ANNEX 6

TO

EXHIBIT A

6.1. Plan of the *Sacramento*, Brazil, 1668: Pernambucano de Mello, U., 'The Shipwreck of the Galleon Sacramento-1668 off Brazil', *International Journal of Nautical Archaeology* 8.3 (1979), 213.

6.2. Plan of the *Hazardous*, England, 1703: Owen, N.C., '*Hazardous* 1990-1991 Interim Report', *International Journal of Nautical Archaeology* 20.4 (1991), 326, 328.

6.3. Plan of the coherent wreck site of the *Conde de Tolosa*, wrecked 1724, off Hispanola: James, S.R., 'A Reassessment of the Chronological and Typological Framework of the Spanish Olive Jar', *Historical Archaeology* 22 (1988), fig. 3.

DR. SEAN A. KINGSLEY

The International Journal of Nautical Archaeology and Underwater Exploration (1979), 8.3: 211–223

The shipwreck of the galleon *Sacramento*–1668 off Brazil

Ulysses Pernambucano de Mello

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Photographs by Daniel Lins Menucci

The Brazilian Ministry of Navy and the Ministry of Education and Culture are promoting the first underwater archaeological exploration in Brazil.

The site of the exploration lies at 13° 12′ 18″ latitude south and 38° 30′ 04″ longitude west, near the entrance of the port of the Bay of All Saints (Baía de Todos os Santos), in the Brazilian State of Bahia (Fig. 1).

The shipwreck lies on a gravel bottom at 31–33 m depth, and at the top and around a pile of ballast stones, are scattered guns, anchors, Spanish olive oil jars and coral encrusted porcelain making a marvellous spectacle.

Honoured by the invitation to supervise the exploration due to begin in September 1976, I joined the Brazilian Navy ship *Gastão Moutinho* which was specially provided for the task, plus a team of 30 divers experienced in rescue work.

Planimetric and photographic surveys were the first tasks for the team; and after the division of the site into small squares (3 m x 3 m), we started the removal of the archaeological material (Fig. 2).

Identifying and dating the shipwreck

The cargo and artillery carried by the submerged ship provided evidence of its date and identification. Brass guns of English, Dutch and Portuguese origin were recovered, which bore, besides the name of their founder, the date of casting. There were guns of 1590, 1596, 1597, 1622, 1634, 1649, and 1653. Besides this information, some of them bore an engraving on the reinforce of the breech block, an armillary sphere with the Latin inscription 'Spero in Deo', and a little above this emblem another inscription 'Companhia GL do Brazil' (General Company of Brazil).

The guns indicated that the sinking occurred after 1653 and also that the owner of the ship was the 'Companhia Geral do Comércio do Brazil', founded in Lisbon, on February 6, 1649. Its purpose was to maintain an armada of 36 vessels to convoy the merchant fleet which sailed between Brazil and Portugal every year.

The pottery recovered in the exploration (Portuguese maiolica) also provided evidence of the ship's identity; some pieces, specially the bottles, had the same emblem as some of the guns: the armillary sphere surrounded by a sun, having on it a band with the inscription 'Spero in Deo', and a little below this sphere the date 1649, year of the founding of the 'Companhia'. Portuguese silver coins were also collected and identified. In the majority of cases they belonged to the reign of Dom João IV (1640–1656). There were also Spanish coins. The Portuguese coins constituted the best items for establishing the *terminus post quem* of the shipwreck, because they had been over-stamped on one face to raise their value by 25%. Research on the subject traced the Royal Warrant (*Alvará Régio*) which authorized the over-stamping: it was dated March 22, 1663. With this information we concluded that the ship was Portuguese, acting for the 'Companhia Geral do Comércio do Brazil' and sank after March 1663. Since we were closer to a more precise identification of the wrecked ship we turned to the chroniclers for additional historical documentation of the period.

History

Sebastião da Rocha Pitta (1660–1738), the historian, a native of the State of Bahia, in his

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Annex 6.1

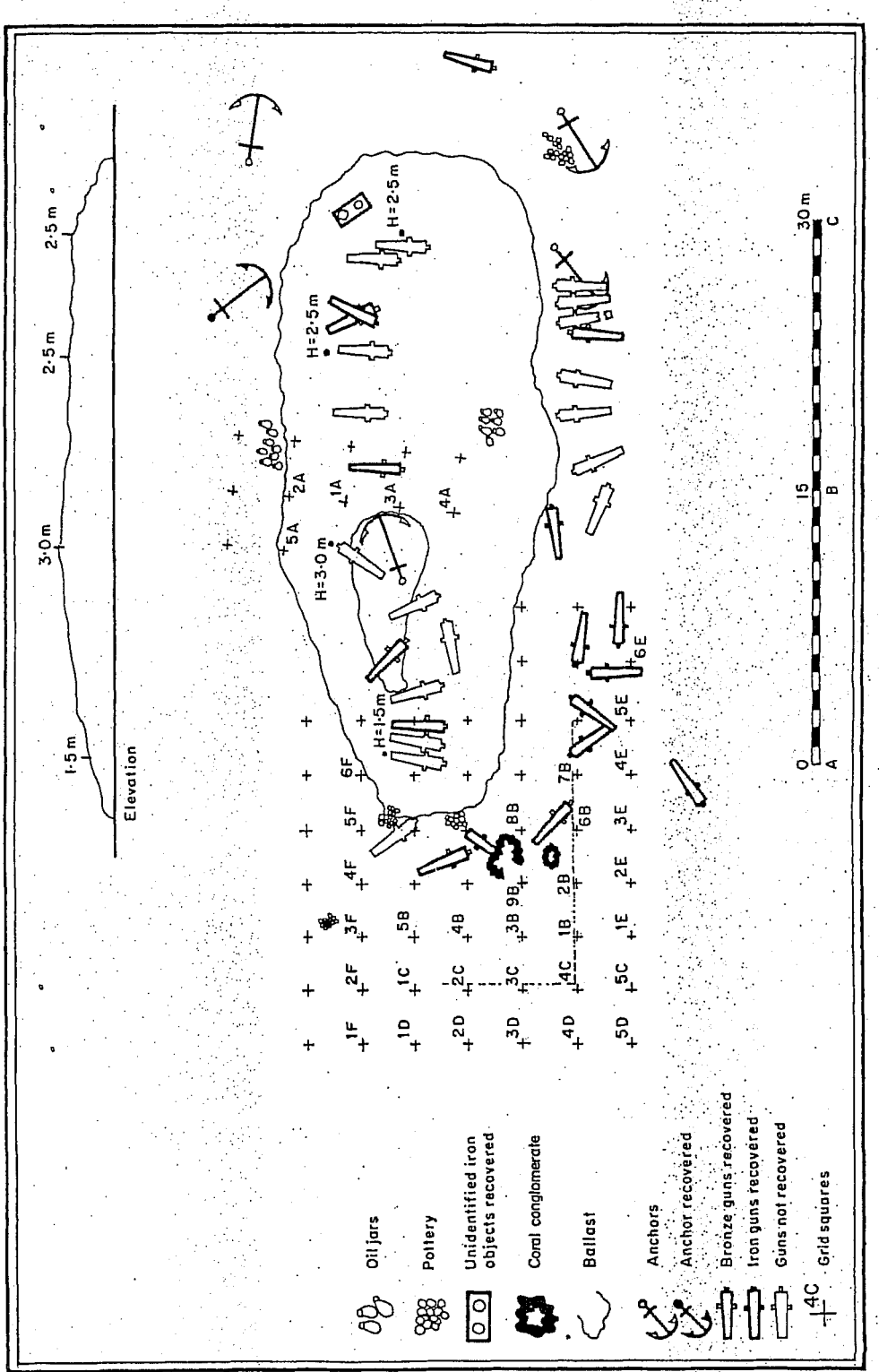

Figure 2. Planimetric survey and divisions of the site.

The International Journal of Nautical Archaeology (1991) 20.4: 325–334

Hazardous 1990–1991 interim report

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This report is intended as a follow-up of the report published in this journal in 1987 (Owen, 1987).

The hull remains on the site identified as being that of the warship *Hazardous* (lost whilst in English service after having been built by, and captured from, the French) are in two main parts, the larger of which, lying to the north, would appear to be the bow portion and represents just over half the length of the ship. From what appears to be the head, integral timbers run south for approximately 24 m to where there is a distinct break in the hull. At this point there is a rocky outcrop of softish limestone under the remaining section of hull timbers which are completely exposed along their length out to the most southerly point of the site. The remains therefore extend some 42 m along a north-south axis. The southern part of the remains (approximately 13 m long by 5 m wide) is of lighter construction than the rest of the structure and is probably all that remains of the stern portion of the ship.

At the northern end of the site the remains are mainly buried, but seabed erosion is gradually uncovering them—as is excavation.

Planking

The thickness of the main planking varies considerably. At the southern end of the site it is approximately 75–100 mm thick, and covered with a softwood sheathing (pine or fir?) approximately 75 mm thick. At the north end of the port side 150 mm planking was found—thought to be part of a strengthening wale at the level of the gundeck. Softwood sheathing was also found at the northern end of the site. The width of the planking also varied and on a particular 2 m wide section at the southern end planks of 190 mm, 300 mm, and 350 mm were noted, the average figure being 300 mm.

Bow and stem

The shipwright Maurice Young, who dived on the site in the 1988 season, is responsible for the suggestion that the timbers illustrated in Fig. 1, no. 1 are breasthooks (strengthening pieces for the bow) and that the complex structure at the extreme north of the site is the scarfed and laminated stem and beakhead timbers.

If Maurice Young is right, it would appear that the large section of buried hull remains constitutes the port section of the bows. Erosion of this timber structure has revealed the laminations and scarf joints necessary to produce the strength needed at a potentially weak point in the ship's construction, where it was not possible to form this section from a single piece of timber. It was not uncommon to have dozens of interlocking timbers to form the steep curve of the stem where it is fayed into the keel.

It can be seen in Fig. 2 that the laminated timbers of the stem have had sandwiched between them a material that has yet to be identified, but is thought to be a lead compound. The lower joint was found to have sheet lead between the timbers. This use of lead appears to be very unusual and research has not revealed a parallel. Our opinion is that when the ship was constructed the lead sheeting was fitted to deter the shipworm *Teredo navalis*, from penetrating and damaging the bow timbers.

Lead was also used on the ship as caulking and large amounts have been found all over the wreck site driven between the planks. Research has revealed two references to lead caulking so far; one refers to the wreck of the *San Esteban*, a 16th-century Spanish ship lost off Padre Iland in the Gulf of Mexico, 'an examination of the caulking of the hull planks showed that a mixture of oakum and animal hair, held in place by resin soaked fabric covered by thin strips of lead'

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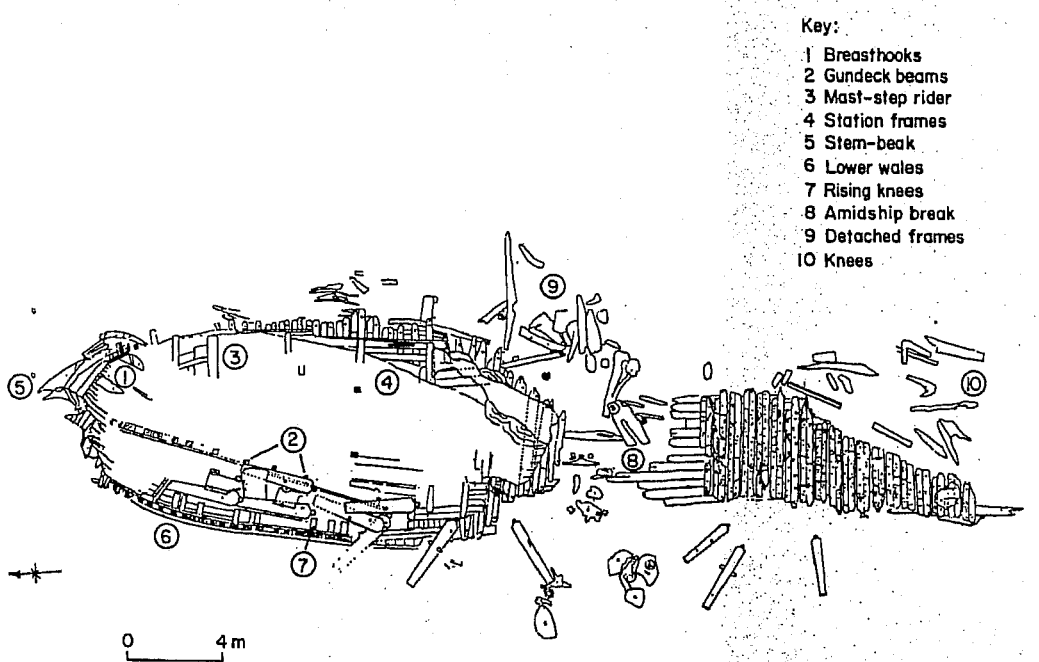

Figure 1. Plan of *Hazardous* showing hull features. (Drawing: N. C. Owen.)

Figure 2. Lead and timber laminations at the stem. (Photo: P. Burner.)

(Throckmorton, 1987: 178). The other reference which is comtemporary with our site refers to a specification from the 1690s for the construction of an 80-gun ship to 'set all the bulkheads up on oaken plank fayed on the deck at the foot of the stanchions, of ten inch broad and four inchs

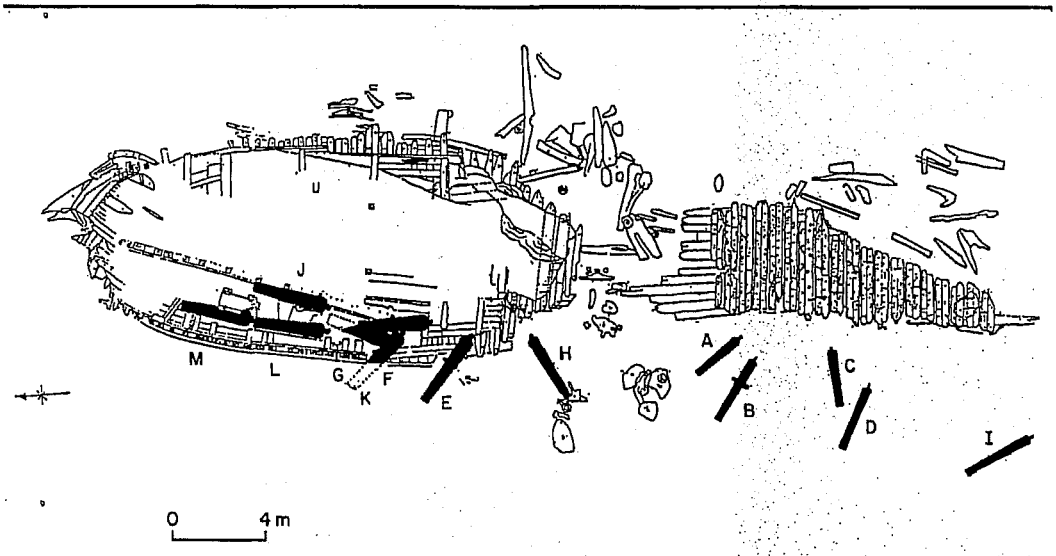

Figure 3. Plan of *Hazardous* showing the gun positions. (Drawing: N. C. Owen.)

round the bow. Until 1715 they were apparently perpendicular to the keel on English warships (Lavery, 1984: 33). In 1715 it was ordered that the frames near the bow and stern should be fitted at an angle. It would appear that this method of construction had already been adopted in France by 1698.

Deck beams

The timbers marked no. 2, (Fig. 1) would appear to be gundeck beams and are supporting guns J & F. The guns are lying along the side of the hull at the junction of the deck with the port side of the hull. This change of position occurred when the ship fell on her beam ends and all loose items obviously slid across the deck to end up in a jumbled heap. Excavation of this area should reveal substantial amounts of artefacts.

Gun K which is protruding through the hull and down at an angle could be still in its position in the gunport. This has not been substantiated and awaits excavation (Fig. 3).

Research

From our research carried out in France, it would appear that no plans or details of the construction of *Le Hazardeux* (French name) have survived. These might have confirmed that the wreck is *Hazardous*.

The artefacts recovered from the wreck indicate a late 17th-century warship. Contemporary documentary evidence from the Public Records Office places the wrecking of *Hazardous* in the right position in Bracklesham Bay. In addition the survey of the exposed hull section has revealed a close parallel. The parallel is with later 18th-century East Indiaman construction as interpreted by Jean Boudriot in his informed but conjectural reconstruction of the *Bonhomme Richard*. A famous French ship of similar size but of a later date, the *Bonhomme Richard* was formerly the East India Company ship *Duc de Duras*, built in 1765 (Table 1).

Both ships have similarities in basic construction with frame pairs, station frames and planking of similar size and configuration (Table 1). The similarity between the two vessels seems to demonstrate that the construction is French, as it would appear that English warships of the same period are constructed of single frames, which are narrower but positioned closer together as in the construction of *Dartmouth* in 1690 (Muckleroy, 1978: 189).

The team has been able to examine another wreck off the Sussex coast from which artefacts recovered indicate a similar date to *Hazardous* in the late 17th to early 18th century. There is a reasonable possibility that this wreck is that of the *Eagle* advice boat lost in the Great Storm of 1703.

Her planking was 39 cm sided by 7·5 cm moulded and the frames were 33 cm sided by 20 cm moulded. The planks were attached to the frames with wooden treenails only. No iron

Annex 6.3

STEPHEN R. JAMES, JR.

A Reassessment of the Chronological and Typological Framework of the Spanish Olive Jar

ABSTRACT

Bound for New Spain in 1724, the *Conde de Tolosa* and the *Nuestra Señora de Guadalupe* sank on the northeast coast of the Dominican Republic during a hurricane. Recent salvage of the two wrecks was undertaken by Caribe Salvage. Among the items recovered were over 600 complete Olive Jars. Employed as a main type of shipping container by the Spanish during their exploration and colonization of the Americas, the Olive Jar, with its various forms, has been shown by recent studies to be a temporal indicator.

Housed at the Museo de las Casa Reales in Santo Domingo, the jars of the *Tolosa* and *Guadalupe* represent the largest intact Olive Jar assemblage recovered in the New World. Analysis of these containers imparts a wealth of information critical to the understanding of this widely used and diffused ceramic type. Besides revealing a previously unreported form, the study suggests needed changes in both the chronological and typological framework of the Olive Jar and addresses previous hypotheses about intended capacities and contents and rim attributes and glazing frequencies employed as temporal indicators.

Introduction

Two Spanish galleons, the *Conde de Tolosa* and the *Nuestra Señora de Guadalupe*, sailed from the port of Cádiz on 13 July 1724. Laden with passengers, provisions, and mercury for the mines of New Spain, the ships set a course for Veracruz. Thirty-nine days after leaving Cádiz, the ships sighted Puerto Rico and anchored off the town of Aguada. Fresh provisions were brought aboard and the crew and passengers received a much needed rest. The morning of August 23 dawned with sultry foreboding. Premonitions of an impending storm, though noticed by a few experienced mariners, went unheeded by those in command. Orders were given to make sail. Two days after leaving Aguada, the winds changed direction and intensified. On 25 August the luckless ships, driven by hurricane winds and seas, met their violent fates on the reefs of Samaná Bay on the northeast coast of Hispañola (Borrell 1980).

Two hundred and fifty-three years later, salvage of the two wrecks was undertaken by Caribe Salvage of the Dominican Republic. During the course of salvage operations, which were directed by Tracy Bowden, numerous ceramic vessels were recovered. The majority of these vessels were relegated to anonimity on the shelves of various storage areas of the Museo de las Casas Reales in Santo Domingo. The bulk of the ceramic assemblage consisted of hundreds of narrow-mouthed storage containers known to archaeologists as Spanish Olive Jars. Though also recovered from archaeological sites of other nationalities, such as French, English and Portuguese, the jars were used and produced primarily by the Spanish during the exploration and colonization of the Americas. The amphora-like shape of the jars indicates that they are lineal descendents of a pottery tradition that originated in early eastern Mediterranean civilizations. The forms were brought to Spain by colonists and conquerors and were adopted and modified through time (Goggin 1960:5). Employed as a main type of shipping container, the jars held foodstuffs and supplies. Documents from the General Archives of the Indies at Seville list various types of beans and olives as well as wine, olive oil, and tar that were shipped in *botijas*, *botijas peruleras*, *botijas medias*, and *botijuellas* (Arcila Farías 1946:188; García Fuentes 1980:243; Goggin 1960:3–6; Ruidiaz y Caravia 1893:559–566; Torre Revello 1943:731). Presumably these terms for ceramic containers refer to Olive Jars. Archaeological evidence indicates that the jars were indeed used to ship such goods. A sealed jar recovered on the coast of North Carolina contained olives (Richard Lawrence, personal communication 1982), a jar excavated at Panama Vieja contained traces of tar (Long 1967:24), and one found on the beach in St. Augustine, Florida contained soap (Kathleen Deagan 1985, pers. comm.).

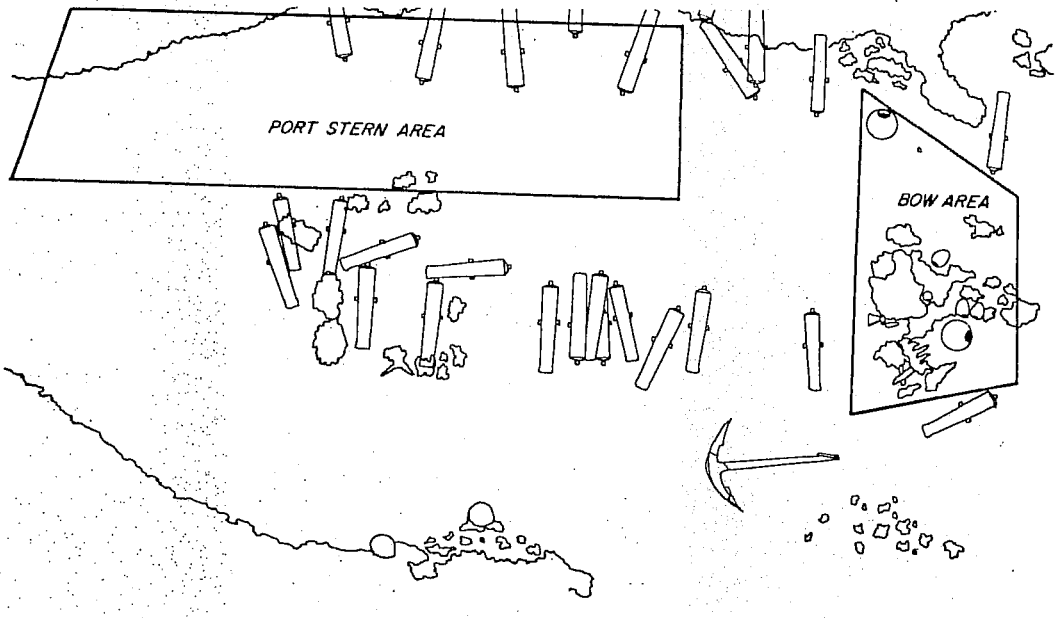

FIGURE 3. Olive Jar Provenience on the *Conde de Tolosa*, no Scale (after Borrell 1980).

(Smith 1978:88) as well as in St. Augustine (Kathean Deagan 1985, pers. comm.). The origin of these jars is unsubstantiated, but the flea market examples were identical to those in the government's assemblage.

All jars were sorted into forms or shapes, counted, and analyzed for glaze and content. If a jar or several jars had a shape distinct from others, it would be given a separate classification. Four jar forms were present in the assemblage: Forms I, II, III and IV (Figure 4). Glaze analysis consisted of determining to what extent the vessels had been glazed. Glazing categories are interior glaze only, interior and exterier glaze, no glaze, and not ascertainable due to concretions. Glaze colors were also noted. Because of color variations on a single vessel, a Munsell color chart was not employed. Rather, common color terms that best matched the overall appearance were used. Jars were then measured for height, maximum diameter, empty weight, and volume. Rims were measured for external and internal diameter, height, and thickness. Volume studies were accomplished by filling jars with water. The jars, filled to the base of the rim, thus allowing room for a cork closure, were then emptied into a container. The liquid in the container was then measured. All jars measured for volume except Form IV were internally glazed. Internal glazing prohibited the absorption of water into the vessel walls, thereby giving an accurate volume measurement. Form IV jars, previously weighed, were again weighed following the volume measurement to determine if water had been absorbed. The vessels showed only a minute weight increase, indicating that volume measurements were accurate. As most vessels were whole, it was difficult to obtain a good view of the paste. However, enough cracked and partial jars existed to permit a proper analysis. The paste of all forms was similar in minerological content, possibly indicating a common clay source. Paste samples from each jar form were further analyzed