized case bottle was recovered from the bow section in 1997.

Case gin bottle fragments: MA10, 17, 50, 87, 89, 96, 103, 111, 150, 588, 594, 686, 746, 749, 769, 1099, 1101, 1114, 1116, 1128, 1131, 1135, 1169, 1176, 1224, 1249, 1288, 1307, 1319, 1330, 1345, 1382, 1399, 1443, 1486,

TABLE 18. Intact 'case' bottles.

| Acc. No. | Comments   | Ht. (mm) | Base (mm <sup>2</sup> ) | Shoulder (mm <sup>2</sup> ) | O.D. Lips (mm) | Bore diam. (mm) |
|----------|--|----------|-------------------------|-----------------------------|----------------|-----------------|
| 54       | Rounded shoulders (Fig. 150A)                            | 220      | 92                      |                             | 37             |                 |
| 250      | Sloped down shoulders. Cork stopper in place (Fig. 150D) | 227      | 92                      |                             | 37             | 21              |
| 1100     | Small hole in body                                       | 252      | 75                      | 90                          | 35             | 15              |
| 1181     | Small hole in body                                       | 253      | 75                      | 89                          | 33             | 13              |
| 1221     | (Fig. 150B)  | 240      | 73                      | 84                          | 32             | 14              |
| 1222     |  | 245      | 73                      | 87                          | 34             | 15              |
| 1318     | Small hole in body (Fig. 150E)                           | 258      | 74                      | 91                          | 34             | 15              |

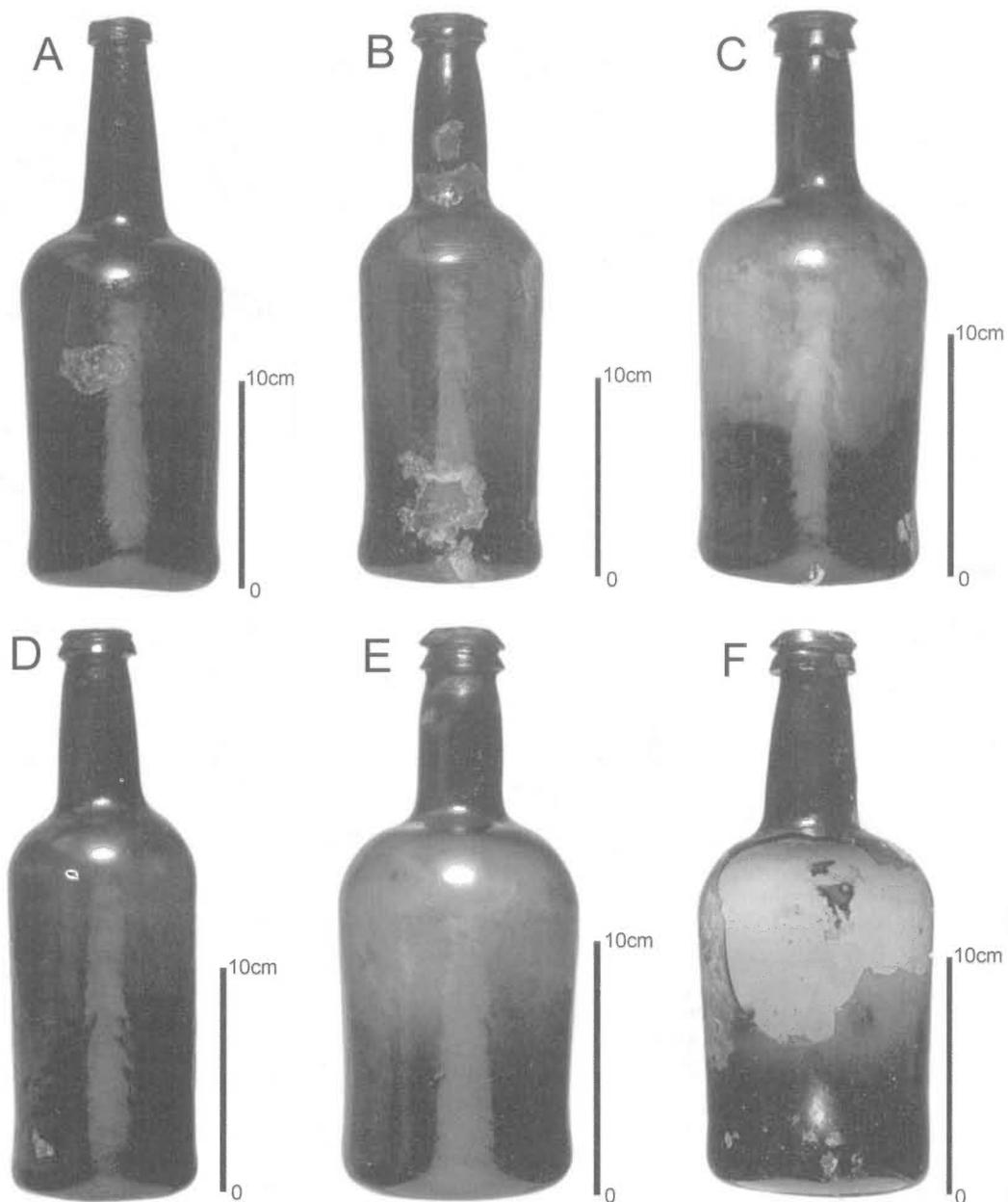


FIG. 148. A-F, English wine bottles; A, MA591; B, MA667; C, MA696; D, MA697; E MA1010; F, MA1144.

1529, 1541, 1545, 1593, 1680, 4037, 4112, 4120, 4124, 4151.

**Wide-mouthed Bottles.** Two intact, rectangular-bodied bottles and three fragments are described below. They have concave chamfers, short wide necks, flanged lips, a flat basal surface and

sloping shoulders. The glass is transparent with many bubbles and is either pale or dark green. No marks observed. Similar bottles have been found on North American sites dating from the Seven Years War (1756-63) and the American Revolutionary War (1776-81). They probably

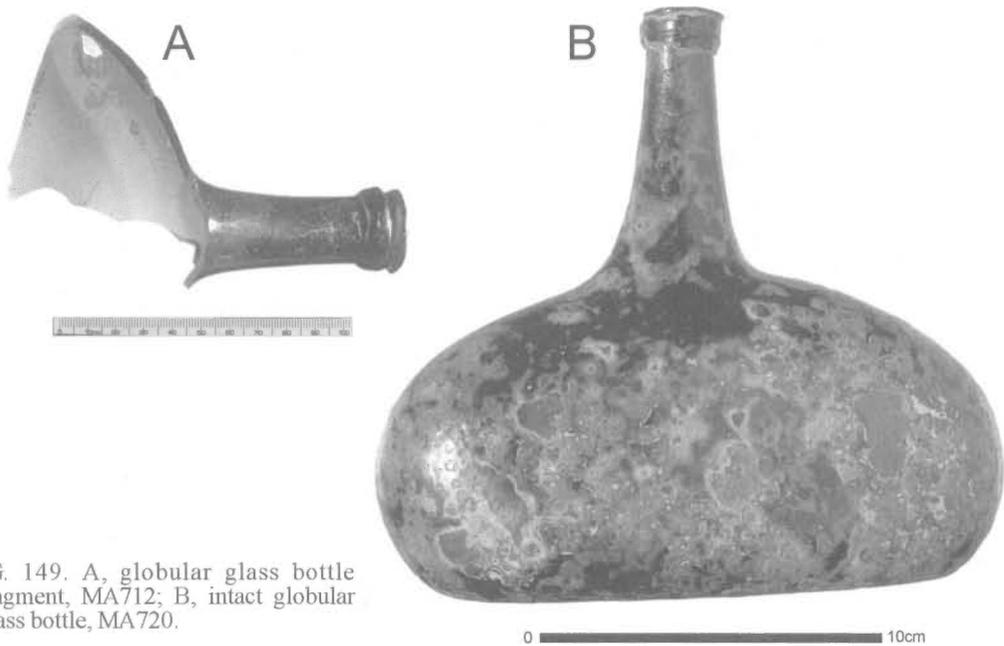


FIG. 149. A, globular glass bottle fragment, MA712; B, intact globular glass bottle, MA720.

had cork stoppers and appear to have been used as containers for dry, pulverised or powdered substances such as spices, medicines or toiletries (cf. Jones & Smith, 1985: 98).

MA514: Intact bottle. Light green glass. Ht. 180mm. Base 85 × 56mm. Lips O.D. 47mm. Bore diam. 35mm (Fig. 150C).

MA656: Intact bottle. Light green glass. Ht. 175mm. Base 88 × 60mm. Lips O.D. 42mm. Bore diam. 30mm (Fig. 150F).

**Wide-mouthed Bottle Fragments.** MA61: Bottle fragment. Segment of neck and shoulder. Pale green glass. O.D. lips 55mm. Bore diam. 40mm.

MA88: Bottle fragment. Segment neck and shoulder. Pale green glass. Bore diam. 34mm.

MA691: Bottle fragment. Dark green glass. Bore diam. 34mm. Base 60 × 87mm.

MA1437: Bottle fragment. Segment neck and part of shoulder. O.D. lips 52mm. Bore diam. 36mm.

**Unidentified Bottles and Fragments.** MA51: Bottle fragment. Segment of a cylindrical neck with a string rim. Pale green glass. Neck L. 50mm. O.D. lips 25mm. Bore diam. 20mm.

MA90: Bottle fragment. Segment of neck and shoulder. Pale green glass. Flat flanged lips and rounded shoulders. O.D. lips 35mm. Bore diam. 18mm (Fig. 151A).

MA99: Bottle fragments. Segments of a flat base and a square body with rounded corners. Pale green glass. Remnants of original contents identified lead as the major element, copper as minor element and traces of antimony and iron (Queensland Government Chemical Laboratory, 1984). Base 38mm<sup>2</sup>.

MA101: Bottle fragment. Segment of a flat base and a square body with rounded corners. Colourless glass. Base 40mm<sup>2</sup>.

MA105: Bottle fragment. Segment of a neck and string rim. Light green glass. Turquoise glass stopper in situ.

MA107: Bottle fragment. Segment of a square body with rounded corners. Pale green glass. Rudimentary neck and flanged lips. Base 88mm<sup>2</sup>. O.D. lips 84mm. Bore diam. 64mm.

MA567: Bottle fragment. Segment of a shallow concave rectangular base. Dark green glass. Rudimentary star pattern punched lightly into the base. Base 70 × 30mm.

MA1383: Bottle fragment. Segment of a narrow, cylindrical neck. Dark green glass. Wide flanged lips with a slight upward thrust. Lip melted into neck. Flat, wide shoulders. O.D. lips 40mm. Bore diam. 32mm.

MA1428: Small intact bottle. Colourless glass. Short wide straight finished neck. Cylindrical body tapering slightly towards a flat base. Ht.

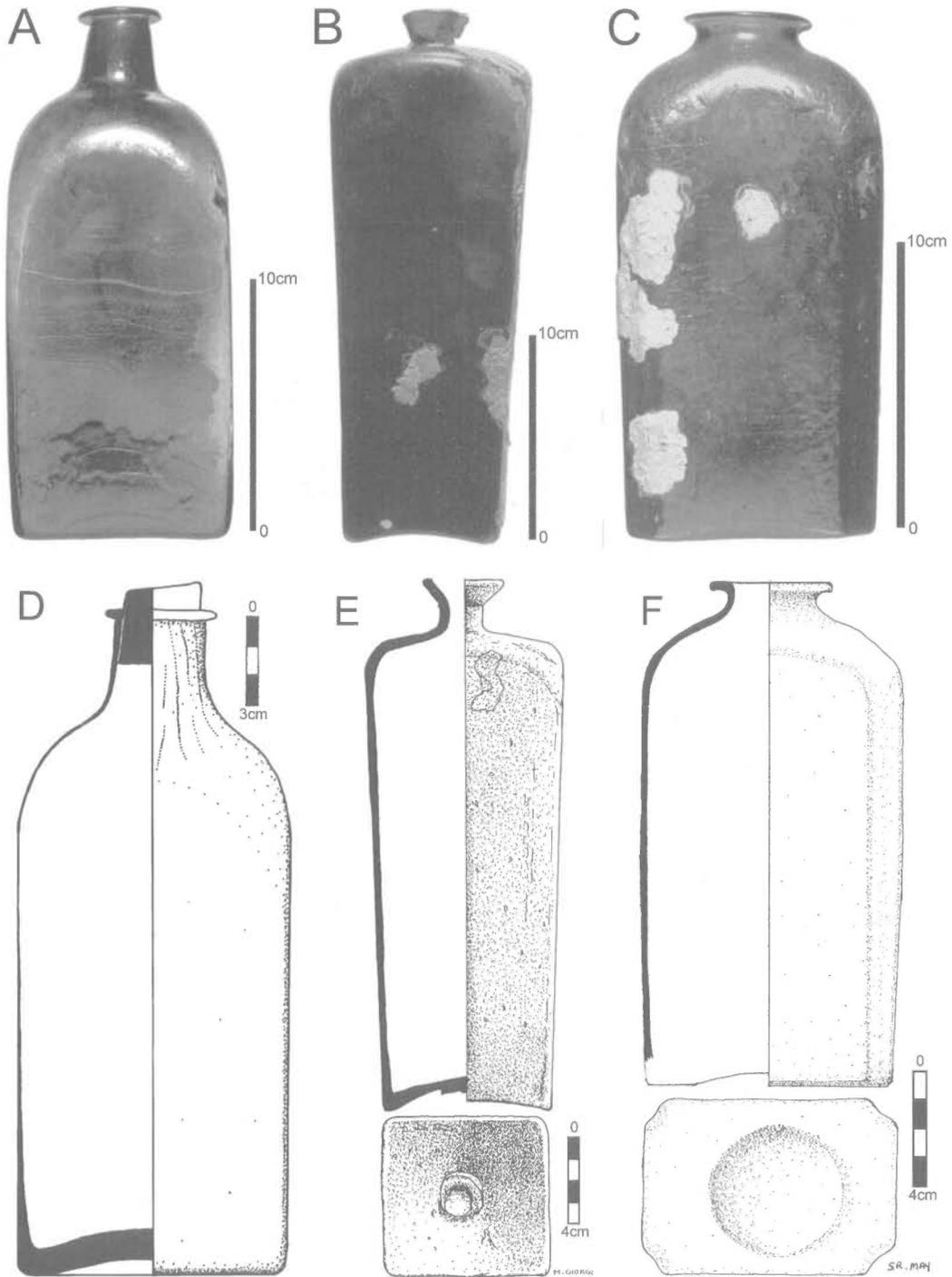


FIG. 150. A, D, case bottles with rounded shoulders; A, MA54; D, MA250. B, E, case bottles; B, MA1221; E, MA1318. C, F, wide-mouthed bottles; C, MA514; F, MA656.

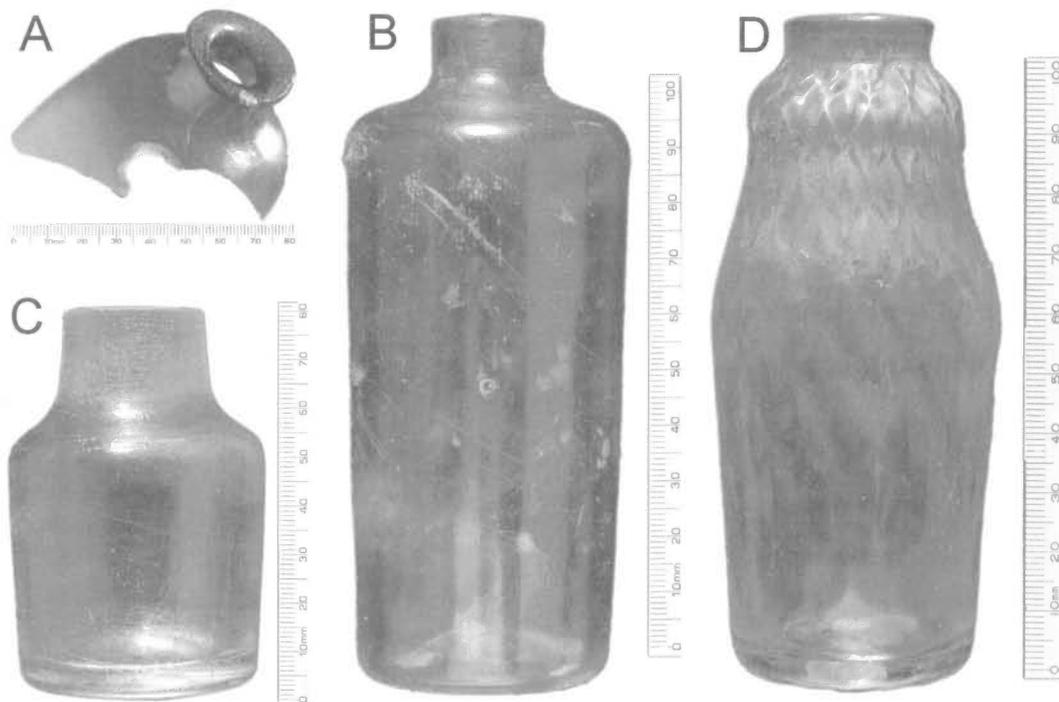


FIG. 151. A, bottle fragment, MA90. B, C, intact bottles; B, MA1428; C, MA1466. D, cut glass bottle, MA4021.

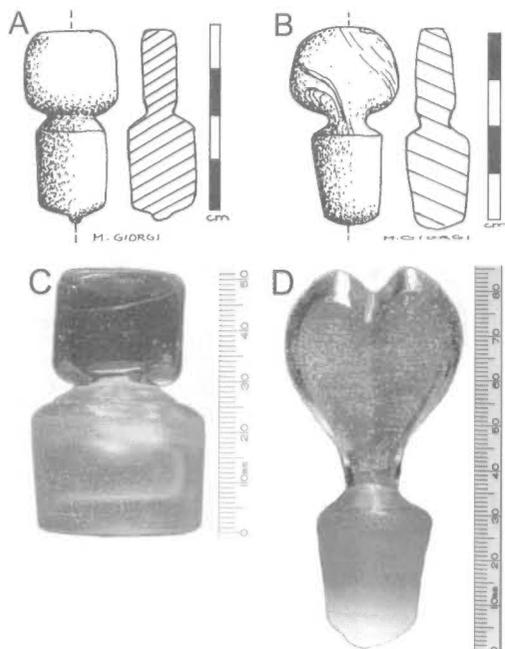


FIG. 152. Glass stoppers; A, MA106; B, MA115; C, MA1630; D, MA4036.

123mm. Base diam. 45mm. Bore diam. 19mm (Fig. 151B).

MA1466: Small intact bottle. Short, squat cylindrical body tapering towards base. Short wide shear neck with no lips. Colourless glass. Ht. 83mm. Bore diam. 32mm (Fig. 151C).

MA1508: Bottle fragment. Segment of a cylindrical body tapering towards a flat base. Many scratches on base probably indicate use-wear. Possibly used as a decanter. Colourless glass. Base diam. 92mm.

MA3004: Small bottle. Part of the lip missing. Consists of a square body with rounded corners, a short cylindrical neck and flared lips. Sand coloured staining on the inside. Aqua glass. Ht. 48mm. Base 35 × 40mm.

MA4021: Small ornate bottle. Flat, round base with a body that narrows in the centre. Longitudinal diamond-shaped ribbed pattern cut into the glass. Colourless glass. Ht. 110mm. Base diam. 39mm. Bore diam. 25mm (Fig. 151D).

**Miscellaneous Bottle Fragments.** Ninety fragments of colourless, green, aqua and blue bottle glass are listed below. The glass thickness

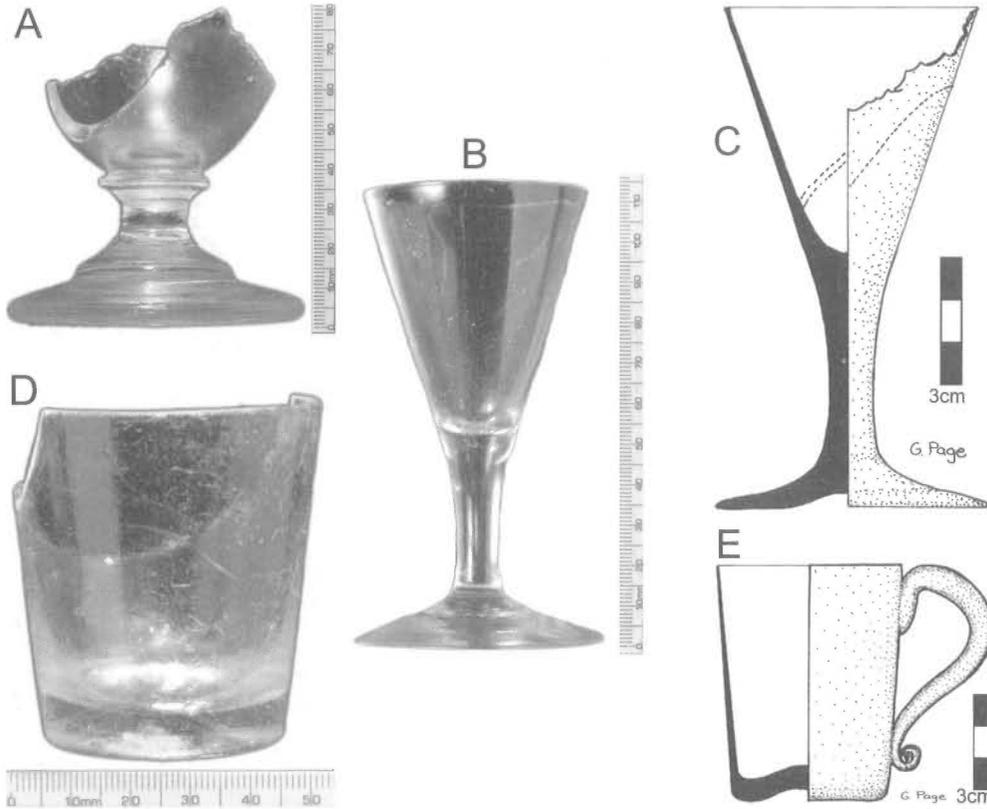


FIG. 153. A, incomplete rummer-goblet, MA11. B, drinking glass, MA1465. C, incomplete drinking glass, MA1634. D, plain conical drinking tumbler, MA1167. E, tumbler with attached handle, MA1727.

varies from 1mm to 4mm. Accession numbers frequently represent several fragments.

MA17, 39, 55, 56, 64, 103, 112, 113, 117, 127, 136, 565, 686, 740, 749, 757, 1067, 1070, 1102, 1108, 1119, 1151, 1163, 1207, 1217, 1239, 1251, 1256, 1264, 1265, 1268, 1294, 1307, 1347, 1575, 1631, 1735, 1749, 1750.

**Bottle Stoppers.** MA106: Glass stopper. Flat square finial with rounded edges. Ground shank with slight taper. Colourless glass. L. 40mm. Th. 15mm (Fig. 152A).

MA115: Glass stopper. Flat rectangular finial with rounded edges. Ground shank with a slight taper. Colourless glass. L. 42mm. Th. 15mm (Fig. 152B).

MA1630: Glass stopper. Flat ovoid finial. Ground shank with a slight taper. Colourless glass. Shank diam. 31mm (Fig. 152C).

MA4036: Glass stopper. Heart-shaped finial with bevelled edges. Ground shank with a slight taper.

Colourless glass. L. 85mm. Shank diam. 22mm (Fig. 152D).

**Drinking Vessels (Stemware).** This term is used to describe glass vessels made up of a foot, a stem and a bowl (Jones & Sullivan, 1985: 141).

MA11: Rummer-goblet fragments including a base, stem and segment of a bowl (cf. Jones & Sullivan, 1985: 142). Flat foot and squat beaded stem with a collar. Colourless glass. Foot diam. 78mm (Fig. 153A).

MA1465: Intact drinking glass. Consists of a plain conical foot, plain-drawn stem and a conical bowl (cf. Jones & Sullivan, 1985: 44). Colourless glass. Ht. 114mm. Foot diam. 62mm (Fig. 153B).

MA1634: Drinking glass. Largely intact but a segment of the bowl is missing. Shallow conical foot, plain-drawn stem and a conical bowl. Colourless glass. Ht. 113mm. Foot diam. 64mm (Fig. 153C).

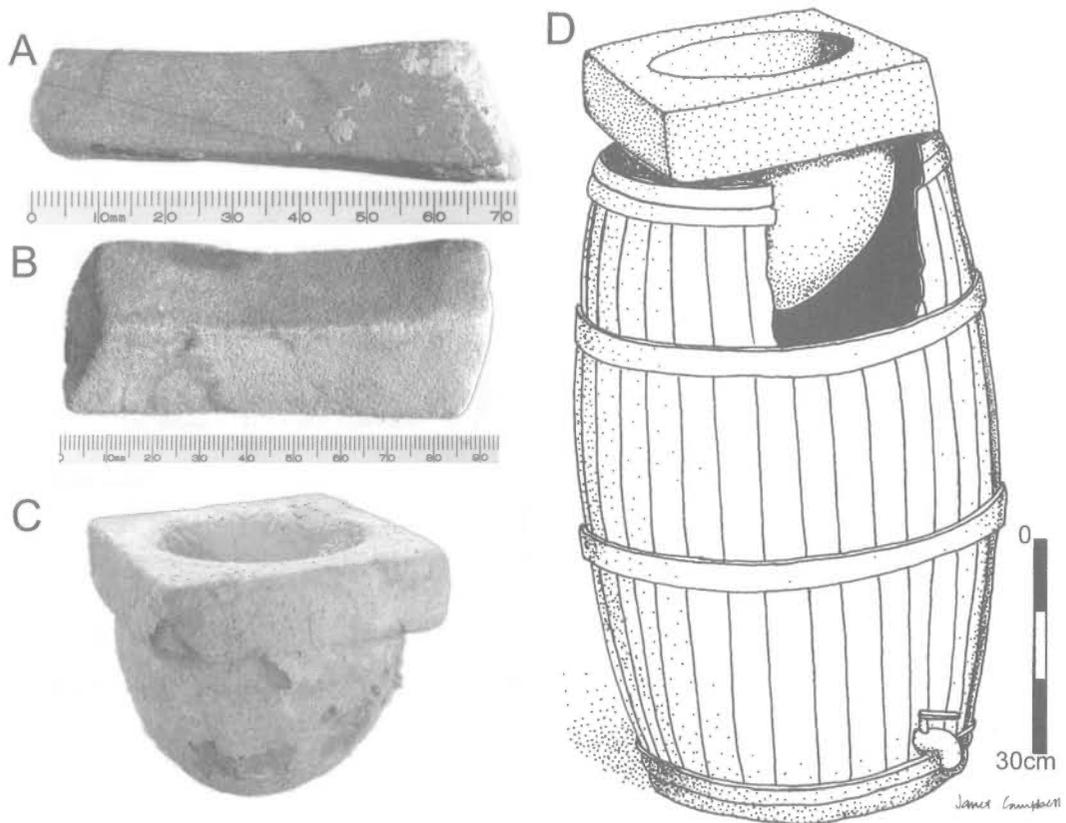


FIG. 154. A, B, ground stone, possibly whetstone; A, MA763; B, MA4090. C, dripstone, MA1041; D, illustration of how dripstone might have been set up onboard the *Pandora*.

MA1713: Drinking glass fragment. Segment of base and stem. Shallow conical foot and plain-drawn stem. Colourless glass. Foot diam. 62mm.

**Tumblers.** MA1167: Plain conical drinking tumbler. Shallow concave base. Colourless glass. Ht. 60mm. Base diam. 41mm (Fig. 153D).

MA1727: Intact tumbler. Shallow conical base with a pontil. Slightly tapered body with an attached handle. Decorative curve on end of the handle. Colourless glass. Ht. 71mm. Base diam. 48mm. Rim diam. 57mm (Fig. 153E).

#### UTENSILS AND ACCESSORIES

##### SHARPENING

**Whetstones.** MA763: Ground stone. A rectangularly shaped segment of fine-grained

quartz mica schist. Possibly used as a whetstone. L. 70mm (Fig. 154A).

MA4090: Ground stone. A rectangularly shaped segment of sandstone with a concave grinding surface. L. 92mm. W. 29mm. Th. 26mm (Fig. 154B).

##### WATER FILTRATION

**Dripstone.** MA1041: Dripstone. Hollowed out sandstone bowl with a deep square rim and a dome-shaped belly. Used to filter impurities from barrels of drinking water at sea. The porosity of the sandstone allowed water to seep through, thus filtering sediment. A support was required to keep the stone in place.

When excavated in 1986, it was found in association with barrel hoops. It is therefore possible that the dripstone was placed on top of a barrel that was then lashed in position (Fig.

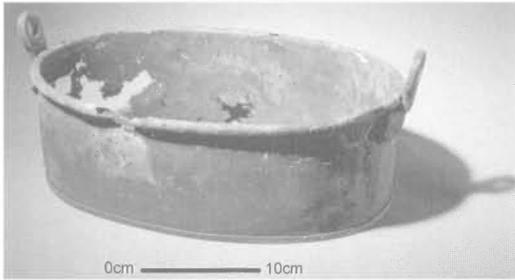


FIG. 155. Baking pan, MA1386.

154D). Water was probably decanted into the filter from a larger barrel or pumped from barrels stored in the *Pandora's* hold. A spigot placed towards the base of the barrel under the dripstone could have been used to tap the filtered water.

This dripstone was probably set up in the wardroom for the officers' use or in the Great Cabin. Alternatively it was set up on the quarterdeck in a similar manner to the dripstone case on the *Bounty* referred to by James Morrison (State Library NSW: Dixon Library Reel, CY 265, p.56). Like the *Bounty's* dripstone it also may have been purchased in Tenerife on the voyage to the Pacific. Ht. 385mm. Rim 97mm × 390mm. Rim Th. 113mm. Basin diam. 290mm [cf. Sullivan, 1979: 16 (1)(2), Stanbury & MacLeod, 1988] (Fig. 154C).

## COOKING

**Baking Pan.** MA1386: Copper baking pan. Oval shaped with a rolled rim. Two looped handles riveted to each end for gimbaling on a rod over a fire. L. 460mm. W. 288mm. Ht. 140mm. L. handles 44mm (Fig. 155).

**Cauldrons.** Two similar copper cauldrons. In 18th century terminology these copper cauldrons were known as 'kettles'. They are a riveted construction of sheet copper with opposed looped handles and a rolled rim. The side seams and lower body seams are joined with hexagonal rivets. Both were excavated outside the confines of the hull remains on the starboard side. This location suggests they were being loaded onto the *Pandora's* boats for containment of drinking water when the crew were preparing to abandon ship. On the open boat voyage to Timor, Edwards 'bemoaned the lack of sufficient ... vessels ... and means ... to contain a gallon of water for each person in the boats ...' (United Services Magazine, 1843: 420).

MA34: Ht.525mm. O.D. rim 615. I.D. rim 564 (Fig. 156A).

MA3010: Ht.505, O.D. rim 540mm. I.D. rim 495mm. (Fig. 156B).

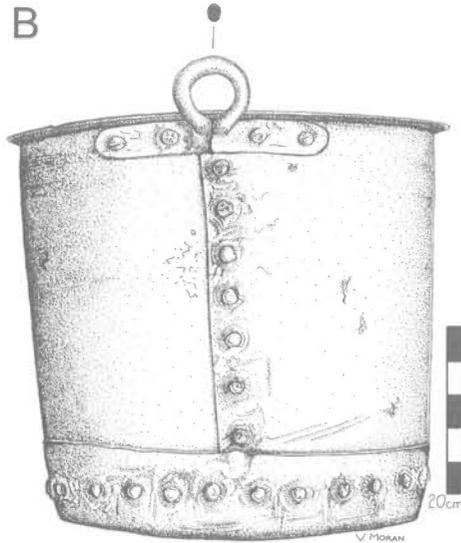


FIG. 156. A, B, cauldrons; A, MA34; B, MA3010.

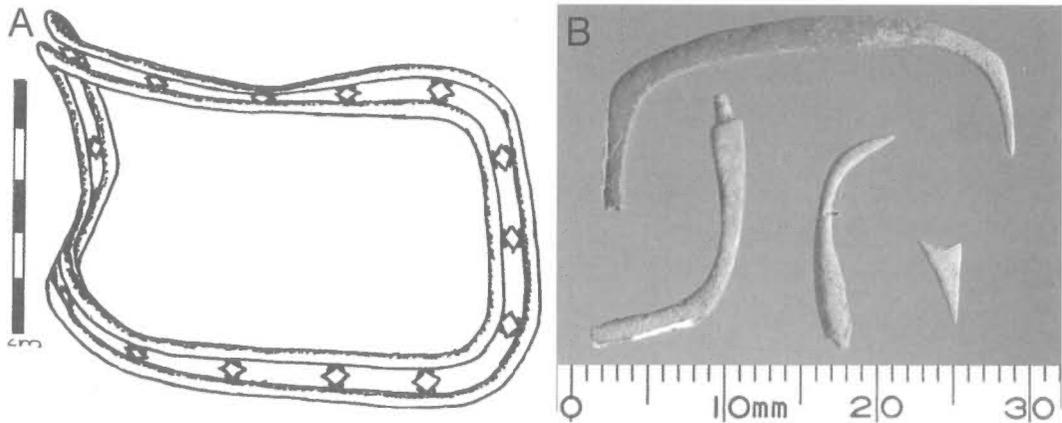


FIG. 157. A, buckle, MA78; B, belt buckle components, MA4185.

## CLOTHING AND ACCESSORIES

### BUCKLES

MA78: Pewter buckle consisting of a rectangular frame of two flat parallel strips connected by diamond-shaped stud inserts. The inserts are equidistantly spaced around the frame. Material analysis identified the major component as tin, minor components as sulphur and trace elements as silver, lead, zinc, copper, iron (Queensland Government Chemical Laboratory, 1984). L. 98mm. W. 65mm. Th. 1mm (Fig. 157A).

MA4185: Copper alloy belt buckle fragments. Maximum W. 26mm (Fig. 157B).

### BUTTONS

**Copper Alloy Buttons - Type 7.** Buttons listed in Table 19 are flat-faced round discs of copper alloy with an eye soldered to the back. Some have a grey coating which is suggestive of tin-plating (Hume, 1985: 90). One button displays a black, shiny coating on the face that suggests silver-plating (Hume, 1985: 90). Some have vestiges of impressed decoration. These buttons appear to have been cast in one piece. Using South's button typology (Hume, 1985: 91), they most closely resemble Type 7.

**Bone buttons - Type 15.** Flat bone discs with a single central opening. They have a thickness of 1mm and the central opening diameter is 2mm. In South's button typology these buttons resemble Type 15 (cf. Hume, 1985: 91).

Bone buttons are listed below. Diam. (mm) is shown after MA number:

MA79/2 (19) & 79/3 (19) (Fig. 158D); MA100/1 (15) (Fig. 158E); MA100/2 (15); MA100/3 (15); MA134/1 (15);

MA134/2 (24); MA1770 (19); MA4116 (14) (Fig. 158G); MA4128 (14); MA4158 (21).

**Miscellaneous Buttons.** MA509: Copper alloy button. Faint impressed lines radiate out. Worn centre. Diam. 27mm.

MA589: Large copper alloy button. Cast domed disc with remains of an eye soldered onto the back. Diam. 32mm.

MA722: Copper alloy button. Flat-faced disc with two small central slits for attachment purposes. Faint impressed lines radiate out from the centre. Diam. 25mm.

MA1056: Copper alloy button. Cast domed disc with an eye soldered onto the back. The face displays an impressed oval floral design flanked by two four-leaf clovers. Diam. 31mm (Fig. 158F).

MA1192: Copper alloy button fragment. Covered in concretion. Cast domed disc with an eye soldered onto the back. Diam. 34mm.

MA4024: Copper alloy button. Part of the foot attachment remains. Eye missing. Diam. 35mm.

TABLE 19. Copper alloy buttons.

| Acc. No. | Comments  | Diam. (mm) |
|----------|---|------------|
| 133      | Broken eye soldered to foot; evidence to suggest tin-plating on both surfaces (Fig. 158A)             | 12         |
| 141      | Eye soldered to underside of foot; remnants of coating suggest tin-plating (Fig. 158B)                | 15         |
| 146      | Remnants of impressed fouled anchor   | 17         |
| 717      | Impressed fouled anchor (Fig. 158C)   | 17         |
| 1757     | Foot soldered onto back of disc, no eye; black shiny coating on front of disc suggests silver-plating | 15         |
| 1074     | Eye attached to underside   | 14         |
| 1076     | Eye attached to foot  | 16         |

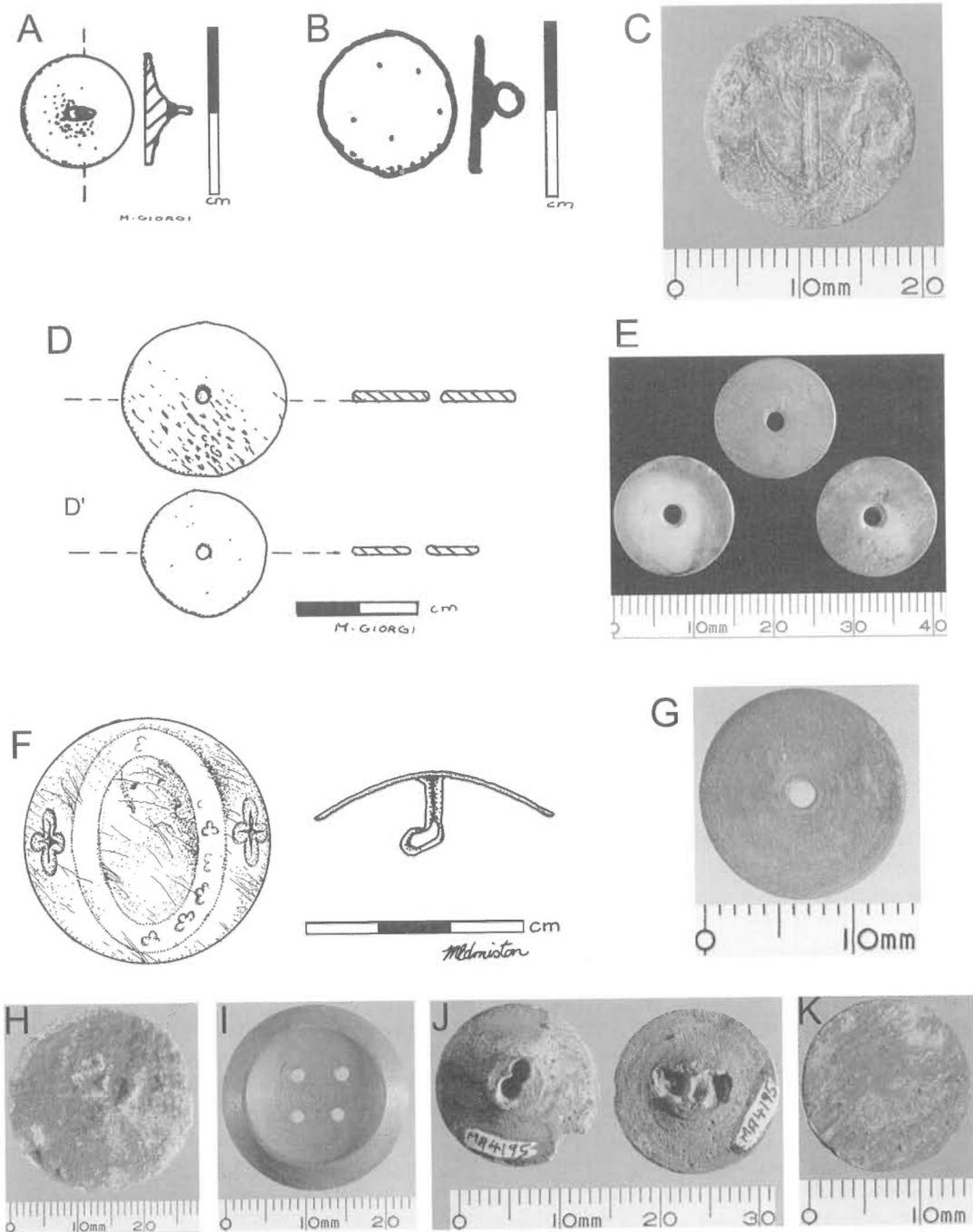


FIG. 158. Copper alloy buttons; A, MA133; B, MA141; C, button with impressed fouled anchor, MA717. Bone buttons; D, MA79; E, MA100. F, copper alloy button with oval floral design, MA1056. G, bone button, MA4116. H, copper alloy button, MA4074. I, bone button with four attachment holes, MA4122. J, lead buttons, MA4195/1-2. K, copper alloy buttons, MA4201.

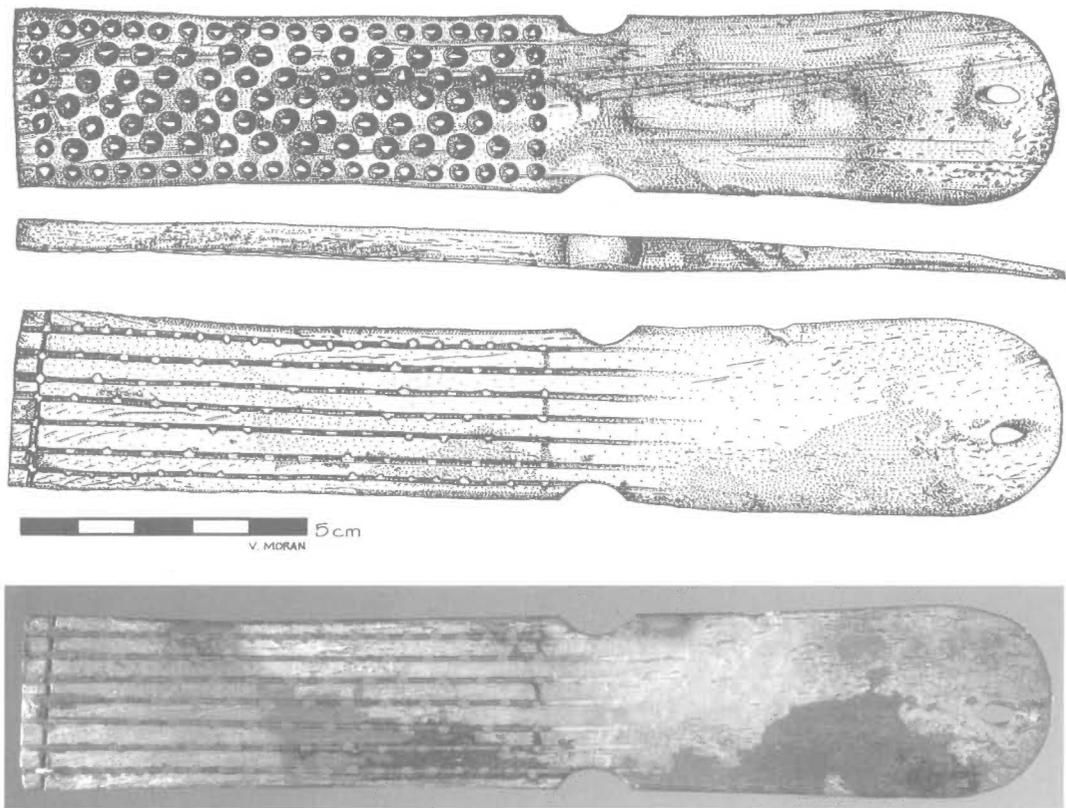


FIG. 159. Ivory brush / shoehorn, MA72.

MA4031: Copper alloy button. Diam. 25mm.

MA4045: Copper alloy button. A flat round disc cast in one piece. Eye missing. An impressed fouled anchor is faintly visible. Diam. 27mm.

MA4059: Copper alloy button. Flat round disc cast in one piece. Eye missing. Diam. 35mm.

MA4074: Copper alloy button. Flat round disc cast in one piece. Foot attachment but eye missing. Diam. 22mm (Fig. 158H).

MA4122: Bone button. Four attachment holes. Concave upper surface with raised edges. Diam. 23mm (Fig. 158I).

MA4146: Large bone button with attachment ring. Diam. 38mm. Heavily concreted.

MA4195/1-2: Two lead buttons. Flat-faced discs with evidence of eye attachment. Diam. 16mm (Fig. 158J).

MA4201: Copper alloy button. Flat-faced disc cast in one piece. Evidence of an attachment ring. Diam. 15mm (Fig. 158K).

MA4205: Copper alloy button. Evidence of eye attachment. Diam. 15mm.

#### TOILETRY ARTICLES

**Brushes and combs.** MA72: Ivory brush and shoe-horn. The back of the brush contains grooves for the attachment of the bristles which have not survived. The brush handle is shaped as a shoe-horn. An obliquely pierced hole at the end of the handle possibly received a cord for hanging purposes. L. 184mm. Maximum W. 30mm. Th. 5mm (Fig. 159).

MA73: Ivory brush components (2 pieces). Pierced portion for bristle attachment (bristles have not survived); and decorative backing to the brush. Both parts have a threaded hole to receive the handle. L. 53mm. W. 20mm. Opening diam. 6mm (Fig. 160).

MA75: Ivory object consisting of three circular discs, and a threaded screw carved from one

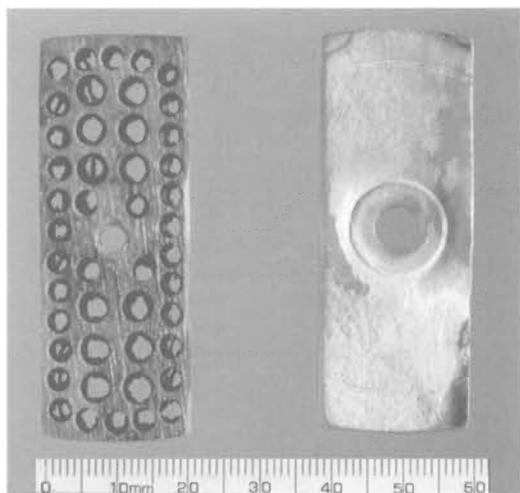


FIG. 160. Ivory brush components, MA73.

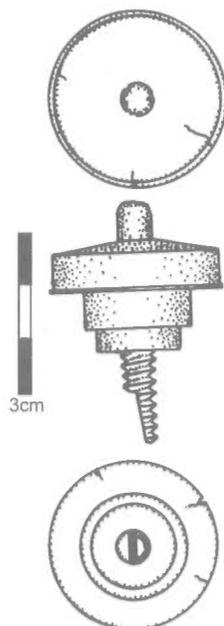


FIG. 161. Ivory object, possibly a brush handle, MA75.

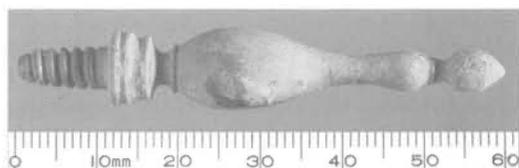


FIG. 162. Turned ivory handle, MA104.

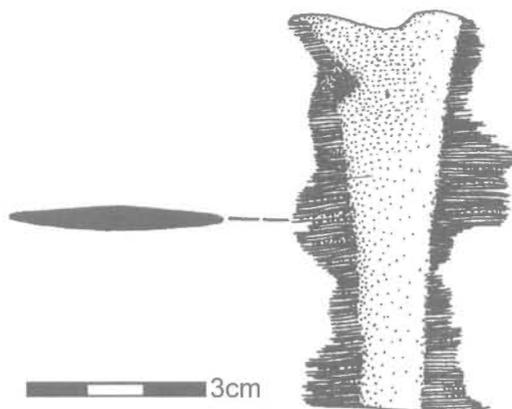


FIG. 163. Wooden lice comb, MA114.

piece of ivory. Possibly a brush handle. L. 34mm. Threaded screw diam. 5mm (Fig. 161).

MA104: Turned ivory handle threaded at one end. Possibly a brush handle. L. 58mm. Threaded section diam. 4mm (Fig. 162).

MA114: Fine-toothed wooden lice comb (cf. Sullivan, 1986:87). L. 58mm (Fig. 163).

MA121: Wooden finial with a threaded end. Possibly a brush handle. L. 50mm (Fig. 164).

MA3012: Wooden brush component. Brush back with grooves for attachment of the bristles (Fig. 165).

MA4117: Ivory handle of a small brush. Holes for bristle attachment. L. 138mm.

## POLYNESIAN OBJECTS

### MATERIAL CULTURE

The *Pandora* assemblage also includes ethnographic objects that were part of the material culture of 18th century Polynesia. They were acquired by the crew when the *Pandora* was in Polynesia in 1791 searching for the *Bounty*.

In 18th century England, ethnographic objects were referred to as 'artificial curiosities' and were in great demand among collectors of exotica and curios. It is well documented that officers and sailors serving on vessels destined for exotic places acquired ethnographic artefacts as well as natural specimens on behalf of collectors back at home, many of whom maintained collections for commercial as well as for ethnographical purposes (Brears, 1992: 107ff.).

One such collector was Sir Joseph Banks, who had accompanied James Cook in 1769 on his first

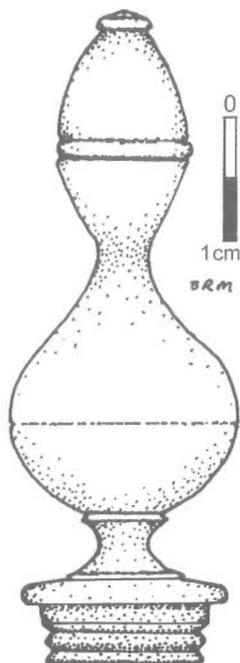


FIG. 164. Turned ivory handle, MA121.

Pacific voyage and subsequently maintained a very keen interest in the cultural history of the Pacific region. It is well documented that Banks often made sure he was able to add to his own collection whenever an opportunity presented itself. For instance, during the preparations for George Vancouver's voyage to the Pacific, Banks corresponded with HMS *Discovery's* surgeon Archibald Menzies, who not only advised Banks about the articles '... which will answer best ... for trading', but emphasised that any vessel going there ought to be supplied with '... two blacksmiths and a forge together with the necessary utensils for working from iron, copper and brass such forms as may best suit the fickle disposition of the natives ...' (Menzies to Banks, 4 April 1790, SLNSW, Mitchell Library microfilms FM4 23).

It is possible Banks also availed himself of the opportunity when it presented itself with the *Pandora*, in fact Menzies' advice may even have been communicated to the *Pandora* in light of the fact that the *Pandora's* surgeon mentions that the forge was fired up to make knives and iron work' for trading purposes on the voyage out (Thomson, 1915: 101). A direct link between Banks and the *Pandora* may exist through the *Pandora's* purser, Gregory Bentham. Although

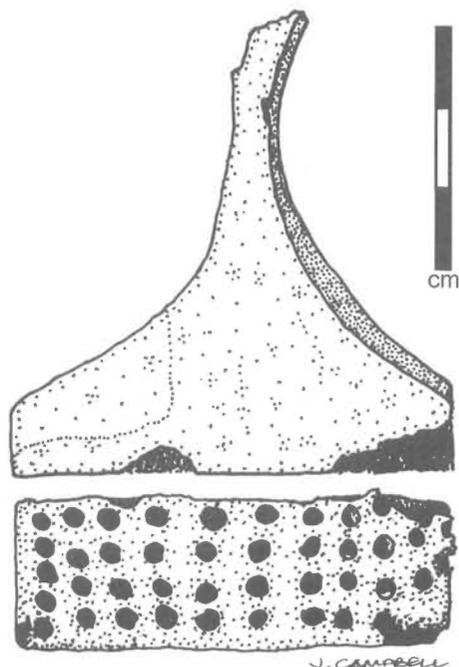


FIG. 165. Wooden brush component, MA3012.

no conclusive documentary evidence has been found to support this, it has been suggested that Bentham was collecting on behalf of Banks (Coleman, 1988b: 44-5).

Banks was Bentham's patron and had likely used his good offices on Bentham's behalf after Cook's third voyage to get him appointed as a purser in 1779. Banks may even have guaranteed or advanced Bentham the money a purser needed to obtain the appointment to a particular class of vessel (cf. Rodger, 1986: 88). Bentham had subsequently been promoted to the *Pandora* in December 1783 (Adm. 106/2898) as one of the standing officers. In this capacity he had obviously remained associated with the *Pandora* while she was 'in ordinary', although he served on other ships between 1784 and 1790.

However, Bentham was mustered on as the *Pandora's* purser for active duty again in early August 1790, which was in fact about one week before Captain Edwards was summoned to the Admiralty to receive his orders for the *Pandora's* Pacific voyage. Until then, as far as Edwards was concerned he had been preparing the *Pandora* for service in the Channel Fleet as part of the general rearmament that was going on in anticipation of hostilities against Spain.

Bentham's reappearance on the *Pandora's* muster at this juncture is in all likelihood purely coincidental. However, it could be considered as an indication that Banks had had some influence in the Admiralty's selection of the *Pandora* for the punitive voyage against the mutineers. It may be that he actually requested the *Pandora* be sent out to the South Pacific, knowing that his protege, Bentham, was the purser. Alternatively, he may have directed Bentham to muster on again because he had been advised that the Admiralty had decided to select the *Pandora* for the mission.

Whatever the case, it is evident that other officers (and many of the ordinary crew) collected curiosities. One of the documents in Captain Edwards' papers is a handwritten list, with an estimate of the value of losses of personal effects, which includes £200 worth of '... productions and curiosities collected at different places during the voyage ...' (Adm. MS. 180).

#### ADZE BLADES

**Stone Adze Blades.** Stone adze blades are listed in Table 20. Triangular in cross-section, they consist of a tang and a blade. They were fashioned from fine-grained intermediate to basic volcanic rock (W. Delaney, pers. comm., 1996). The blade and sides are smoothly ground.

TABLE 20. Stone adze blades.

| Acc. No. | Description  | L. (mm) | Blade W. (mm) |
|----------|--|---------|---------------|
| 1123     | Arched tang; closely resembles Duff type 3 (cf. Duff, 1959: 134). Tang W. 90mm (Fig. 166A)                                     | 255     | 65            |
| 1159     | Arched tang; evidence of flaking   | 250     | 60            |
| 1186     | Arched tang; evidence of flaking   | 195     | 58            |
| 1311     | Flared blade with sharp edge; some evidence of flaking; resembles Duff type 3E (cf. Duff, 1959: 134). Tang L. 55mm (Fig. 166B) | 140     | 72            |
| 1387     | Arched tang; evidence of flaking on two surfaces   | 179     | 58            |
| 1563     | Sharp blade; evidence of flaking on two surfaces; resembles Duff type 3A (cf. Duff, 1959: 134). Tang L. 46mm (Figs 166C)       | 110     | 41            |

The tang is roughly cut. They would once have been hafted to a wooden handle. No evidence of hafting has been found. Similar adzes have been recovered from the Society Islands (cf. Duff, 1959: 134, Kaeppler, 1978: 153).

**Shell Adze Blades.** MA1161: Shell adze blade fashioned from a large clam shell, *Tridacna maxima* (T. Whitehead, pers. comm., 1996). This adze is untanged, ground on both edges and the outside of the shell forms the back of the blade. L. 82mm. Blade W. 42mm.

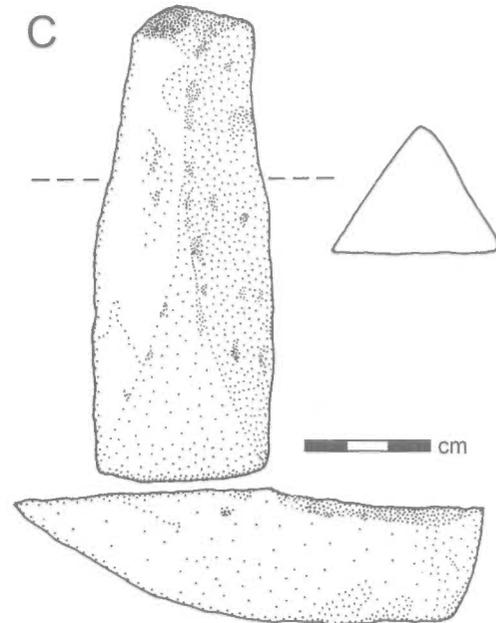
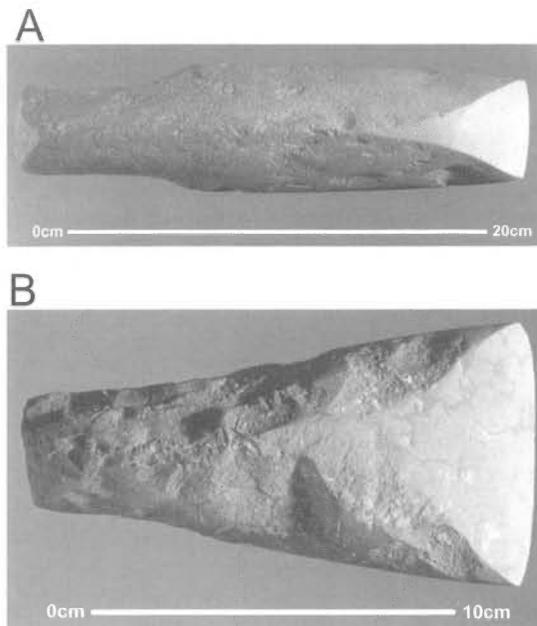


FIG. 166. Adze blades; A, MA1123; B, MA1311; C, MA1563.

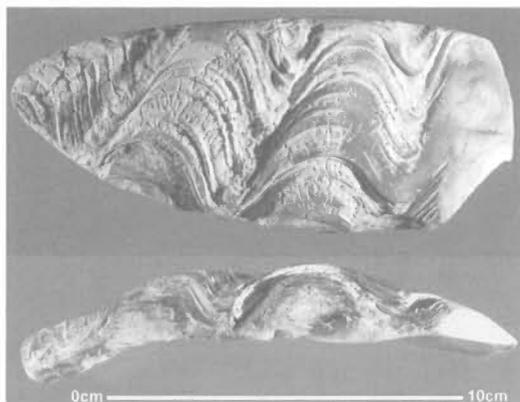


FIG. 167. Shell adze, MA1699.

MA1699: Shell adze blade. Fashioned out of the large clam shell, *Tridacna maxima* (T. Whitehead, pers. comm., 1996). This adze is untanged, ground on both edges and the outside of the shell forms the back of the blade. L. 137mm. Blade W. 56mm (Fig. 167).

#### FISHHOOKS

**One-piece fishhooks.** MA1435: Rotating fishhook with knobbed line attachment. Made from *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). L. 78mm. W. 42mm. Th. 7mm (Fig. 168A).

MA4101: Fishhook with knobbed line attachment. Made from coconut. L. 60mm. W. 36mm (Fig. 168B).

**Two Component Fishhooks (Shanks).** The following shell objects are shanks from two component fishhooks known as the West Polynesian type (cf. Kaeppler, 1978: 235;

Hauser-Schaublin, 1998: 322). The shanks were recovered separately, however, the complete object would have been a shank lashed to a shell hook with a fine plaited line possibly made from coconut fibres (Hauser-Schaublin, 1998: 322).

MA157: Fishhook shank fragment. Made from an unidentified shell species (T. Whitehead, pers. comm., 1996). Shell carved to a point with a drilled hole for line attachment. Broken and partially covered in concretion. L. >35mm. Maximum W. 14mm. Hole diam. 4mm (Fig. 169A).

MA1509: Fishhook shank fragment. Made from an unidentified shell species (T. Whitehead, pers. comm., 1996). Shell carved to a point with a drilled hole for line attachment. Broken along shank. L. >36mm. Maximum W. 8mm (Fig. 169B).

MA4113: Fishhook shank. Made from a species of pearl shell, *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). Carved to a point at one end and bluntly finished at the other end. A drilled hole at the pointed end and an etched horizontal groove carved in the blunt end were for line attachment. L. 84mm. Maximum W. 12mm (Fig. 169C).

MA4162: Fishhook shank. Made from a species of pearl shell, *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). Carved to a point at one end and bluntly finished at the other end. A drilled hole in the pointed end was for line attachment. L. 88mm. Maximum W. 10mm (Fig. 169D).

**Three Component Fishhooks (Facing Plates).** The following shell objects are the facing plates from three component fishhooks of the classic Tongan style used for catching bonito (cf.

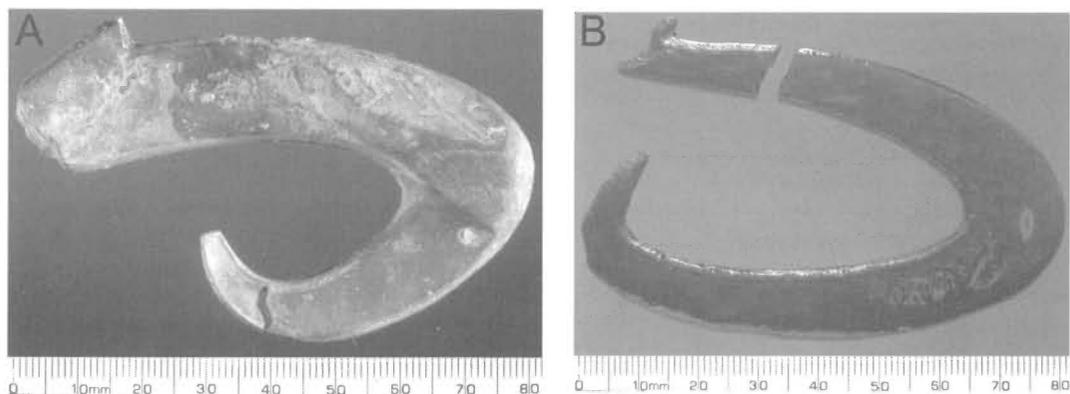


FIG. 168. A, one-piece shell, MA1435; B, one-piece coconut fish hook, MA4101.

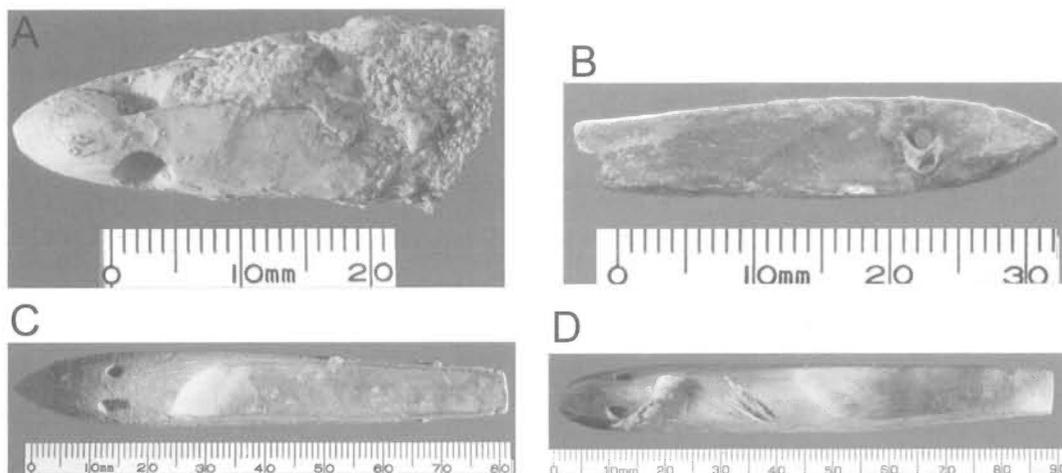


FIG. 169. Two component fish hook shanks; A, MA157; B, MA1509; C, MA4113; D, MA4162.

Kaeppler, 1978: 235, Hauser-Schaublin, 1998: 322). They were recovered separately, however as a complete object the facing plate would have been attached at both ends to a shank usually made from whalebone. A hook made from a species of pearl shell was commonly lashed to the shank.

MA1550/1: Fishhook facing plate. Made from an unidentified shell species. Carved into a flat spatula shape with a point at one end. Broken along the shank. Two holes for line attachment are drilled through the tip. Lightly covered in concretion. L. >118mm. Maximum W. 27mm (Fig. 170A).

MA1500/2: Fishhook facing plate. Made from a species of pearl shell, *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). Carved into a flat spatula shape with a point at one end. Broken along the shank. Two holes for line attachment at each end. L. 122mm. Maximum W. 31mm (Fig. 170B).

MA1567: Fishhook facing plate. Made from a species of pearl shell, *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). Carved into a flat spatula shape with a point at one end and bluntly finished at the other end. Two holes for line attachment at each end. L. 148mm. Maximum W. 28mm (Fig. 170C).

MA1723: Fishhook facing plate. Made from a species of pearl shell, *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). Spatula shaped with a point at one end and bluntly finished at the other end. L. 115mm. Maximum W. 25mm (Fig. 170D).

MA1730: Fishhook facing plate. Made from an unidentified shell species (T. Whitehead, pers. comm., 1996). Spatula shaped with a point at one end and bluntly finished at the other end. A u-shaped hole for twine attachment drilled through both ends. L. 110mm. Maximum W. 18mm.

MA4072: Fishhook facing plate. Made from a species of pearl shell, *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). Spatula shaped with a point at one end and bluntly finished at the other end. Hole drilled at the pointed end. L. 95mm. Maximum W. 14mm.

**Three Component Fishhooks (Shanks).** The following carved bone objects are the shanks from three component fish-hooks of the classic Tongan style used for catching bonito (cf. Kaeppler, 1978: 235, Hauser-Schaublin, 1998: 322). They were backed by a facing plate carved from a species of shell (see above) and attached by cord to a hook usually made of turtle shell (Kaeppler, 1978: 235).

MA21: Fishhook bone shank. Attachment points at both ends. Possibly carved from whalebone (S. Van Dyck, pers. comm., 1995). L. 145mm. Maximum W. 33mm (Fig. 170E).

MA690: Fishhook bone shank. Attachment points at both ends. Possibly carved from whalebone (S. Van Dyck, pers. comm., 1995). L. 152mm. Maximum W. 26mm. Th. 18mm (Fig. 170F).

MA1500: Fishhook bone shank. Attachment points at both ends. Possibly carved from

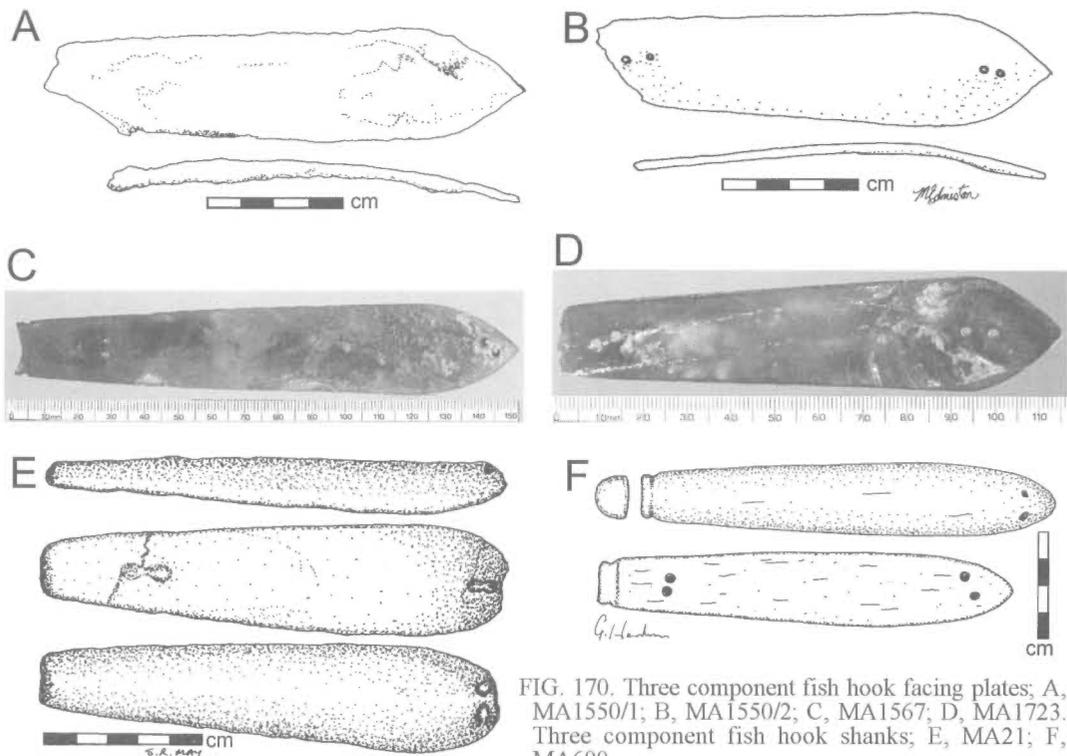


FIG. 170. Three component fish hook facing plates; A, MA1550/1; B, MA1550/2; C, MA1567; D, MA1723. Three component fish hook shanks; E, MA21; F, MA690.

whalebone (S. Van Dyck, pers. comm., 1995). L. 130mm. Maximum W. 22mm. Th. 10mm.

MA4091: Fishhook bone shank. Attachment points at both ends. Possibly carved from whalebone (S. Van Dyck, pers. comm., 1995). L. 142mm. W. 31mm.

#### STONE POUNDERS

MA1143: Stone pounder. Made from fine-grained intermediate to basic volcanic rock (W. Delaney, pers. comm., 1996). Consists of one piece of stone fashioned into a flared circular base, round grip and an upward curved bar handle. It is ground on all surfaces. Used in Polynesia to pound breadfruit, taro or other fruit to create a mash called *poi* which was an important food staple (Barrow, 1972: 96). Evidence of use-wear is demonstrated by pitting in the base. H. 150mm. Base diam. 130mm. (Fig. 171).

MA4138: Stone pounder. Made from fine-grained intermediate to basic volcanic rock (W. Delaney, pers. comm., 1996). Consists of one piece of stone fashioned into a flared oval base, round grip and a flared bar handle.

Evidence of use-wear is demonstrated by pitting in the base. H. 115mm. Base diam. 125mm.

#### OCTOPUS LURE COMPONENTS

MA776: Modified cowrie shell. *Cypraea maculifera* (T. Whitehead, pers. comm., 1996). Basic structure of the shell is intact but part of the aperture has been chipped away into a semi-circular shape and two holes drilled into the top surface. A probable component of an Eastern Polynesian octopus lure (M. Eddowes, pers. comm., 1998). L. 58mm. W. 42mm (Fig. 172A).

MA777: Modified cowrie shell. A very large specimen of *Cypraea maculifera* (T. Whitehead, pers. comm., 1996). Basic structure of the shell is intact but part of the aperture has been chipped away into a semi-circular shape and two holes drilled into the top surface. A probable component of an Eastern Polynesian octopus lure (M. Eddowes, pers. comm., 1998). L. 81mm. W. 54mm. Depth 38mm. Drilled hole diam. 7mm (Fig. 172C, D).

MA778: Modified cowrie shell. *Cypraea tigris* (T. Whitehead, pers. comm., 1996). The top of

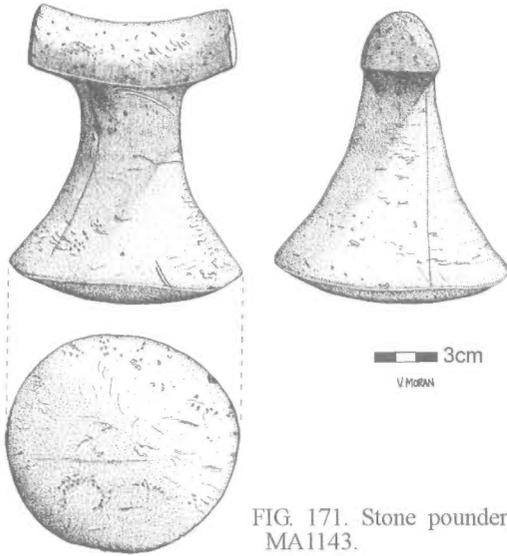


FIG. 171. Stone pounder, MA1143.

the shell has been ground into an oval dish shape with a hole drilled at either end. A possible component of a Tongan octopus lure. Similar shells fastened to stone sinkers were collected in Tonga on the Cook voyages (Kaepler, 1978: 234). L. 65mm. W. 49mm. Drilled hole diam. 4mm (Fig. 172E, F).

MA1396: Modified cowrie shell. *Cypraea tigris*. The top of the shell has been ground into an oval dish shape with a hole drilled at either end. A possible component of a Tongan octopus lure. Similar shells fastened to stone sinkers were collected in Tonga on the Cook voyages (Kaepler, 1978: 234). L. 49mm. W. 38mm. Drilled hole diam. 4mm.

TAHITIAN MOURNING GOWN COMPONENTS

**Pearl shell slips.** Several rectangular slips of pearl shell have been recovered and are listed below. Made from a species of *Pinctada* (T. Whitehead, pers. comm., 1996), a minute hole has been drilled at one end for attachment purposes. Possibly part of chest apron of a Tahitian mourning gown (cf. Kaepler, 1978: 124).

MA668, L. 27, W. 3, Th.1 (Fig. 173A); MA1182, L.21, W.2, Th.1 (Fig. 173B), MA1755, L.33, W.2, Th.1 (Fig. 173C). All measurements are in mm.

**Coconut Discs.** MA4123: Worked coconut object. A flat oval disc with a hole drilled at either end. Shaped from a coconut kernel. Possibly part

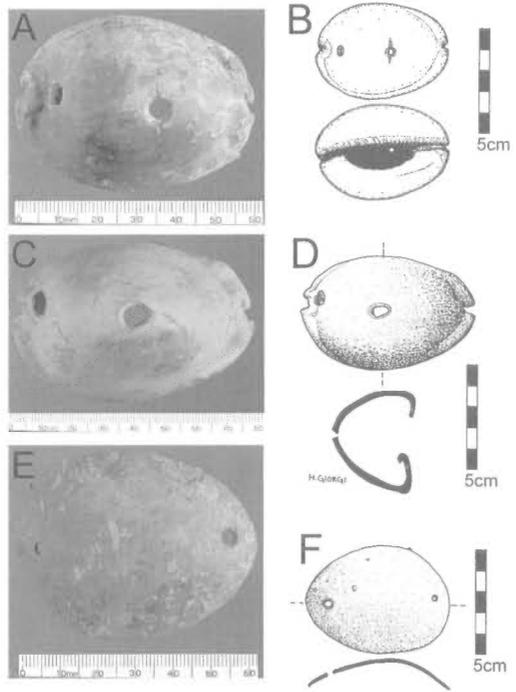


FIG. 172. Octopus lure components; A, B, MA776; C, D, MA777; E, F, MA778.

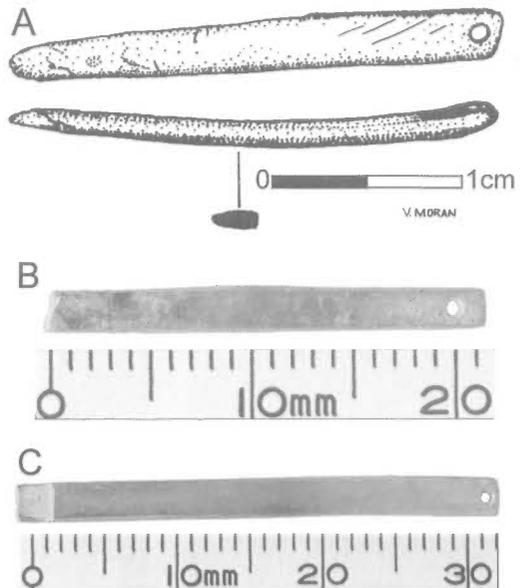


FIG. 173. Rectangular slips of pearl shell from a Tahitian mourning gown; A, MA668; B, MA1182; C, MA1755.

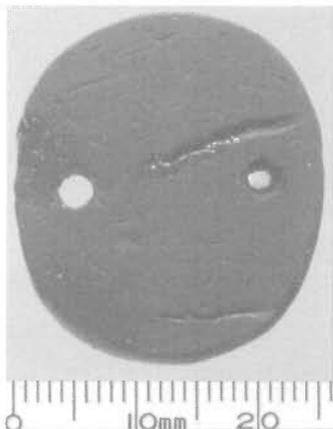


Fig. 174. Worked coconut disc, MA4123

of the apron from a Tahitian mourning gown (cf. Kaeppler, 1978: 124). L. 29mm (Fig. 174).

MA4143: Worked coconut disc. A flat oval disc with a drilled hole at either end. Possibly part of the apron from a Tahitian mourning gown (cf. Kaeppler, 1978: 124). L. 24mm.

#### OTHER ETHNOGRAPHIC SHELL OBJECTS

MA1388: Worked shell fragment. Made from the species *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). Flat and almost square with a hole drilled in three corners. Polished surfaces.  $>55 \times >50$ mm. Hole diam. 4mm (Fig. 175A).

MA1609: Worked pearl shell fragment. Made from the species *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). A flat disc with a hole drilled on one edge. Polished surfaces. L.  $>33$ mm. Maximum diam. 35mm. Hole diam. 4mm (Fig. 175B).

MA1722: Shell bracelet. Made from the lower part of the trochus shell, *Trochus niloticus* (T. Whitehead, pers. comm., 1996). The outside of shell displays signs of polishing. These bracelets are found in the region of Vanuatu (Hauser-Schaublin, 1998: 333). O.D. 112mm. I.D. 84mm (Fig. 175C).

MA1724: Worked pearl shell fragment. Made from the species *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). A flat disc with a hole drilled on one edge. Polished surfaces. Maximum diam. 34mm. Hole diam. 4mm (Fig. 175D).

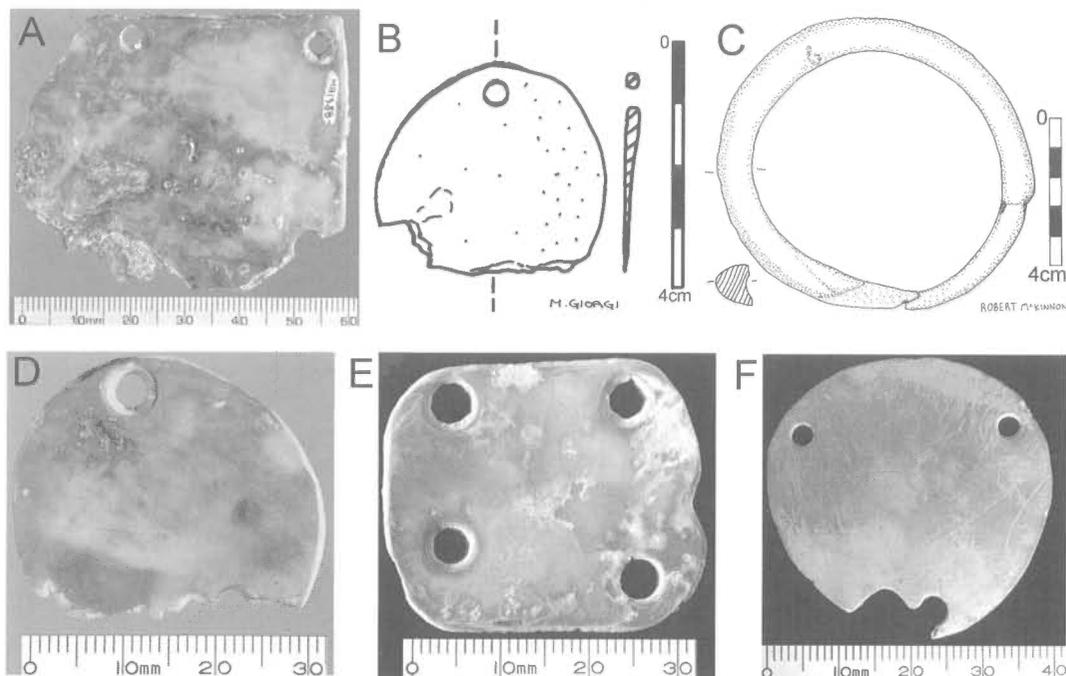


FIG. 175. A, worked shell fragment, MA1388; B, worked pearl shell fragment, MA1609; C, shell bracelet, MA1722. D-F, worked pearl shell; D, MA1724; E, MA1780; F, MA4067.



FIG. 176. Shell trumpet, MA1740.

MA1740: Shell trumpet. Made from the species *Charonia tritonis* (Whitehead, pers. com. 1996). The shell has a blow-hole chipped through the third whorl from the end. A similar shell trumpet was recovered from the Society Islands on either Cook's first or second voyage and is now housed in the Cambridge University Museum (cf. Kaeppler, 1978: 144). When complete this trumpet possibly had a mouthpiece of a nut and a section of bamboo and fibre band attached along its length as a handle (cf. Hauser-Schaublin, 1998: 333). Alternatively the mouthpiece could have been made of gum (cf. Kaeppler, 1978: 144). Used as a signalling instrument (Hauser-Schaublin, 1998: 324). L. 360mm. W. 174mm (Fig. 176).

MA1780: Worked pearl shell. Made from the species *Lopha cristagalli* (T. Whitehead, pers. comm., 1996). Flat, almost square plate with rounded edges and a hole drilled in each corner. Polished surfaces. 30 × 35mm. Hole diam. 5mm (Fig. 175E).

MA4067: Worked pearl shell. Made from the species *Pinctada margaritifera* (T. Whitehead, pers. comm., 1996). A flat disc with three holes equidistantly drilled around the edges. A small piece broken off one edge. Polished surfaces. Diam. 39mm (Fig. 175F).

#### SHARK TOOTH

MA4103: Shark tooth. Species unidentified. Small hole drilled into the base. Possibly part of an incising tool used in Tongan club decoration (cf. Kaeppler, 1978: 233). Alternatively, it could

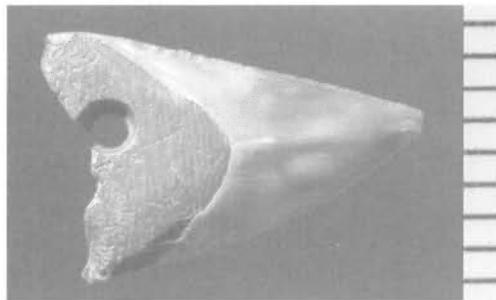


FIG. 177. Shark tooth, MA4103.

have been part of a Tahitian breast gorget (cf. Kaeppler, 1978: 12). L. 12mm (Fig. 177).

#### WOODEN WAR CLUBS

MA1351: Wooden club. Carved from the species *Casuarina equisetifolia* (M. Cause, pers. comm., 1996). A tapered cylindrical shank widening out into a diamond-shaped head. In a worn and degraded condition, any surface decoration has worn off. Using Churchill's typology (cf. Churchill, 1917: 56), this club is known as the 'coconut stalk' or *apa'apai* form. Probably of Tongan origin (M. Quinnell, pers. comm., 1997). L. 400mm. Maximum diam. 60mm (Fig. 178A).

MA1394: Wooden club. A tapered cylindrical shank widening out into a spatula shaped flattened head. Although in a worn and degraded condition, there is some evidence of incised surface decoration including a banded zigzag design. Using Churchill's typology (cf. Churchill, 1917: 63), this club is known as the 'paddle' form. Probably of Tongan origin (M. Quinnell, pers. comm., 1997). L. 870mm. Maximum W. 55mm (Fig. 178B).

MA1395/1: Wooden club. A tapered cylindrical shank widening out into a diamond shaped head. Using Churchill's typology, this shape is known as the 'coconut stalk' type (Churchill, 1917: 56). Probably of Tongan origin (M. Quinnell, pers. comm., 1997). L. 605mm. Maximum W. 94mm (Fig. 178C).

MA1395/2: Wooden club. A tapered cylindrical shank. Although worn and degraded, there is some evidence of incised surface decoration including basketry, vertical lines and a banded zigzag design. Broken at the head. Probably of Tongan origin (M. Quinnell, pers. comm., 1997). L. 660mm. Maximum W. 50mm (Fig. 179).

#### QUIVER CAP

MA4141: Quiver cap. Fashioned from an immature coconut with a drilled hole on either

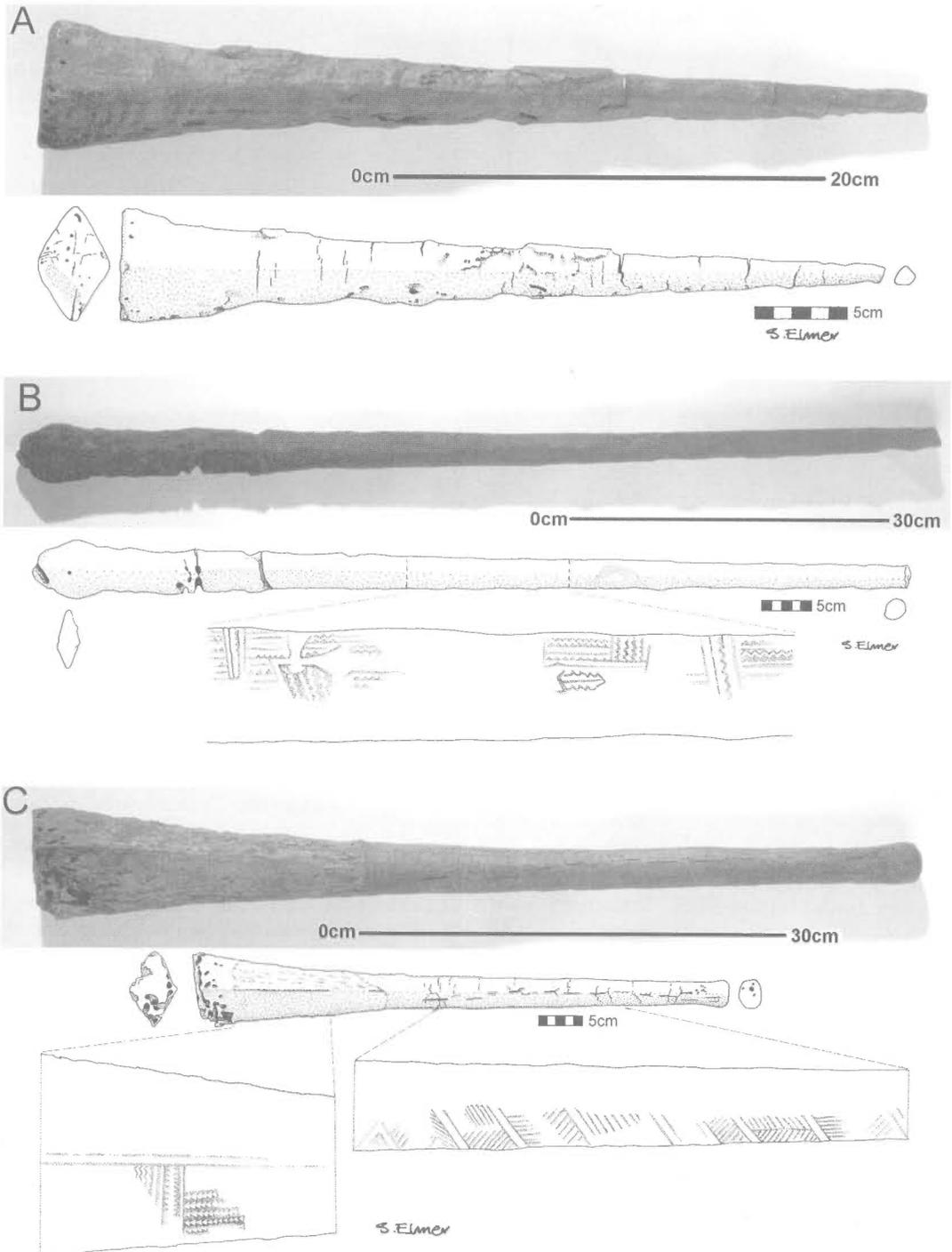


FIG. 178. Wooden clubs; A, MA1351; B, MA1394; C, MA1395/I.

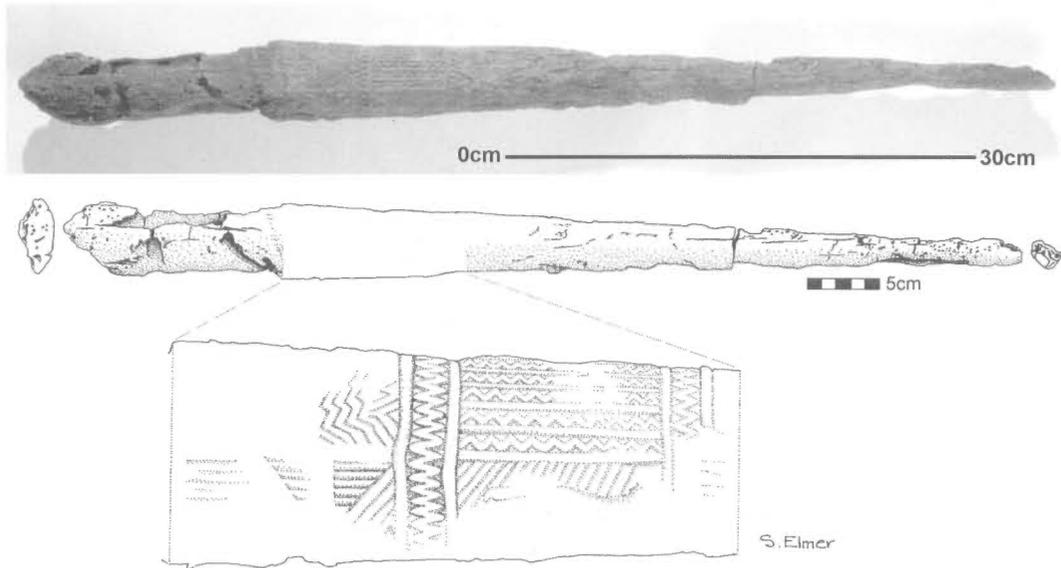


FIG. 179. Wooden club; MA1395/2.

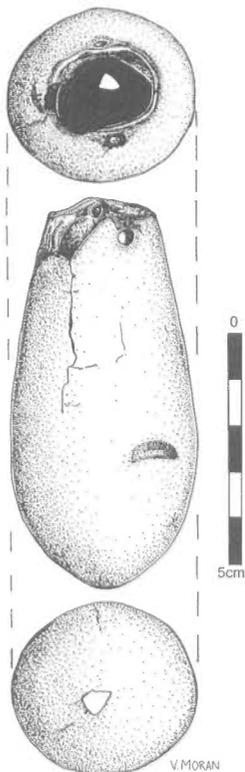


FIG. 180. Quiver cap, MA4141.

side of the opening for twine attachment (cf. Kaeppler, 1978: 144). L. 82mm. Maximum diam. 36mm (Fig. 180).

#### NATURAL HISTORY SPECIMENS

The *Pandora* assemblage includes a large collection of shell specimens. While shells do occur naturally at the wrecksite, the specimens excavated from the *Pandora* (depth of 33m) are frequently large examples of their species or shells usually found on the reeftop and not in deep water. In other cases, some shells have been found in unnatural clusters, possibly indicating deliberate collection (T. Whitehead, pers. comm., 1996). The shell collection presented below was identified by Thora Whitehead and Darryl Potter of the Marine Science Laboratory at the Queensland Museum.

In the 18th century, objects of nature collected during voyages to exotic places were known as 'natural curiosities'. 'Natural curiosities' included shell, bird, fish, insect, plant and mineral specimens. Shells were easy for crew members to collect as they presented few storage problems (Kaeppler, 1978: 37).

#### *Gastropods*

Cypraeidae (Cowrie shell). *Cypraea tigris*: MA779, L. 93, W. 65 (Fig. 181A); MA1120, L. 92, W. 67; MA1189, L. 97, W. 71; MA1190, L. 83, W.

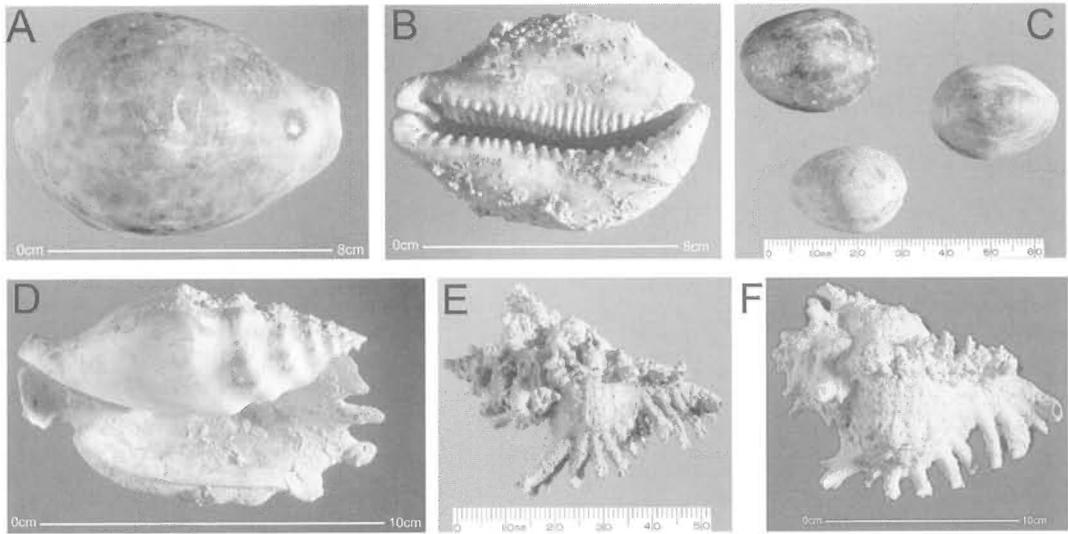


FIG. 181. A, B, cowrie shells, *Cypraea tigris*; A, MA779; B, MA4020. C, cowrie shells, *Cypraea caputserpentis*, MA1811/1-3; D, stromb shell, *Strombus sinatus*, MA1372. E, F, murex shell, *Chicoreus brunneus*; E, MA1807; F, MA3015.

54; MA1238, L.94, W.69; MA1333, L.97, W.70; MA1345, (hole in the side is probably natural wear (D. Potter, pers. comm., 1996)), L. 85, W. 40; MA1468, L. 87, W. 64; MA1672, L. 89, W. 60; MA1814, L. 79, W. 54; MA4020, L. 93, W. 66 (Fig. 181B); MA4048, L. 22, W. 18. *Cypraea caputserpentis*: MA1811/1, L. 30, W. 22; MA1811/2, L. 26, W. 20 (Fig. 181C). *Cypraea* sp.: MA4153 (heavily concreted), L. 38, W. 30. *Cypraea carneola*: MA4202, L. 36, W. 28.

Strombidae (Stromb shell). *Strombus sinuatus*: MA1372, L.110mm (Fig. 181D).

Muricidae (Murex shell). *Chicoreus ramosus*: MA1497, L. 210, W. 150; MA3015, L. 150, W. 93 (Fig. 181F). *Chicoreus brunneus*: MA1807, L. 57, W. 45 (Fig. 181E).

Terebridae (Auger shell). *Terebra maculata*: MA678/1, L. 155; MA1678/2 (Fig. 182), L. 140; MA4035, L. 135; MA4084, L. 115; MA4199, L. 120.

Buccinidae (Dwarf triton shell). *Colubraria muricata*: MA1800, L. 76, W. 30 (Fig. 183A).

Conidae (Cone shell). Possibly *Conus leopardus* (Whitehead, 1994: pers.comm.): MA1808, L. 106 (Fig. 183B). *Conus textile*: MA4069 (Fig. 183C). *Conus eburneus*: MA4120, L. 38.

Turbinellidae (Vase shell). *Tudivasum armigera* ( $\times 3$ ): MA1813, L. of the largest shell 101 (Fig. 183D).

Volutidae (Volute shell). *Cymbiola rutila*: MA4179, L. 80.

(All measurements in mm).

#### Bivalves

Veneridae (Venus shell). *Antigona clathrata*: MA1000, L. 80, W. 90, D. 58.

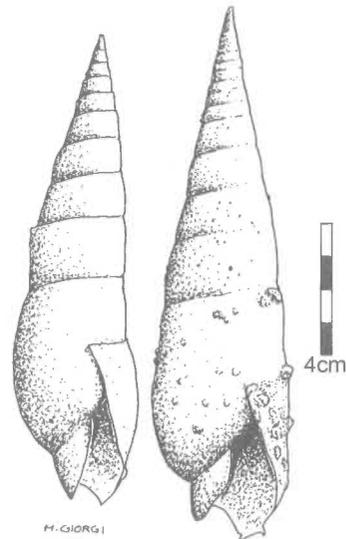


FIG. 182. Two auger shells, *Terebrida maculata*, MA1678/2

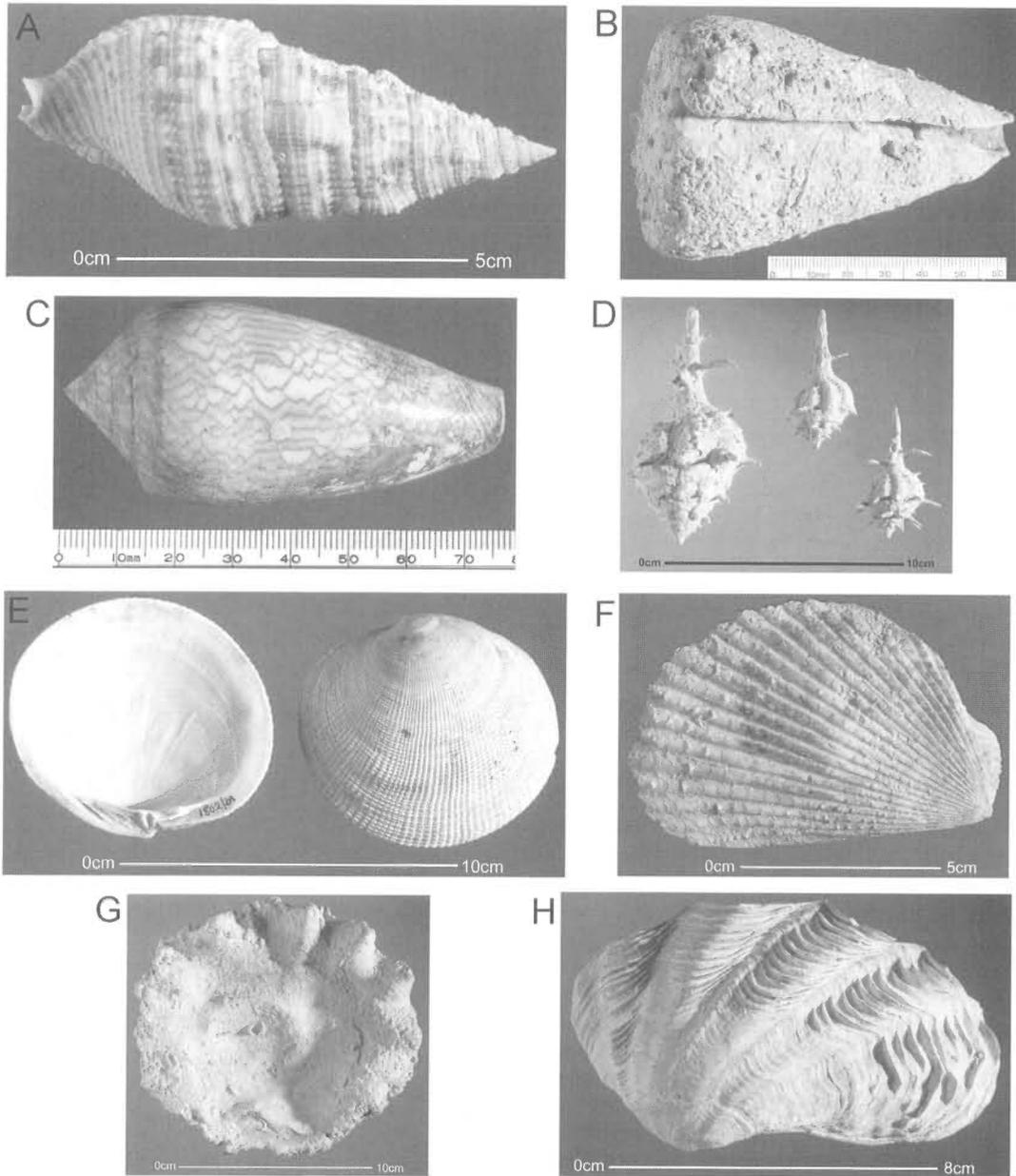


FIG. 183. A, dwarf triton shell, *Colubraria muricata*, MA1800; B, cone shell; possibly *Conus leopardus*, MA1808; C, cone shell, *Conus textile*, MA4069; D, vase shells, *Tudivasum armigera*, MA1813; E, lucina cockle, *Odakia tigerina*, MA1802; F, file shell, *Lima lima vulgaris*, MA1801; G, honeycomb oyster shell, *Hyotissa hyotis* (one valve), MA1804; H, giant clam, *Tridacna maxima* (one valve), MA1805.

Lucinidae (Lucina cockle): 18 large intact specimens of the Lucina cockle (*Codakia tigerina*). The largest of these has a maximum width of 135mm. The cockles are listed below by

accession number. Some numbers represent more than one bivalve. MA1273: 1275; 1360; 1365; 1430; 1444; 1632; 1674; 1746; 1747; 1768; 1802 (Fig. 183E); 4075; 4098.

Limidae (File shell). *Lima lima vulgaris*: MA1801 (Fig. 183F).

Ostreidae (Honeycomb oyster shell). *Hyotissa hyotis*: MA1803 (Fig. 183G), W. 170; MA1804 (one valve), L. 125, W. 140.

Tridacnidae (Burrowing clam). *Tridacna maxima*: MA1805 (one valve) (Fig. 183H), L. 108, W. 62.

Spondylidae (Thorny oyster). *Spondylus sinensis*: MA3007 (excluding spines), L. 70, W. 68. *Spondylus squamosus*: MA4170, (covered in concretion), L. 68.

(All measurements in mm).

### MISCELLANEOUS OBJECTS

#### PIPES

MA731: Claypipe. Bowl and a segment of stem. Raised ribbed decoration on bowl. Stem parallel with the top of the bowl. Sharp spur with initial 'A' on one side and initial 'Q' on the other side. Tan coloured clay. L. 75mm. Bowl diam. 25mm. Bowl Ht. 50mm (Fig. 184A, B).

MA1168: Pipe component. Bowl with a short horn-shaped stem. More vitrified than conventional claypipes and has the appearance of grey, mottled stoneware. The bowl is decorated with an incised line and verticle wedge shapes. A raised section on the heel is decorated with pairs of incised horizontal lines. The user added his or her own stem to this type of pipe (Sullivan, 1986: 90). L. 42mm. Bowl diam. 29mm. Bowl Ht. 36 (Fig. 185).

MA4034: Claypipe segment. Stem only. Round in cross-section. L. 57mm. Stem diam. 5mm. Bore diam. 2mm.

#### GLASS BEADS

Glass beads were an important trade item on 18th century Pacific voyages. Along with iron objects such as nails and hatchets, they were exchanged for ship's provisions and 'curiosities'. For the entire period of 18th century Pacific discovery voyages, accounts of exchanges between Europeans and Pacific islanders abound with references to glass beads as a staple item of trade. For instance, Forster mentions how he acquired '... a small dart, two small fishhooks & a small bit of green stone ... for a couple of nails and beads ...' during Cook's second voyage in 1773-4 (Hoare, 1982: 289).

The number of glass beads recovered from the *Pandora* to date is low. This could be related to

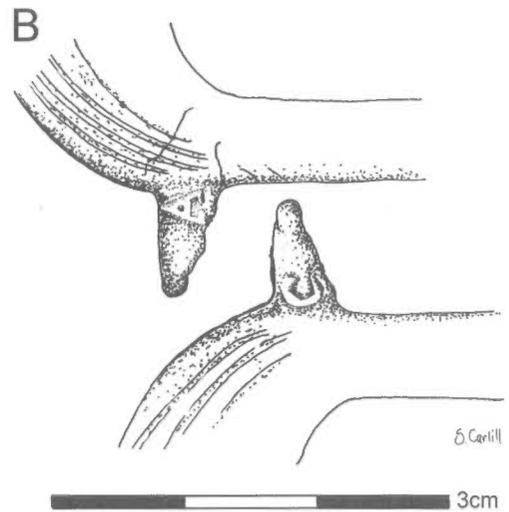
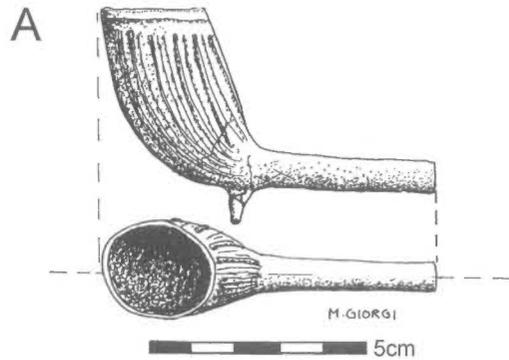


FIG. 184. A, claypipe, MA731; B, spur detail.

the fact that excavation has been limited to certain parts of the shipwreck and beads may yet be located in larger quantities elsewhere.

Another explanation may be that the bulk of the beads which were part of the *Pandora*'s trade goods supply had already been expended by the time the vessel sank. Alternatively, the *Pandora* may not have been carrying large quantities of beads to begin with because by the 1790s they were actually considered by some to be an inappropriate trade item. Evidence supporting the latter explanation can be inferred from Archibald Menzies' letter to Sir Joseph Banks in which Banks is advised that beads should not be considered an appropriate trade item, especially not along the coast of North West America '... at Nootka we found copper the article most sought after and in this we were very

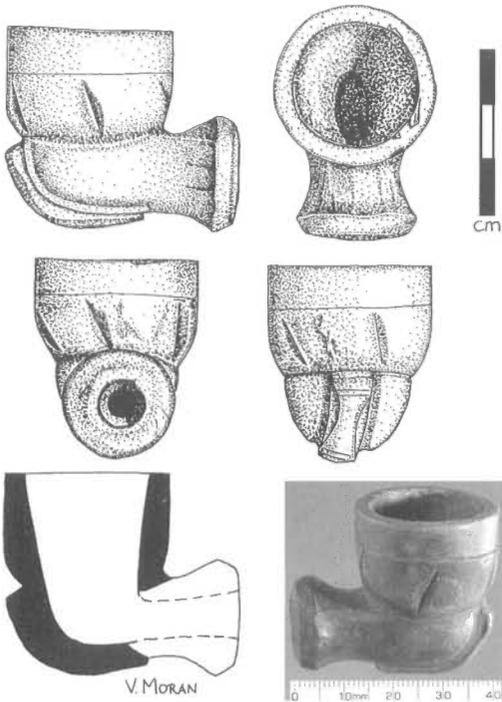


FIG. 185. Pipe bowl with a short horn-shaped stem, MA1168.

deficient', Menzies goes on to say that there was such an oversupply of beads that the Nootkans even adorned their dogs with them (ML Microfilms, Banks Papers FM4 23).

MA581: Fifteen simple tubular glass beads with monochrome bodies. Rounded edges and no surface decoration. 13 amber and 2 colourless. Diameters range from 1.5-3mm (cf. Karklins, 1985) (Fig. 186).

FACETTED STONE

MA1071: A single faceted black stone. Flat base with a dome-shaped surface made up of 23 facets. The flat base suggests it was originally set in a ring or a pendant type ornament. Ht. 8mm. W. 13mm (Fig. 187).

BOTANICAL REMAINS

MA53: Coconut fragments.

MA1331: Seedpod fragment. Oval shaped with one pointed end. Raised ridge running length. Possibly a type of palm nut (T. Clifford, pers. comm., 1994). L. 55mm. W. 38mm.



FIG. 186. Fifteen simple tubular glass beads, MA581 (strung together for collection purposes only).

MA1734: Several fragments of a brown leathery material. Possibly the outer skin of a plantain (T. Clifford, pers. comm., 1994).

MA4015: Seven coconut shell fragments.

MA4140: Coconut fragments.

FAUNAL REMAINS

MA660: Left humerus of a young pig. L. 127mm.

MINERALS

MA638, MA675: Vitreous black coal, possibly anthracite.

UNIDENTIFIED OBJECTS

IRON

MA38: Zig-zag shaped wrought iron artefact. Metal round in cross-section with a slight taper towards blunt ends. L. 635mm. Shank diam. 30mm.

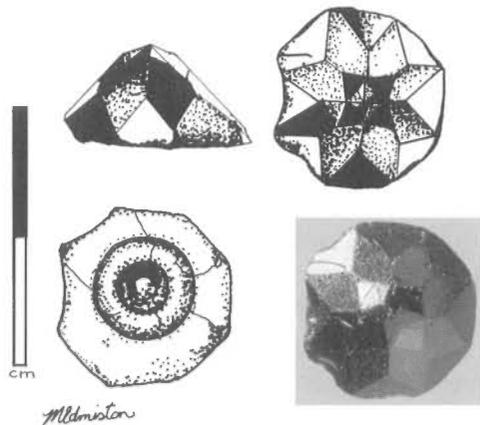


FIG. 187. Faceted stone, MA1071.

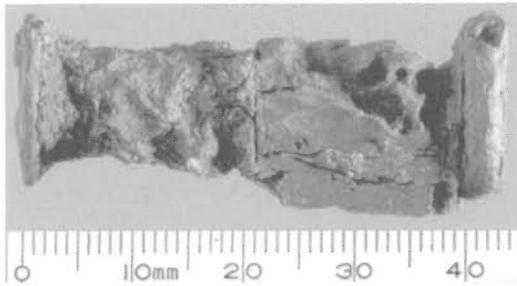


FIG. 188. Unidentified cast iron object, MA152.



FIG. 189. Wrought iron brace, MA645.

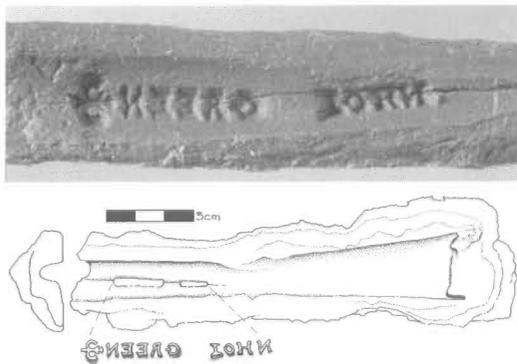


FIG. 190. Unidentified tool engraved with 'John Green' and possibly a broad arrow, MA1525.

MA152: Cast iron object. A cylindrical shank with flat disc-shaped heads at either end. L. 52mm. Head diam. 15mm. Shank diam. 9mm (Fig. 188).

MA645: Wrought iron brace. Backed by a thin veneer of wood. Dimensions are approximate as the object is covered in concretion. 250mm<sup>2</sup>. Depth 80mm. Th. 40mm (Fig. 189).

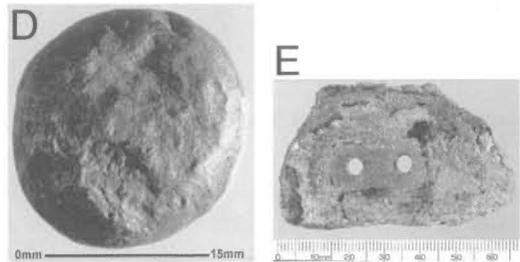
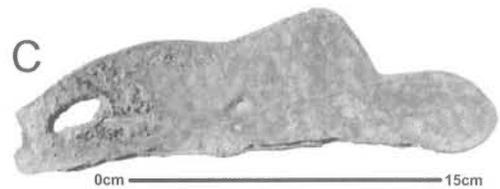
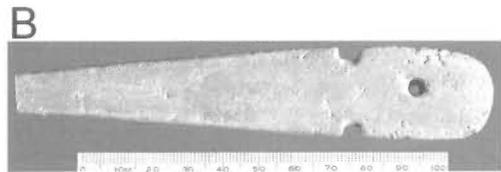
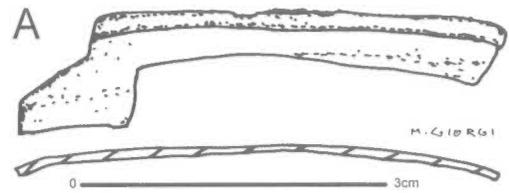


FIG. 191. A, worked shell fragment, MA1069; B, worked bone object, MA1121; C, pewter fragment, MA1358; D, lead weight, MA4094; E, leather fragment, MA1766.

MA1525: Impression in concretion of a wrought iron tool. Possibly a gouge. The name 'John Green'? and a mark (possibly a broad arrow) are engraved on the side. 'John' reads as a mirror image (Fig. 190).

#### SHELL

MA1069: Worked shell fragment. Undetermined species. L. 49mm. W. 6mm. Th. 1mm (Fig. 191A).

#### BONE

MA1121: Worked bone object. Flat spatula-shaped object. Bluntly finished with notches in either side and a drilled hole at one end. Possibly a Polynesian object collected during the voyage. L. 130mm. Maximum W. 25mm (Fig. 191B).

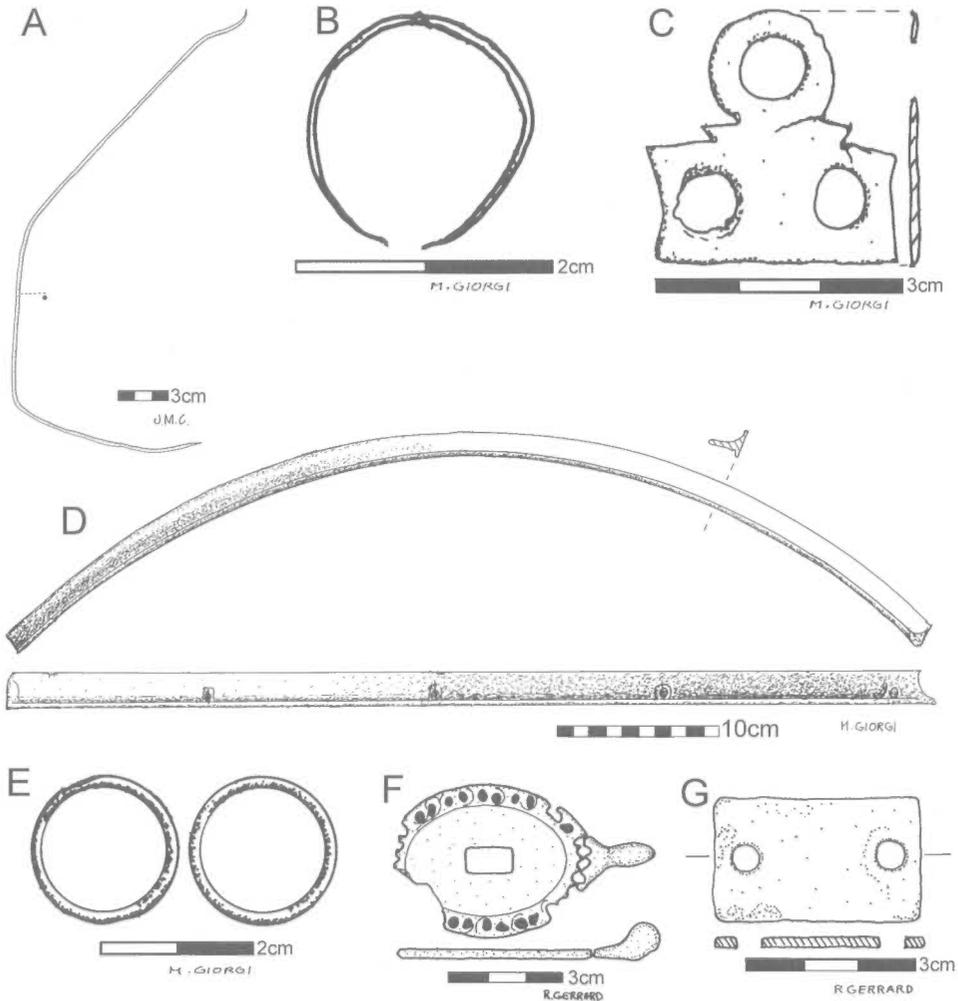


FIG. 192. A, copper alloy wire, MA129; B, copper alloy ring, MA145; C, copper alloy plate, MA515; D, brass rim, MA593; E, copper alloy rings, MA726, MA1122; F, copper alloy shell, possibly part of knuckle guard, MA1060; G, bronze platelet, MA1083.

#### PEWTER

MA1358: Flat pewter fragment. Ornate rounded edge. L. 230mm. Maximum W. 64mm. Th. 4mm (Fig. 191C).

#### LEAD

MA44: Lump of lead. Orange colour. Identified as lead oxide and lead carbonate (Queensland Government Chemical Laboratory, 1985).

MA1343: Lead rod. Shank round in cross-section with one tip chamfered and the other end blunt. L. 150mm. Diam. 5mm.

MA4094: Lead weight. Rounded disc-shaped. Diam. 24mm (Fig. 191D).

#### LEATHER

MA1766: Leather fragment. Rectangular plate impression with two holes in the centre.  $40 \times 60 \times 3$ mm (Fig. 191E).

#### COPPER ALLOY

MA12: Flat copper strap fragment. Tapered slightly towards each end. One end bluntly finished the other end broken off. L. 710mm. W. 18mm.

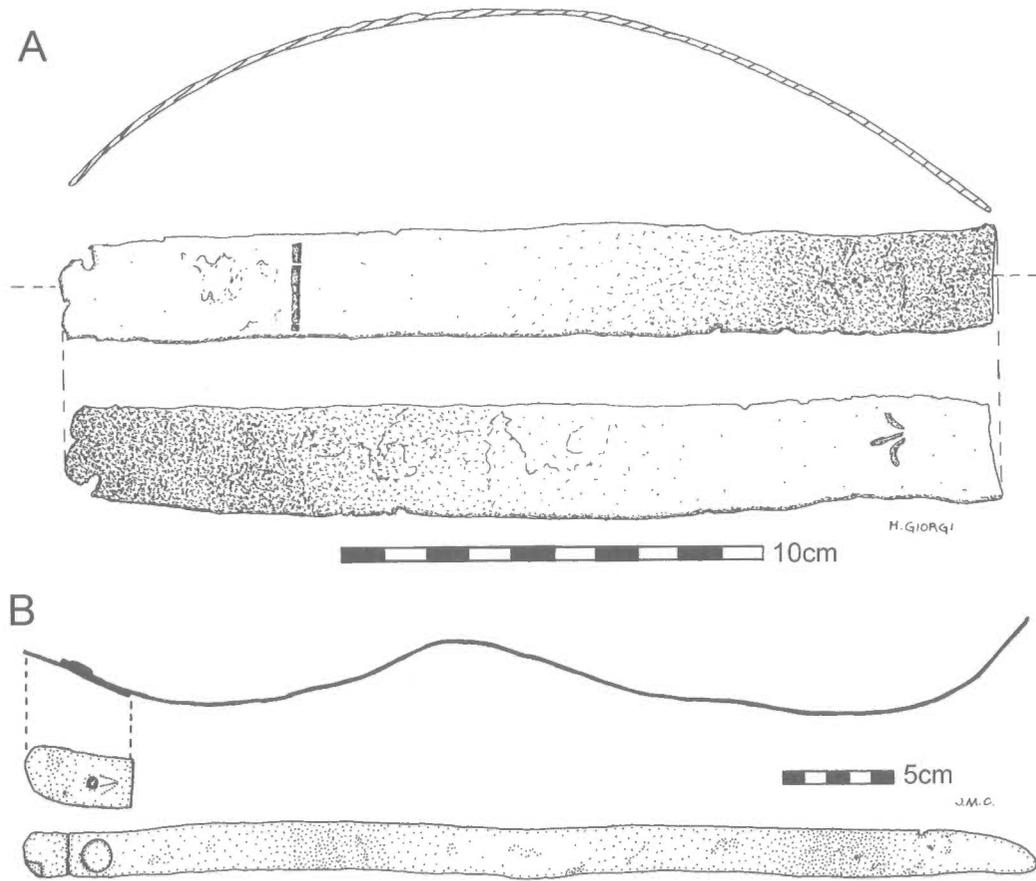


FIG. 193. Copper alloy strap fragments; A, MA1369; B, MA1785.

MA47: Buckled copper alloy strap. Rounded ends. L. 545mm if extended. W. 24mm. Th. 1mm.

MA129: Copper alloy wire. Shank round in cross-section. Tapered and pointed at both ends. Possibly a gouge to clean the touch hole of a cannon or to pierce the powder charge of a cartridge. L. 39mm if extended. Diam. 3mm (Fig. 192A).

MA145: Copper alloy ring. Metal flattened with rounded corners and not joined. Diam. 17mm. Th. metal 1mm (Fig. 192B).

MA515: Thin rectangular plate with a protruding ring attached to one side. Possibly part of a catch or latch. Two circular openings in the rectangular section. L. 27mm. Ring diam. 7mm. Th. of metal 1mm (Fig. 192C).

MA520: Flange fitting. Flat bowl shape with central hole and cylindrical shaft. Diam. 45mm. Hole diam. 22mm. Depth 30mm.

MA593: Brass rim. Curved with four equidistant threaded holes. L. 600mm. W. 22mm (Fig. 192D).

MA726, 1122 : Identical copper alloy rings. Diam. 19mm (Fig. 192E).

MA1039: Copper alloy object. Round in cross-section and tapered. Five evenly spaced indented parallel lines encircle the object. L. 20mm. Maximum W. 16mm. Minimum W. 11mm.

MA1060: Copper alloy shell. Possibly part of a knuckle guard from a sword hilt. 40 × 7mm (Fig. 192F).

MA1083: Bronze platelet. Rectangular with two circular openings at either end. L. 37mm. W. 21mm. Metal Th. 2mm (Fig. 192G).

MA1158: Copper alloy strap fragment. L. 85mm. W. 20mm. Th. 2mm.

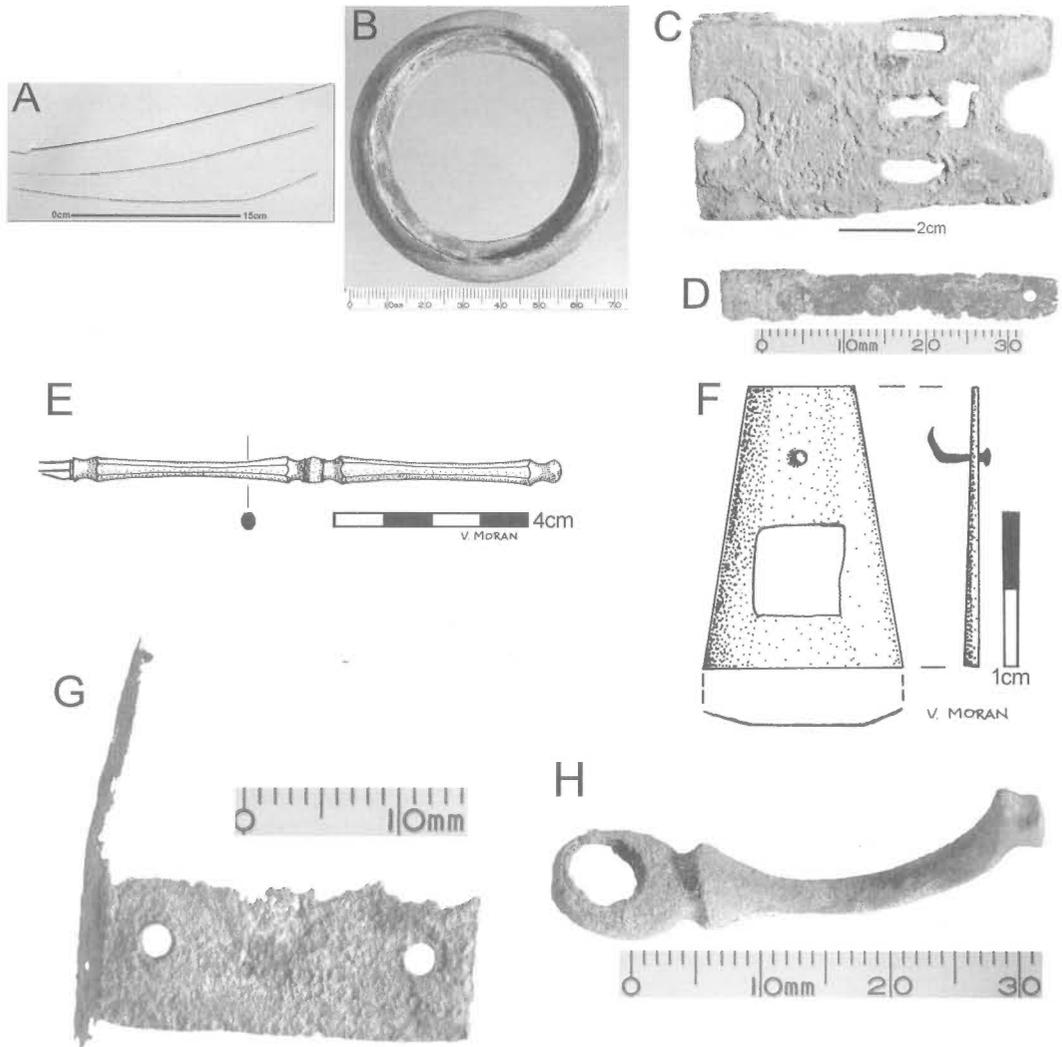


FIG. 194. Copper alloy objects; A, rods, MA4003; B, ring, MA4038; C, plate, MA4041; D, strap, MA4095; E, rod, MA4114; F, unknown, MA4116; G, unknown, MA4155; H, fitting, MA4165.

MA1162: Buckled copper alloy strap fragment. Rounded tip at one end and bluntly finished at the other end. L. if extended 260mm. W. 25mm.

MA1308: Hollow copper alloy tube. Attached to a fragment of wood. Soldered along vertical seam. L. 120mm. Diam. 19mm.

MA1369: Copper alloy strap fragment. Broad arrow embossed on side. Possibly a barrel strap. L. 235mm. W. 24mm. Th. 2mm (Fig. 193A).

MA1370: Curved copper alloy strap fragment. Broken off at both ends. L. if extended 290mm. W. 23mm.

MA1758: Hollow copper alloy cylinder. L. 160mm. Diam. 19mm. Metal Th. 2mm.

MA1785: Copper alloy strap fragment. Two segments rivetted together. Broad arrow embossed on side. L. 430mm. W. 23mm. Rivet diam. 15mm (Fig. 193B).

MA4003/1-3, 4182/1-2: Five thin copper alloy rods. Rectangular in cross-section. A hole in one end. L. 293mm (Fig. 194A).

MA4014: Thin copper alloy rod. Rectangular in cross-section. L. 305mm. Sides 3 × 2mm.

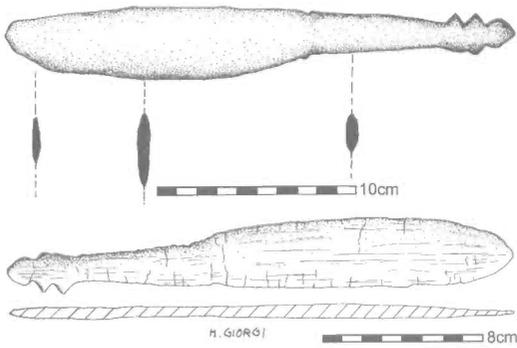


FIG. 195. Wooden object, MA86.

MA4027: Two copper alloy rods. Broken in two. Round in cross section. Pointed ends. L. 335mm.

MA4038: Copper alloy ring. Flat with a raised rim on one side. Threaded inner surface. Diam. 73mm. I. D. 50mm. Depth 7mm (Fig. 194B).

MA4041: Copper alloy object. L. 70mm (Fig. 194C).

MA4095: Thin copper alloy strap. Small hole in one end. L. 39mm. W. 5mm (Fig. 194D).

MA4114: Ornate copper alloy rod. Two grooves at the base possibly for attachment purposes. L. 108mm. Maximum diam. 5mm (Fig. 194E).

MA4116: Copper alloy object. Attached copper alloy nail. L. 36mm. Maximum W. 25mm. Minimum W. 13mm. Square opening 11mm<sup>2</sup>. (Fig. 194F).

MA4155: Copper alloy fragment with two attachment holes. L. 31mm. Nail hole diam. 2mm (Fig. 194G).

MA4165: Copper alloy fitting. Curved stem with a hole in one end. Metal round in cross-section. L. 38mm. Hole diam. 5mm (Fig. 194H).

MA4180: Rectangular copper alloy strap. L. 24mm. W. 7mm. Th. 3mm.

#### WOOD

MA63: Thin wooden disc-shaped object. One side partly missing. Possibly a segment of a pill box. In the late 18th century, pharmacists manufactured their own pill boxes. These were generally hand-made using glued willow shavings and were circular in shape with a close-fitting lid (Bennion, 1979: 258). Diam. 29mm. Th. 2mm.

MA80: Two thin wooden disc-shaped objects. Similar to MA63 (above). Diam. 48mm. Depth 3mm.

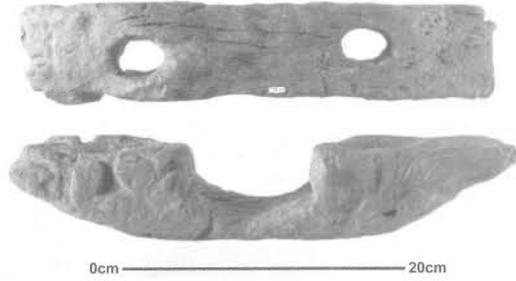


FIG. 196. Shaped wooden object, MA1364.

MA86: Carved wooden object. Spatula shaped with an ornate handle. Polynesian object, possibly a lime stick or spatula (M. Quinell, 1994, pers. comm.). L. 248mm. W. 32mm. Handle L. 100mm (Fig. 195).

MA771: Large fragment of timber. Wide thick boards butted together and attached with wrought iron bolts and trenails. Possibly part of a tiller sweep. L. 850mm. W. 560mm. D. 150mm.

MA1160: Wooden dowel. Cylindrical shank with two blunt ends. L. 74mm. Diam. 16mm.

MA1364: Curved rectangular wooden object. Two large circular openings at each end. Possibly a cleat (cf. Sullivan, 1986: 20). L. 350mm. W. 67mm. Depth 60mm. Hole diam. 35mm (Fig. 196).

MA1603: Rod-shaped wooden fragment. Cylindrical shank broken at both ends. L. 235mm. Diam. 19mm.

MA1606: Wooden rod. Cylindrical shank with carved grooves at one end. L. 430mm. Diam. 23mm.

MA1767: Wooden disc. Possibly a draughts playing piece. Diam. 38mm. D. 6mm.

**Wood Fragments.** There are 259 unidentified fragments of wood in the material collected to 1995. One hundred and twenty-two of these fragments were found in association with either a wrought iron or copper alloy fastening and as such are probably fragments of the ship's structure through which fastenings were driven. The remaining fragments were located individually and are therefore not associated with other artefacts which could indicate their original purpose.

#### ACKNOWLEDGEMENTS

This project would not have been possible without the skills and expertise of a number of people. The authors gratefully acknowledge the

assistance of Ron Coleman, Sally Elmer, Sally Carlile, Robert Allen, Marisa Giorgi, Gary Cranitch, Christine Ianna, Richard Robins, Michael Quinnell, Warren Delaney, Tom Fallowfield, Myron Cause, Trevor Clifford, Mark Eddowes, Stephen Van Dyck, Freya Bruce, Thora Whitehead, Darryl Potter, John Stanicic, Vivian Moran, Alison Mann, Chris Lloyd, Paul Avern, Donna Case, Justin Gough and Ron Belcher.

## LITERATURE CITED

- ASHDOWN, J. 1972. Oil jars. *International Journal of Nautical Archaeology* 1(2): 147-153.
- ADMIRALTY MS 1784. Adm/168 147. Specification for a 24 gun ship. (PRO Kew).
- ADMIRALTY MS 180 Edwards' papers, Naval Hydrographic Office, (Taunton, Somerset).
- ADMIRALTY A/2831 Captain Edwards orders (PRO Kew).
- ADMIRALTY 106/2898. In letters from naval officers. (PRO Kew).
- ANTALL, J. 1981. *Pictorial History of European Medicine and Pharmaceuticals*. (Corvina Kiado, Kner Printing House: Gyoma, Budapest)
- BARROW, T. 1972. Art and life in Polynesia. (A.H. & W. Reed: Wellington).
- BENNION, E. 1979. *Antique medical instruments*. (Sotheby Parke Bernet: London).
- BREARS, P. 1992. Commercial museums of 18th century Cumbria. *Journal of the History of Collecting* 4 (1): 107-126.
- CARPENTER, J. 1985. A watch from HMS *Pandora*. *Antiquarian Horology* 15 (6): 560-601.
- CHURCHILL, W. 1917. Club types of nuclear Polynesia. (The Carnegie Institution of Washington: Washington).
- COLEMAN, R.A. 1988a. A Taylor's Common Pump from the *Pandora*. *International Journal of Nautical Archaeology*. 17(3): 201-04.
- 1988b. The currency of cultural change and 18th century Pacific exploration. *Bulletin of the Australian Institute for Maritime Archaeology*, 12 (1): 37-45.
- 1999a. Early Lead Pencils and a link in their evolutionary development from the wreck of HMS *Pandora* (1791). Unpubl. report, Queensland Museum.
- 1999b. Walter Taylor's sheave coaks. Unpubl. report, Queensland Museum.
- COVILL, W. E. Jr 1971. *ink bottles and inkwells*. (William S. Sullwold, Publishing: Taunton, Massachusetts).
- COYSH, A.W. & HENRYWOOD, R.K. 1982. *The dictionary of blue and white printed pottery 1780 - 1880*. (Antique Collector's Club: Woodbridge).
- de KERCHOVE, 1961. *International Maritime Dictionary*. 2nd edition. (Van Nostrand Reinhold Company: New York).
- DELANEY, W. 1989. An examination of gunflints recovered from the La Perouse shipwrecks, *L'Astrolabe* and *La Boussole*. *The International Journal of Nautical Archaeology* 18(2):113-122.
- DUFF, R.S. 1959. Neolithic adzes of eastern Polynesia. Pp. 121-148. In Freeman, J. & Geddes, W.R. (eds) *Anthropology in the South Seas: essays presented to H.D. Skinner*. (Avery & Sons: New Plymouth).
- FALCONER, W. 1815. *New Dictionary of the Marine*. (Improved and enlarged by William Burney). Reprinted 1970. (Macdonald & Jane's: London).
- FARMER, D. & FARMER, C. 1989. *The Kings Bread: 2nd rising, cooking at Niagara 1726-1815*. (Old Fort Niagara Assoc Inc: Youngstown, New York).
- GENET, N., VERMETTE, L. & DECAIRE-AUDET, L. 1974. *Les objets familiers de nos ancetres*. (Les Editions de l'homme: Montreal).
- HAUSER-SCHAUBLIN, B. & KRUGER, G. 1998. *James Cook. Gifts and treasures from the South Seas*. (Prestel: Munich).
- HOARE, M. (ed.) 1982. *The Resolution Journal of Johann Reinold Forster, 1772-75*. (The Hakluyt Society: London).
- HOLMES, C. (ed) 1982. *Captain Cook's final voyage: the journal of midshipman George Gilbert*. (Caliban Books: Coulston, ACT).
- HUME, I.N. 1985. *A guide to artefacts of colonial America*. (Alfred A Knopf: New York).
- JONES, O. 1986. *Cylindrical English wine & beer bottles*. (Parks Canada: Ottawa).
- JONES, O. & SMITH, A. 1985. *Glass of the British Military, ca.1755-1820*. (Parks Canada: Ottawa).
- JONES, O. & SULLIVAN, C. 1985. *Glass Glossary for the description of containers, tableware, flat glass and closures*. (National Historic Parks and Site Branch: Parks Canada:Ottawa).
- KAEPPLER, A.L. 1978. *Artificial Curiosities: An exposition of native manufactures, collected on the three voyages of Captain James Cook R.N*. Bernice Bishop Museum Special Publication. (Bishop Museum Press: Honolulu, Hawaii).
- KARKLINS, K. 1985. *Glass beads. The Levin catalogue of mid-19th century beads; a sample book of 19th Century Venetian beads. Guide to the description and classification of glass beads*. *Studies in Archaeology, Architecture and History*. (National Historic Parks & Sites Branch, Parks Canada: Ottawa).
- KENDRICK, J. 1989. Spruce beer and the battle against scurvy. *Argonautica, Newsletter of the Canadian Nautical Research Society* 4(4).
- KENNARD, A.N. 1988. *Gunfounding and Gunfounders: a directory of cannon founders from earliest times to 1850*. (Arms and Armour Press: London).
- KIST, B., GAWRONSKI, J. & STOKVIS-VANBOETZELAER, O. 1992. *Hollandia Compendium*. (Elsevier Science Publishers: Amsterdam).

- LAVERY, B. 1987. The arming and fitting of English ships of war 1600-1815. (Conway Maritime Press: London).
- LAVERY, B. 1988. The Royal Navy's first *Invincible*. (Invincible Conservations: Portsmouth).
- L'ESTRANGE G. & TURNER, L. 1980. Antique scientific instruments. (Blandford Press: Poole).
- LITCHFIELD, F. 1971. Pottery & Porcelain, 6th edition. (Adam & Charles Black: London).
- LOTBINIERE, S. de, 1984. Gunflint recognition, *International Journal of Nautical Archaeology* 13(2) :206-209.
- McCARTHY, M. 1983. Ships fastenings: a preliminary study. *The Bulletin of the Australian Institute of Maritime Archaeology* 7:(1).
1996. Ship's fastenings: a preliminary study revisited. *The International Journal of Nautical Archaeology* 25 (3 and 4): 177-206.
- McEWAN, W. A. & LEWIS, A.H. 1953. *Encyclopedia of Nautical Knowledge*. (Cornell Maritime Press: Centreville, Maryland).
- McKAY, J. & COLEMAN, R., 1992. The 24-gun frigate *Pandora*. *Conway Anatomy of the Ship Series*. (Conway Maritime Press: London).
- MITCHELL LIBRARY MICROFILMS. Banks' papers FM 4 23.
- MURRAY, C. 1993. Corbeta de Guerra H.M.S. *Swift*, 1763: historia, naufragio, rescate y conservacion. (Comite Argentino del ICOMOS: Buenos Aires).
- NEUMANN, G.C. & KRAVIC, F.J. 1975. *Collector's illustrated encyclopedia of the American Revolution*. (Rebel Publishing Co., Inc.: Texarkana, Texas).
- OERTLING, T.J. 1982. The chain pump: an 18th century example. *The International Journal of Nautical Archaeology and Underwater Exploration* 11 (2): 113-124.
- QUARM, R. 1995. An album of drawings by Gabriel Bray RN, HMS *Pallas*, 1774-5. *Mariner's Mirror* 81(1): 32-44.
- QUEENSLAND GOVERNMENT CHEMICAL LABORATORY. 1984. Analysis Report. Unpubl. Papers, Queensland Museum.
- QUEENSLAND HERBARIUM, 1985. Unpubl. report, Queensland Museum.
- RODGER, N.A.M., 1986 *The wooden world: an anatomy of the Georgian Navy*. (Collins: London).
- STANBURY, M. 1994. HMS *Sirius* 1790; an illustrated catalogue of artefacts recovered from the wreck site on Norfolk Island. (Special Publication, Australian Institute for Maritime Archaeology, Fremantle).
- STANBURY, M. & MACLEOD, I. 1988. Colonies, convicts and filtering stones: roads to solutions. *Bulletin of the Australian Institute for Maritime Archaeology* 12 (2):1-10.
- STATE LIBRARY NSW: Dixson Library Reel, CY 265, p.56.
- STEEL, D. 1805. *The elements and practice of naval architecture*. (Reprinted 1977) (Sim Comfort Associates: London).
- SULLIVAN, J.A. 1979. The distillation and purification of water at sea. *Mariner's Mirror* 65 (2).
- SULLIVAN, C. 1986. *Legacy of the Machault*. National Historic Parks & Sites Branch. (Parks Canada: Ottawa).
- THOMSON, B. (ed). 1915. *Voyage of HMS Pandora; being the narratives of Captain Edward Edwards and surgeon George Hamilton*. (Francis Edwards: London).
- UNITED SERVICES MAGAZINE. 1843. *The Pandora Again!* *United Services Magazine and naval and military journal* 172: 411-420.
- WATNEY, A. 1973. *English blue & white porcelain of the 18th Century*. (Faber & Faber: London).

## APPENDIX 1

A list of artefacts recovered from HMS *Pandora* between 1977 and 1995, with X and Y grid coordinates (see Gesner this issue). All coordinates in metres from the datum point. NR = not recorded, SPH = spoil heap, RR = random recovery.

| ACC. NO. | DESCRIPTION                              | X    | Y         | ACC. NO. | DESCRIPTION   | X    | Y    |
|----------|--|------|-----------|----------|---|------|------|
| MA1      | Spectacle plate                          |      | Reef flat | MA49     | Apothecary bottle with cork stopper                   | 20.5 | 10.9 |
| MA2      | Taylor's common pump chamber             |      | NR        | MA50     | Case bottle fragment & pebble                         | 21.3 | 10.8 |
| MA3      | Oil jar                                  |      | NR        | MA51     | Bottle fragment                                       | 21.2 | 10.7 |
| MA4      | Rudder pintle                            |      | Reef flat | MA52     | Single sheave from pulley block                       | 19.1 | 10.1 |
| MA5      | Copper clench bolt                       |      | NR        | MA53     | Coconut fragments                                     | 21.0 | 11.2 |
| MA6      | Rudder pintle                            |      | Reef flat | MA54     | Intact case bottle                                    | 21.5 | 10.7 |
| MA10     | Case bottle fragment                     | 11.4 | 13.7      | MA55     | Light green bottle fragments                          | 21.2 | 10.7 |
| MA11     | Rummer-goblet fragment                   | 10.3 | 14.6      | MA56     | Green bottle fragment                                 | 21.4 | 9.9  |
| MA12     | Flat copper alloy strap                  | 11.3 | 10.7      | MA57     | Stoneware jar   | 21.2 | 10.6 |
| MA13     | Earthenware pot (spruce jar)             | 11.0 | 13.5      | MA60     | Window pane fragments.                                | 20.8 | 10.3 |
| MA14     | Earthenware pot (spruce jar)             | 11.0 | 13.5      | MA61     | Wide-mouthed bottle fragment                          | 19.9 | 10.8 |
| MA15     | Short copper bolt                        | 11.2 | 11.6      | MA63     | Wooden wafer-like object (possibly pill box section)  |      | NR   |
| MA16     | Short copper bolt                        | 11.0 | 14.2      | MA64     | Bottle fragments & pebble                             | 20.9 | 10.3 |
| MA17     | Case bottle & other bottle fragments     | 11.2 | 11.6      | MA65     | Stoneware jar   | 20.9 | 10.3 |
| MA18     | Double pulley block                      | 11.1 | 14.2      | MA68     | Square shanked bolt                                   | 19.1 | 10.1 |
| MA19     | Ten sheathing tacks                      | 11.2 | 11.6      | MA69     | Stoneware jar   | 4.0  | 10.3 |
| MA21     | Shell fishhook shank (Polynesian)        | SPH  |           | MA71     | Brass instrument case                                 | 20.1 | 11.0 |
| MA22     | Window pane fragment                     | 11.0 | 14.2      | MA72     | Brush & shoehorn                                      | 19.6 | 9.7  |
| MA23     | Short copper bolt                        | 11.3 | 11.7      | MA73     | Ivory brush   | 19.6 | 9.7  |
| MA27     | Window pane fragments                    | 10.2 | 10.1      | MA74     | Syringe   | 19.6 | 9.7  |
| MA28     | Copper clench bolt                       | 13.1 | 15.4      | MA75     | Turned ivory knob                                     | 19.1 | 10.1 |
| MA30     | Window pane fragment                     | 13.2 | 15.4      | MA76     | English 'wine' or 'beer' bottle fragment              | 19.6 | 9.7  |
| MA31     | Single sheave with three-lobed coaks     | 44.7 | 6.3       | MA78     | Pewter buckle   | 19.6 | 9.7  |
| MA32     | Stoneware jar                            | 20.7 | 10.9      | MA79     | Two bone buttons                                      | 19.6 | 9.7  |
| MA33     | Stoneware jar                            | 20.8 | 11.0      | MA80     | Wooden wafer-like object (possibly pill box fragment) | 20.1 | 11.0 |
| MA34     | Cauldron                                 | 16.2 | 4.4       | MA81     | Pencil  | 19.1 | 10.1 |
| MA35     | Stoneware jar                            | 11.1 | 12.2      | MA82     | Window pane fragment                                  | 19.6 | 9.7  |
| MA36     | Stoneware jar with cork stopper          | 21.6 | 10.4      | MA83     | Apothecary bottle                                     | 20.8 | 11.0 |
| MA37     | Brick                                    | 44.9 | 5.2       | MA84     | Butt plate from musket                                | 19.6 | 9.7  |
| MA38     | Zig zag shaped wrought iron object       | 20.6 | 11.3      | MA85     | Trigger guard   | 19.1 | 10.1 |
| MA39     | Bottle fragments                         | 19.1 | 10.1      | MA86     | Carved wooden object (Polynesian)                     | 19.1 | 10.1 |
| MA40     | Creamware dinner plate                   | 20.7 | 11.2      | MA87     | Case bottle fragment                                  | 20.1 | 9.3  |
| MA41     | Stoneware fragments                      | 21.3 | 10.8      | MA88     | Wide-mouthed bottle fragment                          | 19.6 | 9.7  |
| MA42     | 101 musket balls                         | 20.5 | 10.9      | MA89     | Case bottle fragments                                 | 19.6 | 9.7  |
| MA43     | Six musket balls                         | 20.5 | 10.9      | MA90     | Bottle fragment                                       | 19.6 | 9.7  |
| MA44     | Lump of lead                             | 44.8 | 6.1       | MA91     | Apothecary bottle fragment                            | 19.6 | 9.7  |
| MA45     | Stoneware jar                            | 20.9 | 10.9      | MA92     | Twelve musket balls                                   | 19.6 | 9.7  |
| MA46     | Window pane fragments                    | 20.5 | 11.2      | MA93     | Mortar  | 20.4 | 10.4 |
| MA47     | Copper alloy strap                       | 20.2 | 9.8       | MA94     | Three wood fragments                                  | 19.6 | 9.7  |
| MA48     | English 'wine' or 'beer' bottle fragment | 21.2 | 10.7      | MA95     | Brick fragments                                       | 20.1 | 9.3  |
|          |  |      |           | MA96     | Case bottle fragment                                  | 19.6 | 9.7  |
|          |  |      |           | MA97     | Wood fragment   | 19.6 | 9.7  |
|          |  |      |           | MA98     | Wood fragments  | 19.6 | 9.7  |
|          |  |      |           | MA99     | Square-bodied bottle fragments                        | 20.1 | 11.0 |
|          |  |      |           | MA100    | Three bone buttons                                    | 19.9 | 10.1 |
|          |  |      |           | MA101    | Square-bodied bottle fragments                        | 20.1 | 11.0 |
|          |  |      |           | MA102    | 'Petit type' tourniquet clamp                         | 20.1 | 11.0 |
|          |  |      |           | MA103    | Case & other bottle fragments                         | 20.1 | 11.0 |

| ACC. NO. | DESCRIPTION  | X    | Y    | ACC. NO. | DESCRIPTION                                    | X         | Y |
|----------|--|------|------|----------|--|-----------|---|
| MA104    | Turned ivory handle  | 20.1 | 10.9 | MA154    | Earthenware pot (spruce jar)                   | NR        |   |
| MA105    | Bottle fragments with turquoise stopper                    | 20.1 | 10.9 | MA156    | Window pane fragment                           | NR        |   |
| MA106    | Glass stopper  | 20.4 | 10.4 | MA157    | Shell fishhook shank (Polynesian)              | NR        |   |
| MA107    | Square-bodied bottle fragment                              | 19.4 | 10.2 | MA200    | Pintle pin                                     | Reef flat |   |
| MA108    | English 'wine' or 'beer' bottle fragment                   | 19.4 | 10.2 | MA202    | Hand pump                                      | NR        |   |
| MA109    | Round-flanged coak   | 19.1 | 10.1 | MA250    | Intact case bottle with cork stopper           | NR        |   |
| MA110    | Silver pocket watch  | 20.1 | 11.0 | MA251    | Keel staple                                    | Reef flat |   |
| MA111    | Case bottle fragments                                      | 20.1 | 11.0 | MA252    | Blue rimmed bowl fragment                      | NR        |   |
| MA112    | Bottle fragment  | 20.1 | 11.0 | MA300    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA113    | Bottle fragments   | 20.1 | 11.0 | MA303    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA114    | Lice comb  | 19.6 | 9.7  | MA304    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA115    | Glass stopper  | 20.2 | 9.2  | MA305    | Square-shanked bolt, ex concretion             | NR        |   |
| MA116    | Stoneware jar  | 20.1 | 11.0 | MA307    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA117    | Bottle fragments   | 20.0 | 10.9 | MA308    | Cannonball, ex concretion                      | NR        |   |
| MA118    | Copper sheeting  | 20.1 | 11.0 | MA309    | Single sheave from pulley block, ex concretion | NR        |   |
| MA119    | Wood fragment  | 19.1 | 10.1 | MA310    | Eye bolt, ex concretion                        | NR        |   |
| MA120    | Wood fragment  | 19.1 | 10.1 | MA313    | Square-shanked bolt, ex concretion             | NR        |   |
| MA121    | Turned wooden handle                                       | 19.1 | 10.1 | MA316    | Square-shanked spike, ex concretion            | NR        |   |
| MA123    | Eye bolt   | 19.1 | 10.1 | MA318    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA125    | Brick  | 20.1 | 9.3  | MA320    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA126    | Round-flanged coak   | 19.1 | 10.1 | MA322    | Double pulley block, ex concretion             | NR        |   |
| MA127    | Bottle fragment  | 19.1 | 10.1 | MA323    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA128    | Window pane fragment                                       | 19.1 | 10.1 | MA324    | Square-shanked spike, ex concretion            | NR        |   |
| MA129    | Copper alloy wire  | 19.1 | 10.1 | MA325    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA130    | Wood fragment  | 19.1 | 10.1 | MA326    | Wrought iron band fragment, ex concretion      | NR        |   |
| MA131    | Wood fragments   | 19.1 | 10.1 | MA328    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA132    | Clove oil bottle   | 19.1 | 10.1 | MA329    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA133    | Copper alloy button  | 19.1 | 10.1 | MA330    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA134    | Two bone buttons   | 19.1 | 10.1 | MA332    | Thirteen rose-headed nails, ex concretion      | NR        |   |
| MA135    | Earthenware pot fragment (spruce jar) & creamware fragment | NR   |      | MA336    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA136    | Green bottle fragments                                     | 19.1 | 10.1 | MA337    | Wrought iron band fragment, ex concretion      | NR        |   |
| MA138    | Oil jar  | 44.2 | 6.5  | MA338    | Wrought iron round bolt, ex concretion         | NR        |   |
| MA139    | Oil jar  | NR   |      |          |  |           |   |
| MA140    | Cole/Bentinck chain pump components                        | 23.0 | 4.7  |          |  |           |   |
| MA141    | Copper alloy button  | 19.1 | 10.1 |          |  |           |   |
| MA142    | Fire grates & ash pan                                      | 42.4 | 7.2  |          |  |           |   |
| MA143    | Window pane fragment                                       | 8.3  | 15.3 |          |  |           |   |
| MA144    | Earthenware pot fragment (spruce jar)                      | 42.4 | 7.2  |          |  |           |   |
| MA145    | Copper alloy ring  | 19.1 | 10.1 |          |  |           |   |
| MA146    | Cannister shot & copper alloy button                       | 20.8 | 10.3 |          |  |           |   |
| MA147    | Cabinet latch  | 19.1 | 10.1 |          |  |           |   |
| MA148    | 6-pounder cannon   | 19.1 | 10.1 |          |  |           |   |
| MA149    | Stoneware jar  | NR   |      |          |  |           |   |
| MA150    | Case bottle fragment                                       | NR   |      |          |  |           |   |
| MA151    | Wrought iron round bolt                                    | 20.8 | 10.3 |          |  |           |   |
| MA152    | Small cast iron object                                     | 21.0 | 11.1 |          |  |           |   |
| MA153    | Musket ball  | 19.6 | 9.7  |          |  |           |   |

| ACC. NO. | DESCRIPTION                         | X    | Y     | ACC. NO. | DESCRIPTION  | X    | Y    |
|----------|-------------------------------------|------|-------|----------|--|------|------|
| MA339    | Square-shanked spike, ex concretion | NR   |       | MA570    | English 'wine' or 'beer' bottle fragment             | 10.4 | 7.5  |
| MA340    | Square-shanked bolt, ex concretion  | NR   |       | MA571    | Chimney flue segment                                 | 9.5  | 9.6  |
| MA500    | Taylor's Common pump components     | 25.4 | 9.9   | MA573    | Axe  | 11.2 | 7.4  |
| MA501    | Round-flanged coak                  | NR   |       | MA574    | Wrought iron round bolt                              | NR   |      |
| MA502    | Wrought iron band fragment          | 4.4  | 10.5  | MA575    | Wrought iron round bolt                              | NR   |      |
| MA503    | Square shanked spike                | 5.8  | 12.1  | MA576    | Window pane fragment                                 | 8.3  | 6.7  |
| MA504    | Portlid hinge                       | 5.7  | 13.2  | MA577    | Cast lead weight                                     | 8.3  | 6.6  |
| MA508    | Pebble                              | 6.5  | 12.5  | MA578    | Eye bolt   | 10.1 | 7.8  |
| MA509    | Copper alloy button                 | 6.0  | 12.3  | MA579    | Chimney flue fragment & pebble                       | 10.0 | 8.0  |
| MA510    | Sheathing tack                      | 6.8  | 12.4  | MA580    | Brass finial   | 8.9  | 8.6  |
| MA511    | Pebble                              | 6.7  | 12.9  | MA581    | Andiron leg & glass beads                            | 9.7  | 8.4  |
| MA512    | Counterweight                       | 6.9  | 11.4  | MA583    | Wrought iron round bolt & wrought iron band fragment | 9.9  | 8.0  |
| MA513    | Window pane fragment                | 7.8  | 13.5  | MA584    | Wrought iron round bolt                              | 9.3  | 8.5  |
| MA514    | Wide-mouthed bottle                 | 7.8  | 10.5  | MA586    | Copper sheeting                                      | 9.3  | 8.6  |
| MA515    | Copper alloy object                 | 6.1  | 10.8  | MA587    | English 'wine' or 'beer' bottle fragment             | 8.4  | 9.0  |
| MA518    | Wrought iron band fragment          | 7.1  | 12.9  | MA588    | Case bottle fragment                                 | 8.9  | 14.6 |
| MA519    | Counterweight                       | 7.8  | 10.6  | MA589    | Copper alloy button                                  | 9.3  | 8.6  |
| MA520    | Copper alloy object                 | 6.3  | 11.7  | MA590    | Wood fragment  | 9.2  | 8.4  |
| MA522    | Window pane fragment                | 7.6  | 10.3  | MA591    | English 'wine' or 'beer' bottle                      | NR   |      |
| MA523    | Lead sheeting                       | 7.3  | 10.5  | MA592    | Earthenware pot fragment (spruce jar)                | 8.8  | 11.7 |
| MA524    | Wrought iron round bolt             | 7.8  | 11.7  | MA593    | Copper rim   | 8.9  | 10.9 |
| MA526    | Wrought iron band fragment          | 8.0  | 11.6  | MA594    | Window pane & case bottle fragment                   | NR   |      |
| MA527    | Counterweight                       | 7.8  | 13.9  | MA595    | Copper sheeting                                      | NR   |      |
| MA528    | Eye bolt & lead sheet fragment      | 6.9  | 12.3  | MA597    | Lead sheeting  | NR   |      |
| MA529    | Eye bolt                            | 6.8  | 12.1  | MA598    | Copper sheeting                                      | 9.7  | 8.3  |
| MA530    | Lead sheeting                       | 6.9  | 12.4  | MA599    | Wrought iron round bolt                              | 9.6  | 8.4  |
| MA531    | Pebble                              | 7.8  | 12.8  | MA600    | Lead sheeting  | NR   |      |
| MA537    | Portlid hinge fragment              | 7.4  | 11.7  | MA601    | Lead sheeting  | NR   |      |
| MA538    | Lead sheeting                       | 6.8  | 13.5  | MA603    | Wood fragment  | 11.4 | 8.8  |
| MA539    | Lead sheeting                       | 5.7  | 11.2  | MA604    | Three fragments instrument glass                     | 11.6 | 9.1  |
| MA540    | Wrought iron round bolt             | 4.3  | 11.2  | MA605    | Wood fragment  | 11.3 | 8.5  |
| MA541    | Thimble fragment                    | 7.1  | 11.5  | MA606    | Wrought iron round bolt                              | 11.3 | 8.6  |
| MA542    | Wrought iron round bolt             | 7.0  | 12.2  | MA607    | Creamware fragment                                   | 11.9 | 9.5  |
| MA543    | Lead sheeting                       | 6.8  | 13.0  | MA608    | Earthenware pot fragment (spruce jar)                | 11.9 | 9.3  |
| MA544    | Square shanked bolt                 | 7.8  | 11.1  | MA609    | Flattened lead roll                                  | 11.2 | 8.7  |
| MA545    | Lead sheeting                       | 6.75 | 12.96 | MA610    | Earthenware pot fragment (spruce jar)                | 11.6 | 10.4 |
| MA546    | Wrought iron round bolt & ring bolt | 7.5  | 10.9  | MA611    | Window pane fragment                                 | 11.8 | 10.4 |
| MA547    | Wrought iron round bolt             | 7.2  | 10.0  | MA612    | Copper clench bolt                                   | 11.6 | 10.4 |
| MA548    | Eye bolt                            | NR   |       | MA613    | Lead sheeting  | 9.7  | 8.6  |
| MA552    | Earthenware pot (spruce jar)        | 9.3  | 14.2  | MA614    | Wrought iron round bolt                              | 9.6  | 8.6  |
| MA553    | Copper sheeting                     | 9.3  | 14.2  | MA615    | Earthenware pot fragment (spruce jar)                | NR   |      |
| MA554    | Sandglass fragment                  | 8.3  | 14.3  | MA616    | Copper clench bolt                                   | 11.8 | 9.3  |
| MA555    | Creamware fragment                  | 8.3  | 14.4  | MA617    | Chimney flue section                                 | 11.6 | 9.4  |
| MA556    | Round-flanged coak                  | 9.2  | 14.5  | MA619    | Intact pane of glass                                 | 11.3 | 9.2  |
| MA557    | Lice comb fragment                  | 9.0  | 14.1  | MA620    | Copper clench bolt                                   | 11.4 | 9.1  |
| MA563    | Lead sheeting                       | 7.1  | 11.9  |          |  |      |      |
| MA565    | Bottle fragment                     | NR   |       |          |  |      |      |
| MA567    | Bottle fragments & pebble           | 9.8  | 9.2   |          |  |      |      |
| MA568    | Scabbard stud                       | 10.6 | 7.5   |          |  |      |      |
| MA569    | Telescope                           | 9.1  | 7.4   |          |  |      |      |

| ACC. NO. | DESCRIPTION   | X    | Y    | ACC. NO. | DESCRIPTION                                  | X    | Y    |
|----------|---|------|------|----------|--|------|------|
| MA621    | Copper clench bolt                                      | 10.4 | 9.0  | MA686    | Case & other bottle fragments                | 12.0 | 10.3 |
| MA622    | Sheathing tack  | 10.5 | 9.8  | MA687    | Stoneware jar                                | NR   |      |
| MA623    | Sheathing tack  | 10.5 | 9.8  | MA689    | Creamware fragment                           | 12.0 | 10.0 |
| MA624    | Window pane fragment                                    | 10.5 | 9.8  | MA690    | Shell fishhook shank (Polynesian)            | 12.1 | 10.3 |
| MA625    | Copper clench bolt                                      | 10.6 | 9.4  | MA691    | Wide-mouthed bottle fragment                 | 12.1 | 10.2 |
| MA626    | Wrought iron round bolt                                 | 11.1 | 8.8  | MA692    | Cast lead weight                             | 11.9 | 10.3 |
| MA627    | Copper clench bolt                                      | 10.3 | 10.7 | MA695    | Bulbous earthenware jar<br>with cork stopper | 9.3  | 10.1 |
| MA628    | Copper clench bolt                                      | 11.5 | 11.3 | MA696    | English 'wine' or 'beer' bottle              | 9.3  | 8.5  |
| MA629    | Blunderbuss barrel &<br>ramrod retainer                 | 11.3 | 6.5  | MA697    | English 'wine' or 'beer' bottle              | 8.8  | 9.6  |
| MA630    | Cast lead weight  | 10.7 | 10.5 | MA698    | Lead sheeting                                | 9.0  | 9.5  |
| MA634    | Window pane fragment                                    | NR   |      | MA699    | Window pane fragment                         | 9.0  | 9.7  |
| MA635    | Copper clench bolt                                      | 11.5 | 11.6 | MA700    | Pebble                                       | 8.8  | 9.6  |
| MA636    | Copper clench bolt                                      | 11.4 | 10.9 | MA701    | Cast lead weight                             | 12.1 | 10.2 |
| MA637    | Copper clench bolt                                      | 11.6 | 11.5 | MA702    | Cast lead weight                             | 12.6 | 10.6 |
| MA638    | Piece of black coal                                     | NR   |      | MA703    | Cast lead weight                             | 12.9 | 10.8 |
| MA639    | Copper clench bolt                                      | 11.3 | 9.6  | MA704    | Window pane fragment                         | 12.9 | 10.8 |
| MA640    | Wrought iron band fragment                              | 11.6 | 9.5  | MA705    | Sheathing tack                               | 12.9 | 10.8 |
| MA642    | Copper clench bolt                                      | 12.0 | 11.3 | MA706    | Two pebbles                                  | 12.9 | 10.8 |
| MA644    | Cylindrical lead roll                                   | 33.4 | 7.4  | MA708    | Earthenware pot (spruce jar)                 | 13.0 | 10.9 |
| MA645    | Wrought iron brace                                      | 8.0  | 5.4  | MA709    | Earthenware pot fragment<br>(spruce jar)     | 12.5 | 10.9 |
| MA646    | Wrought iron band fragment                              | 32.5 | 6.9  | MA710    | Cast lead weights                            | 12.1 | 10.5 |
| MA648    | Wrought iron band fragment                              | 33.6 | 6.8  | MA711    | Creamware fragment                           | 12.1 | 10.5 |
| MA649    | Wood fragment   | 32.6 | 6.8  | MA712    | Globular bottle fragment                     | 15.3 | 11.4 |
| MA650    | Wrought iron band fragment                              | 32.4 | 7.1  | MA713    | Window pane fragment                         | 15.3 | 11.4 |
| MA651    | Wrought iron round bolt                                 | 32.8 | 7.2  | MA715    | Earthenware pot fragment<br>(spruce jar)     | NR   |      |
| MA652    | Copper clench bolt                                      | 10.6 | 11.5 | MA717    | Wood fragment & copper<br>alloybutton        | NR   |      |
| MA653    | Wrought iron round bolt                                 | NR   |      | MA718    | Lead sheeting                                | NR   |      |
| MA654    | Cast lead weight  | 11.8 | 10.3 | MA720    | Intact globular bottle                       | 9.8  | 8.3  |
| MA655    | Window pane fragment                                    | 11.8 | 10.3 | MA721    | Window pane fragment                         | 8.4  | 9.8  |
| MA656    | Wide-mouthed bottle                                     | 11.6 | 12.9 | MA722    | Copper alloy button                          | 8.4  | 9.8  |
| MA658    | Cowling   | 31.5 | 7.3  | MA723    | Andiron base plate                           | 8.4  | 9.8  |
| MA659    | Wrought iron band fragment                              | 31.5 | 7.3  | MA724    | Pebble                                       | 8.4  | 9.8  |
| MA660    | Pig humerus   | SPH  |      | MA725    | Escutcheon                                   | NR   |      |
| MA662    | Copper clench bolt                                      | 10.8 | 11.2 | MA726    | Copper alloy ring                            | NR   |      |
| MA664    | Wrought iron round bolt                                 | 10.2 | 10.3 | MA727    | Scabbard stud                                | NR   |      |
| MA665    | Earthenware pot (spruce jar)                            | 11.4 | 10.7 | MA731    | Claypipe                                     | NR   |      |
| MA666    | Cast lead weight  | 11.0 | 10.7 | MA732    | Window pane fragment                         | 13.1 | 11.2 |
| MA667    | English 'wine' or 'beer' bottle                         | NR   |      | MA733    | Cylindrical lead roll                        | 12.9 | 10.4 |
| MA668    | Pearl shell slip (Polynesian)<br>& window pane fragment | 10.5 | 10.5 | MA734    | Earthenware pot fragment<br>(spruce jar)     | 12.3 | 10.6 |
| MA670    | Earthenware pot (spruce jar)                            | 11.9 | 13.8 | MA738    | Slate fragment                               | 12.9 | 11.7 |
| MA671    | Earthenware pot (spruce jar)                            | 11.9 | 13.8 | MA739    | Short copper bolt                            | 12.2 | 11.6 |
| MA672    | Earthenware pot (spruce jar)                            | 11.9 | 13.8 | MA740    | Bottle fragment                              | NR   |      |
| MA673    | Earthenware pot (spruce jar)                            | 12.3 | 12.4 | MA743    | Sandglass fragment                           | NR   |      |
| MA674    | Earthenware pot fragment<br>(spruce jar)                | 12.3 | 12.4 | MA745    | Earthenware pot fragment<br>(spruce jar)     | NR   |      |
| MA675    | Piece of black coal                                     | NR   |      | MA746    | Case bottle fragment                         | NR   |      |
| MA679    | Copper clench bolt                                      | 10.0 | 11.8 | MA747    | Earthenware pot (spruce jar)                 | 13.3 | 10.7 |
| MA680    | Copper clench bolt                                      | 10.0 | 11.8 | MA748    | Window pane fragment                         | 13.0 | 10.3 |
| MA681    | Copper clench bolt                                      | 10.0 | 11.8 | MA749    | Case & other bottle fragments                | 13.0 | 10.3 |
| MA682    | Cable loops   | 10.0 | 11.8 |          |  |      |      |
| MA685    | Cast lead weight  | NR   |      |          |  |      |      |

| ACC. NO. | DESCRIPTION                               | X    | Y    | ACC. NO. | DESCRIPTION                                  | X    | Y   |
|----------|---|------|------|----------|--|------|-----|
| MA750    | Creamware bowl fragment                   | 13.1 | 11.1 | MA1025   | Wrought iron round bolt                      | 12.7 | 6.9 |
| MA751    | Creamware dinner plate fragment           | 13.1 | 11.1 | MA1026   | Wood planking & window pane fragment         | 12.8 | 6.3 |
| MA752    | Earthenware container fragment            | 13.1 | 11.1 | MA1028   | Wrought iron round bolt                      | 13.8 | 7.1 |
| MA754    | Nine sheathing tacks                      | 13.1 | 11.1 | MA1029   | English 'wine' or 'beer' bottle              | 13.9 | 6.6 |
| MA755    | Earthenware pot fragment (spruce jar)     | 13.1 | 11.1 | MA1030   | Single sheave from pulley block              | 12.4 | 6.4 |
| MA756    | Cast lead weights                         | 12.7 | 11.3 | MA1032   | Eye bolt                                     | 13.4 | 5.3 |
| MA757    | Bottle fragment                           | NR   |      | MA1034   | Sheathing tack                               | NR   |     |
| MA758    | Earthenware pot fragment (spruce jar)     | NR   |      | MA1035   | Single sheave from pulley block              | 13.7 | 7.4 |
| MA759    | Copper sheeting                           | NR   |      | MA1036   | Wrought iron round bolt                      | 13.2 | 5.5 |
| MA760    | Pebble                                    | NR   |      | MA1038   | Copper sheeting                              | 15.8 | 5.8 |
| MA761    | Earthenware pot fragment (spruce jar)     | 13.0 | 10.9 | MA1039   | Copper alloy object                          | 13.4 | 6.2 |
| MA763    | Whetstone                                 | 12.6 | 11.4 | MA1040   | Gun flint                                    | 13.8 | 6.2 |
| MA764    | Lead sheeting                             | NR   |      | MA1041   | Dripstone                                    | 12.9 | 6.5 |
| MA765    | Lead sheeting                             | NR   |      | MA1044   | Lead sheeting                                | 14.2 | 4.2 |
| MA766    | Lead sheeting                             | NR   |      | MA1047   | Wrought iron round bolt                      | 12.5 | 7.8 |
| MA767    | Short copper bolt                         | NR   |      | MA1048   | Wrought iron round bolt                      | 15.3 | 5.1 |
| MA768    | Sheathing tack                            | NR   |      | MA1049   | Wrought iron round bolt                      | 14.2 | 4.3 |
| MA769    | Case bottle fragment                      | NR   |      | MA1050   | Instrument glass fragment                    | NR   |     |
| MA772    | Window pane fragment                      | NR   |      | MA1051   | Window pane fragments                        | 13.5 | 6.2 |
| MA773    | Slate fragment                            | 13.0 | 10.9 | MA1052   | Round-flanged coak                           | SPH  |     |
| MA775    | Cable loop fragments                      | NR   |      | MA1053   | Earthenware container fragment               | NR   |     |
| MA776    | Octopus lure component (Polynesian)       | 31.5 | 7.3  | MA1055   | Musket ball                                  | 13.3 | 6.7 |
| MA777    | Octopus lure component (Polynesian)       | 31.5 | 7.3  | MA1056   | Copper alloy button                          | 15.4 | 5.0 |
| MA778    | Octopus lure component (Polynesian)       | 31.5 | 7.3  | MA1057   | Window pane fragment                         | 15.4 | 5.0 |
| MA779    | Cowrie shell ( <i>Cypraea tigris</i> )    | NR   |      | MA1058   | Window pane fragment                         | 12.2 | 6.5 |
| MA780    | Fireplace                                 | NR   |      | MA1059   | Earthenware pot fragment (spruce jar)        | NR   |     |
| MA781    | Copper clench bolt                        | NR   |      | MA1060   | Copper alloy object (possibly knuckle guard) | NR   |     |
| MA782    | Earthenware pot fragment (spruce jar)     | NR   |      | MA1063   | Wood fragments                               | 15.5 | 5.5 |
| MA783    | Pebble                                    | 7.0  | 12.2 | MA1064   | Wrought iron round bolt                      | 12.5 | 6.5 |
| MA784    | Swivel gun                                | NR   |      | MA1065   | Wood fragment                                | 13.9 | 7.8 |
| MA1000   | Venus shell ( <i>Antigona clathrata</i> ) | NR   |      | MA1066   | Wood fragment                                | 15.3 | 5.0 |
| MA1002   | Lead sheeting                             | 14.4 | 2.9  | MA1067   | Bottle fragment                              | NR   |     |
| MA1006   | Intact window pane                        | 13.6 | 3.3  | MA1068   | Pebble                                       | NR   |     |
| MA1010   | English 'wine' or 'beer' bottle           | 12.9 | 4.9  | MA1069   | Worked shell fragment                        | NR   |     |
| MA1013   | Butt plate from musket                    | 12.8 | 5.5  | MA1070   | Bottle fragment                              | 14.6 | 8.6 |
| MA1014   | Wood fragment                             | 12.5 | 5.8  | MA1071   | Facetted black stone                         | NR   |     |
| MA1015   | Wrought iron band fragment                | 13.4 | 5.9  | MA1072   | Creamware vase-like container                | 14.5 | 8.7 |
| MA1016   | Wood fragment                             | 13.8 | 4.9  | MA1073   | Sheathing tack                               | 15.0 | 7.7 |
| MA1017   | Wood fragment                             | 12.5 | 6.1  | MA1074   | Copper alloy button                          | 15.2 | 7.4 |
| MA1018   | Wood fragment                             | 13.0 | 5.7  | MA1075   | Earthenware pot fragment (spruce jar)        | 12.4 | 7.7 |
| MA1019   | Wood fragments                            | 12.8 | 4.9  | MA1076   | Copper alloy button                          | 15.5 | 7.7 |
| MA1020   | Wood fragments                            | 13.5 | 4.8  | MA1077   | Sword wooden grip                            | 12.3 | 7.9 |
| MA1021   | Wood fragment                             | 12.3 | 5.9  | MA1078   | Sheathing tack                               | 12.6 | 6.8 |
| MA1022   | Wood fragment                             | 13.4 | 5.3  | MA1079   | Sheathing tack                               | 14.2 | 7.4 |
| MA1024   | Wrought iron round bolt                   | 13.9 | 7.0  | MA1080   | Sheathing tack                               | 13.1 | 6.5 |
|          |   |      |      | MA1081   | Wrought iron round bolt                      | 13.8 | 7.5 |
|          |   |      |      | MA1082   | Window pane fragment                         | 14.6 | 8.8 |
|          |   |      |      | MA1083   | Bronze object                                | NR   |     |

| ACC. NO. | DESCRIPTION                              | X    | Y    | ACC. NO. | DESCRIPTION                            | X    | Y   |
|----------|--|------|------|----------|--|------|-----|
| MA1084   | Earthenware pot fragment (spruce jar)    | 14.5 | 9.0  | MA1142   | Earthenware container fragment         | 14.5 | 5.5 |
| MA1085   | Intact window pane                       | 14.7 | 8.9  | MA1143   | Stone pounder (Polynesian)             | 15.9 | 5.5 |
| MA1086   | Sandglass fragment                       | NR   |      | MA1144   | English 'wine' or 'beer' bottle        | 15.6 | 8.8 |
| MA1087   | Three sheathing tacks                    | 14.3 | 8.9  | MA1145   | Sheathing tack                         | 14.3 | 9.8 |
| MA1089   | Window pane fragment                     | 14.3 | 9.2  | MA1146   | Sheathing tack                         | 15.9 | 9.8 |
| MA1090   | Creamware fragment                       | 14.5 | 9.2  | MA1147   | Pebble                                 | 14.2 | 8.6 |
| MA1091   | Creamware plate fragment                 | 14.6 | 9.1  | MA1148   | Sheathing tack                         | 13.8 | 9.6 |
| MA1092   | Earthenware pot (spruce jar)             | 14.6 | 9.2  | MA1149   | Sheathing tack                         | 13.7 | 9.5 |
| MA1094   | Bronze quadrant                          | 25.0 | 10.0 | MA1150   | Sheathing tack                         | 13.7 | 9.6 |
| MA1095   | Lead sheeting                            | 15.1 | 6.9  | MA1151   | Bottle fragments                       | 13.8 | 9.4 |
| MA1096   | Sheathing tack                           | NR   |      | MA1153   | Cast lead weight                       | 15.6 | 7.6 |
| MA1097   | Wood fragment                            | 14.4 | 9.1  | MA1154   | Cast lead weight                       | 15.6 | 7.7 |
| MA1099   | Case bottle fragments                    | 14.4 | 9.0  | MA1155   | Cast lead weight                       | 15.6 | 7.6 |
| MA1100   | Inatct case bottle                       | 14.4 | 9.1  | MA1158   | Copper alloy strap fragment            | 15.1 | 6.6 |
| MA1101   | Case bottle fragments                    | 14.2 | 9.2  | MA1159   | Stone adze blade (Polynesian)          | NR   |     |
| MA1102   | Bottle fragment                          | NR   |      | MA1160   | Wooden dowel                           | 14.9 | 7.6 |
| MA1103   | Scabbard fragment                        | 12.3 | 7.9  | MA1161   | Shell adze blade (Polynesian)          | 15.5 | 7.8 |
| MA1104   | English 'wine' or 'beer' bottle fragment | 13.1 | 8.6  | MA1162   | Copper alloy strap                     | 15.1 | 6.9 |
| MA1105   | Window pane fragment                     | 14.0 | 7.0  | MA1163   | Bottle fragments                       | 15.1 | 6.9 |
| MA1106   | Sheathing tack                           | 14.0 | 7.0  | MA1164   | Earthenware pot (spruce jar)           | 12.9 | 8.4 |
| MA1107   | Window pane fragment                     | NR   |      | MA1165   | Earthenware pot (spruce jar)           | 13.0 | 8.3 |
| MA1108   | Bottle fragment                          | NR   |      | MA1167   | Conical drinking tumbler               | 15.5 | 5.8 |
| MA1111   | Copper clench bolt                       | 12.4 | 9.5  | MA1168   | Pipe component                         | 15.4 | 5.8 |
| MA1112   | Two sandglass ampoules                   | 14.5 | 9.0  | MA1169   | Case bottle fragments                  | 14.2 | 9.5 |
| MA1113   | Two sandglass fragments                  | 14.6 | 9.2  | MA1170   | Wrought iron band fragment             | 13.9 | 7.1 |
| MA1114   | Case bottle fragments                    | NR   |      | MA1171   | Cabinet fittings                       | 15.1 | 4.6 |
| MA1115   | Sheathing tack                           | NR   |      | MA1173   | Earthenware pot fragment (spruce jar)  | 14.2 | 9.3 |
| MA1116   | Case bottle fragments                    | NR   |      | MA1174   | Wrought iron band fragment             | 15.4 | 5.8 |
| MA1117   | Sheathing tack                           | 14.6 | 9.6  | MA1175   | Short copper bolt                      | 14.5 | 8.2 |
| MA1118   | Wood segment with keyhole                | 14.6 | 9.2  | MA1176   | Case bottle fragment                   | 14.2 | 9.1 |
| MA1119   | Bottle fragments                         | 14.6 | 9.2  | MA1177   | Window pane fragment                   | NR   |     |
| MA1120   | Cowrie shell ( <i>Cypraea tigris</i> )   | 15.2 | 7.8  | MA1179   | Wood fragment                          | 14.4 | 9.3 |
| MA1121   | Bone object (Polynesian)                 | 15.2 | 7.9  | MA1181   | Inatct case bottle                     | 13.4 | 9.4 |
| MA1122   | Cu alloy ring                            | 12.5 | 9.0  | MA1182   | Pearl shell slip (Polynesian)          | 13.4 | 9.4 |
| MA1123   | Stone adze blade (Polynesian)            | 15.3 | 6.7  | MA1183   | Earthenware pot (spruce jar)           | 13.9 | 9.5 |
| MA1124   | Cast lead weight                         | 15.3 | 7.1  | MA1184   | Earthenware pot (spruce jar)           | 13.6 | 9.6 |
| MA1125   | Wrought iron band fragment               | 15.2 | 6.9  | MA1186   | Stone adze blade (Polynesian)          | 15.7 | 7.7 |
| MA1126   | Wrought iron round bolt                  | 15.1 | 6.9  | MA1187   | Creamware container fragment           | 12.7 | 9.6 |
| MA1127   | Window pane fragment                     | SPH  |      | MA1188   | Two sheathing tacks                    | 12.7 | 8.8 |
| MA1128   | Case bottle fragments                    | NR   |      | MA1189   | Cowrie shell ( <i>Cypraea tigris</i> ) | 15.1 | 7.8 |
| MA1129   | Intact window pane                       | 14.8 | 9.2  | MA1190   | Cowrie shell ( <i>Cypraea tigris</i> ) | 14.9 | 7.8 |
| MA1131   | Case bottle fragments                    | NR   |      | MA1191   | Creamware plate fragment               | 15.8 | 7.6 |
| MA1133   | Window pane fragment                     | 13.9 | 9.1  | MA1192   | Copper alloy button fragment           | 15.5 | 7.8 |
| MA1134   | Window pane fragment                     | 15.6 | 7.4  | MA1194   | Cast lead weight                       | 15.6 | 7.7 |
| MA1135   | Case bottle fragment                     | 13.5 | 8.5  | MA1196   | Wrought iron band fragment             | 12.0 | 8.8 |
| MA1136   | Cast lead weight                         | 15.6 | 7.5  | MA1197   | Wrought iron band fragment             | 14.6 | 6.2 |
| MA1137   | Sheathing tack                           | 13.6 | 9.1  | MA1199   | Wrought iron round bolt                | NR   |     |
| MA1138   | Sheathing tack                           | 13.6 | 8.2  | MA1200   | Wrought iron band fragment             | 12.3 | 9.5 |
| MA1139   | Cylindrical lead roll                    | 13.8 | 9.0  | MA1201   | Wrought iron round bolt                | NR   |     |
| MA1140   | Lead roll                                | 15.0 | 7.9  | MA1203/1 | Wrought iron round bolt                | NR   |     |
| MA1141   | Window pane fragment                     | NR   |      | MA1203/2 | Threaded bolt                          | NR   |     |
|          |  |      |      | MA1205   | Wrought iron round bolt                | 12.1 | 9.0 |

| ACC. NO. | DESCRIPTION                            | X    | Y    | ACC. NO. | DESCRIPTION                               | X    | Y    |
|----------|--|------|------|----------|---|------|------|
| MA1207   | Bottle fragments                       | 15.2 | 7.9  | MA1273   | Lucina cockle ( <i>Codakia tigerina</i> ) | 14.4 | 8.7  |
| MA1208   | Lead sheeting                          | 15.9 | 7.4  | MA1275   | Lucina cockle ( <i>Codakia tigerina</i> ) | 14.3 | 9.1  |
| MA1209   | Cylindrical lead roll                  | 12.2 | 9.0  | MA1276   | Blue & white teabowl fragment             | 15.6 | 8.6  |
| MA1211   | Musket ball                            | 13.9 | 6.2  | MA1277   | Wood fragment                             | 14.7 | 9.2  |
| MA1212   | Two musket balls                       | 13.4 | 6.5  | MA1278   | Earthenware pot (spruce jar)              | 14.5 | 9.2  |
| MA1215   | Wrought iron round bolt                | 12.3 | 8.4  | MA1279   | Creamware plate fragment                  | 15.4 | 8.3  |
| MA1216   | Wrought iron band fragment             | 12.3 | 9.0  | MA1280   | Wood fragment                             | 14.3 | 8.7  |
| MA1217   | Bottle fragments                       | 13.7 | 9.6  | MA1281   | Octant component                          | NR   |      |
| MA1218   | Earthenware pot (spruce jar)           | 13.4 | 9.4  | MA1282   | Window pane fragment                      | 15.2 | 6.6  |
| MA1219   | Earthenware pot (spruce jar)           | 13.4 | 9.4  | MA1283   | Inatct window pane                        | 15.4 | 6.5  |
| MA1220   | Creamware fragment                     | 13.4 | 9.4  | MA1284   | Sheathing tack                            | NR   |      |
| MA1221   | Intact case bottle                     | 13.9 | 9.2  | MA1285   | Creamware fragment                        | NR   |      |
| MA1222   | Intact case bottle                     | 13.8 | 9.1  | MA1286   | Butt plate from musket                    | 14.1 | 6.2  |
| MA1223   | Two pebbles                            | 12.4 | 8.8  | MA1287   | Wooden axe handle                         | 14.5 | 6.9  |
| MA1224   | Case bottle fragment                   | 13.8 | 9.3  | MA1288   | Case bottle fragments                     | NR   |      |
| MA1225   | Earthenware pot (spruce jar)           | 13.8 | 9.0  | MA1289   | Earthenware pot (spruce jar)              | 13.4 | 9.0  |
| MA1226   | Earthenware pot (spruce jar)           | 13.7 | 9.1  | MA1290   | Cylindrical lead roll                     | 13.4 | 9.0  |
| MA1227   | Creamware platter fragment             | 13.5 | 9.5  | MA1291   | Cylindrical lead roll                     | 13.8 | 8.9  |
| MA1228   | Cylindrical lead roll                  | 13.2 | 9.4  | MA1292   | Creamware plate fragment                  | 13.8 | 9.6  |
| MA1229   | Wrought iron band fragment             | 15.1 | 6.2  | MA1294   | Bottle fragment                           | 13.9 | 9.0  |
| MA1230   | Sheathing tack                         | NR   |      | MA1295   | Creamware plate fragment                  | 13.5 | 8.9  |
| MA1231   | Creamware platter fragment             | 13.8 | 11.8 | MA1296   | Wrought iron round bolt                   | 13.2 | 9.2  |
| MA1233   | Four sheathing tacks                   | NR   |      | MA1297   | Wrought iron band fragment                | 13.0 | 9.2  |
| MA1234   | Two sheathing tacks                    | NR   |      | MA1298   | Earthenware pot fragment (spruce jar)     | 13.4 | 9.0  |
| MA1235   | Copper sheeting                        | NR   |      | MA1300   | Blue rimmed bowl fragment                 | 14.4 | 10.7 |
| MA1237   | Sheathing tack                         | 13.8 | 9.3  | MA1301   | Window pane fragment                      | 12.6 | 10.2 |
| MA1238   | Cowrie shell ( <i>Cypraea tigris</i> ) | 14.3 | 7.7  | MA1302   | Cast lead weight                          | 12.3 | 10.4 |
| MA1239   | Bottle fragments                       | 15.4 | 6.7  | MA1303   | Cast lead weight                          | 12.5 | 10.9 |
| MA1241   | Trigger guard                          | 14.5 | 6.3  | MA1305   | Intact window pane                        | 14.7 | 9.1  |
| MA1242   | Creamware serving platter              | 13.8 | 8.6  | MA1306   | Intact window pane                        | 15.8 | 8.8  |
| MA1245   | Three flattened lead rolls             | 13.6 | 9.1  | MA1307   | Case & other bottle fragments             | 14.2 | 8.9  |
| MA1246   | Earthenware pot (spruce jar)           | 14.0 | 8.8  | MA1308   | Copper alloy tube                         | 14.1 | 8.8  |
| MA1248   | Wood fragments                         | 14.7 | 7.4  | MA1309   | Earthenware pot (spruce jar)              | 14.1 | 8.9  |
| MA1249   | Case bottle fragments                  | 13.6 | 9.1  | MA1310   | Earthenware pot (spruce jar)              | 13.9 | 9.0  |
| MA1251   | Bottle fragments                       | NR   |      | MA1311   | Stone adze blade (Polynesian)             | 15.7 | 8.6  |
| MA1252   | Copper sheeting                        | 15.6 | 11.1 | MA1312   | Creamware soup plate fragment             | 14.7 | 9.1  |
| MA1253   | Window pane fragment                   | 13.6 | 11.7 | MA1313   | Creamware container fragment              | 14.7 | 9.1  |
| MA1254   | Wood fragment                          | 15.1 | 11.1 | MA1314   | Musket ball                               | 13.3 | 9.2  |
| MA1256   | Bottle fragments                       | NR   |      | MA1315   | Two sheathing tacks                       | 13.8 | 9.6  |
| MA1257   | Sheathing tack                         | NR   |      | MA1317   | Sheathing tack                            | 14.0 | 9.3  |
| MA1258   | Window pane fragment                   | 12.9 | 10.6 | MA1318   | Intact case bottle                        | 14.3 | 10.8 |
| MA1259   | Four cast lead weights                 | NR   |      | MA1319   | Case bottle fragment                      | 14.5 | 10.8 |
| MA1260   | Lead sheeting                          | 12.4 | 11.1 | MA1321   | Sheathing tack                            | 12.7 | 15.6 |
| MA1261   | Eye bolt                               | 13.3 | 11.8 | MA1322   | Cast lead weight                          | 12.6 | 15.4 |
| MA1262   | Wrought iron band fragment             | 12.7 | 11.3 | MA1323   | Window pane fragment                      | 12.7 | 15.8 |
| MA1264   | Window pane & bottle fragments         | 14.1 | 9.2  | MA1324   | Sheathing tack                            | 12.7 | 15.6 |
| MA1265   | Bottle fragment                        | 14.5 | 9.2  | MA1326   | Earthenware pot (spruce jar)              | 13.3 | 9.2  |
| MA1266   | Wood fragment                          | 14.4 | 9.2  | MA1327   | Wood fragments                            | 14.8 | 11.2 |
| MA1267   | Wood fragment                          | 14.3 | 9.2  | MA1328   | Angled band fragment                      | NR   |      |
| MA1268   | Bottle fragment                        | 14.2 | 9.2  | MA1329   | Wrought iron band fragment                | 14.7 | 11.1 |
| MA1269   | Wood fragment                          | 14.6 | 9.1  | MA1330   | Case bottle fragments                     | 13.5 | 9.5  |
| MA1270   | Single sheave from pulley block        | 14.7 | 8.9  | MA1331   | Seedpod (possibly palm nut)               | 12.9 | 8.9  |
| MA1271   | Sheathing tack                         | NR   |      |          |   |      |      |

| ACC. NO. | DESCRIPTION   | X    | Y    | ACC. NO. | DESCRIPTION                                     | X    | Y    |
|----------|---|------|------|----------|---|------|------|
| MA1333   | Cowrie shell ( <i>Cypraea tigris</i> )                        | 15.9 | 8.5  | MA1392   | Wood fragments                                  | 14.9 | 8.6  |
| MA1334   | Wrought iron band fragment                                    | 15.9 | 8.8  | MA1393   | Wood fragments                                  | 14.5 | 8.8  |
| MA1337   | Creamware fragment  | NR   |      | MA1394   | Tongan war club                                 | 15.2 | 8.3  |
| MA1341   | Earthenware pot (spruce jar)                                  | 13.2 | 9.2  | MA1395   | Window pane fragment & two Tongan war clubs     | 15.3 | 8.2  |
| MA1342   | Sheathing tack  | 12.1 | 9.4  | MA1396   | Octopus lure component (Polynesian)             | NR   |      |
| MA1343   | Lead rod  | 12.2 | 9.2  | MA1397   | Copper sheeting                                 | NR   |      |
| MA1344   | Tiller sweep roller   | 13.3 | 9.1  | MA1398   | Creamware fragment                              | NR   |      |
| MA1345   | Cowrie shell ( <i>Cypraea tigris</i> ) & case bottle fragment | 13.3 | 9.1  | MA1399   | Case bottle fragment                            | 13.6 | 12.7 |
| MA1347   | Bottle fragments  | 14.8 | 11.0 | MA1400   | Wrought iron band fragment                      | NR   |      |
| MA1348   | Wood fragments  | 13.6 | 14.8 | MA1401   | Flattened lead roll                             | 14.5 | 10.9 |
| MA1349   | Window pane fragments   | 15.5 | 10.9 | MA1402   | Window pane fragment                            | 14.4 | 10.5 |
| MA1350   | Sheathing tack  | 13.1 | 15.4 | MA1408   | Wrought iron round bolt 14.1                    | 10.6 |      |
| MA1351   | Tongan war club   | 15.2 | 8.3  | MA1410   | Wrought iron band fragment                      | NR   |      |
| MA1352   | Wood fragment   | 15.2 | 8.7  | MA1411   | Wrought iron round bolt                         | NR   |      |
| MA1353   | Earthenware pot (spruce jar)                                  | 14.6 | 8.9  | MA1412   | English 'wine' or 'beer' bottle fragment        | 12.8 | 12.7 |
| MA1354   | Creamware bread & butter plate fragment                       | 15.9 | 9.2  | MA1414   | Earthenware pot (spruce jar)                    | 12.6 | 14.0 |
| MA1356   | Earthenware pot (spruce jar)                                  | 13.4 | 12.5 | MA1415   | Earthenware pot (spruce jar)                    | 13.8 | 12.7 |
| MA1357   | Trigger guard   | 15.5 | 9.7  | MA1416   | Earthenware pot (spruce jar)                    | 14.7 | 13.2 |
| MA1358   | Pewter object   | 15.5 | 9.8  | MA1417   | Window pane fragment                            | 12.5 | 12.8 |
| MA1359   | Wood fragment   | 15.4 | 8.5  | MA1419   | Wrought iron round bolt                         | 12.5 | 13.0 |
| MA1360   | Lucina cockle ( <i>Codakia tigerina</i> )                     | 14.5 | 9.0  | MA1420   | Wood fragment                                   | 13.4 | 12.5 |
| MA1361   | Flattened lead roll   | 14.6 | 8.9  | MA1421   | English 'wine' or 'beer' bottle fragment        | 14.4 | 10.3 |
| MA1363   | Creamware fragments   | 14.6 | 8.9  | MA1423   | Wood fragment                                   | 14.4 | 10.5 |
| MA1364   | Wooden object (possibly cleat)                                | 14.2 | 9.1  | MA1424   | Copper alloy latch                              | 14.3 | 10.3 |
| MA1365   | Lucina cockle ( <i>Codakia tigerina</i> )                     | 14.5 | 8.9  | MA1425   | Three sheathing tacks                           | NR   |      |
| MA1366   | Eye bolt  | 14.3 | 9.0  | MA1426   | Creamware plate fragment                        | 14.5 | 10.3 |
| MA1367   | Hook with attached thimble & rope fragment                    | 14.7 | 8.8  | MA1427   | Window pane fragment                            | 12.6 | 14.0 |
| MA1368   | Earthenware pot (spruce jar)                                  | 13.3 | 12.2 | MA1428   | Intact bottle                                   | 14.1 | 9.1  |
| MA1369   | Copper alloy sharp fragment                                   | 13.9 | 12.6 | MA1429   | Creamware jar                                   | 16.0 | 8.5  |
| MA1370   | Copper alloy object   | 13.6 | 12.5 | MA1430   | Lucina cockle ( <i>Codakia tigerina</i> )       | 14.9 | 9.0  |
| MA1371   | Earthenware pot (spruce jar)                                  | 13.9 | 13.4 | MA1433   | Creamware fragment                              | NR   |      |
| MA1372   | Shell ( <i>Strombus sinuatus</i> )                            | 13.5 | 13.4 | MA1434   | Wood fragments                                  | 14.1 | 9.2  |
| MA1373   | Earthenware pot (spruce jar)                                  | 13.0 | 12.7 | MA1435   | One-piece shell fishhook (Polynesian)           | NR   |      |
| MA1374   | Window pane fragment  | 13.6 | 13.3 | MA1436   | Sheathing tack                                  | NR   |      |
| MA1375   | Window pane   | 13.1 | 12.5 | MA1437   | Wide-mouthed bottle fragments                   | 13.6 | 12.3 |
| MA1376   | Window pane   | 13.1 | 12.5 | MA1438   | Earthenware pot (spruce jar)                    | 13.5 | 13.7 |
| MA1379   | Wrought iron band fragment                                    | 14.8 | 10.2 | MA1439   | Earthenware pot (spruce jar)                    | 13.7 | 9.6  |
| MA1380   | Copper sheeting   | 14.8 | 10.5 | MA1440   | Earthenware pot (spruce jar)                    | 12.8 | 13.4 |
| MA1381   | Earthenware pot fragment (spruce jar)                         | 13.4 | 12.8 | MA1441   | Earthenware pot fragment (spruce jar)           | 13.3 | 13.5 |
| MA1382   | Case bottle fragment  | 12.2 | 12.4 | MA1442   | Wrought iron round bolt                         | 13.4 | 13.0 |
| MA1383   | Bottle fragment   | 14.4 | 10.4 | MA1443   | Case bottle fragments                           | 13.7 | 9.6  |
| MA1384   | Sheathing tack  | NR   |      | MA1444   | Four lucina cockles ( <i>Codakia tigerina</i> ) | 13.8 | 9.2  |
| MA1385   | Window pane fragment  | NR   |      | MA1445   | Window pane fragment                            | 12.3 | 12.8 |
| MA1386   | Baking pan & wrought iron round bolt                          | 14.6 | 10.4 | MA1446   | Creamware plate fragment                        | 12.4 | 12.8 |
| MA1387   | Stone adze blade (Polynesian)                                 | 15.3 | 8.2  | MA1447   | Cast lead weight                                | 12.5 | 12.4 |
| MA1388   | Wooden handle & shell object (Polynesian)                     | NR   |      | MA1448   | Cast lead weight                                | 12.5 | 12.4 |
| MA1390   | Window pane fragment  | 14.8 | 8.3  | MA1449   | Earthenware pot (spruce jar)                    | 12.3 | 12.8 |
| MA1391   | Wood fragment   | 14.9 | 8.6  |          |   |      |      |

| ACC. NO. | DESCRIPTION  | X    | Y    | ACC. NO. | DESCRIPTION                                     | X    | Y    |
|----------|--|------|------|----------|---|------|------|
| MA1450   | Earthenware pot fragment (spruce jar)                      | 15.1 | 12.6 | MA1511   | Blue & white saucer fragment                    | 16.5 | 8.1  |
| MA1451   | Earthenware pot (spruce jar)                               | 12.2 | 13.2 | MA1512   | Three English 'wine' or 'beer' bottle fragments | 14.1 | 10.4 |
| MA1452   | Window pane fragment                                       | NR   |      | MA1515   | Wrought iron band fragment                      | 15.9 | 8.1  |
| MA1454   | Wrought iron band fragment                                 | NR   |      | MA1516   | Wood fragment with keyhole                      | 16.4 | 8.8  |
| MA1455   | Creamware fragment   | NR   |      | MA1517   | Wrought iron round bolt                         | 16.5 | 8.2  |
| MA1457   | Window pane & scabbard fragment                            | NR   |      | MA1519   | Slate fragment                                  | 15.1 | 10.3 |
| MA1459   | Wrought iron round bolt                                    | 14.4 | 10.1 | MA1521   | Window pane fragment                            | NR   |      |
| MA1461   | Seven sheathing tacks                                      | NR   |      | MA1524   | Wrought iron round bolt                         | 15.2 | 10.3 |
| MA1463   | Earthenware pot fragment (spruce jar) & stoneware fragment | NR   |      | MA1525   | Gouge with 'John Green' stamp                   | 15.1 | 10.4 |
| MA1464   | Copper sheeting  | NR   |      | MA1526   | Wood fragments                                  | 14.3 | 10.1 |
| MA1465   | Intact drinking glass                                      | 16.3 | 8.1  | MA1528   | Window pane fragment                            | NR   |      |
| MA1466   | Intact bottle with shear neck                              | 16.5 | 8.4  | MA1529   | Case bottle fragments                           | 14.2 | 11.9 |
| MA1467   | Creamware plate fragment                                   | 16.0 | 8.0  | MA1530   | Screw bolt                                      | 14.4 | 10.9 |
| MA1468   | Cowrie shell ( <i>Cypraea tigris</i> )                     | 16.1 | 8.1  | MA1531   | Screw bolt                                      | 14.2 | 11.9 |
| MA1469   | Creamware dinner plate fragment                            | 16.0 | 8.6  | MA1532   | Three sheathing tacks                           | NR   |      |
| MA1470   | Blue & white teabowl                                       | 16.3 | 8.5  | MA1533   | Earthenware pot fragment (spruce jar)           | NR   |      |
| MA1472   | Wrought iron band fragment                                 | 16.2 | 8.1  | MA1534   | Creamware bowl fragment                         | 14.2 | 11.9 |
| MA1473   | Earthenware pot (spruce jar)                               | 13.2 | 13.3 | MA1536   | Wood fragment                                   | 15.3 | 8.3  |
| MA1474   | Sandglass fragment   | NR   |      | MA1537   | Creamware plate fragment                        | 15.2 | 8.2  |
| MA1475   | Earthenware pot (spruce jar)                               | 13.1 | 13.5 | MA1538   | Two musket balls                                | 14.9 | 8.4  |
| MA1477   | Earthenware pot (spruce jar)                               | 13.1 | 13.5 | MA1539   | Cast lead weight                                | 15.1 | 8.4  |
| MA1478   | Earthenware pot fragment (spruce jar)                      | 13.1 | 13.5 | MA1540   | Earthenware pot (spruce jar)                    | 13.3 | 13.6 |
| MA1479   | Creamware plate fragment                                   | 13.1 | 13.5 | MA1541   | Case bottle fragment                            | 13.2 | 13.4 |
| MA1480   | Earthenware pot (spruce jar)                               | 12.4 | 13.1 | MA1542   | Wrought iron round bolt                         | 12.7 | 12.1 |
| MA1481   | Copper sheeting  | 14.7 | 13.4 | MA1543   | Earthenware pot (spruce jar)                    | NR   |      |
| MA1482   | Creamware soup plate                                       | 14.9 | 11.0 | MA1545   | Case bottle fragment                            | 14.4 | 10.0 |
| MA1483   | Earthenware pot (spruce jar)                               | 12.8 | 11.7 | MA1546   | Earthenware pot (spruce jar)                    | 14.3 | 10.0 |
| MA1484   | Rudder nail  | 14.9 | 11.3 | MA1547   | Wooden fishing float                            | 14.4 | 9.9  |
| MA1485   | Plain hinge  | 14.2 | 10.2 | MA1548   | Sandglass fragments                             | 14.4 | 9.8  |
| MA1486   | Case bottle fragment                                       | 14.0 | 10.0 | MA1549   | Wooden fishing float                            | 14.5 | 10.1 |
| MA1488   | Flattened lead roll  | 14.0 | 10.0 | MA1550-1 | Two shell fishhook facing plates (Polynesian)   | 14.4 | 10.0 |
| MA1490   | Eye bolt   | NR   |      | MA1551   | Wood fragment                                   | 14.4 | 10.2 |
| MA1491   | Wrought iron round bolt                                    | 14.2 | 10.3 | MA1552   | Earthenware pot (spruce jar)                    | 14.4 | 9.8  |
| MA1493   | Window pane fragment                                       | NR   |      | MA1553   | Earthenware pot (spruce jar)                    | 14.5 | 10.0 |
| MA1494   | Eight sheathing tacks                                      | NR   |      | MA1554   | Earthenware pot (spruce jar)                    | 14.4 | 9.9  |
| MA1495   | Wrought iron band fragment                                 | NR   |      | MA1555   | Wood fragment                                   | 14.4 | 10.1 |
| MA1496   | Window pane fragment                                       | NR   |      | MA1556   | Window pane fragment                            | NR   |      |
| MA1497   | Murex shell ( <i>Chicoreus ramosus</i> )                   | NR   |      | MA1357   | Trigger guard                                   | NR   |      |
| MA1499   | Sandglass fragment   | 14.4 | 10.4 | MA1558   | Earthenware pot fragment (spruce jar)           | NR   |      |
| MA1500   | Shell fishhook shank (Polynesian)                          | 14.3 | 10.4 | MA1559   | Copper sheeting                                 | NR   |      |
| MA1501   | Earthenware pot (spruce jar)                               | 14.1 | 10.4 | MA1562   | Two plain hinges                                | 15.9 | 9.4  |
| MA1502   | Creamware bowl fragment                                    | 13.9 | 10.3 | MA1563   | Stone adze blade (Polynesian)                   | 15.9 | 9.4  |
| MA1503   | Tilley sweep roller  | 14.1 | 10.4 | MA1564   | Creamware dinner plate fragment                 | 15.7 | 9.3  |
| MA1505   | Earthenware pot (spruce jar)                               | 14.2 | 10.4 | MA1567   | Shell fishhook facing plate (Polynesian)        | 15.2 | 10.8 |
| MA1506   | Earthenware pot (spruce jar)                               | 14.1 | 10.3 | MA1568   | Creamware fragments                             | 15.2 | 10.8 |
| MA1507   | Window pane fragments                                      | 14.1 | 10.4 | MA1571   | Single sheave from pulley block                 | 15.9 | 9.2  |
| MA1508   | Decanter fragment  | 16.5 | 8.0  | MA1572   | Creamware dinner plate fragment                 | 16.0 | 9.3  |
| MA1509   | Shell fishhook shank (Polynesian)                          | 16.5 | 8.0  | MA1573   | Copper clenched bolt                            | 13.0 | 13.3 |

| ACC. NO. | DESCRIPTION                              | X    | Y    | ACC. NO. | DESCRIPTION  | X    | Y    |
|----------|--|------|------|----------|--|------|------|
| MA1575   | Bottle fragment                          | 15.7 | 12.7 | MA1649   | Creamware container fragment                                       | NR   |      |
| MA1576   | Earthenware pot (spruce jar)             | 12.6 | 12.9 | MA1650   | Window pane fragment   | NR   |      |
| MA1577   | Sheathing tack                           | 13.7 | 13.7 | MA1652   | Earthenware pot fragment (spruce jar)                              | NR   |      |
| MA1578   | Earthenware pot (spruce jar)             | 13.0 | 12.7 | MA1653   | Earthenware pot fragment (spruce jar)                              | 13.3 | 12.4 |
| MA1579   | Window pane fragment                     | 14.3 | 9.9  | MA1654   | Wood fragment  | 13.3 | 12.4 |
| MA1581   | Wood fragment                            | 14.0 | 10.2 | MA1655   | Rose-headed spike  | NR   |      |
| MA1583   | Tiller sweep roller                      | 14.5 | 9.8  | MA1657   | Short copper bolt  | NR   |      |
| MA1585   | Earthenware pot (spruce jar)             | 14.3 | 9.8  | MA1661   | Ring bolt  | NR   |      |
| MA1586   | Earthenware pot (spruce jar)             | 14.4 | 10.2 | MA1662   | Two cast lead weights  | NR   |      |
| MA1587   | Earthenware pot (spruce jar)             | 14.4 | 10.1 | MA1664   | Apothecary bottle  | 15.0 | 8.9  |
| MA1588   | Wooden handle                            | NR   |      | MA1665   | Sander from desk set   | 15.1 | 9.0  |
| MA1590   | Earthenware pot (spruce jar)             | 15.0 | 9.1  | MA1667   | Creamware bowl fragment  | NR   |      |
| MA1591   | Sandglass ampoule                        | 14.5 | 9.2  | MA1670   | Counterweight  | 16.2 | 9.3  |
| MA1593   | Case bottle fragments                    | 14.1 | 9.4  | MA1672   | Cowrie shell ( <i>Cypraea tigris</i> )                             | 15.9 | 8.8  |
| MA1594   | Bale handle fragment                     | NR   |      | MA1673   | Blue & white saucer fragment                                       | 16.2 | 9.4  |
| MA1595   | Copper clench bolt                       | 15.3 | 14.0 | MA1674   | Lucina cockle ( <i>Codakia tigrina</i> )                           | 15.8 | 9.4  |
| MA1596   | Wood fragment                            | 12.7 | 13.3 | MA1675   | Single sheave from pulley block                                    | NR   |      |
| MA1597   | Grip from sword handle                   | 11.7 | 13.0 | MA1677   | Musket ball  | NR   |      |
| MA1598   | Wrought iron band fragment               | 12.4 | 12.5 | MA1678   | Two auger shells ( <i>Terebra maculata</i> )                       | NR   |      |
| MA1599   | Hull sheathing section                   | NR   |      | MA1679   | Window pane fragment   | 15.9 | 8.8  |
| MA1600   | Copper clench bolt                       | 12.2 | 12.9 | MA1680   | Case bottle fragments  | NR   |      |
| MA1601   | Copper clench bolt                       | 12.1 | 12.7 | MA1683   | Earthenware pot fragment (spruce jar) & wrought iron band fragment | 12.9 | 8.9  |
| MA1602   | Wood fragment                            | 14.1 | 9.0  | MA1684   | Earthenware pot fragment (spruce jar)                              | NR   |      |
| MA1603   | Wooden fragment                          | NR   |      | MA1686   | Wrought iron round bolt  | NR   |      |
| MA1604   | Wood fragment                            | 14.1 | 9.0  | MA1688   | Wood fragment  | 13.3 | 11.7 |
| MA1605   | Window pane fragment                     | 12.3 | 13.2 | MA1692   | Window pane fragment   | NR   |      |
| MA1606   | Wooden rod                               | 13.9 | 9.0  | MA1693   | Single sheave from pulley block                                    | NR   |      |
| MA1607   | Scabbard stud                            | 12.7 | 13.3 | MA1694   | Window pane fragment   | NR   |      |
| MA1608   | Earthenware container fragment           | NR   |      | MA1695   | Sandglass fragment   | NR   |      |
| MA1609   | Polynesian worked shell object           | NR   |      | MA1696   | Scabbard fragment  | NR   |      |
| MA1611   | Musket ball                              | NR   |      | MA1698   | Window pane fragment   | NR   |      |
| MA1612   | Earthenware pot fragment (spruce jar)    | NR   |      | MA1699   | Shell adze blade (Polynesian)                                      | 14.4 | 10.4 |
| MA1615   | Window pane fragment                     | NR   |      | MA1700   | Earthenware pot fragment (spruce jar)                              | 14.2 | 10.3 |
| MA1616   | Instrument glass fragment                | NR   |      | MA1701   | Earthenware pot (spruce jar)                                       | 14.2 | 10.2 |
| MA1618   | Sandglass fragment                       | NR   |      | MA1702   | Window pane fragment   | NR   |      |
| MA1617   | Creamware fragment                       | NR   |      | MA1703   | Two sheathing tacks  | NR   |      |
| MA1619   | Scabbard fragment                        | NR   |      | MA1709   | Sandglass fragment   | 14.4 | 10.4 |
| MA1622   | Blue & white saucer                      | 16.2 | 9.3  | MA1711   | Wrought iron band fragment   | NR   |      |
| MA1625   | Creamware jar                            | 16.1 | 9.0  | MA1713   | Drinking glass fragment  | NR   |      |
| MA1626   | Scabbard fragment                        | 16.1 | 9.3  | MA1715   | Earthenware pot (spruce jar)                                       | NR   |      |
| MA1627   | Pistol                                   | 16.5 | 8.2  | MA1716   | Earthenware pot (spruce jar)                                       | NR   |      |
| MA1629   | Earthenware pot (spruce jar)             | 13.4 | 12.1 | MA1717   | Earthenware pot (spruce jar)                                       | NR   |      |
| MA1630   | Glass stopper                            | 15.9 | 13.6 | MA1718   | Sandglass fragments  | 14.3 | 9.7  |
| MA1631   | Bottle fragments                         | NR   |      | MA1719   | Wood fragment  | 14.1 | 10.1 |
| MA1632   | Lucina cockle ( <i>Codakia tigrina</i> ) | NR   |      | MA1720   | Sandglass fragment   | 14.6 | 9.7  |
| MA1633   | Window pane fragment                     | NR   |      | MA1722   | Polynesian shell bracelet  | 14.4 | 9.6  |
| MA1634   | Drinking glass                           | 15.9 | 9.3  |          |  |      |      |
| MA1636   | English 'wine' or 'beer' bottle fragment | 15.8 | 8.2  |          |  |      |      |
| MA1643   | Ring bolt                                | 16.0 | 9.5  |          |  |      |      |
| MA1645   | Scabbard fragment                        | NR   |      |          |  |      |      |
| MA1647   | Round-flanged coak                       | NR   |      |          |  |      |      |

| ACC. NO. | DESCRIPTION                                       | X            | Y   | ACC. NO. | DESCRIPTION  | X    | Y    |
|----------|---|--------------|-----|----------|--|------|------|
| MA1723   | Shell fishhook facing plate (Polynesian)          | 14.5         | 9.7 | MA1804   | Honeycomb oyster shell ( <i>Hyotissa hyotis</i> )      | NR   |      |
| MA1724   | Polynesian worked shell object                    | 14.5         | 9.7 | MA1805   | One valve of the giant clam ( <i>Tridacna maxima</i> ) | NR   |      |
| MA1726   | Sandglass fragment                                | 14.6         | 9.7 | MA1807   | Murex shell ( <i>Chicoreus brunneus</i> )              | NR   |      |
| MA1727   | Handled tumbler                                   | 16.5         | 9.1 | MA1808   | Cone shell (possibly <i>Comus leopardus</i> )          | NR   |      |
| MA1728   | Drinking mug                                      | 14.4         | 8.1 | MA1811   | Two cowrie shells ( <i>Cypraea caputserpentis</i> )    | NR   |      |
| MA1729   | Inkwell or sander                                 | 15.1         | 8.9 | MA1813   | Three vase shells ( <i>Tudivasum armigera</i> )        | NR   |      |
| MA1730   | Shell fishhook facing plate (Polynesian)          | 14.6         | 9.5 | MA1814   | Cowrie shell ( <i>Cypraea tigris</i> )                 | NR   |      |
| MA1732   | Wood fragments                                    | 14.3         | 8.8 | MA3001   | Wrought iron round bolt                                | NR   |      |
| MA1733   | Two sheathing tacks                               | 14.1         | 8.9 | MA3002   | Wrought iron round bolt                                | NR   |      |
| MA1734   | Plantain skin remains                             | 14.4         | 9.0 | MA3003   | Blue & white saucer                                    | NR   |      |
| MA1735   | Bottle fragments                                  | 14.1         | 9.1 | MA3004   | Aqua bottle  | 23.3 | 2.8  |
| MA1736   | Window pane fragment                              | 14.9         | 8.5 | MA3005   | Blue & white saucer                                    | RR   |      |
| MA1737   | Copper sheeting                                   | 15.9         | 9.3 | MA3006   | Wood fragment  | 22.6 | 2.7  |
| MA1739   | Chimney flue section                              | NR           |     | MA3007   | Thorny oyster ( <i>Spondylus sinensis</i> )            | 22.7 | 3.0  |
| MA1740   | Polynesian shell trumpet                          | 16.4         | 9.0 | MA3008   | Wood fragment  | 22.8 | 2.9  |
| MA1743   | Wooden fishing float                              | NR           |     | MA3009   | Wrought iron round bolt                                | NR   |      |
| MA1745   | Wooden fishing float                              | NR           |     | MA3010   | Cauldron   | NR   |      |
| MA1746   | Lucina cockle ( <i>Codakia tigerina</i> )         | NR           |     | MA3012   | Wooden brush fragment                                  | NR   |      |
| MA1747   | Lucina cockle ( <i>Codakia tigerina</i> )         | NR           |     | MA3013   | Double pulley block                                    | NR   |      |
| MA1748   | Earthenware pot fragment (spruce jar)             | NR           |     | MA3014   | Wrought iron round bolt                                | NR   |      |
| MA1749   | Bottle fragments                                  | NR           |     | MA3015   | Murex shell ( <i>Chicoreus ramosus</i> )               | NR   |      |
| MA1750   | Bottle fragments                                  | NR           |     | MA3018   | Wood fragments   | NR   |      |
| MA1752   | Pebble  | NR           |     | MA3019   | Wood fragment  | NR   |      |
| MA1755   | Pearl shell slip (Polynesian)                     | NR           |     | MA4000   | Intact window pane                                     | 16.0 | 10.6 |
| MA1757   | Copper alloy button                               | Sand packing |     | MA4001   | Copper sheeting  | 16.0 | 10.6 |
| MA1758   | Copper alloy cylinder                             | NR           |     | MA4002   | Wr iron strap.   | 16.0 | 10.6 |
| MA1759   | Wrought iron band fragment                        | NR           |     | MA4003   | Two brass rods.  | 16.0 | 10.3 |
| MA1765   | Apothecary bottle                                 | NR           |     | MA4004   | Sheathing tack   | 16.0 | 10.3 |
| MA1766   | Leather fragment                                  | NR           |     | MA4006   | Wr iron band   | 16.0 | 10.3 |
| MA1767   | Wooden disc                                       | NR           |     | MA4007   | Copper sheeting fragment & two sheathing tacks         | 16.0 | 9.9  |
| MA1768   | Lucina cockle ( <i>Codakia tigerina</i> )         | NR           |     | MA4008   | Slate fragment   | 16.0 | 10.1 |
| MA1769   | Window pane fragment                              | NR           |     | MA4009   | Two window pane fragments                              | 16.0 | 10.6 |
| MA1770   | Bone button                                       | NR           |     | MA4010   | Wood fragment  | 16.0 | 10.2 |
| MA1771   | Cast lead weight                                  | NR           |     | MA4011   | Wood fragments   | 16.0 | 10.3 |
| MA1772   | Musket ball                                       | NR           |     | MA4012   | Copper sheeting  | NR   |      |
| MA1773   | Five flattened lead rolls                         | NR           |     | MA4013   | Creamware bowl fragment                                | NR   |      |
| MA1775   | Creamware fragment                                | NR           |     | MA4014   | Thin brass rod.  | 16.0 | 10.4 |
| MA1777   | Window pane fragment                              | NR           |     | MA4015   | Coconut fragments                                      | 16.0 | 10.5 |
| MA1778   | Instrument glass fragment                         | NR           |     | MA4016   | Stoneware jar containing mercury                       | 16.0 | 9.4  |
| MA1779   | Gun flint   | NR           |     | MA4017   | Wood fragment  | 16.0 | 9.3  |
| MA1780   | Polynesian worked shell object                    | NR           |     | MA4018   | Copper sheeting fragments                              | 16.1 | 9.4  |
| MA1783   | Wrought iron band fragment                        | NR           |     | MA4019   | Single sheave from pulley block                        | 16.0 | 9.4  |
| MA1784   | Wrought iron band fragment                        | NR           |     | MA4020   | Cowrie shell ( <i>Cypraea tigris</i> )                 | 16.0 | 10.1 |
| MA1785   | Copper alloy strap fragment                       | RR           |     | MA4021   | Intact cut glass bottle                                | 15.7 | 9.4  |
| MA1786   | Padlock   | NR           |     | MA4022   | Creamware dinner plate & window pane fragments         | 15.9 | 10.1 |
| MA1800   | Dwarf triton shell ( <i>Colubraria muricata</i> ) | NR           |     |          |  |      |      |
| MA1801   | File shell ( <i>Limnimavulgaris</i> )             | NR           |     |          |  |      |      |
| MA1802   | Lucina cockle ( <i>Codakia tigerina</i> )         | NR           |     |          |  |      |      |
| MA1803   | Honeycomb oyster shell ( <i>Hyotissa hyotis</i> ) | NR           |     |          |  |      |      |

| ACC. NO. | DESCRIPTION   | X    | Y    | ACC. NO. | DESCRIPTION  | X    | Y        |
|----------|---|------|------|----------|--|------|----------|
| MA4023   | Window pane fragments                                   | 15.5 | 9.6  | MA4075   | Two lucina cockles<br>( <i>Codakia tigerina</i> )              | 15.6 | 9.2      |
| MA4024   | Copper alloy button                                     | 16.1 | 9.8  | MA4076   | Two sandglass fragments  | 14.7 | 9.4      |
| MA4025   | Slate fragment  | 15.8 | 9.4  | MA4077   | Large sandglass base fragment                                  | 14.7 | 9.8      |
| MA4026   | Window pane fragment                                    | 15.9 | 9.2  | MA4078   | Sandglass neck fragment  | 14.9 | 9.7      |
| MA4027   | Two copper alloy rods                                   | 16.0 | 9.6  | MA4079   | Pocket style telescope   | 14.8 | 9.1      |
| MA4028   | Swivel gun  | NR   |      | MA4080   | Wood and pane fragment   | 14.9 | 9.0      |
| MA4029   | Creamware dinner plate<br>fragment                      | 16.0 | 9.4  | MA4081   | Creamware fragment   | 15.0 | 10.1     |
| MA4030   | Creamware bread &<br>butter plate fragment              | 15.7 | 9.9  | MA4082   | Index mirror from octant                                       | SPH  |          |
| MA4031   | Copper alloy button &<br>creamware fragment             | 15.7 | 9.9  | MA4083   | Wooden fishing float   | SPH  |          |
| MA4032   | Earthenware pot (spruce jar)                            | 15.3 | 10.3 | MA4084   | Auger shell ( <i>Terebra maculata</i> )                        | SPH  |          |
| MA4033   | Creamware bowl fragment                                 | NR   |      | MA4085   | Sandglass base fragment  | SPH  |          |
| MA4034   | Claypipe stem   | NR   |      | MA4086   | Sandglass base   | SPH  |          |
| MA4035   | Auger shell ( <i>Terebra maculata</i> )                 | 16.0 | 9.9  | MA4087   | Creamware fragment   | SPH  |          |
| MA4036   | Glass stopper   | 15.6 | 10.0 | MA4088   | Window pane fragment   | SPH  |          |
| MA4037   | Window pane & case bottle<br>fragment                   | 14.5 | 10.2 | MA4089   | Sheathing tack   | 14.9 | 9.4      |
| MA4038   | Copper alloy ring                                       | SPH  |      | MA4090   | Whetstone  | 14.6 | 9.5      |
| MA4040   | Side plate for musket                                   | NR   |      | MA4091   | Fishhook bone shank (Polynesian)                               | 15.1 | 9.8      |
| MA4041   | Copper alloy object                                     | SPH  |      | MA4092   | Attachment plate for index<br>mirror on octant                 | SPH  |          |
| MA4043   | Three musket balls                                      | SPH  |      | MA4094   | Lead weight  | 14.8 | 9.9      |
| MA4044   | Copper sheeting fragment                                | NR   |      | MA4095   | Copper alloy strap   | SPH  |          |
| MA4045   | Copper alloy button                                     | NR   |      | MA4096   | Sheathing tack   | 15.2 | 9.9      |
| MA4046   | Sandglass fragment                                      | NR   |      | MA4097   | Sheathing tack   | 14.8 | 9.9      |
| MA4047   | Creamware fragment                                      | NR   |      | MA4098   | Lucina cockle ( <i>Codakia tigerina</i> )                      | 16.0 | 10.9     |
| MA4048   | Cowrie shell ( <i>Cypraea tigris</i> )                  | NR   |      | MA4099   | Wood fragment  | 16.1 | 10.6     |
| MA4050   | Inkwell   | 14.7 | 10.3 | MA4100   | Earthenware pot (spruce jar)                                   | 16.0 | 9.8      |
| MA4051   | Sheathing tack & wood fragment                          | 14.9 | 10.1 | MA4101   | One-piece coconut fishhook<br>(Polynesian)                     | 16.0 | 9.9      |
| MA4052   | Wood fragment   | 15.1 | 10.3 | MA4102   | Wood fragment  | 16.0 | 9.9      |
| MA4053   | Wood fragment   | 15.2 | 10.5 | MA4103   | Shark tooth with drilled hole<br>(Polynesian)                  |      | Sediment |
| MA4054   | Sheathing tack  | 15.4 | 9.8  | MA4105   | Creamware fragment   | 14.8 | 9.9      |
| MA4055   | Earthenware pot (spruce jar)                            | 15.4 | 9.8  | MA4106   | Creamware dinner plate fragment                                | 15.1 | 9.8      |
| MA4057   | Sandglass ampoule                                       | 15.4 | 10.4 | MA4107   | Creamware sherd  | 15.2 | 9.9      |
| MA4058   | Copper sheeting   | NR   |      | MA4108   | Window pane fragment   | 15.0 | 9.8      |
| MA4059   | Copper alloy button                                     | 15.4 | 9.4  | MA4109   | Window pane fragment   | 14.6 | 9.9      |
| MA4060   | Window pane fragment                                    | 15.4 | 9.5  | MA4110   | Window pane fragment   | 14.6 | 9.9      |
| MA4061   | Window pane fragment                                    | NR   |      | MA4111   | Instrument glass fragment                                      | 14.6 | 9.9      |
| MA4062   | Pane fragment   | 15.4 | 19.4 | MA4112   | Case bottle fragments  | 14.3 | 9.7      |
| MA4063   | Earthenware pot fragments<br>reconstructed (spruce jar) | 15.3 | 10.2 | MA4113   | Shell fishhook shank (Polynesian)                              | 15.7 | 9.7      |
| MA4064   | Creamware fragment                                      | 15.2 | 9.3  | MA4114   | Copper alloy rod   | 15.0 | 9.5      |
| MA4067   | Polynesian worked shell object                          | 15.3 | 10.4 | MA4115   | Dividers fragment  | 15.0 | 9.5      |
| MA4068   | Window pane fragment 15.3                               | 10.4 |      | MA4116   | Copper alloy fragment<br>& bone button                         | 14.9 | 9.5      |
| MA4069   | Cone shell ( <i>Comus textile</i> )                     | 15.1 | 9.8  | MA4117   | Brush handle   | 14.9 | 9.5      |
| MA4070   | Window pane fragment                                    | 15.0 | 9.7  | MA4118   | Sandglass base fragment  | 15.8 | 10.0     |
| MA4071   | Earthenware pot (spruce jar)                            | 15.0 | 9.7  | MA4119   | Window pane fragment   | 15.8 | 10.0     |
| MA4072   | Shell fishhook facing plate<br>(Polynesian)             | 15.0 | 9.7  | MA4120   | Cone shell ( <i>Conus eburneus</i> )<br>& case bottle fragment | 16.0 | 10.2     |
| MA4073   | Earthenware pot fragment<br>(spruce)                    | 14.9 | 9.6  | MA4121   | Instrument glass fragment                                      | 16.0 | 10.2     |
| MA4074   | Copper alloy button                                     | 16.1 | 9.6  | MA4122   | Bone button  | 15.8 | 9.7      |
|          |   |      |      | MA4123   | Coconut disc (Polynesian)                                      | 15.2 | 9.6      |

| ACC. NO. | DESCRIPTION                                   | X    | Y    | ACC. NO. | DESCRIPTION  | X    | Y    |
|----------|---|------|------|----------|--|------|------|
| MA4124   | Window pane & case bottle fragment            | 15.7 | 9.8  | MA4170   | Thorny oyster ( <i>Spondylus sinensis</i> ) (ex concretion MA4080) | NR   |      |
| MA4125   | Six sheathing tacks                           | 15.5 | 9.7  | MA4171   | Wood fragment (ex concretion MA4080)                               | NR   |      |
| MA4126   | Sandglass fragment                            | 15.2 | 9.5  | MA4172   | Round-flanged bronze coak (ex concretion MA4066)                   | NR   |      |
| MA4127   | Window pane fragment                          | 16.0 | 10.2 | MA4174   | Window pane fragment   | 14.5 | 10.2 |
| MA4128   | Bone button                                   | 15.5 | 9.8  | MA4175   | Window pane fragment   | 14.5 | 10.2 |
| MA4131   | Pebble & musket ball                          | 15.5 | 9.6  | MA4178   | Wood fragment  | 14.5 | 10.2 |
| MA4132   | Wooden handle                                 | 15.2 | 10.1 | MA4179   | Volute shell ( <i>Cymbiola rutila</i> )                            | 14.5 | 10.2 |
| MA4133   | Wooden fishing float                          | 15.3 | 9.4  | MA4180   | Copper alloy fragment  | 14.5 | 10.2 |
| MA4134   | Sheathing tack                                | 14.8 | 10.4 | MA4181   | Copper alloy sheathing tacks                                       | 14.5 | 10.2 |
| MA4135   | Pane fragment                                 | 15.4 | 10.1 | MA4182   | Three copper alloy rods  | 14.5 | 10.2 |
| MA4136   | Window pane fragment                          | 14.7 | 10.3 | MA4183   | Creamware fragment   | 14.5 | 10.2 |
| MA4137   | Sandglass base.                               | 14.8 | 10.1 | MA4184   | Pebble   | 14.5 | 10.2 |
| MA4138   | Stone pounder (Polynesian)                    | NR   |      | MA4185   | Small buckle components  | 14.5 | 10.2 |
| MA4139   | Creamware soup plate.                         | 14.9 | 10.4 | MA4186   | Wood fragments   | 14.5 | 10.2 |
| MA4140   | Coconut                                       | 15.4 | 10.2 | MA4187   | Wood fragments   | 14.5 | 10.2 |
| MA4141   | Coconut quiver cap (Polynesian)               | SPH  |      | MA4188   | Lead patch from carronade  | 14.5 | 10.2 |
| MA4143   | Coconut disc (Polynesian)                     | SPH  |      | MA4189   | Scabbard fragment  | 14.5 | 10.2 |
| MA4144   | Index mirror from octant                      | SPH  |      | MA4190   | 18-pounder carronade   | 14.5 | 10.2 |
| MA4146   | Large bone button                             | SPH  |      | MA4191   | Pane fragments with broad arrow                                    | 14.5 | 10.2 |
| MA4148   | Earthenware pot fragment (spruce jar)         | SPH  |      | MA4192   | Fine rope fragments  | 14.5 | 10.2 |
| MA4149   | Sandglass fragment                            | SPH  |      | MA4193   | Wood fragment  | 14.5 | 10.2 |
| MA4150   | Sandglass fragment                            | SPH  |      | MA4194   | Thin rope fragments  | 14.5 | 10.2 |
| MA4151   | Case bottle fragments                         | SPH  |      | MA4195   | Two lead buttons   | 14.5 | 10.2 |
| MA4152   | Window pane fragment                          | SPH  |      | MA4196   | Musket ball  | 14.5 | 10.2 |
| MA4153   | Cowrie shell ( <i>Cypraea</i> sp.)            | SPH  |      | MA4197   | Thick rope fragments   | 14.5 | 10.2 |
| MA4154   | Pebble  | SPH  |      | MA4198   | Brass spigot   | 14.5 | 10.2 |
| MA4155   | Copper alloy fragment                         | SPH  |      | MA4199   | Auger shell ( <i>Terebra maculata</i> )                            | 14.5 | 10.2 |
| MA4156   | Six sheathing tacks                           | SPH  |      | MA4200   | Yoke from swivel gun (ex concretion MA4028)                        | NR   |      |
| MA4157   | Scabbard fragment                             | SPH  |      | MA4201   | Copper alloy button  | NR   |      |
| MA4158   | Bone button                                   | SPH  |      | MA4202   | Cowrie shell ( <i>Cypraea carneola</i> )                           | 14.5 | 10.2 |
| MA4159   | two hinges attached to wood fragment          | SPH  |      | MA4203   | Powder ladle (ex concretion MA4028)                                | NR   |      |
| MA4161   | Lion-head pommel                              | SPH  |      | MA4205   | Copper alloy button  | 14.5 | 10.2 |
| MA4162   | Shell fishhook shank (Polynesian)             | SPH  |      | MA4206   | Pebble   | 14.5 | 10.2 |
| MA4163   | Sheathing tacks                               | SPH  |      | MA4207   | Stoneware fragment   | 14.5 | 10.2 |
| MA4164   | Sandglass base                                | SPH  |      | MA4211   | Wood fragments   | 14.5 | 10.2 |
| MA4165   | Copper alloy object                           | SPH  |      | MA4212   | Wood fragment  | 14.5 | 10.2 |
| MA4166   | Lead sheeting (ex concretion MA4028)          | NR   |      |          |  |      |      |
| MA4167   | Creamware plate (ex concretion MA4066)        | NR   |      |          |  |      |      |
| MA4168   | Creamware jar fragment (ex concretion MA4066) | NR   |      |          |  |      |      |
| MA4169   | Window pane fragments (ex concretion MA4080)  | NR   |      |          |  |      |      |

MA341-499 and MA785-999 not used. MA1815-2999 and MA3020-3999 assigned to non-Pandora objects.