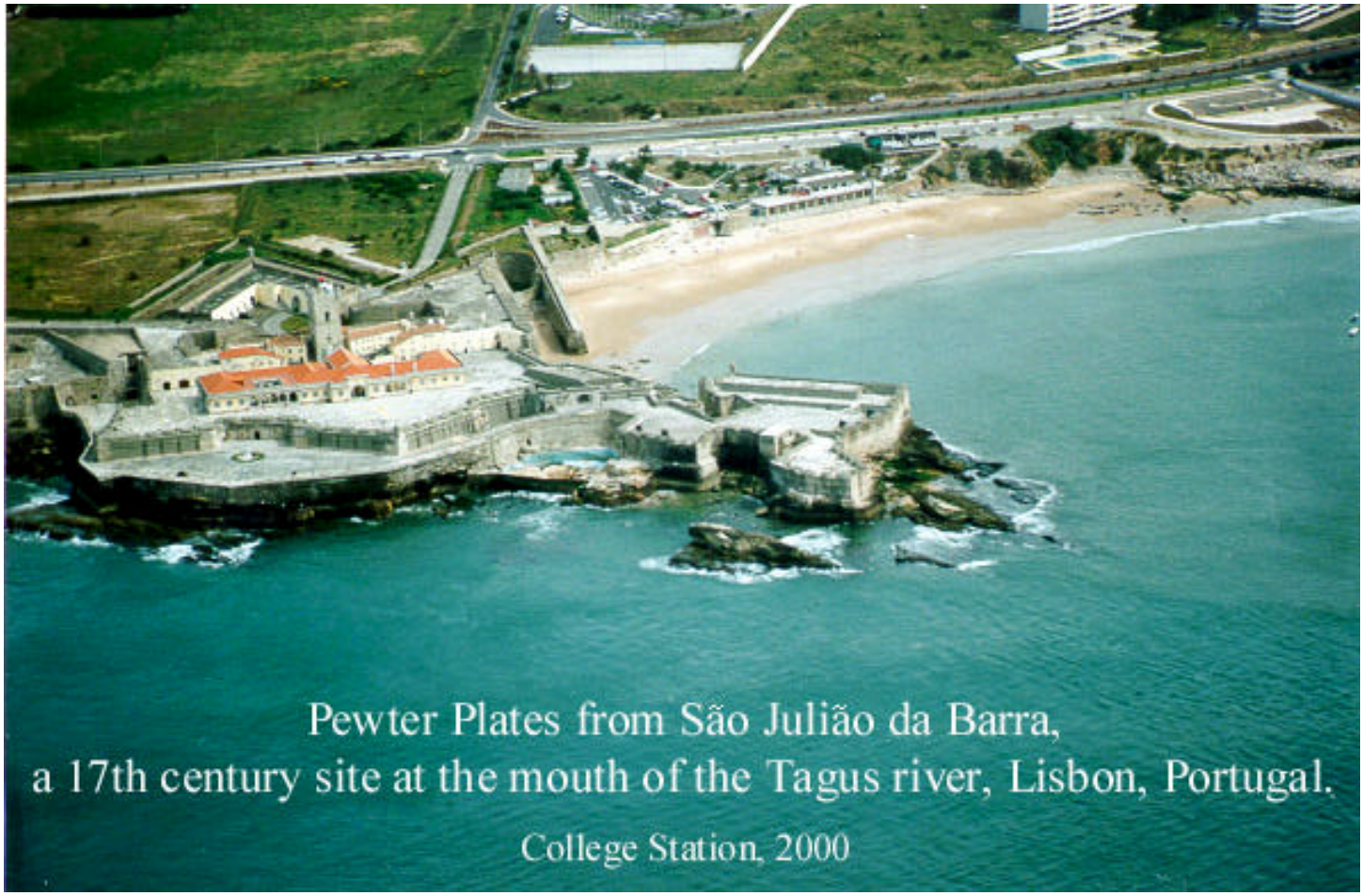

Pewter Plates from São Julião da Barra,
a 17th century site at the mouth of the Tagus river, Lisbon, Portugal.

College Station, 2000

Index

Introduction ……..… 3

The archaeological site of São Julião da Barra ……... 4

Pewter Ware ……..…….. 6

Portuguese Pewter Ware ……..… 9

Pewter Ware from São Julião da Barra ……..……..… 10

Discussion ……...… 16

Bibliography ……..……...… 20

Further Reading ……...……. 22

Notes ……...…..…… 23

Catalogue ……...…. 24

Pewter plates from São Julião da Barra, a 17th century site at the mouth of the Tagus river, Portugal.

by Filipe Castro

College Station, December 2000, fvcastro@hotmail.com

Introduction

This paper refers to the collection of 23 pieces of pewter flatware found in the archaeological complex of São Julião da Barra, on the mouth of the Tagus river, near Lisbon, Portugal.

Not much is known about this site which was not surveyed until 1994, and only partially excavated in 1996/97 and in 1999. However, two of the twenty-seven areas identified in São Julião da Barra as having relevant archaeological interest have yielded cultural materials dating from the late 16th and early 17th centuries, presumably resulting from the wreck of the Portuguese indiaman *Nossa Senhora dos Mártires*, which was wrecked against the fortress on September 15 1606.

A catalogue of these 23 items is presented and a description and a classification is given, following the methodology adopted by Shirley Gotelipe-Miller in her study of the flatware from Port Royal.

Finally, the only two marks surviving on these pewter flatware pieces were compared with the catalogues available at Texas A&M University with inconclusive results, being impossible to identify them at least for the time being.

The archaeological site of São Julião da Barra

In spite of its wide appearance, already praised by Strabo[i] in the 1st century AD, the Tagus sandbar was a very dangerous place for navigation during the age of sail. Two large shallows – the *Cachopos* – actually narrow the entrance into two channels: the southern or wide channel, and the northern or narrow channel. The southern channel is more or less straight and fairly deep, but points southwest, while the main routes – from the North Atlantic world, and West and East Indies – forced an approach to Lisbon along the northern coast of Portugal. This made it very often impossible for the 16th and 17th centuries' larger ships to wear under the prevalent northwest winds, leaving the northern channel as the only remaining option. However, even at the time this channel was already then considered too narrow to lay anchor in case of necessity, too shallow for comfort, and too crooked for the galleys to tow any ship out of it.[ii] Nevertheless, since it was often the only option, it was many times utilized to access the Lisbon harbor.

In the late 16th and early 17th centuries Portugal was driven into the religious wars of the Counter Reformation by the Hapsburg kings Felipe II, III and IV, who held both the crowns of Portugal and Spain from 1580 to 1640. English privateers started preying on the Portuguese, and as a consequence the fortress of São Julião da Barra was built at the entrance of the Tagus mouth to protect the access to Lisbon. It stands on the northern margin, on top of a rocky cape that extends over the northern channel. This fortress was finished in the early 17th century, extending upon a series of small rocks and islets. Soon after its construction it was considered that by covering the small channels between the rocks and islets, this building had diverted the natural flow of tidal currents and generated a process of silting that turned the northern channel even narrower and shallower.

For all those reasons São Julião da Barra is a known cemetery of ships, and at least 27 sites of archaeological importance have been defined around the fortress, ranging in relevance from small isolated finds to remains of hulls[iii]. An historical investigation by

the Portuguese Museu Nacional de Arqueologia yielded a list of 16 wrecks registered as having been lost around or close to São Julião da Barra, between 1450 and 1966.

The bottom around the fortress presents a fairly regular stratigraphy (Table I) but the strong dynamics of the sea have mixed all the cultural materials of this complex. No layer is absolutely free of contamination, even those areas under heavy objects, such as cannons, anchors or rocks. Furthermore, in 1755 Portugal was struck by an earthquake of catastrophic proportions, followed by a tsunami – three waves, of which the highest is estimated to have been around 6 meters (20 ft.) in height – which dragged very heavy and large rocks over at least some of the surveyed archaeological sites.

Table I

São Julião da Barra - Stratigraphy

Layer	Thickness	Description
A	Variable	Siliceous sand with great mobility, its thickness varying seasonally, rich of cultural materials of several different sources, highly contaminated with refusals and organic remains, mostly related to fishing activity (lines, hooks, lead weights, traps, cables, nets, etc.).
B	5-30 cm	Dark sediments mixed with siliceous sand, containing organic materials, rich in lead strip fragments from the caulking arrangements of this wreck.
C	20-60 cm	Pebbles (both calcareous and basaltic) with average diameters between 4 e 15 cm, containing pockets of peppercorns and occasionally porcelain shards, and other cultural materials related with this shipwreck.
D	5-30 cm	Corse siliceous sand with frequent pockets of peppercorns and other organic materials, relatively stable and not contaminated with materials from other sources. Most intact artifacts were found within this layer.
E	2-5 cm	Very fine yellow sand, compacted, archaeologically sterile.
F	-	Rocky limestone bottom, sometimes altered and presenting a clayish consistence, varying between grey and ochre, almost always showing remains of mollusks such as barnacles, mussels and other bivalves.

Pewter Ware

The earliest pewter pieces in the archaeological record date from the Roman period – from the 3rd century on – and amount to only a few hundred in number. It is not known how pewter was utilized through the early Middle Ages, except for some chalices and patens found at Metz, France, in priests' tombs dating from the 11th and 12th centuries. It is thought that pewter may have been used in poor churches as a substitute of silver for the liturgical tools. Anyway, its production developed during this period. By the 13th century the production of pewter utensils was a well organized craft in France, and by the 14th century its production was regulated in England, suggesting that also there it was a developing craft. During the 15th and 16th centuries, as the houses of the growing middle classes became more comfortable and domestic life more pleasant, pewter became a suitable material for daily use. First used mainly for kitchen utensils, it soon became a widely used material, replacing wood and coarse pottery in the fabrication of dishes, trays, measures, flagons, jugs, tankards, and mugs, but also of spoons, candlesticks, boxes, and other household utensils. In the 16th and 17th centuries it became decorated with cast motifs, particularly on the lids and handles of tankards; in Germany, Switzerland, and Scandinavia incised decoration and undulating lines made with a wheel became fairly popular.

Pewter is an alloy of tin and lead used at least since the Greek times. When it is new it presents a beautiful silver, turning darker as it ages and becoming gray with a lustrous shine. Most items were cast in heavy bronze moulds, sometimes in several pieces that were later soldered together. The composition of the alloys varied according to the items to be manufactured, going from less than 1% to up to 40% of lead. Other metals were added to the alloy, such as copper, zinc, or antimony, these last two utilized only towards the end of the 17th century. The more lead in the alloy, the more malleable the mixture, and the easier to cast difficult shapes. On the other hand, the smaller the amount of lead, the stronger and sturdier the resulting alloy.

Alloys with high contents of lead – up to 40% – were known as "black metal" and generally used in non food-related items, a good practice in view of its very poisonous

nature. Alloys with 23 to 30% of lead (and 1 to 2% of copper) were known as "lay metal" and used to cast most hollowware, such as measures, beakers, and candlesticks. Much sturdier was the "trifle metal", a mixture with more or less 10% of lead, used to cast tankards, pots, buttons, buckles, candle moulds, and toys. Finally, "fine pewter" was used to make "solid-ware" or "sadware", the flat and easy to cast flatware to which more strength was demanded. It was a mixture with less than 1% of lead and 1 to 3 % of copper, sometimes hammered after being casted – and before being finished at the lathe – to increase its density.

Tin was already found already in ancient Egyptian tombs, by then considered just a different form of lead. Known to the Greeks, who called the British Isles *Cassiterides*, tin was widely exported from Cornwall to the rest of Europe during the Roman period.

Tin is a metallic element (symbol Sn), highly ductile and malleable at a temperature of 100° C (212° F). It melts at about 232° C (about 450° F), boils at about 2260° C (about 4100° F), and has a specific gravity of 7.28. Tin's atomic number is 50 and its atomic weight is 118.69. The principal ore of tin is the mineral cassiterite (SnO2) found in Cornwall, England and Germany, but also in the Malay Peninsula, Bolivia, Brazil, Australia, and Alaska. Tin ranks 49th in abundance of the elements in the earth's crust.

Lead is an exceptionally soft metal and thus very easy to work. It was one of the first known metals, known to the Egyptians, already mentioned in the Old Testament, and utilized by the Romans in many trades, from the making of water pipes, soldered with an alloy of lead and tin, to the casting of statuettes and sounding leads for nautical use.

Lead is a metallic element (symbol Pb), very dense, soft, malleable, and ductile. When gently heated it can be forced through annular holes, making it very easy to cast objects. Lead melts at 328° C (662° F), boils at 1740° C (3164° F), and has a specific gravity of 11.34. Its atomic number is 82 and its atomic weight is 207.20. Lead occurs naturally in eight isotopic forms, of which four are stable and four radioactive. The ore of lead is widely distributed all over the world in the form of a sulfide called galena. It ranks

36th in natural abundance among elements in the earth's crust. As a raw material lead presents a major drawback: it is highly poisonous.

Although many alloys do not survive well in marine environments, pewter performs quite well. Even after several centuries on the sea, both pewterer marks and possession marks are frequently preserved on the surface of pewter ware. This is the case of the large pewter collection of 269 artifacts recovered from the sunken ruins of Port Royal by the treasure hunter Robert Marx in the 1960s and by a team from Texas A&M University and the Institute of Nautical Archaeology during the 1980s. Besides 155 pieces of flatware this collection includes hollowware, spoons, kitchen utensils, and other artifacts[iv].

Corrosion on marine environments depends greatly on the alkalinity or acidity of the medium surrounding the artifact. The quality of the alloy – in terms of the percentages of the several metals mixed to obtain a certain type of pewter – and the quality of the mixture can influence the corrosion process. Surfaces can present small eruptions or uneven holes, as a result of different rates of corrosion of the metals that form the alloy.

In terrestrial sites pewter is not frequently found. On one hand it does not preserve well in contact with most soils in the presence of moisture, and on the other hand pewter objects were generally not discarded because they had a long durability and a fairly high value when sold for recasting. Nevertheless, pewter ware is by no means rare. Many museums and private collections have large assemblages of pewter ware, unfortunately many times collected piece by piece, frequently without a cultural provenience, almost always acquired from auctions, particulars, and antique shops.

A long list of artifacts can be made with pewter. Museum and private collections frequently include trays, plates, cups, tankards, porringers, bowls, bottles, bottle caps boxes, all sorts of kitchen utensils – such as ladles, funnels, and colanders – but also common house objects like chamber pots, urinals, candlesticks, and oil lamps, picture frames, decorative figures, watch cases, sundials, inkstands and sand casters. Other artifact types include tokens, buttons, buckles, badges, rings, chains, as well as toys, medical instruments, or ecclesiastical wares and religious implements.

Portuguese Pewter Ware

In Portugal pewter workshops prospered at least since the 16th century, but the very rare use of pewterer marks make it very difficult to study, and it is therefore still mostly unknown. Pewter was widely used aboard ships for its resistance both to corrosion and impact, not breaking as frequently as most pottery did. Archaeological finds are rare. In the 1970s an assemblage has been found at the mouth of the Arade river, in the south of Portugal, and was said to bear late 17th century English pewterer marks.[v] It was dug up from the margin of the river by a bulldozer, together with rotten timbers, and bought by a private collector. Two pewter plates have been found in Baleal, in the 1980s, on a 16th century wreck site at very shallow depths. And finally, another collection was recovered by an avocational archaeologist on the site of a late 17th century wreck, presumed to be the *Grande Principessa di Toscanna*, wrecked on the coast a few miles north of the village of Cascais, on December 1696. This flatware also bears pewterer's marks but has not yet been studied.

The São Julião da Barra collection is therefore the third assemblage to have been found underwater in Portugal. It is presumed to date from the late 16th and early 17th centuries. Collections of pewter ware are not very common on 16th and 17th century wreck sites. Although several Iberian wrecks from this period did yield small quantities of pewter flatware assemblages, such as the the *Espiritu Santo* (1554),[vi] *Girona* (1588), *Sta. Maria de la Rosa* (1588)[vii], and Atocha (1622),[viii] only the *Trinidad Valencera* (1588) has a collection of similar size (15 pieces).[ix]

Pewter Ware from São Julião da Barra

Pewter flatware was found on 3 of the 28 sites of archaeological relevance above mentioned: SJB1, SJB2, and SJB4 (FIG. 1). None of the pieces can be directly related to any of the shipwrecks whose identity is known, and therefore be dated accurately within a narrow period of time. Exception can be made for a number of plates, which were found on the SJB2 site – believed to be the wreck of the *Nossa Senhora dos Mártires* – deeply embedded in layer D, which is most certainly related with this wreck.

A total of 23 flatware items have been recovered, distributed by the different sites as shown on Table II below:

Table II

São Julião da Barra - Pewter Flatware

Ref. No.	**Description**	**Provenience**
0465.02.0016	Plate	SJB1/1994
0465.02.0017	Plate	SJB1/1994
63.04	Small plate	SJB4/1996-97
148.01	Plate	SJB2/1996-97
161.09	5 plates and 9 saucers	SJB1/1996-97
165.01	Deep dish	SJB2/1996-97
168.01	Deep dish	SJB2/1996-97
171.01	Plate	SJB2/1996-97
171.02	Plate	SJB2/1996-97
205.01	Plate	SJB2/1996-97

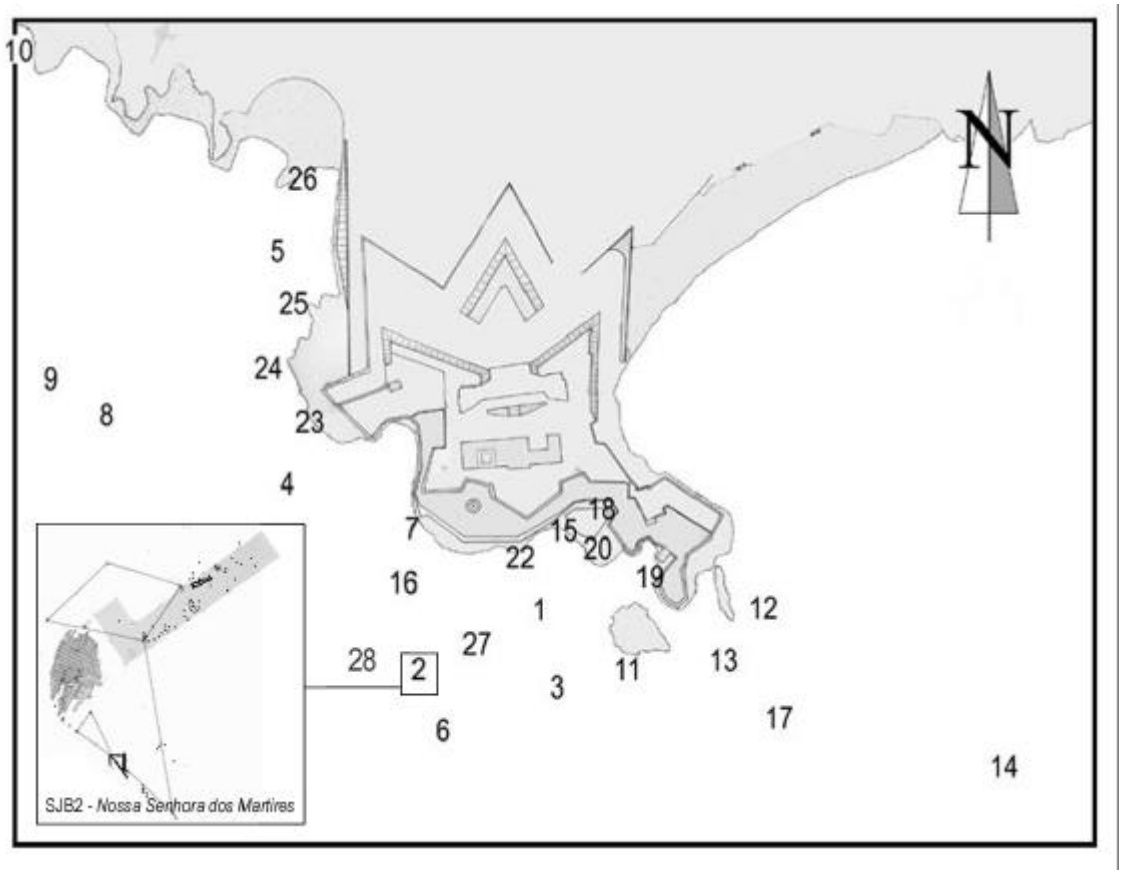

FIG. 1 - São Julião da Barra: Archaeological sites after the filed season of 2000.

The description of these artifacts follows the terminology adopted by Gotelipe-Miller[x] for the Port Royal pewter flatware, as shown below on FIG. 2 and Table III. Characterization of flatware is generally based on its shape although pewter flatware was sold by weight rather than by size or diameter. Pewter flatware has a rim, a bouge (the curved part) and a well (the bottom). Typologies are based on the shape and decoration of the rims, and on the relation between the size of the rim and the total diameter of the item. Rims can be very broad (this type being known as Cardinal's hat), broad, medium and narrow. Decorations range from plain to several reeds (or rings), either casted or incised.

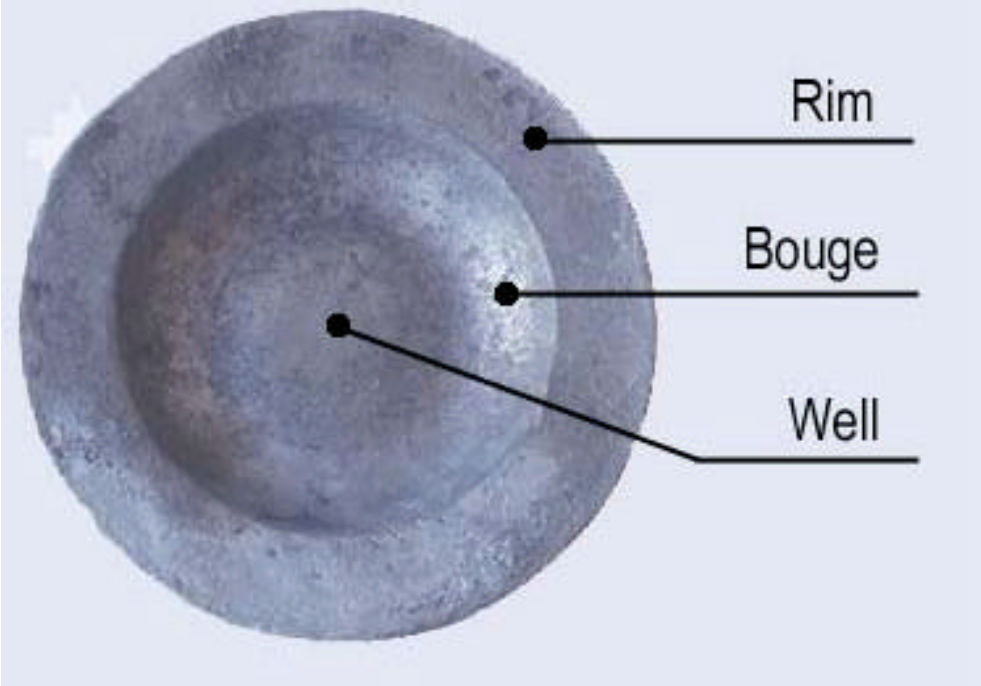

FIG. 2 - Flatware terminology.

Table III

Pewter Flatware Types (after Gotelibe-Miller, p. 28)

Charger	Serving tray with Ø > 42 cm
Dish	Serving tray 27 cm > Ø > 42 cm
Deep dish	Serving tray with h > 3 cm
Plate	Dish for individual use 16.5 cm > Ø >27 cm
Saucer	Dish for individual use Ø < 16.5 cm (also called butter plate)
Paten	Flat small tray for ecclesiastical uses
Bowl	Deep container with rounded sides
Basin	Deep container with straight bottom and somewhat straight sides

The collection from São Julião da Barra shows only three types of rims (FIG. 3). I followed the rim characterization presented in Gotelipe-Miller[xi] and Brownsword & Pitt[xii] as shown bellow, on Table IV, and considered the single incised reed as Gotelibe-Miller Type 4 for simplicity.

Table IV

Pewter Flatware Rim Types (after Gotelibe-Miller and Brownsword & Pitt)

Rim type	**Gotelibe-Miller**	**Brownsword & Pitt**
Plain Rim	Type **1**	Not considered
Single reed	Type **2**	Type **a** if angled Type **c** if with groove Type **d** if rounded Type **e** if below
Simple raised multiple reed	Type **3**	Not considered
Incised simple reed	Not considered	Type **b**
Incised multiple reed	Type **4**	Not considered
Complex multiple reed	Type **5**	Not considered

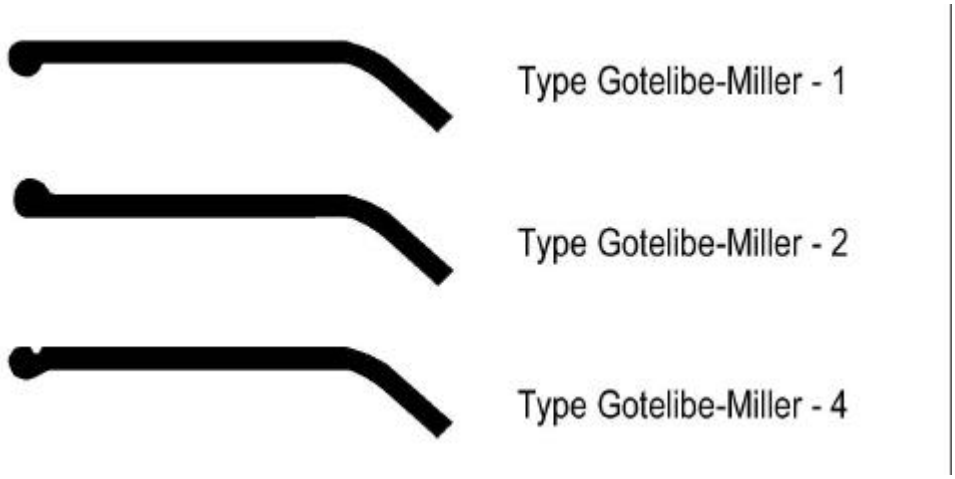

FIG. 3 - São Julião da Barra rim typology.

In what concerns subtypes, according to Gotelibe-Miller, all rims from a certain type fall in the same subtype. In other words: all type 1. rims belong to the 1b. category, and all type 2. belong to the 2a. category. As mentioned above, all type 4 (incised reeds) have no subtype in this classification.

Many pewters bear marks from its makers, from its owners, and less frequently from the merchant involved in its commerce. Maker's marks are called "touchmarks" when they represent the official pewterer's mark registered in the guildhouse, "quality marks" when they were not officially sanctioned by the guilds but were rather utilized to advertise quality, and "hallmarks" when they form a structured set of stamps imitating the marks used to characterize silver objects. Hallmarks are meaningless and were only used for marketing purposes. Ownership marks can be either monograms, frequently showing the initials of its owners, or more simple scratched marks, generally also showing initials or signs such as a cross, for example.

Seven plates of this collection have touchmarks (FIG. 4 and FIG. 5), and three have ownership marks, in this second case consisting of scratched initials, of which I unfortunately do not have pictures nor drawings. There are several published inventories of pewter marks for different countries, regions, and time spans, although I do not know any study pertaining to Portuguese pewter marks[xiii].

FIG. 4 - Touchmark on plate with ref. no. 0465.02.0016 and catalog no. 01.

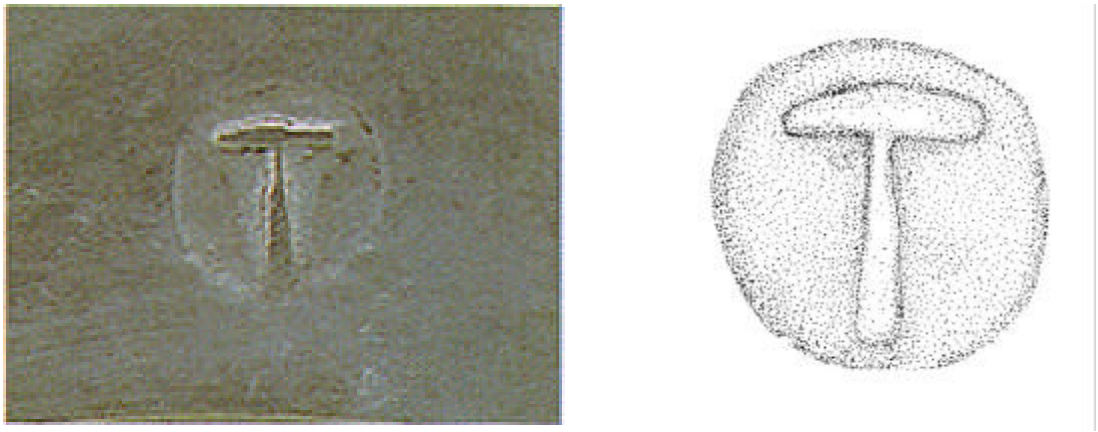

FIG. 5 - Touchmark on plates and saucers with ref. no. 161.09, catalog nos. 10-15.

As mentioned above, the possession marks consist of scratched initials on one plate and two dishes. The plate with the catalogue No. 02 bears the initials "A" and "T", dish No. 19 has a scratched "M", and dish No. 20 a "V". All these letters are initials of very common Portuguese, as well as Spanish Christian names and surnames, yielding no clues to any of the passengers whose names we know: Cristóvão de Abreu, a young sailor, Pedro, a young Japanese Jesuit, Francisco Rodrigues, a senior Jesuit priest on his way to Rome, Manuel Barreto Rolin, the captain, and Aires de Saldanha, the vice-king returning to Portugal on the *Nossa Senhora dos Mártires* who died a few days before reaching the Azores.

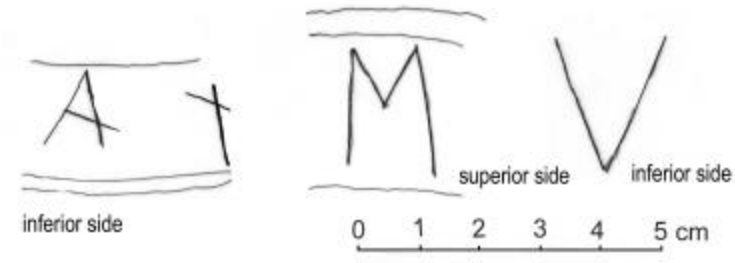

FIG. 6 - Possession marks on plates and saucers with catalog nos. 02, 19 and 20.

Discussion

The collection of pewter flatware from São Julião da Barra presents itself as a very simple one, without pieces of status, of large size, or of complex decoration. The pewterer's marks preserved are not typical of any know tradition, and parallels were not found insofar. Its possession's marks are also very simple and consist of scratched initials on the lower side of the rim.

Although several other wrecks from Portuguese India route ships have been found no one has ever been excavated by archaeologists and no pewter has been reported in the relations of artifacts published to this moment.

I have compared the diameters of the pewters from São Julião da Barra with the published flatware found on Iberian wrecks from the mid 16th century to the mid 17th century (TABLE V).

Table V

Pewter Flatware Diameters of Several Iberian Wrecks (cm)

	SJB	***Espiritu Santo***	***Trinidad Valencera***	***Girona***	***S. M. Rosa***	***N. S. Atocha***
Dishes 27 > Ø > 42	28.3, 29.0	-	28.7, 29.1, 30.9, 35.4, 36.0	-	30.6	34.7
Plates 16.5 > Ø > 27	18.0, 21.0, 21.0, 21.0, 21.2, 21.2, 21.2, 21.2, 21.2, 21.5, 21.5, 21.5	23.7, 23.7	20.3, 20.3, 20.5, 20.5, 20.8, 21.3, 21.5, 21.7, 25.7	20.3	20.2, 20.2	-
Saucers 16.5 > Ø	14.7, 14.7, 14.7, 14.7, 14.7, 14.7, 14.8, 14.8, 15.0	-	13.1	-	-	-

In the majority of the bibliography consulted no values were given for rim dimensions, diameters of the well, and depth in the center, nor was I able to find values for the weights, nor analysis of the alloys.

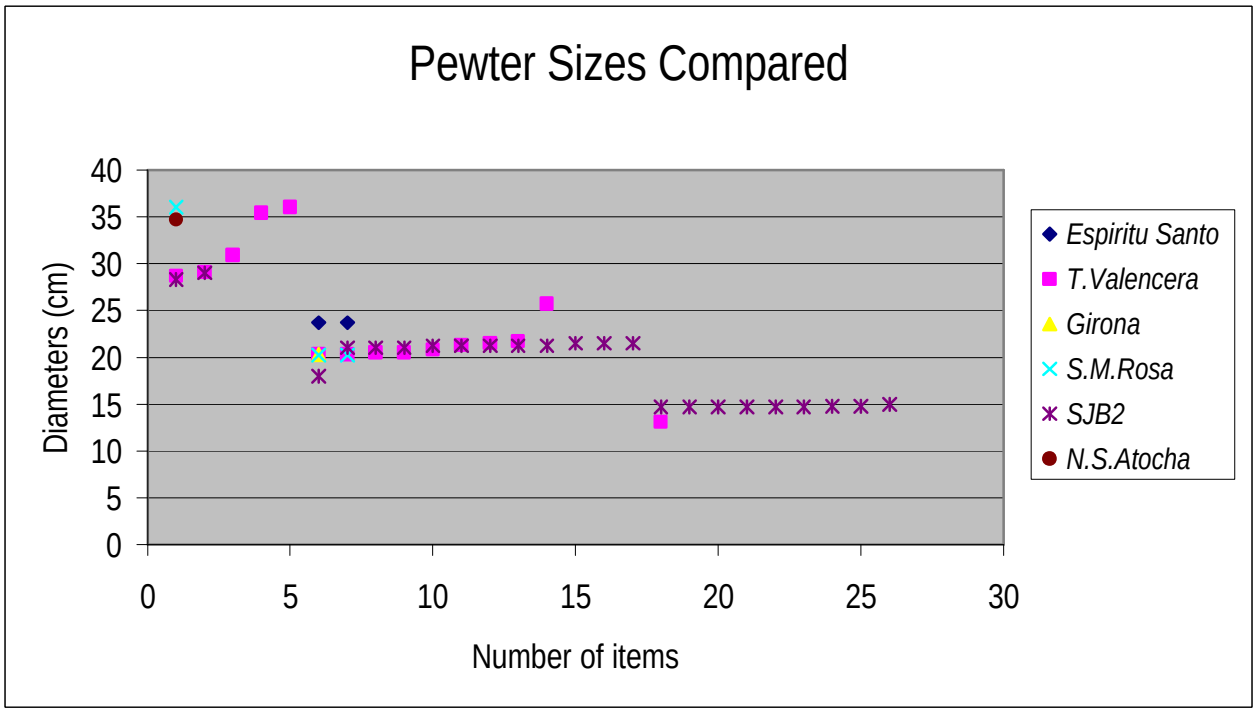

FIG. 7 - Comparison of the diameters of pewters from several Iberian wrecks.

The results presented on FIG. 7, consisting solely of a simple comparison of diameters, show a not surprising trend to cluster around the average values defined by Gotelipe-Miller for dishes, plates, and saucers, suggesting that the adoption of these sizes was generalized long before the destruction of Port Royal by the earthquake of 1692.

As to the weights, I have tried to compare the weight of the values expressed in grams with the values expressed in the units in which they may have been bought and sold: *onças* and *arráteis* (Table VI). I have considered 1 *arrátel* as weighing 459 gr. and being the equivalent to 16 *onças* of 28.6875 gr. each. The results do point in certain cases to the manufacture of flatware with certain standard weights, as it has been suggested[xiv], but are not at all conclusive in this matter. Only complete pieces were considered in this analysis, although some are very corroded and were therefore certainly havier at the time of the wreck. The values are presented below in FIGS. 8, 9 and 10.

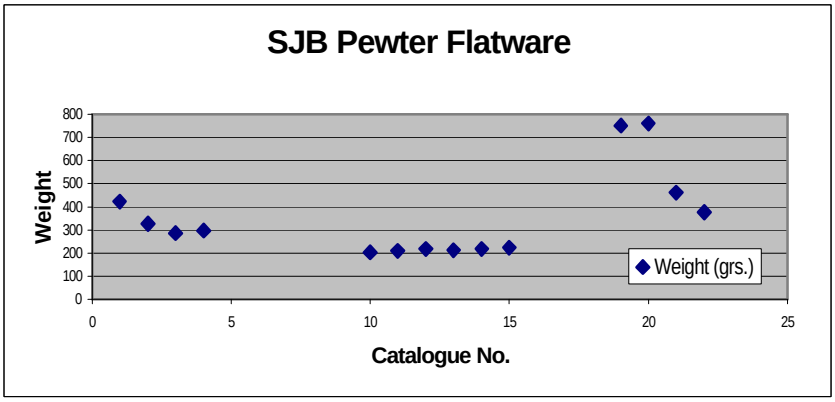

FIG. 8 - Weights of the complete pieces in grams.

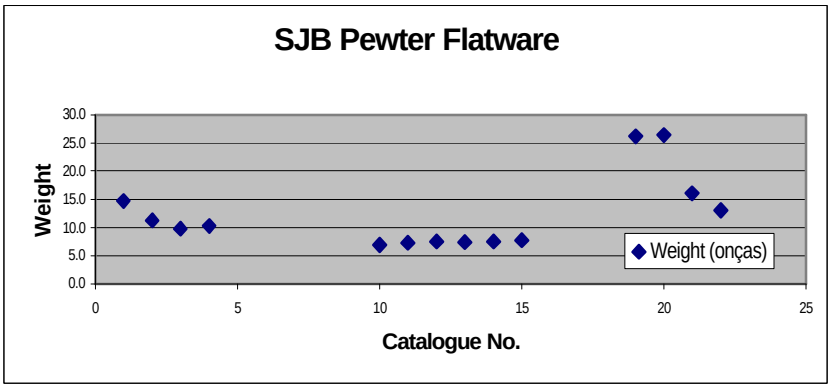

FIG. 9 - Weights of the complete pieces in *onças*.

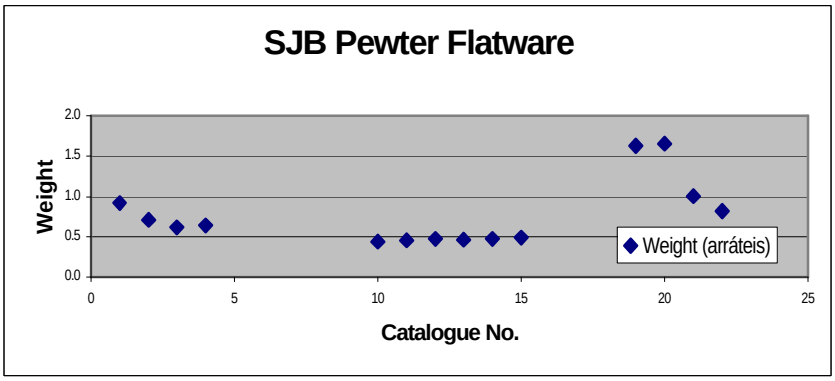

FIG. 10 - Weights of the complete pieces in *arráteis*.

Table VI

Pewter Flatware Weights

Catalogue No.	Weight (grs.)	Weight (onças)	Weight (arráteis)
1	422	14.7	0.9
2	325	11.3	0.7
3	283	9.9	0.6
4	295	10.3	0.6
10	201	7.0	0.4
11	209	7.3	0.5
12	216	7.5	0.5
13	212	7.4	0.5
14	216	7.5	0.5
15	224	7.8	0.5
19	749	26.1	1.6
20	758	26.4	1.7
21	460	16.0	1.0
22	375	13.1	0.8

Perhaps in the future new data will allow a few tentative answers to all the questions that remain unanswered, relative to the origin of these flatwares, its marks, or the quality of its alloys, when compared, for instance, with the French or English pewter flatware – in the presumption that these pewters are not of French or English origin.

Since it does not seems plausible that new documentation pertaining to this wreck will show in the future, it does not seem possible that the possession marks will ever allow us to assign potential owners to these pieces.

In conclusion, I believe that this study alone and as it is does not add too much to our knowledge of early 17th century pewter flatware. However, I also believe that it will gain a different interest after the metal analysis are performed for each item, and the weights are plotted in the missing records of the catalog. Only in the future, after comparison with other collections of similar cultural horizons that may come to be published, we might be able to place the manufacture of these items in time and in space.

Bibliography

For this report I have consulted several works that are not quoted in the footnotes. I also came across references, sometimes incomplete that I could not consult but which I think deserve mention in this basic bibliography. A complete relation of the bibliography consulted is listed below. The books that I could not access at Texas A&M University are indicated under the sub-title "Further Reading".

Bedford, John, *Pewter*, Walker Ed., New York, 1966.

Brownword, R. and Pitt, E.E.H. "X-Ray Fluorescence Analysis of English 13-16th Century Pewter Flatware", Archaeometry 26.2 (1984), pp. 237-244.

Bruzelli, Birger, "An Improved Method of Reproducing Pewter Marks" *PCCA Bulletin*, Vol.5, No.4, pp. 74-78, December 1965.

Carlson, Janice H., *Analysis of British and American Pewter by X-Ray Fluorescence Spectroscopy*, Offprint from Winterthur Portfolio, Winterthur.

_____, X-Ray Fluorescence Analysis of Pewter: English and Scotish Measures", *Archaeometry*, 19.2 (1997), pp. 147-155.

Casella, Gabriella Maria, Almeida, Isabel Maria Santos da Silva, and Lacerda, Miguel, *Trabalho de Investigação sobre peças de Estanho encontradas na Foz do Rio Arade (Portimão*), Paper for the course of Introdução aos Estudos de Arqueologia e da História de Arte at the Faculdade de Letras of the Universidade de Lisboa, teacher Luís Manuel Teixeira, June 1984.

Castro, Filipe *Projecto SJB2: Relatório dos Trabalhos realizados em 1999*, CNANS, College Station, 1999.

Cotterell, Howard Hershel, *National Types of Old Pewter*, Weather Vann Books, New York, 1972.

*_____, *Old Pewter, its Makers and Marks*, 1963.

D'Intino, Raffaella "Objects of dayly life" in Afonso, Simonetta L. *Nossa Senhora dos Mártires: The last Voyage.* Ed. Verbo / Expo'98, Lisboa, 1998.

Douroff, B.A., *Étains Français des XVII^e^ et XVIII^e^ Siècles*, Editions Charles Massin, Paris.

*__D__ubbe, B. *Tin en Tinnegieters in Netherland*.

*__E__mery, John, *European Spoons Before 1700*, 1976.

__G__otelipe-Miller, Shirley, *Pewter and Pewterers from Port Royal Jamaica: Flatware before 1692*, Thesis on file at Texas A&M University, College Station, 1990.

*__H__intze, Erwin, *Die Deutschen Zinngiesser und Ihre*.

__H__omer, Ronald F. *Five Centuries of Base Metal Spoons*, Ed. Author, 1975.

__H__ornsby, Peter, *Pewter of the Western World 1600-1850*, Schiffer Publications, 1983.

_____, et al. *Pewter, Acelebration of the Craft 1200-1700*, The Museum of London, 1990.

__J__ackson, C.J., "The Spoon and its History", *Archaeologia* 53, pp. 107-146.

__J__ackson, Radway, *English Pewter Touch Marks*, 1970.

__L__aughlin, Ledlie Irwin, *Pewter in America*, American Legacy Press, New York, 1981.

*__L__ofgren, Albert, *Det Svenska Tenngjutarehantverkets Marker*, 7 Vols., 1925.

__M__athewson, Duncan *Treasure of the Atocha*, Pisces Books, New York, 1986.

__M__cNab, Jessie - "Metalwork," Microsoft Encarta, 1994.

NA, *Pewter in American Life*, Pewter Collectors Club of America Inc., 1984.

NA, *British Pewter 1600-1850*, The Currier Gallery of Art, 1974.

NA, "John Townsend, English Quaker with American Connections", *PCCA Bulletin*, Vol.5, No.2, pp. 23-26, December 1964.

__O__sburn, Burl Neff, *Pewter, Spun, Wrough, and Cast*, Intern Textbook Co., 1938.

*__S__nodin, Michael, *English Silver Spoons*.

__P__earl, Christopher A., *More Pewter Marks*, The Pewter Society, Halesworth Press Limited, Ney York.

____, *Addenda to More Pewter Marks*, The Pewter Society, Halesworth Press Limited, Ney York, 1977.

*____, *American and British Pewter*.

*____, *British Pewter and Butaria Metal*.

*__S__tara, D., *Pewter Marks of the World*.

Strabo, *Geography (Rerum Geographicarum), Harvard University Press, 1931-49.*

Thomas, John Carl, *Connecticut Pewter and Pewterers*, The Connecticut Historical Society, 1976.

*__U__llyett, Kenneth, *Pewter, A Guide for Collectors*.

Vasconcelos, Frazão de "Sobre a Barra do Tejo" in *Subsídios para a História da Carreira da Índia no tempo dos Filipes*, Academia Portuguesa da História, Lisbon, 1993.

Zeller, Rolando van, Estanhos Portugueses, Companhia Editora do Minho, Barcelos, 1969.

Further Reading

Cotterell, Howard Hershel, *Old Pewter, its Makers and Marks*, 1963.

Dubbe, B. *Tin en Tinnegieters in Netherland*.

Emery, John, *European Spoons Before 1700*, 1976.

Hintze, Erwin, *Die Deutschen Zinngiesser und Ihre*.

Lofgren, Albert, *Det Svenska Tenngjutarehantverkets Marker*, 7 Vols., 1925.

Snodin, Michael, *English Silver Spoons*.

Pearl, Christopher A., *American and British Pewter*.

____, *British Pewter and Butaria Metal*.

Stara, D., *Pewter Marks of the World*.

Ullyett, Kenneth, *Pewter, A Guide for Collectors*.

Notes

[i] Strabo, *Geographia*, 3.3.1..

[ii] Vasconcelos, Frazão de "Sobre a Barra do Tejo" in *Subsídios para a História da Carreira da Índia no tempo dos Filipes*, Academia Portuguesa da História, Lisbon, 1993, p. 89.

[iii] Castro, Filipe *Projecto SJB2: Relatório dos Trabalhos realizados em 1999*, CNANS, College Station, 1999.

[iv] Gotelipe-Miller, Shirley *Pewter and Pewterers from Port Royal Jamaica: Flatware before 1692*, Thesis on file at Texas A&M University, College Station, 1990.

[v] Casella, Gabriella Maria and Almeida, Isabel Maria Santos da Silva, *Trabalho de Investigação sobre peças de Estanho encontradas na Foz do Rio Arade (Portimão)*, made for the course of "Introdução aos Estudos de Arqueologia e da História de Arte" at the Faculdade de Letras of the Universidade de Lisboa, teacher Luís Manuel Teixeira, in June 1984. (Drawings by Miguel Lacerda). Unpublished report.

[vi] Arnold III, J. Barto & Weddle, Robert *The Nautical Archaeology of Padre Island: the Spanish Shipwrecks of 1554*. Academic Press. London, 1978, p. 290.

[vii] Flanagan, Laurence *Ireland's Armada Legacy*, Alan Sutton Publications, 1988.

[viii] Corey, Malcom "Pewter from the Nuestra Señora de Atocha" in *http:\\melfisher.org*, December 1998.

[ix] Flanagan, Op. cit..

[x] Gotelipe-Miller, Shirley, Op. cit. pp. 28-35.

[xi] Ibid. pp. 125-136.

[xii] Brownword, R. and Pitt, E.E.H. "X-Ray Fluorescence Analysis of English 13-16th Century Pewter Flatware", *Archaeometry* 26.2 (1984), pp. 237-244.

[xiii] All titles are mentioned in the bibliography section.

[xiv] Rolando van Zeller mentions this practice at least for the larger plates. Zeller, Rolando van, Estanhos Portugueses, Companhia Editora do Minho, Barcelos, 1969.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 01 **INSAS:** 04613.03.0016

Form: Plate **Diameter:** 210 mm **Rim type:** 2a.

Rim width: 20 mm **Rim ratio:** 0.095 **Well diam.:** 170 mm

Depth: 23 mm **Weight:** 422 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, narrow rim with one reed on the outer edge, 21 cm in diameter, bearing a well preserved touchmark.

Touchmarks: **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 0465.02.0016.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 02 **INSAS:** 04613.03.0017

Form: Plate **Diameter:** 215 mm **Rim type:** 4

Rim width: 23 mm **Rim ratio:** 0.107 **Well diam.:** 169 mm

Depth: 20 mm **Weight:** 325 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Badly preserved, narrow rim with one incised reed on the outer edge, 21.5 cm in diameter, no touchmarks, ownership marks: scratched "A" and "T".

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** "A" & "T"

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 0465.02.0017.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 03 **INSAS:** 04613.05.0075

Form: Plate **Diameter:** 180 mm **Rim type:** 1a.

Rim width: 35 mm **Rim ratio:** 0.194 **Well diam.:** 110 mm

Depth: 25 mm **Weight:** 283 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, broad plain rim, 18 cm in diameter, bearing no touchmarks.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB4 - Field season of 1996/7 ref. 63.04.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 04 **INSAS:** 04613.05.0071

Form: Plate **Diameter:** 210 mm. **Rim type:** 1a.

Rim width: 22 mm **Rim ratio:** 0.105 **Well diam.:** 166 mm

Depth: 34 mm **Weight:** 295 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Badly preserved, narrow plain rim with one reed on the outer edge, 21 cm in diameter, bearing no touchmarks.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 148.01.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 05 to 08 **INSAS:** 04613.05.0073

Form: Plates **Diameter:** 212 mm **Rim type:** 1a.

Rim width: 27 mm **Rim ratio:** 0.127 **Well diam.:** 158 mm

Depth: 25 mm* **Weight:** 741 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Very badly preserved, part of a pile with 14 plates and saucers, medium plain rim, 21.2 cm in diameter, no touchmarks preserved.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.01.01 to 04.

* incomplete.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 09 **INSAS:** 04613.05.0074

Form: Plates **Diameter:** 210 mm **Rim type:** 1a.

Rim width: 27 mm **Rim ratio:** 0.129 **Well diam.:** 156 mm

Depth: 20 mm* **Weight:** 300 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Very badly preserved, part of a pile with 14 plates and saucers, medium plain rim, 21 cm in diameter, bearing a preserved touchmark representing a hammer.

Touchmarks:  **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.02.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 10 **INSAS:** 04613.05.0076

Form: Saucer **Diameter:** 148 mm **Rim type:** 1a.

Rim width: 24 mm **Rim ratio:** 0.162 **Well diam.:** 100 mm

Depth: 22 mm **Weight:** 201 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, medium plain rim, 14.8 cm in diameter, bearing a well preserved touch mark representing a hammer.

Touchmarks:  **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.03.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 11 **INSAS:** 04613.05.0077

Form: Saucer **Diameter:** 150 mm **Rim type:** 1a.

Rim width: 25 mm **Rim ratio:** 0.167 **Well diam.:** 100 mm

Depth: 21 mm **Weight:** 209 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, medium plain rim, 15 cm in diameter, bearing a well preserved touch mark representing a hammer.

Touchmarks:  **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.04.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 12 **INSAS:** 04613.05.0078

Form: Saucer **Diameter:** 147 mm. **Rim type:** 1a.

Rim width: 24 mm **Rim ratio:** 0.163 **Well diam.:** 99 mm

Depth: 23 mm **Weight:** 216 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, medium plain rim, 14.7 cm in diameter, bearing a well preserved touch mark representing a hammer.

Touchmarks:  **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.05.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 13 **INSAS:** 04613.05.0079

Form: Saucer **Diameter:** 148 mm **Rim type:** 1a.

Rim width: 24 mm **Rim ratio:** 0.162 **Well diam.:** 100 mm

Depth: 22 mm **Weight:** 212 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, medium plain rim, 14.8 cm in diameter, bearing a well preserved touch mark representing a hammer.

Touchmarks:  **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.06.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 14 **INSAS:** 04613.05.0080

Form: Saucer **Diameter:** 147 mm **Rim type:** 1a.

Rim width: 24 cm **Rim ratio:** 0.163 **Well diam.:** 99 mm

Depth: 23 mm **Weight:** 216 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Very well preserved, medium plain rim, 14.7 cm in diameter, bearing a well preserved touch mark.

Touchmarks:  **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.07.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 15 **INSAS:** 04613.05.0081

Form: Saucer **Diameter:** 147 mm **Rim type:** 1a.

Rim width: 24 mm **Rim ratio:** 0.163 **Well diam.:** 99 mm

Depth: 22 mm **Weight:** 224 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Very well preserved, medium plain rim, 14.7 cm in diameter, bearing a well preserved touch mark representing a hammer.

Touchmarks:  **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.08.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 16 and 17 **INSAS:** 04613.05.0082

Form: Saucer **Diameter:** 147 mm. **Rim type:** 1a.

Rim width: 24 mm **Rim ratio:** 0.163 **Well diam.:** 99 mm

Depth: 17 mm * **Weight:** 230 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, medium plain rim, 14.7 cm in diameter, no preserved touchmarks.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 refs. 161.09.01. and 02.

* incomplete.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 18 **INSAS:** 04613.05.0083

Form: Saucer **Diameter:** 147 mm **Rim type:** 1a.

Rim width: 24 mm **Rim ratio:** 0.163 **Well diam.:** 99 mm

Depth: 20 mm * **Weight:** 101 gr. **Thickness:** 3 mm

Origin: Unknown

Description: Fairly well preserved, medium plain rim, 14.7 cm in diameter, no preserved touchmarks.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 161.09.10.

* incomplte.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 19 **INSAS:** 04613.05.0068

Form: Deep dish **Diameter:** 283 mm **Rim type:** 4

Rim width: 31 mm **Rim ratio:** 0.110 **Well diam.:** 221 mm

Depth: 42 mm **Weight:** 749 gr. **Thickness:** 2 mm

Origin: Unknown

Description: Fairly well preserved, narrow rim with one incised reed on the outer edge and another on the inner edge, 28.3 cm in diameter, no touchmarks, ownership mark: "M".

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** "M"

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 165.01.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 20 **INSAS:** 04613.05.0067

Form: Deep dish **Diameter:** 290 mm **Rim type:** 1a.

Rim width: 27 mm **Rim ratio:** 0.093 **Well diam.:** 236 mm

Depth: 30 mm **Weight:** 758 gr. **Thickness:** 2 mm

Origin: Unknown

Description: Fairly well preserved, narrow plain rim, 30 cm in diameter, no touchmarks preserved, ownership mark: "V".

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** "V".

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 168.01.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 21 **INSAS:** 04613.05.0069

Form: Plate **Diameter:** 212 mm **Rim type:** 2a.

Rim width: 17 mm **Rim ratio:** 0.080 **Well diam.:** 178 mm

Depth: 23 mm **Weight:** 460 gr. (?1 *arrátel*) **Thickness:** 2 mm

Origin: Unknown

Description: Fairly well preserved, narrow rim with one reed on the outer edge, 21,2 cm in diameter, no preserved touchmarks.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 171.01.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 22 **INSAS:** 04613.05.0070

Form: Plate **Diameter:** 215 mm **Rim type:** 4

Rim width: 23 mm **Rim ratio:** 0.107 **Well diam.:** 169 cm

Depth: 19 cm **Weight:** 375 gr. **Thickness:** 2 mm

Origin: Unknown

Description: Not very well preserved, narrow rim with one incised reed on the outer edge and another on the inner edge, 21.5 cm in diameter, no preserved touchmarks.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 171.02.

São Julião da Barra Pewter Flatware Catalogue

Catalogue number: 23 **INSAS:** 04613.05.0072

Form: Plate **Diameter:** 215 mm **Rim type:** 2a.

Rim width: 20 mm **Rim ratio:** 0.093 **Well diam.:** 175 mm

Depth: 21 mm **Weight:** 300 gr. **Thickness:** 2 mm

Origin: Unknown

Description: Badly preserved, narrow rim with one reed on the outer edge, 21.5 cm in diameter, bearing no preserved touchmarks.

Touchmarks: None **Quality or Hallmarks:** None **Ownership marks:** None

Metal analysis: Not yet performed **Parallels:** Unknown

Archaeological provenience: SJB1 - Field season of 1994 ref. 205.01.

Published on Nordic Underwater Archaeology, Jan 2001, www.abc.se/~pa/uwa/