

MERIDA NO MORE:
PORTUGUESE REDWARE IN NEWFOUNDLAND

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MERIDA NO MORE: PORTUGUESE REDWARE IN NEWFOUNDLAND

by

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Abstract

This thesis presents a discussion of Portuguese Redware, formally known as “Merida-type ware”, in late sixteenth- and seventeenth-century archaeological contexts in Newfoundland. A full review of English- and Portuguese-language literature regarding the ware begins the discussion. Portuguese Redware is then defined and production areas in Portugal for the ware are outlined. Samples from several collections, from English and French in Newfoundland are examined and a vessel form typology is presented that is applicable to Portuguese Redware in Newfoundland. The likely production provenance for the Newfoundland samples, the Aveiro region and, to a lesser degree, Lisbon, is discussed. The Portuguese Redware fabrics occurring in Newfoundland are also described. Possible export forms are discussed, such as the Portuguese Redware olive jar, as well as the differences in Portuguese Redware occurrence between sites. A preliminary trace element examination by laser ablation inductively coupled plasma-mass spectrometry of 28 Portuguese Redware sherds from Casa do Infante, Porto and Ferryland, St. John’s and Placentia in Newfoundland is presented. The thesis concludes with a discussion of factors that drove the consumption of Portuguese Redware by the English and French maritime community associated with Newfoundland in the seventeenth century. These factors include trade connections between the Newfoundland cod fishery and Portuguese markets and the maritime communities’ place at the cusp of the consumer revolution in the early modern period.

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Chapter 1

Introduction

1.1 Research Background

When this thesis was begun, I naively thought that it could be approached in the same way as other ceramics-based theses that had come out of Memorial University's Archaeology Unit. It would begin with a site description, a history of the research into the ceramic (and the ceramic itself) would be presented, and then a nice discussion of vessel counts in different contexts of the site and how this relates to the greater North Atlantic, perhaps a few drawings and a tidy conclusion. This structure worked extremely well for several past theses, and the ceramics-based theses being produced by MUN graduate students are generally well received (Pope 1986; Stoddart 2000; Temple 2004). In the end, this thesis does loosely follow the structure behind many of the previous Memorial ceramic theses, but in a modified form.

I, being generally optimistic, decided that I would study a relatively unresearched ceramic, "Merida ware" and, instead of relying solely on the main theses-producing historical site, Ferryland, I would attempt to orient its presence in a pan-Newfoundland late sixteenth- through seventeenth-century context. This pan-Newfoundland context would then be situated within the greater North Atlantic context. Finally, I would take the sherd counts, vessel descriptions and typology construction one step further and include an exploratory study of the trace element composition of the ceramic by laser ablation inductively coupled mass spectrometry. Although more ambitious than some of the previous theses, this research was deemed acceptable to continue, because, after all,

“Merida ware” had been consistently identified in Newfoundland collections for the last twenty years. There was a small but seemingly solid pool of publication on the ceramic and this is something I could effectively expand on by adding a discussion of the Newfoundland material.

My supervisor, Dr. Peter Pope, who was the first person to identify “Merida ware” in Newfoundland, warned me that the basic production provenience of the ceramic might be wrong and that I should plan a trip to Portugal to research this further. This ceramic type was labeled “Merida ware” by John Hurst in the 1960s because of early research which suggested it was produced near Merida, Spain (Hurst et al 1986). It was later realized the ceramic is Portuguese, and for many years this ware was described as being a production of the Alto Alentejo region of Portugal, around the city of Estremoz (Hurst et al 1986; Gutiérrez 2000: 74-78). Dr. Pope questioned this, however, after a trip to Porto where he made contact with the director of the Casa do Infante excavations, Paulo Dordio, and gained some Portuguese publications suggesting that the coastal areas of Portugal had productions of early modern coarse earthenware. I dutifully learned enough Portuguese to get by and booked my flights, growing more and more suspicious of the information presented in the English sources concerning “Merida ware” as I read the Portuguese publications. I was still optimistic of the validity of the sherd counts and vessel descriptions I done thus far because, after all, “Merida ware” had been consistently identified in Newfoundland for the past twenty years.

Before leaving for Portugal, a new English name for “Merida ware” had to be decided on, as talking to Portuguese archaeologists about Portuguese earthenware yet calling it “Merida ware” would be impolite, to say the least! Several other names have

been suggested previously, such as “orange micaceous ware” and “Iberian micaceous redware” (Deagan 1987: 40-41; Brown 2002: 38-39). But these labels are unwieldy and only marginally better than “Merida ware”. I finally decided that “Portuguese Redware” would be properly descriptive and would mirror a common Portuguese label for the ceramic, *louça vermelha*. It is a better label than something like *cerâmica comum*, as it has clearer meaning in English as well as being descriptive of the red type of coarse earthenware that occurs in Newfoundland. There is more than one type of early modern coarse earthenware fabric in Portugal and a name specifying the red type was essential for discussion.

Upon arrival in Portugal, I quickly realized how little English researchers actually did know about Portuguese Redware and how much of the information we had been relying upon was incorrect. Although one gets a certain amount of information from publications, it certainly does not equal physically seeing and handling the material in question. I had seen a couple of ware typologies published in Portuguese but I was unsure how these typologies fit with the Newfoundland ceramics. Early in my research in Portugal I learned that, with few exceptions, the Newfoundland ceramics could be slotted quite nicely into the typologies that had been constructed by my Portuguese colleagues.

At this point, my research became focused on presenting the current knowledge of early modern Portuguese coarse earthenware; a knowledge that most English researchers have been disregarding. Some of this information has been published, albeit in Portuguese, which could lead to a certain amount of disuse by English researchers. Some of the information has not been published and has not been explored because there has been very little contact between Portuguese and Anglophone researchers: especially in the

case of researchers in North America. There have been no attempts in the English-speaking literature to utilize Portuguese vessel form names for coarse earthenware, nor has there been much discussion on what defines the different ware varieties.

Unfortunately, descriptions of the Portuguese earthenware in Newfoundland collections suffered from this gap in knowledge. Peter Pope did a good job by identifying the ceramic in Newfoundland but this was a couple of decades ago. He used the sources that were available to him at that time. The interest in early modern coarse earthenware is relatively new in Portugal, so Pope would not have encountered any Portuguese publications if he had sought them out. The problem is that this initial identification was never expanded on, and, for almost twenty years, Portuguese Redware in Newfoundland has been described using fuzzy and often incorrect descriptors. My objective became to rectify this paucity of knowledge, in order to give future identifications clarity and allow them to make sense within the existing Portuguese research.

1.2 Introduction and Research Objectives

This thesis is a product of my goal to clarify further Portuguese coarse earthenware identifications, particularly in Newfoundland. It also offers a presentation of the current state of Portuguese coarse earthenware research, something which has not been discussed in English before. The Newfoundland material is situated within this broader research. It was a challenge to study the Newfoundland Portuguese Redware, as it was impossible to re-identify all the sherds which had been misidentified. A sampling strategy was therefore implemented, although this strategy limited the specific temporal contexts which could be utilized. Certain collections offered fabulous vessel variety, but

poor provenience. Since one of the aims was to present an overall picture of the ware in Newfoundland, these collections were incorporated nevertheless. This further limited temporal specificity and the final time period that was examined ranged from the late sixteenth century to the early eighteenth century. I decided that specific contexts were less important, in this case, than presenting a basic description of what was occurring on the island.

This thesis has been written to use as a guide to Portuguese Redware identifications, particularly on the island of Newfoundland but it does have greater application to similar contexts off of the island. It offers a typology of the vessel forms found on the island, as well as descriptions of other forms of Portuguese coarse earthenware which exist elsewhere but have yet to be identified here in Newfoundland. I did forge on with the trace element analysis, and there is a chapter which contains the preliminary data from these tests, which I hope will be incorporated into further testing in Portugal, currently planned. The consumption of Portuguese coarse earthenware by the English and French in Newfoundland is explored and this chapter validates the material research, as studying pots in a vacuum is useless. The greater historical context and the reasons behind usage must always be examined in order to make the research meaningful beyond a mere description of material culture.

The research undertaken for this project aimed to address the following research questions:

1. What defines early modern Portuguese coarse earthenware?
2. What comprises Portuguese coarse earthenware in Newfoundland?
3. What is the production provenance of the Newfoundland ceramics?

4. How can we explain the occurrence of this ceramic in late sixteenth- through seventeenth-century archaeological contexts in Newfoundland?

1.3 Content Outline

Chapter 2 details the collections that were examined for the thesis research, both in Newfoundland and in Portugal. I present a historiography of Portuguese coarse earthenware in Chapter 3. This chapter serves as a comprehensive introduction to the geographic regions where Portuguese coarse earthenware has been studied and as a critical discussion of the previous research. In Chapter 4 I present my methodology for the analysis of the Newfoundland material, including a discussion of the sampling strategy employed and the challenges that occurred with the development and implementation of the strategy.

Chapter 5 discusses fabric, forms and production areas. It defines what the earthenware types are, describes the fabrics and basic vessel forms as well as the currently-known production areas for each type in Portugal. Chapter 6 offers a Newfoundland-specific typology for Portuguese Redware. This typology is based on previous research in Portugal and includes vessel descriptions, drawings and photographs. The fabrics occurring in Newfoundland are described. Vessel form frequencies and the differences between several Newfoundland sites are also discussed, as are the potential Portuguese production areas for Newfoundland material excavated to date. The results from the trace element analysis of 28 Portuguese Redware sherds (from Newfoundland and Portuguese contexts) are presented in Chapter 7. These results are preliminary and

were conducted at the MUN Earth Sciences department using laser ablation inductively coupled mass spectrometry.

Chapter 8 is my theoretical framework for the subsequent chapter discussing the consumption of Portuguese Redware. It includes a brief history of consumption theory and its applications to the early modern period. Chapter 9 discusses the factors behind the consumption of Portuguese Redware by the English and French communities connected to Newfoundland. It presents a brief history of English and French activities on the island in the sixteenth and seventeenth centuries as well as the English and French trading connections to Portugal. It examines both external and internal factors affecting consumption patterns. Chapter 10 provides a summary of the research conclusions with suggestions for further research.

Chapter 2

Collections Background

2.1 The Portuguese Collections

2.1.1 Introduction

The work I undertook for this thesis included a research trip to Portugal. Whilst there I visited ten collections which contained material from over twenty different sites. These collections ranged from small city sites to very large federally-sponsored projects to culture resource management firm finds. The collections were located from Lisbon northwards, with the northernmost collection located a short distance from the Spanish border. For most of the collections I was allowed full access and this greatly facilitated my research.

This section will describe the Portuguese collections and the associated sites that proved to be most applicable to the study of Portuguese coarse earthenware in Newfoundland (Figure 2.1). One of the associated sites, Ria de Aveiro A, is an earlier context than those excavated in Newfoundland but is included because the forms and fabrics found at this site are applicable to the study of Newfoundland material, while demonstrating the relative continuity of the Aveiro-type ceramic productions from the fifteenth to the seventeenth centuries. It is not until the eighteenth century that Aveiro-type ceramics undergo major morphological changes (Paulo Dordio 2006, pers. comm.). The Aveiro sites are also useful for their exceptional collections which has resulted in a substantial amount of accurate typological classification and definition being undertaken.



FIGURE 2.1. Map of Portugal, site areas marked. (Adapted from Gutiérrez 2000: 74.)

The rest of the sites that are described have large seventeenth-century contexts and have collections that are similar to those emerging in Newfoundland.

2.1.2 *Casa do Infante, Porto*

One of the major collections that will be used in this thesis is from the Casa do Infante site in Porto. Porto is a northern port city which played an important role in the sixteenth- and seventeenth-century Newfoundland fishing economy. Porto was (and still is) host to the production and trade of port wine. Porto's markets played host to English, French and Basque merchants bringing cod from Newfoundland to exchange for wine and other commodities (Abreu-Ferreira 1995, 2003, 2004; Pope 2004; Barros 2007). This fish-for-wine trade especially typical of the English will be discussed in detail in a subsequent chapter.

Casa do Infante is a large urban site located near the waterfront of Porto. The site spans the Roman period to the current day, for the seventeenth-century structures known as "*Casa do Infante*" (House of the Infante) are still in use, as a municipal history archive, museum and collections storage. The site is traditionally known as the birthplace of Infante Don Henrique, *o Navegador*, a fifteenth-century Portuguese noble and explorer. In the sixteenth and seventeenth centuries the buildings served as a mint and customs house and underwent extensive renovations and expansions. Archaeological excavation began at Casa do Infante in 1991 and continued until 1998 (Barreira et al. 1998). Ceramics were a major part of the material culture recovered and over 500,000 ceramic sherds were found, spanning the third to nineteenth century. There was a decision to study, in detail, the sherds found in modern contexts, dating from the sixteenth to

eighteenth centuries. These sherds (57,512 in number) were used to examine the ceramic supply and trading patterns of Porto over a two hundred year period (Barreira et al. 1998). This study, which resulted in a number of publications and a large step forward in the classification of modern era Portuguese ceramics, is the reason for the suitability of the Casa do Infante site for comparative studies with Newfoundland collections. The Casa do Infante structures are within view of Vila Nova de Gaia, the traditional as well as present main production and supply area for port wine.

The ceramics that were used for the Casa do Infante study included all types of Portuguese-manufactured coarse earthenware. These wares include the black and red types as well as the lead-glazed and *faiença* (tin-glazed earthenware). These coarse earthenwares were the types focused on for analysis and classification, although many other ceramic types were found, including Portuguese fine earthenware as well foreign-manufactured tin-glazed wares, stoneware and porcelain (Barreira et al 1998: 146). In the course of the study, several different production areas were suggested for the Portuguese coarse earthenware and these arguments were supported by documentary, archaeological and ethnographic evidence. These production areas will be discussed in a subsequent chapter and are relevant to the Newfoundland collections. The Casa do Infante project serves as an excellent base for further ceramic provenience and trade studies. Although extensive, the Casa do Infante publications (and the director, Paulo Dordio) continually argue for the need for further research, both with material culture as well as documentary evidence.

2.1.3 Ria de Aveiro, Aveiro

Ria de Aveiro A is an underwater site located in the river delta of the city of Aveiro. The site was discovered in 1992 and was excavated from 1996 to 2005 in a project run by the Centro Nacional de Arqueologia Náutica e Subaquática (The National Centre for Nautical and Underwater Archaeology - CNANS). The overwhelmingly large collection from this site is kept at the CNANS warehouse in Lisbon. The warehouse also houses the collection from the Ria de Aveiro B site, as well as other sub-aquatic sites from the Aveiro area.

The Ria de Aveiro A site consists of a wrecked transport ship. The wreck was found in the shallow waters of the Aveiro lagoon. Organic remains on the ship were dated and placed the wreck in the mid to late fifteenth century. The size and construction of the ship suggests that it was used for local transportation. Over two dozen ceramic vessel types were found at the wreck site and most were the common coarse fabric earthenware that is now considered to have been locally produced. Organic remains, such as nuts, were also found in quantity (Alves et al. 1998). The excavations were separated into two major phases. The first phase, from 1996 to 1999 concentrated on the recovery of the ship itself and the second phase, from 2000 to 2005 focused on the recovery of the ship's contents. The project produced (and is still producing) comprehensive site reports and the data from the site has been analyzed in several publications, both in English and in Portuguese (Alves et al. 1998; Alves et al. 2001; Bettencourt et al. 2003; Bettencourt et al. 2003a; Bettencourt et al. 2003b; Alves and Rieth 2004; Bettencourt et al. 2005a; Bettencourt et al. 2005b; Bettencourt and Carvalho 2007). The ceramic material is well illustrated and is also accessible. It was most useful to go to the CNANS warehouse and

be able to see complete vessels of all the typological forms that are published in the reports.

This site is extremely significant to post-medieval Portuguese archaeology because it is one of the best preserved vestiges of early modern trade in Portugal. It is also wonderfully applicable to the study of Newfoundland contexts because thousands of complete, locally-produced vessels were recovered, resulting in an accurate and comprehensive typology of Aveiro-type vessel forms and fabrics. The similarities, both in form and fabric, between the Newfoundland ceramics, the Ria de Aveiro A ceramics as well as the Casa do Infante seventeenth-century material demonstrates a continuity in the Aveiro region ceramic production spanning over two hundred years. In the eighteenth century the Aveiro region ceramics begin to undergo major morphological changes (Paulo Dordio 2006, pers. comm.).

2.1.4 Convento de Jesus, Aveiro

The Aveiro regional museum holds a small collection from excavations at the Convento de Jesus. Conveniently, the museum resides in the convent buildings themselves. The excavations were undertaken on a seventeenth- to eighteenth-century kitchen section of the convent (José Cristo 2006, pers. comm.). The collection consists only of complete examples and does not include any cooking vessels. The forms are mostly for serving and for preparation of cold food. The museum has the potential to be extremely important in the provenience studies of Aveiro ceramics due to its proximity and association to a known seventeenth-century pottery *barrio* (neighbourhood) (Isabel Pareda 2006, pers. comm.). This *barrio* was casually excavated a number of years ago,

but no published research resulted from this work. There also has been little archival research on this bairro.

2.1.5 Santa Clara-a-Velha, Coimbra

The Santa Clara-a-Velha site is located across the river from the centre of the city of Coimbra. The site consists of the remains of a Franciscan monastery, which was abandoned in the late seventeenth century due to flooding (Instituto Português do Património Arquitectónico e Arqueológico 2008). The monastery had a long and rich occupation and has yielded an extensive collection which includes a wide range of seventeenth-century ceramics, both locally produced and imported. The collection has excellent examples of all types of the earthenware argued to have been produced in Coimbra, as well as earthenware from other areas in Portugal, including some spectacular examples of fine earthenware from Estremoz (Paulo Dordio 2006, pers. comm.). The site is currently the subject of a major government initiative that is going to result in it becoming a significant part of Portugal's tourism and heritage industry.

2.1.6 Rua Benfornosoz, Lisbon

The archaeology in Lisbon is interesting as well as challenging, thanks to the major disruption of the famous 1755 earthquake. There has been a great number of excavations undertaken in the city and most, if not all, of these sites have locally produced coarse earthenware. One of the significant sites in the city is Rua Benfornosoz.

Rua Benfornoso is a kiln site in Lisbon with a solid seventeenth-century component. It was excavated by archaeologists from the Câmara Municipal de Lisboa. The excavations at Rua Benfornoso have unearthed mostly ceramic wasters, in a wide range of forms. A significant percentage of the ceramic material is glazed. Because most of the vessels were thrown away due to irregularity, the collection must be examined with caution. This being said, the Rua Benfornoso site has yielded a concentrated picture of ceramic production in seventeenth-century Lisbon (António Marques 2006, pers. comm.). As with many early modern sites in Portugal, the amount of ceramic material is overwhelming, and this site suffers greatly from a current lack of examination and research. The examination of the ceramics has been slowly progressing, however, and hopefully a publication will be produced in the near future regarding the site.

2.2 The Newfoundland Collections

2.2.1 Introduction

A variety of collections were examined from Newfoundland (Figure 2.2). It was somewhat difficult to reconcile information from the collections into a pan-Newfoundland survey, due to the wide variation in size, preservation and quality of artifact recording, storage and organization. I quickly realized, however, that there was a distinct pattern of the sherds and vessels in the collections, with the same vessel types and fabrics occurring in most of the collections. The collections that are described here all have seventeenth-century components. A few of them have sixteenth-century components as well as early eighteenth-century components. It must be noted that it was not possible to incorporate all Newfoundland collections with seventeenth-century

components and Portuguese Redware in this study. As stated above, the emergent pattern in the collections in which the same vessels and fabric types occurred repeatedly, made examining all of the collections redundant (especially those that did not have significant vessel finds).

2.2.2 *The Rooms, St. John's*

The provincial museum of Newfoundland, known as the Rooms, holds an excellent collection of Portuguese Redware collected from the Avalon Peninsula. A large portion of this collection is from underwater contexts, from both casual divers as well as more structured, regulated underwater excavations. The beauty of the ceramics in this collection is that many of them are complete, or nearly so. This was a useful collection to utilize for analysis of vessel forms and fabrics and there are a few vessel forms that would be extremely difficult to identify, if they were not complete.

The sites that comprise the collection that I examined at the Rooms include ChAe-09 (Bay Bulls Harbour 2), ChAe-02 (Bay Bulls general collection), CfAf-09 (Kingman's Cove), CgAf-03, CfAf-19 and the *HMS Sapphire* wreck. Although the material in this collection was from a wide range of contexts, the Portuguese Redware was relatively homogeneous in attributes and similar to that found in the Ferryland collection. The Bay Bulls Harbour 2 ceramics may be associated with the *HMS Sapphire* wreck.

HMS Sapphire was an English frigate, which sank in Bay Bulls harbour in 1696. The ship was sent to Newfoundland to protect English interests from French attack.

According to court records regarding the actions of the captain and officers of the

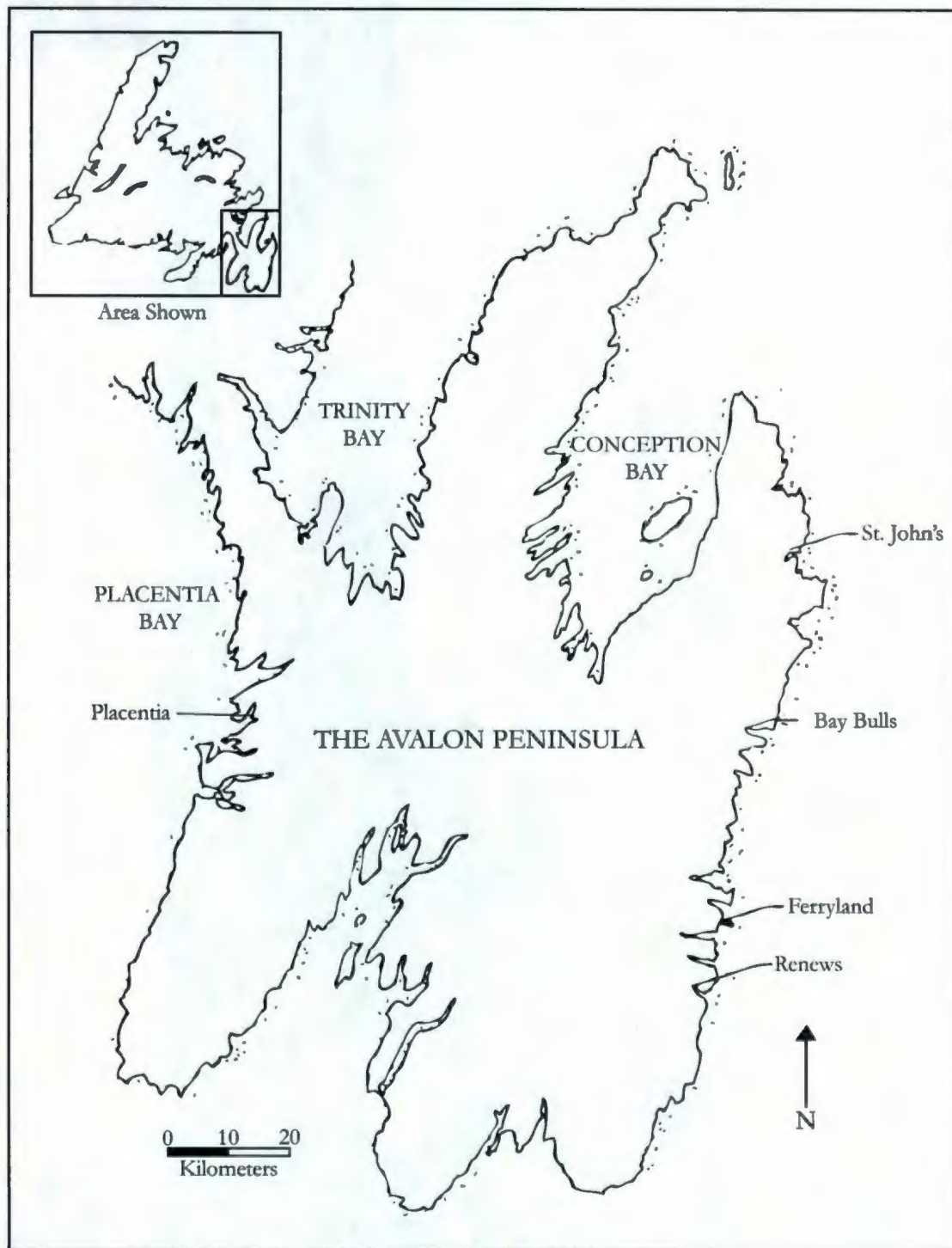


FIGURE 2.2. Map of the Avalon Peninsula, Newfoundland. (Adapted from Pope 1986:

2.)

Saphire, the ship was scuttled after being overwhelmed by a French naval squadron at Bay Bulls (Barber 1977: 306-307). The wreck was initially excavated in 1974 by the Newfoundland Marine Archaeology Society and the excavation was continued by Parks Canada in conjunction with local divers in 1977 (NMAAS 1977a, 1977b, 1997c). Unfortunately, only a limited amount of artifacts from the *Saphire* excavation are in Newfoundland at the present time. Most of the collection is in Parks Canada storage in Ottawa, a collection which I did not have the opportunity to examine directly.

2.2.3 *The Waterfront, St. John's*

327 Water Street (CjAe-08) in St. John's was excavated by Dr. Peter Pope of Memorial University's Archaeology Unit. Testing on the site began in 1993 and continued in 1997. Full excavation of the site occurred over the 1998 and 2000 field seasons of Dr. Pope's Waterfront project (Pope 1998, Pope 2003). There were several other sites tested and excavated during the Waterfront project, however, CjAe-08 was the most relevant for the study of Portuguese Redware.

The site has material dating from the sixteenth century through the nineteenth century and undisturbed contexts dating from the mid-seventeenth century. There were a variety of occupations on the site, ranging from migratory fishermen in the sixteenth and early seventeenth centuries, to a prosperous late seventeenth-century (fishing) plantation, followed by merchant occupations into the nineteenth century (Pope 2003). Portuguese Redware occurs in reliably identified seventeenth-century contexts, as well as occurring in a higher than normal percentage in a pebble beach which was sealed at the end of the

seventeenth century by harbour in-filling (Pope 2003: 10). Pope has argued that this may be evidence of a sixteenth-century Portuguese presence at the site. This hypothesis will be discussed in a latter chapter.

The St. John's waterfront yielded two more excavations, CjAe-53 (Ilhavo Park) and CjAe-15 (New Fort) which have a number of Portuguese Redware sherds in their collections. These excavations unearthed contexts from the late 1690s to the early 1700s and provide an example of Portuguese Redware occurring on English sites around St. John's at the end of the seventeenth century and early eighteenth century (Pope 1995; Mills and Tuck 2004).

2.2.4 *Renews*

In 1993 and 1994 a seventeenth-century planters' house was excavated by Stephen Mills. This site yielded over 15,000 artifacts, including a range of coarse earthenware associated with the house. The house was occupied from approximately 1660 to 1680 and was occupied year-round in this period (Mills 2000; Mills 2006: 158-159). As could be predicted, the Portuguese Redware assemblage from *Renews* is similar to that of *Ferryland*. Notably, a reconstructable and delicate small *cântaro* was recovered and is currently on display at the Rooms. Mills has suggested, from examination of the artifact assemblage, that the occupants of this house may have been participating in the alcohol trade. He argues that over 25 percent of the ceramic, glass and pewter artifacts are related to beverage consumption and this could suggest association with a tippling house (Mills 2006: 161).

2.2.5 Castle Hill, Vieux Fort (Mount Pleasant) (ChAl-04) and New Fort (ChAl-09), Placentia

There have been three significant sites with seventeenth-century contexts excavated in Placentia, Newfoundland. All three of these sites have English as well as French components. Castle Hill (18M36P7) was excavated by Roger Grange of Parks Canada in the 1960s. The Vieux Fort (ChAl-04) was excavated recently as part of Amanda Crompton's PhD research. The New Fort (ChAl-09) was excavated under the direction of Stephen Mills in 2006 and 2007.

Placentia (known in French as Plaisance) was a French colony from the mid-seventeenth century to the beginning of the 1700s. In 1713 it was taken over by the English by the Treaty of Utrecht. Placentia was fortified in several areas. The Vieux Fort was initially occupied in 1662 and eventually fell into disuse when construction on the Castle Hill redoubt began in 1693 (Grange 1971: 64). All three of these sites have French, English and mixed contexts. The New Fort produced, unusually, very few artifacts, likely due to the extensive rebuilding when the English gained possession (Stephen Mills 2007, pers. comm.). Portuguese Redware is found in English and mixed contexts on these sites. What is more interesting, however, is that Portuguese Redware is also found in French contexts in Placentia, ranging from the last half of the seventeenth century. The Portuguese material represents a smaller fraction in the French contexts than in contemporary English contexts, however, its presence is significant. Although some of these sherds were excavated in the 1960s, they were not recognized as Portuguese until recently, due to misidentification in the original site report. Luckily

Amanda Crompton and Stephen Mills are both familiar with Portuguese Redware and were able to reliably identify it in their respective excavations.

2.2.6 Ferryland (CgAf-02)

The Colony of Avalon (CgAf-02) at Ferryland was an English colony which prospered in the seventeenth century under the governance of a series of wealthy planters. The area was utilized by migratory fishers from the mid-sixteenth century onwards. A colony was founded in 1621 by Sir George Calvert, who abandoned the settlement in the late 1620s. Sir David Kirke and his family took over the colony in 1638. The colony flourished through the seventeenth century, as attested by the amazing range of material goods left behind. The colony left behind a range of permanent structures, including a cobblestone street, a brewhouse/bakery, a forge and a stone mansion house (Tuck and Gaulton 2003). By the 1670s, there were about a dozen planter households in the colony (Pope 2004:7). In 1696 the Colony of Avalon was destroyed by the French. Ferryland was resettled, but did not regain in the eighteenth century the prominence it held in the seventeenth century (Tuck and Gaulton 2003).

Extensive excavations have been ongoing at Ferryland under the direction of Dr. James Tuck and Dr. Barry Gaulton for over twenty years. Dr. Tuck initially tested the site in the 1960s, but it was not until 1984 that formal excavation began. The first block of work occurred in 1984-1986. A second block of work began in 1992 and has been continued each season until the present (Tuck 1993; Tuck 1996; Tuck and Gaulton 2003). The project has uncovered hundreds of thousands of artifacts, including over 9000 sherds of Portuguese Redware.

Ferryland is distinguished from the other Newfoundland collections included in this study due to its sheer size and richness. The amount of Portuguese material available allowed for a pattern of vessel types and fabrics to emerge which was applicable to other sites. Ferryland does have some unusual Portuguese material, as well, such as the fine red earthenware, called by some Newfoundland archaeologists “terra sigillata” (Baart 1992). Portuguese fine earthenware is rare outside of Portugal, and its presence in Ferryland signifies not only the connections between the markets in Portugal and that particular Newfoundland harbour, but also the wealth of an important planter (Gaulton and Mathias 1998; Tuck and Gaulton 2002; Tuck and Gaulton 2003). This fine Portuguese earthenware is not seen in any other North American collection. The Ferryland collection also includes a higher than normal amount of Portuguese faiança from the mid-1600s, again demonstrating the trading ties between Newfoundland and Portugal (Stoddart 2000).

Chapter 3

Historiography of the Ware

3.1 Introduction

There has been a general paucity of research concerning Portuguese produced coarse earthenware. This lack of research spans not only English sources, but sources in other languages, including sources coming out of Portugal. There are many reasons for this, but mainly it stems from the appallingly small amount of communication between Portuguese and English archaeologists and the overall lack of past research and interest on early modern coarse earthenware in Portugal. Portugal has been yielding wonderful archaeological ceramic collections for many years now and the focus of research there has been on the fancier or older wares. Faiença, fine earthenware, Roman and prehistoric pottery have all been relatively well studied in the area (Michaëlis de Vaconcellos 1988). It has only been in the last few years that interest has been focused on the coarse historical earthenware; wares that form huge percentages of the ceramic assemblages in sites across the country (Resende 1986; Sardinha 1990; Rego 1993; Catarino 1995; Diogo et al. 1995; Real et al. 1995; Silva 1996; Gaspar et al. 1997; Alves et al. 1998; Barreira et al. 1998; Osório et al. 1998; Teixeira 1998; Castro et al. 1999; Alves et al. 2001; Bettencourt et al. 2003; Bettencourt et al. 2003a; Bettencourt et al. 2003b; Sousa et al. 2003; Alves and Rieth 2004; Sousa 2004; Bettencourt et al. 2005a; Bettencourt et al. 2005b; Bettencourt and Carvalho 2007; Sousa 2007). This interest has been spurred by the discovery of sites unbelievably rich in early modern coarse earthenware, such as Casa do Infante in Porto, Rua Benfornosoz in Lisbon and Ria de Aveiro A in Aveiro as well as

the increasing knowledge that Portuguese coarse earthenware was an important export to many parts of the world in the sixteenth and seventeenth centuries (Teixeira 1998; Alves et al. 2001). The emerging interest in studying early modern Portuguese coarse earthenware encompasses the four main types; red, black, brown and glazed, as these are often found intermixed archaeologically. However, the research is still new and the amount of work that has actually reached the publication stage is still very small. Most of the work and knowledge surrounding Portuguese coarse earthenware in Portugal is still in the notes of various hardworking archaeologists around the country. I was surprised at the depth of information many of these researchers had on the coarse earthenware and am grateful that all who I talked to were more than willing to share the information with me. The depth of knowledge comes from the sheer amount of material these archaeologists encounter at each site they excavate, plus the fact that coarse earthenware has been continually produced in Portugal since at least medieval times and a few the forms that were seen in the seventeenth century are still in use today (Paulo Dordio 2006, pers. comm.; Claudio Brochado 2006, pers. comm.). Extensive production of traditional forms only ceased in the early twentieth century and still carries on, albeit in a lessened amount. The Portuguese still use coarse earthenware in their kitchens and a lucrative industry has developed for the sale of locally produced earthenware to tourists, especially in centres such as Barcelos (Claudio Brochado 2006, pers. comm.). This chapter will discuss the historiography of both the Portuguese and English research surrounding early modern Portuguese coarse earthenware.

3.2 *The Portuguese Works*

There has been some initial typological work conducted on archaeological coarse earthenware in Portugal. This work is in addition to the typologies constructed for ethnographic collections (Claudio Brochado 2006, pers. comm.; Claudia Mihazaz 2006, pers. comm.). The ethnographic studies into coarse earthenware have focused on nineteenth- and twentieth-century productions and are not necessarily applicable to collections of seventeenth-century materials, although they are a useful base for further typological classification (Claudio Brochado 2006, pers. comm.). There have been several sources published in Portuguese regarding archaeological coarse earthenware, but many of these sources have only cursory descriptions and scant illustration, generally focusing on either *faiença* or fine earthenware, with the coarser wares merely being mentioned briefly. A discussion of the fine earthenware was written in the early part of the twentieth century and republished in 1988. This source, “Algumas palavras a respeito de *púcaros* de Portugal”, is one of the first treatises on early modern ceramics in Portugal, but focuses on *púcaros*, or fine ware, rather than coarse earthenware (Michaëlis de Vaconcellos 1988). Two main projects have yielded publications with comprehensive typologies and discussions of archaeological coarse earthenware. These projects are the CNANS excavations in Aveiro and Casa do Infante in Porto. There have been several other smaller publications and projects that have yielded vessel drawings and descriptions for early modern Portuguese earthenware, however, these publications/projects have not attempted comprehensive typologies. There has also been at least one typology constructed for medieval earthenware in Lisbon (Gaspar and Amaro 1997).

The Ria de Aveiro sites have both had several reports and articles published about them. Dr. Francisco Alves and his team at CNANS have put in an admirable effort, designing and illustrating an applicable typology to classify the many forms that are occurring at these sites (Alves et al. 1998; Alves et al. 2001; Bettencourt et al. 2003a; Bettencourt et al. 2003b; Alves and Rieth 2004; Bettencourt et al. 2005a; Bettencourt et al. 2005b; Bettencourt and Carvalho 2007). The sites are pre-seventeenth century. However, most of the forms are applicable to seventeenth-century contexts (Patrícia Carvalho and José Bettencourt 2006, pers. comm.; Paulo Dordio 2006, pers. comm., Isabel Pareda 2006, pers. comm.; Gutiérrez 2007). The forms are well illustrated and described clearly. In typical Portuguese fashion, the forms are not classified by use (like Beaudry's POTS typology) but rather separated into "open forms" (*formas abertas*) and "closed forms" (*formas fechadas*) (Beaudry et al. 1983; Alves et al. 2003: 21-22). Each typological form is illustrated with several different examples and suggestions as to use are made along with a detailed written description. Along with the red coarse earthenware type, there is also a small amount of the black type, as the black and red types are commonly found in the same contexts in Portugal. Because of the luxury of being based on several thousand complete vessels, this typology is very accurate in its illustration of forms. The source of production for the earthenware in these collections has been argued to be Aveiro. However, there has been no further extensive work undertaken in exploring the sources of these ceramics (Patrícia Carvalho 2006, pers. comm.). The Ria de Aveiro publications and reports are focused mainly on the description of the artifacts found and the excavations, rather than more complex theories regarding the site formation and greater social contexts. The archaeologists at CNANS

are very enthusiastic about furthering the context knowledge of these sites, however, and there is some archival work in progress that should expose more information about specific production sites and the reasons behind the production (Patrícia Carvalho 2006, pers. comm.). Inês Amorim (1996) and António Manuel Silva (1996) have both undertaken archival work examining documents related to the production and trade of the ceramics of the Aveiro region beginning in the eighteenth century onwards. This archival research has argued that there was a complex system of regulation, taxation and trade related to Aveiro production of *louça vermelha* (redware) in the eighteenth and nineteenth centuries. Olga Bettencourt has suggested that Aveiro began marketing their ceramics outside of the region beginning in the sixteenth century (Bettencourt 1995: 185-186). With further work, it should be possible to expand this knowledge of the ceramic trade associated with Aveiro in the sixteenth and seventeenth centuries.

The second site which has yielded some serious publication and analysis of the coarse earthenware is the Casa do Infante site in Porto. This site is an excellent comparison base for Newfoundland collections because it not only contains a seventeenth-century component, but is also located in a port with a long and well documented trade with Newfoundland. Furthermore, the excavation of the site was directed by an archaeologist, Paulo Dordio, who has an active interest in post-medieval coarse earthenware, something which is rather rare in the Portuguese archaeological community.

The researchers from Casa do Infante have constructed a typology of early modern Portuguese ceramics utilizing over 50,000 sherds (Barreira et al. 1998; Teixeira and Dordio 1998). The typology includes *faiença* and all the types of Portuguese coarse

earthenware: the red, the brown, the black and the glazed. The typology is sectioned first by ware type, then vessel type and then by deposit (which roughly corresponds to periods of the sixteenth and seventeenth centuries). Within each broad vessel type, examples of different vessel sub-types are illustrated. Although it has been argued that a pan-Portuguese vessel classification nomenclature has not been developed thus far, the vessel descriptions and names utilized by the Casa do Infante researchers are very similar to those utilized by CNANS. The Casa do Infante project also performed preliminary fabric analysis and fabric categorization by chemical, visual and geological attributes (Castro et al. 1999). Through this research, the Casa do Infante publications present several possible production locations for the various ware types, including broad geographical ranges for the production of each type.

The main problem with the Casa do Infante work is that it is not complete. The ceramic analysis project, although extensive, was not fully comprehensive. The project merely began the analysis; constructing a foundation of knowledge for further work in the future. Each published article ends with an acknowledgement of this. The huge scale of the project limited the depth of information which was possible to glean from the ceramics. The Casa do Infante work is also limited in distribution to the greater archaeological community because it has been published only in Portuguese. At the time of writing, there are no immediate plans to continue work on the Casa do Infante material, mostly due to a lack of researchers willing or able to continue the work (Paulo Dordio 2006, pers. comm.). It is hoped that the work undertaken for this thesis will spur some further provenance analysis of the Casa do Infante material.

There have been a few other publications focused, or partially focused, on the early modern Portuguese coarse earthenware. Élvio Sousa's work on ceramics from sites in Madeira has included some solid basic analyses of Portuguese Redware. He has suggested that some of these ceramics were produced in Madeira kilns, however, it is possible that ceramics were also imported from mainland Portugal (Sousa 2004; Sousa et al. 2003; Sousa 2007). Sousa's latest publication on Madeira ceramics includes a small typology of the unglazed and glazed Portuguese coarse earthenware found. The typology consists of an uncomplicated description of the vessel form, suggested use, etc, coupled with a drawing and, in most cases, a photograph (Sousa 2007). There is also a short discussion of ceramic production, usage and trade associated with Madeira. Like the previous sources discussed, these publications do not have a great depth of discussion, and this is due to them being the first publications to discuss these wares in Madeira, thereby starting with a completely blank slate. They present a foundation for further work.

Finally, there is a massive amount of material that has been excavated in Portugal, but not yet analyzed, let alone published. This material includes ceramics from the Rua Benfornos site in Lisbon (along with many other Lisbon sites). However, as a base of knowledge and publication builds up on Portuguese coarse earthenwares, it should facilitate further research into these collections.

3.3 The English Works

English research on Portuguese coarse earthenwares has developed almost entirely without Portuguese input, for contact between Portuguese and English archaeologists

regarding this ceramic type has been limited. Sometimes the information available to English researchers has either been disregarded, or under-utilized. Therefore, the historiography of these sources will be discussed in isolation from the Portuguese sources.

British work on Portuguese Redware begins with John Hurst in the 1960s. He erroneously named the red micaceous ceramic “Merida ware” after being told by Spanish colleagues the ware had been manufactured in Merida, Spain. In the 1970s, after more research, he discovered what he thought was a production centre for the ware in the Alto Alentejo region of Portugal (Hurst et al. 1986). He proposed a new name for the ware in a subsequent publication (Hurst et al. 1986; Gutiérrez 2000: 74-75). This new name was “Merida-Type Ware”. “Merida” was not dropped from the label as “Merida-ware” was already a well used name for the ceramic. “Merida-type” reflected the uncertainty of the ware’s provenance. Unfortunately due to the lack of knowledge about the ware, the “Merida-type” label has become firmly entrenched in the ware descriptions from collections in Europe and the New World. Hurst’s initial publications on the ware were also flawed, in that they combined several distinct wares under one category. As more information becomes available about Portuguese coarse earthenware, this initial categorization of all the wares under one label will become irrelevant. In spite of its flaws, however, Hurst’s initial research on Portuguese coarse earthenware has been useful as it began the formal recognition of the material in English historical collections. John Hurst was a hugely influential ceramic expert and effectively began British research and recognition of coarse earthenwares coming from Portugal.

Hurst's initial research was quickly expanded on by Colin Martin in 1979. Martin published an article on Spanish Armada pottery that described both glazed and unglazed coarse earthenware which he attributed to Portuguese production areas. He acknowledged and utilized Hurst's "Merida-type" label but asserted that the "Armada 'Mérida-types' were almost certainly manufactured in or close to Lisbon" (Martin 1979: 291). This assertion results from the Armada ships' presence and supply which occurred in Lisbon as well as his recognition that the "Merida-type" ceramics appear to be absent from "Seville-based contexts in the Americas", but are present in Portuguese colonial contexts, not only in the New World, but also in Africa (Martin 1979: 293). Seville was a major supply port for Armada ships. In the 1970s, publications concerning Fort Jesus in Mombassa, Kenya, which was a long-occupied Portuguese colonial outpost, were producing illustrations of unidentified Portuguese coarse earthenware which were very similar to the types which were outlined by Hurst and Martin (Kirkman 1974, Sassoon 1981).

Martin described two distinct Portuguese coarse earthenware types in the Spanish Armada collection. He calls the unglazed red micaceous earthenware "Mérida-type" but separates the glazed versions of this ware into a different type, unlike Hurst, who lumps glazed and unglazed ceramics under the same label. Martin justifies this separation through decorative applications (glazed versus unglazed), form differences (there are jug and plate forms that are not present in the unglazed type) and manufacturing techniques. The Martin paper is exceptional in the fact that it outlines specific manufacturing techniques for the ware types, which are easily visible when examining collections of Portuguese coarse earthenware. Although Martin separates the glazed and unglazed

ceramics into distinct ware types, he notes that the petrographic composition of the types are very similar and therefore could have been produced in the same area, which he suggests is likely near or in Lisbon (Martin 1979: 291, 293, 299-301). Unfortunately most subsequent English publications on these wares barely acknowledge Martin's apt observations and rely heavily on the erroneous provenance information laid out in the Hurst publications.

Alejandra Gutiérrez published an excellent thesis in 2000 which contains a section on Portuguese ceramics which has become one of the main cited sources when describing Portuguese coarse earthenware (Gutiérrez 2000). The material that she used for her thesis came from a variety of medieval English sites in Wessex. Unfortunately the descriptions suffer from the same fundamental flaw as Hurst's earlier publications. There are several different ware types included under the "Merida-type" label. She has combined, like Hurst, the very fine earthenware with the coarse earthenware, which is an artificial combination which does not occur in Portugal. She adds to Hurst's commentary on these wares by describing the fine type as "*púcaros*", which is the correct Portuguese term for the very fine wares produced in Estremoz. She also recognizes that the black earthenware is a different type from the red earthenware, both in production, distribution and forms (Gutiérrez 2000: 79). Gutiérrez notes several different possible production areas for Portuguese Redware, expanding on the argument of an Alto Alentejo-based production. She describes production areas being located in Coimbra, Prado and Ovar as well as Lisbon. However, she argues that the main production centres for Portuguese Redware were in the Alto Alentejo (Gutiérrez 2000: 76). She has some accurate illustrations of the typical forms found, including some illustrations of Portuguese-produced olive jars. She

makes no attempt, however, to utilize Portuguese names for any of the forms, relying instead on a combination of Spanish and English terminology.

Thanks to Hurst's initial identification, Portuguese Redware has been consistently recognized in Britain. However, the identifications are often confused, due to the range of variation that is inherent with the "Merida-type" label. Because the label can include both the fine and coarse red earthenware types, not to mention the brown, black and glazed types, a bizarre diversity of vessel forms and fabrics is possible. Likely adding to this confusion is the probable presence of fine and semi-fine red earthenwares which were produced in many areas in Portugal (such as Coimbra), which may have been copies of the very fine Estremoz-produced *púcaros* (Paulo Dordio 2006, pers. comm.).

Duncan Brown argues in his 2002 book on medieval pottery in Southampton that greater precision is needed in discussion of Portuguese coarse earthenware. His collections range in date from the eleventh to sixteenth centuries. His "Merida-type" identifications, which he has thoughtfully renamed "Iberian Micaceous Redwares" encompass the redware as well as the glazed ware. Within these types, he separates ten different fabrics (Brown 2002: 38-39). It is unclear if he had the black or brown types of Portuguese coarse earthenware in his collections and purposely did not include them under the "Merida-type" label or, as in many other non-Portuguese collections, the black and brown types did not commonly occur. Brown also recognizes the presence of probable Portuguese-produced olive jars. Gutiérrez recently (2007) published an article on the Southampton Portuguese coarsewares from sixteenth and seventeenth century contexts. Although she begins the article with the statement that "Merida-type ware is a misnomer..." she continues to use the name to describe Portuguese Redware throughout

for lack of a generally accepted alternative in English (Gutiérrez 2007: 64). She still argues that the production area for the Portuguese Redware found in England is in the Alto Alentejo, although she presents no evidence of this. She quotes, to the contrary, a document in her discussion of the pottery trade which mentions earthenware arriving from Aveiro in 1584 (Gutiérrez 2007: 74). Current research in Portugal suggests that Aveiro was, in fact, a pottery production area. The document Gutiérrez quotes may suggest that the pottery arrived from Aveiro, because it was produced in the area, rather than across the country in the Alto Alentejo. She does cite Portuguese sources which discuss material from the Alto Alentejo region, but does not consider other production zones, save for a couple of sources regarding the Ria de Aveiro sites, which she uses to talk about the pottery trade, but not production areas or vessel forms. She does not consider coarse earthenware production areas to the north west of Portugal.

Although Gutiérrez's descriptions and figures of the Portuguese Redware from Southampton are more precise than those offered in previous discussions, frustratingly she continues to utilize a mixture of Spanish and English terms to describe the forms. She includes a handful of Portuguese sources which contain more appropriate names for the forms, but disregards the Portuguese naming conventions. She also continues to confuse vessel types and lump several distinct vessel forms under the same type. The main value in Gutiérrez's article is her discussion of the factors behind the trade of Portuguese coarse earthenware to England. She discusses some of the reasons affecting the consumption of the ware, as well as the attributes of the ceramics and the contents they so often contained, which would result in their appearance in English sites. She also

briefly discusses the presence of Portuguese sugar moulds at Southampton, which is a new avenue of research regarding Portuguese coarsewares in England.

Due to the great amount of trade occurring in the region, Devon, England has yielded some excellent collections of Portuguese ceramics. John Allan and James Barber, as well as Peter Pope, argue that Plymouth was one part of the triangle trade between Newfoundland, Iberia and England (Allan and Barber 1992; Pope 2004). Allan and Barber acknowledge the roles of Lisbon, Porto and Aveiro in the trade that was associated with Plymouth in the seventeenth century. They state that there is a strong bias in post-medieval finds in Plymouth sites towards Iberian ceramics, particularly those from Portugal. In some contexts, Portuguese earthenware outnumbers all other ceramic types combined (Allan and Barber 1992: 226-229). There has not been a great deal of published further research on these ceramics, save for describing them. Portuguese ware also makes up a portion of the imported pottery at post-medieval sites in Exeter, although to a lesser degree (Allan 1984: 109-111). D.F. Williams did an initial petrographic study of the Portuguese coarse earthenware from Plymouth and Exeter (Williams 1982). He observed differences between the examples he had examined from Exeter and Plymouth and suggested that the ceramics were likely made in a variety of places, rather than coming from one source. He suggests that one of these production areas could be around Lisbon, as some of the Exeter sherds matched visually to the sherds that Martin examined from two Armada ships (Martin 1979; Williams 1979; Williams 1982). This study was only preliminary, however, and ends with the call for further study of the ware.

In Belgium, Johan Veeckman has identified the presence of Portuguese ceramics from several different sites (Veeckman 1994). He acknowledges the great degree of

variety that can occur in wares labeled “Merida-type”. The vessels he discusses mostly fall into the fine red earthenware category. Jan Baart also discusses the fine Portuguese red earthenware that has been found in Dutch contexts (Baart 1992). This categorization of the fine red earthenware as “Merida-type” wares is misleading, especially for someone familiar with the Portuguese categorization of their earthenware, which delineates fine and coarse earthenware as distinctly different types. Jan Baart began calling the very fine, Estremoz-produced earthenware “terra sigillata” in order to distinguish the fine from the coarse. The “terra sigillata” label has also been adopted to describe Portuguese fine red earthenware in Newfoundland (Gaulton and Mathias 1998; Tuck and Gaulton 2002). However this label is almost as misleading as the “Merida-type” label. Early modern Estremoz-produced fine red earthenware is not related to Roman productions, nor is it morphologically that similar to Roman terra sigillata. In Portuguese, the fine red earthenware is often referred to as *púcaros* or simply fine earthenware. A name related to the Portuguese name should be adopted for the fine red earthenware, although this is an argument which is beyond the scope of this thesis. A major difficulty with the description of the fine and coarse earthenware, especially with the use of the “Merida-type” label is that the fundamental differences between the wares are not described well, or not acknowledged at all. This is a problem because there are fine wares produced outside of Estremoz which are somewhat similar in fabric and vessel forms to the true fine Estremoz wares, but of different production quality. These fine wares can appear very fine in the absence of comparison to the Estremoz wares, but are of a lower quality. With the umbrella “Merida-type” label these, sometimes subtle, differences in vessel quality are missed and inferences for production area (and perhaps acquisition area) can be erroneous

by entire regions. The significance of the consumption of lower quality prestige wares is something that should be examined. A book which discusses Portuguese fine earthenware in both European and New World contexts is currently being compiled and it is hoped that the issue of variance in the wares (both in quality, production and consumption) will be broached (Paulo Dordio 2006, pers. comm.).

Portuguese Redware has been identified in many sixteenth- and seventeenth-century New World and Atlantic contexts. Mitchell Marken discusses “Merida-type” wares on Spanish shipwrecks in the Atlantic, particularly in Caribbean contexts (Marken 1994). The forms that he illustrates are of the Portuguese Redware type. He separates the glazed from the unglazed and argues that there are enough differences in paste type to warrant several subtypes under the “Merida-type” label. Marken retains Martin’s earlier argument that the Armada was supplied Portuguese ceramics via Lisbon kilns (Marken 1994: 188).

Kathleen Deagan also describes Portuguese Redware in Caribbean contexts, however she has relabeled the ware as “orange micaceous ware”. She notes that the ware is very similar to the “Merida-type”, but seems to utilize a new name in order to define a specific fabric, rather than a broad category (Deagan 1987: 40-41). This new name may have been picked due to the inclusion of fine wares into the “Merida-type” category, which the orange micaceous ware is certainly not. Orange micaceous ware is most definitely Portuguese Redware, judging by the descriptions and photos of the ware that have been published. One of the photos in the 1987 *Artifacts of the Spanish Colonies of Florida and the Caribbean* illustrates a typical Portuguese Redware form, a *púcaro* (a confusing vessel form name, describing a small handled vessel, not the fine ware)

(Deagan 1987: 40-41). According to Deagan, Portuguese Redware is found fairly regularly in sixteenth- and seventeenth-century Caribbean and Florida contexts (Deagan 1987: 40-41).

An honours thesis by Rhonda Cranfill on St. Mary's City, in Maryland described some preliminary geological analysis on the orange micaceous wares found there. The data acquired resulted in the classification of the orange micaceous wares as "Merida-type", but no in-depth research was conducted as to the actual production provenance of the sherds. The thesis is useful for the fact that it confirms the St. Mary's City orange micaceous sherds as likely Portuguese Redware (Cranfill 2004).

In Newfoundland, "Merida-type" wares were first identified by Peter Pope (Pope 1986). Newfoundland "Merida-type" identifications generally coincide with Portuguese Redware, as the black and brown types have yet to be confirmed on the island and the fine wares, which occur at the Ferryland site, have been identified as a separate ware (Gaulton and Mathias 1998; Tuck and Gaulton 2002). Portuguese Redware is consistently identified in sixteenth-, seventeenth- and early eighteenth-century contexts (Pope 1995; Pope 1999; Mills 2000; Crompton 2001; Pope 2003c; Tuck and Gaulton 2003; Mills and Tuck 2004). The vessel forms descriptions have been relatively inaccurate, and this is partly due to the high level of fragmentation occurring in most of the island collections, as well as the lack of reconstruction being undertaken for Portuguese Redware vessels. This thesis is the first serious attempt at identifying production provenances as well as at constructing a comprehensive typology for Portuguese Redware occurring in Newfoundland. For the most part, the production areas for the ceramic have been vaguely described at best and the vessel forms have been

described using English designations. The problem with using English labels for Portuguese forms is when forms occur in the Portuguese pottery which do not have a good equivalent in the English terminology.

There has been some previous concentrated work on Portuguese ceramics in Newfoundland undertaken by Eleanor Stoddart, who wrote a thesis on the tin-glaze earthenware found at Ferryland (Stoddart 2000). She discovered a high percentage of Portuguese *faiença* and was able to travel to Portugal to expand her research. Unfortunately she did not bring back much information about the coarse earthenware that disseminated into the general knowledge of Newfoundland archaeologists. She did, however, take a productive step by utilizing some Portuguese terms to describe the Portuguese ware. She also brought attention to the relatively large amount of Portuguese ceramics and the definite connection between Portuguese markets and the Newfoundland cod trade.

There has been slightly more concentrated work on Portuguese *faiença* in the New World than Portuguese Redware, and this is to be expected due to the greater general interest in *faiença* than coarse earthenware. Steven Pendery wrote a very good article in 1999 which made a concerted effort to utilize Portuguese labels for *faiença* vessels occurring in seventeenth-century sites in New England (Pendery 1999). His utilization of the Portuguese names for vessel forms is rather unusual among archaeologists in the English-speaking world, who, as noted above, are often more comfortable utilizing established Spanish names for Portuguese vessels, or by using exclusively English labels. This thesis will attempt to expand on the utilization of Portuguese vessel form names as this will lead to a greater accuracy and clarity in description.

3.4 Conclusion

Although Portuguese Redware has been identified in the archaeological record for over 30 years, the English discussions of the ceramic have been generally superficial and vague. Solid production areas have not been readily identified, or worse, have been inaccurately identified. Portuguese ceramics have been described using a broad categorization, "Merida-type", which has lead to confusion as to what exactly entails Portuguese produced fabrics and vessel forms. This thesis, like several earlier publications calls for a greater degree of accuracy and clarity in the description and classification of early modern Portuguese earthenware, particularly when dealing with the coarse red type, herein named Portuguese Redware. The research here has synthesized the relatively short list of Portuguese-language sources concerning Portuguese Redware as well as information gained from talking to Portuguese archaeologists directly about the ware in order to construct a comprehensive typology and fabric descriptions which occur in Portuguese Redware found in Newfoundland. It is acknowledged, however, that the research here will merely form a foundation for further research into the ware and it is hoped that more research will be undertaken on Portuguese Redware in the New World in the future.

Chapter 4

Methodology

4.1 Introduction

This project began in response to the seemingly simple challenge of quantifying the quantities, types and distributions of Portuguese earthenware at several different sites in Newfoundland. Portuguese Redware had been initially identified in the Newfoundland archaeological record by Peter Pope in his master's thesis on the ceramics at Ferryland (Pope 1986). From this time onwards, historical archaeologists in Newfoundland have consistently recognized Portuguese Redware as a potential ceramic in sixteenth- and seventeenth-century archaeological contexts. The ware has been regularly identified by people processing historical collections on the island. Such frequent identification has lead to a belief that the ware has been consistently and correctly identified. However, consistency and correctness are two things that the identifications often lack. There are inconsistencies in the identification of Portuguese Redware between sites, between excavation seasons and sometimes between cataloguers. The fault for these inconsistencies does not lie with the people identifying the ceramics, but rather with sources that they are utilizing for identification criteria. As the research into Portuguese Redware expanded, I discovered that the sources being utilized for identification were lacking both a comprehensive set of potential fabrics as well as a correct, complete vessel typology for potential forms. It is very difficult to correctly identify forms from fragmented sherds if one does not know the range of potential vessel types. It was at this point of the research process, as the full potential range of fabric and vessel types dawned on me, that the aim of this project shifted from a precise quantification and discussion of

the identified Portuguese Redware to an overview of the forms and fabrics found on the island, augmented with a discussion of other potentially occurring forms and fabrics. The descriptions of the potential forms and fabrics is important, as it will facilitate greater accuracy in subsequent identifications of Portuguese Redware. It is hoped that this thesis can serve as a guide for future identification.

4.2 Research in Portugal

I made a research trip to Portugal in the Fall of 2006. The work overseas involved examining hundreds of examples of Portuguese Redware vessels from over twenty different sites in Portugal. The research also involved gathering Portuguese-language sources on locally produced coarse earthenware and meeting with many archaeologists and curators who have worked with the material. I took extensive notes and photographs and continued contacts with the Portuguese archaeologists have greatly facilitated my identification of these ceramics in Newfoundland. I was able to bring a selection of diagnostic, seventeenth-century sherds back to Canada for direct comparison to sherds found in Newfoundland, these adding to the sherds we had in our reference collection from Portugal that were given by Paulo Dordio in 2005.

4.3 Sampling

Working with a pan-Newfoundland context, it was entirely beyond the scope of an MA project to re-analyze all of the Portuguese Redware sherds that have been identified. Ferryland alone presented over 9000 sherds identified as “Merida”, with the potential for

more to be found among those labeled as “unknown”. Therefore, the collections were sampled.

I began my sampling of most collections by examining the artifact record database entries. Entries that contained sherds that were deemed diagnostic, either by form or by manufacturing or finishing technique, were sorted by event or stratum in order to get an impression of levels that contained higher percentages of diagnostic sherds. At the beginning of the project, this was the stage where attempts were made to locate the diagnostic sherds from the database in the collections. At this point, I noticed that the consistency and correctness of the sherd descriptions were often fallible. This is not a problem affecting one specific collection, but rather an overarching issue with the way archaeologists in Newfoundland are identifying and describing Portuguese Redware. Attempting to locate sherds solely through database records quickly became a frustrating exercise in the critique of artifact recording practices. Locating diagnostic sherds by visual inspection of the collections deemed to be more reliable, particularly after the research work in Portugal.

My visual inspections of the sherds were guided by sorting diagnostic sherd records in the databases (therefore highlighting strata and areas with a higher potential for applicable material) and also by the archaeologists who had excavated the material as well as the people who had processed the sherds. Sherds were chosen for diagnostic quality and for the diversity of form and fabric. The importance of specific archaeological context was lessened through this sampling strategy, as it was examining late sixteenth- through early eighteenth-century contexts in a general rather than specific sense. With this more general strategy, the research was able to incorporate collections

that were poorly provenienced, but were rich in form and fabric diversity. If solely one site was utilized for this research, then specific event contexts, et cetera, would have been much more important in order to associate the sherds with different areas of the site. However, since the aim of the research was to present an overview of potentially occurring Portuguese Redware forms and fabrics in a pan-Newfoundland context, a sampling strategy focused on diagnostic quality and form and fabric diversity with lessened emphasis on specific archaeological context was more applicable.

4.4 Sherd Recording

I examined the diagnostic sherds used for the research closely. Fabric characteristics, vessel forms, manufacturing and finishing techniques were recorded. Sherds that illustrated specific form, fabric or finishing techniques were photographed. I recorded many sherds of each form, fabric and finishing technique in order to demonstrate the range of variation within each category. Careful attention was paid to lighting and camera settings when the sherds were photographed so that these photos could be reliably compared to photos taken in Portugal. I often corrected the colour balance afterwards digitally so that the photos were accurately representing the reality of the sherds. Sample sherds from Portugal were also photographed.

Sherds that I felt best demonstrated fabric types, including the samples from Portugal, were also photographed using a Nikon SM2800 digital camera/microscope apparatus. Sherds from specific forms also had their fabrics photographed. All sherds were photographed under 10X magnification. A selection of these sherds were also photographed under 20X magnification. Two high intensity lights were used in lieu of

the camera flash and this produced results which reliably represented the ceramic fabric. Depending on the characteristics of the sherd, either the edge or surface were photographed. In most cases if the surface was photographed, a picture of the edge was also taken. The Nikon SM2800 proved to be an excellent tool for the close examination of the ceramic fabrics. The SM2800 consistently produced photos which reliably reproduced the visual characteristics of the ceramic fabric. This technique is extremely useful as the fabrics are shown as they are, in colour, without the abstraction of thin sectioning, which often requires an in depth knowledge of the potential petrographic inclusions plus the ability to recognize the inclusions in their flattened, abstracted, thin section form. For simple visual identification, the SM2800 allows for a close examination, without the need for extensive training. This technique was previously used successfully with Peter Pope's Petit Nord collection to distinguish specific fabric characteristics on Breton coarse earthenware (Newstead 2006).

I had a sample of sherds from various sites, including samples from Portugal tested using laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS). These samples were processed at the Earth Sciences Analytical Geochemistry Group lab at Memorial under the supervision of Wilfredo Diegor and Pam King. The reasons for using LA-ICP-MS, a description of the technique and the results will be discussed in a subsequent chapter.

Finally, I drew a series of vessel illustrations using sherds and vessels from several sites in Newfoundland. Although the vessels and sherds were heavily photographed, there is no substitute for the clarity of information on form that can be relayed by a well executed drawing.

4.5 Conclusion

A clear picture of the range of variation in form and fabric for Portuguese Redware in Newfoundland was attained from the information recorded about the sherds. I used this information to construct a typology. Information on the potential (and potentially misidentified) forms and fabrics was also gained. All of this information will be presented in subsequent chapters in a format that will be conducive for further identification of Portuguese Redware in Newfoundland.

Chapter 5

Portuguese Coarse Earthenware: Discussion of Fabrics, Forms and Production Areas

5.1 Introduction

This chapter will discuss broad production areas in Portugal and associated types of Portuguese coarse earthenware. Although not all of these types have currently been identified in Newfoundland, there is a possibility that they do occur in small quantities but have yet to be recognized. It is also useful to situate the possible production area for Newfoundland Portuguese Redware within the greater system of regional ceramic production in Portugal.

There are three main types of unglazed Portuguese coarse earthenware, two of which are associated in a single, broader category. The two categories are black (*louça preta*) and red (*louça vermelha*). In the red category, there is a red colour type, the type most associated with Portuguese Redware, and a brown colour type (Castro et al. 1999: 226-227). Although all three types have similar manufacturing characteristics, there are consistent differences that will be discussed. The types are also associated, for the most part, with different production areas (Barreira et al. 1998). Portuguese archaeologists have considered the lead glazed coarse earthenware (*louça vidrada de chumbo*) as a separate ceramic category, although the types within this category are less defined than that of the unglazed. There are lead-glazed coarse earthenware associated with most of the areas that produced unglazed coarse earthenware. Sometimes these glazed wares are merely glazed versions of unglazed vessels, however sometimes they are distinctly

different, in form and in fabric (Osório et al. 1998; Paulo Dordio 2006, pers. comm.; António Marques 2006, pers. comm.). For the purpose of this discussion, the glazed types will be presented with the *louça vermelha*, as this is the category they are most associated with.

There is one base characteristic which occurs with all Portuguese coarse earthenware. This is the presence of mica in the fabric. The mica occurs in quantity and is easily visible on the surface of the fabric, ranging in size from very small to large particles (Figure 3). Portuguese coarse earthenware sherds are often initially identified by their micaceous surfaces and this identifying characteristic has held up well to a closer examination of the ware types. Some of the ware types are very similar in fabric to other European coarse earthenware and sometimes the only major visual distinguishing fabric characteristic is the micaceousness of the Portuguese fabrics.

In this section, vessel forms are described by their Portuguese names. This is practiced throughout the entire thesis. This is intended to clarify the descriptions of Portuguese-produced vessels and to promote the adoption in English publication of Portuguese names for Portuguese forms. Please refer to the appendix for a full list and description of these vessel forms.



FIGURE 5.1. *Tigela* with mica visible on surface, Ferryland, Newfoundland. (Photo by author, 2006.)

5.2 *Regions of Production*

For readers unfamiliar with Portuguese geography, it is useful to briefly describe the main areas of production for Portuguese coarse earthenware (Figure 5.2). Much of this information is common knowledge to archaeologists in Portugal, although there has been some publication formally outlining production areas (Barreira et al. 1998). The fundamental issue with describing specific production areas is that there have been very few actual production sites excavated. A kiln site in Lisbon (Rua Benfornos) was excavated by the Lisboa Câmara Municipal and yielded an excellent collection of ceramic wasters (António Marques 2006, pers. comm.). A kiln site in Aveiro was partially excavated a number of years ago, however no publications resulted and the Aveiro archaeological office is unsure where the collection is now (José Cristo 2006, pers. comm.; Isabel Pareda 2006, pers. comm.). Many of the pottery *barrios* (neighbourhoods) are known by folk knowledge, by scarcely researched documentary evidence or if they still producing ceramics (Patrícia Carvalho 2006, pers. comm.).

A few main coarse earthenware seventeenth-century production zones are known. From north to south, these are: Braga, Prado, Ovar/Aveiro, Coimbra, Lisbon and Alto Alentejo (Figure 5.2). To the east of Lisbon is the city of Estremoz, in Alto Alentejo, which was certainly producing very fine earthenware, and likely producing some coarseware. Each area produced distinctive ceramic types, although there are overlaps in vessel forms, finishing techniques and fabric composition (Resende 1986; Sardinha 1990; Rego 1993; Catarino 1995; Diogo et al. 1995; Real et al. 1995; Amorim 1996a, 1998; Silva 1996; Gaspar et al. 1997; Alves et al. 1998; Barreira et al. 1998; Osório et al. 1998; Teixeira 1998; Castro et al. 1999; Gutiérrez 2000; Alves et al. 2001; Bettencourt et al.

2003; Bettencourt et al. 2003a; Bettencourt et al. 2003b; Alves and Rieth 2004; Bettencourt et al. 2005a; Bettencourt et al. 2005b; Bettencourt and Carvalho 2007).

It is unlikely that all their earthenware production zones are represented in Newfoundland contexts. The most important areas of production for Newfoundland Portuguese coarse earthenware were the areas closely associated with port cities which Newfoundland-bound ships frequented. These cities also had active English or French involvement in the flow of goods being shipped (Abreu-Ferreira 1995, 2004). The two main ports were Lisbon, which had its own production and Porto, which was known for selling earthenware from Ovar/Aveiro kilns as well as kilns in Prado and Braga (Barreira et al. 1998; Paulo Dordio 2006, pers. comm.; António Silva 2006, pers. comm.). A third, less major port that received Newfoundland-associated ships is Aveiro itself (Innis 1929; Abreu-Ferreira 1995)(Figure 5.2).

5.2 *A Louça Preta* ➤ *The Black Ware*

The Braga area is known for producing coarse earthenware with a highly micaceous black fabric. The black colour is from kiln reduction. The fabric of this ceramic is compact and hard and the vessels are well made and well fired. The black coarse earthenware from this area is considered by Portuguese archaeologists to be a completely distinct type from the red earthenware. In Portuguese this ware type has been called *louça preta* or black ware. This type distinction comes from not only the colour,



FIGURE 5.2. Map of Portugal, with production areas. (Adapted from Gutiérrez 2000.)

but also because this type occurs in cooking and food preparation vessel forms, and rarely in storage vessel forms, unlike the red earthenware (Barreira et al. 1998; Paulo Dordio 2006, pers. comm.). At the Casa do Infante site in Porto, the *louça comum* or coarse subtype of the black ware occurs only in *caçoila* and *panela* forms (Barreira et al 1998: 174 and see below). There is a subtype of this ware which is much finer. Examples of this finer subtype are often finely burnished and can have inlaid patterns of mica, such as leaves, which occurred on a vessel recovered from the Casa do Infante site (Barreira et al 1998: 178) (Figure 5.3).

Confusion can arise with the identification of the Braga ceramics as several other production areas have been known to produce kiln-reduced vessels, such as Aveiro (Bettencourt et al. 2003a: 5). The black vessels produced in other areas, however, generally comprise a much lesser percentage of total vessels, with the red fabric comprising the major percentage (Patrícia Carvalho 2006, pers. comm.). The black vessels in production zones such as Aveiro are black versions of red earthenware forms, rather than different forms (Figure 5.4). It is normal in Portuguese seventeenth-century sites to have a ceramic collection that includes both the red and black fabric types, and it is unusual to have just one or the other, save for sites that have exceptional circumstances. This is likely due to the popularity of the Braga ceramics for cooking, as well as the production of black fabric ceramics in different areas (Claudio Brochado 2006, pers. comm.). Unfortunately this type of ceramic has not been researched to a great degree.

One of the major differences between the range of Portuguese earthenware in Newfoundland versus the range in Portugal is that the black fabric has yet to be identified in Newfoundland collections. There is a possibility that the black fabrics do occur on the



FIGURE 5.3. Micaceous leaf pattern on *louça preta*, Casa do Infante, Porto. (Photo by author 2006.)



FIGURE 5.4. Red and black *tigelas*, Ria de Aveiro, Aveiro. (Photo by author 2006.)

island, and have merely been misidentified, but it is a greater possibility that the black, and therefore cooking related, forms were not chosen by sailors traveling through Portuguese ports in favour of the more prevalent red storage and serving forms. Also some red ceramics may have been produced solely for the export market, and the consumption of these ceramics could have been eclipsing the purchase of domestic-marketed black wares.

5.3 As Louças Vermelhas; Não Vidrada e Vidrada ➤ The Red Wares; Unglazed and Glazed

5.3.1 Prado

Prado has been recently revived as a regional designation and encompasses the area around the city of Barcelos; which is known internationally today for its production of the ceramic gallos (painted roosters) that have become the national symbol of Portugal. In the seventeenth century, Prado area kilns were producing glazed and unglazed earthenware. These wares comprise a large percentage of the ceramic collections in some of the northern ports, such as Porto (Real et al 1995; Barreira et al 1998). The glazed type of this ware is characterized by a highly micaceous, pink/beige fabric on which yellow, orange, green or brown glaze has been applied (Real et al 1995: 179). Often the glazes were highly variable and the colours can show varied tones even on the same vessels. The glazes were normally applied only to the interior (Barreira et al 1998: 163). Vessel forms which occur in the Prado glazed type include *caçoilas*, *alguidars*, *sertãs* and *tigelas* (Again, for form descriptions see the discussion below, in Chapter 6).

The unglazed type of Prado ceramics are considered in Portugal to be *louça vermelha* or red ware, much like the Aveiro ceramics which will be discussed in a section below. They are distinguished from the other red wares by their brown or beige exterior colour and exterior colour that tends to have more pink or brown tones. The Prado-produced coarse earthenware typify the brown type of *louça vermelha*. This type is well fired and the vessels are often thin walled (Figure 5.5). The forms that occur with this type are very similar to the Aveiro-produced ceramics, which include *cântaros*, *tigelas*, *panelas* and *alguidars* (Barreira et al 1998: 166-169).

There is a strong possibility for the presence of Prado-produced ceramics occurring in Newfoundland contexts. These ceramics occurred in similar forms to the Aveiro ceramics and would have been readily available in markets in Porto, which was a port that was well frequented by English and French ships (Abreu-Ferreira 1995, 2004; Paulo Dordio 2006, pers. comm.). The glazed Prado ceramics are similar in visual attributes to glazed earthenware coming from South Somerset, England (Figure 5.6). This similarity and the lack of knowledge of the full range of Portuguese earthenware production could be causing Prado ceramics to be misidentified. The unglazed ceramic is sometimes much more brown than the typical “Merida red” which is the main basis for the identification of Portuguese earthenware in Newfoundland. Although micaceous, the unglazed Prado ceramics could be identified as a different, unknown ware type; especially if the sherds are particularly thin walled, as this type tends to be slightly finer and harder than the common Aveiro type which occurs in Newfoundland.



FIGURE 5.5. Prado brown sherds, Casa do Infante, Porto. (Photo by author, 2006.)



FIGURE 5.6. Glazed sherds; Prado, Casa do Infante, Porto (*a*) and South Somerset, Ferryland, Newfoundland (*b*). (Photo by author, 2007.)

5.3.2 Aveiro/Ovar

The Aveiro/Ovar region produced the most recognizable type of Portuguese coarse earthenware - the examples one would identify as the most typical Portuguese Redware. The kilns of Aveiro and Ovar were major ceramic suppliers for the markets in the area surrounding Porto, including the city itself, in the seventeenth century (Barreira et al. 1998: 181). In this thesis, "Aveiro and Ovar" will be referred to as "Aveiro". By the end of the sixteenth century, Aveiro had become an important area for ceramic production and at this time, exploitation of markets outside the region was being encouraged (Bettencourt 1995).

This Aveiro ware type, like the Prado ware types, comprises major portions of the ceramic collections recovered from sites in Porto (Barreira et al. 1998: 169). This ware has a great potential for research due to the discovery of the Ria de Aveiro sites. Through the work with the Ria de Aveiro A site, a comprehensive typology of vessel forms for this ware has been constructed. It is based on a large number of complete vessels. Given the date of the wreck uncovered, the typology is focused to the late fifteenth/early sixteenth centuries, but the forms are reliably relevant to the seventeenth century, with minor alterations (Barreira et al. 1998: 181; Paulo Dordio 2006, pers. comm.; Patrícia Carvalho and José Bettencourt 2006, pers. comm.; Gutiérrez 2007). The fabric of this ware is also consistent in composition and manufacturing technique in the sixteenth and seventeenth centuries. It is in the eighteenth century that the fabric and likely the forms experience a significant change, becoming finer, more regular with characteristically narrow burnish lines (Figure 5.7)(Paulo Dordio 2006, pers. comm.). The ceramics manufactured in the



FIGURE 5.7. Seventeenth-century (*top*) versus eighteenth-century (*bottom*) Aveiro sherds, Casa do Infante, Porto. (Photo by author, 2006).

Aveiro region have some constant characteristics. The fabric colour for these ceramics is generally an orange/red and always occurs with a large amount of mica. Often the vessels are slipped with a darker red or lighter brown slip (Barreira et al. 1998: 169). Quartz inclusions are common, with some being very large. The larger quartz inclusions are of an opaque, white variety and can sometimes be seen breaking through the surface of the vessels (Figure 5.8).

Up to four different paste types have been recognized from this production area (Bettencourt et al. 2002: 5; Barreira et al. 1998: 169). These type designations are still in a preliminary stage, as there has been very little in-depth geochemical analysis undertaken on Aveiro material (Castro et al. 1997). In the Ria de Aveiro material, four different paste types have been recognized. Group 1 is a reddish orange paste (10R 5/8 in the Munsell colour system). This paste is compact, homogeneous and contains many inclusions, including fine grained mica and some feldspar and quartz grains, which range from small to large. Group 2 is a beige paste (7.5YR 6/3) which is compact and homogeneous. This paste has inclusions of fine to medium grained mica and some medium grained feldspar and quartz. Group 3 (7.5YR 7/6) is an orange paste that is homogeneous and compact. This paste has inclusions of fine to large grains of mica as well as many fine to large grains of feldspar and many medium to large quartz grains. Group 4 is the much less common reduced paste, which is black in colour (2.5Y 5/1) which is compact and homogeneous. This paste has fine to medium grained mica inclusions and some feldspar and large grained quartz inclusions (Bettencourt et al. 2003a: 5).

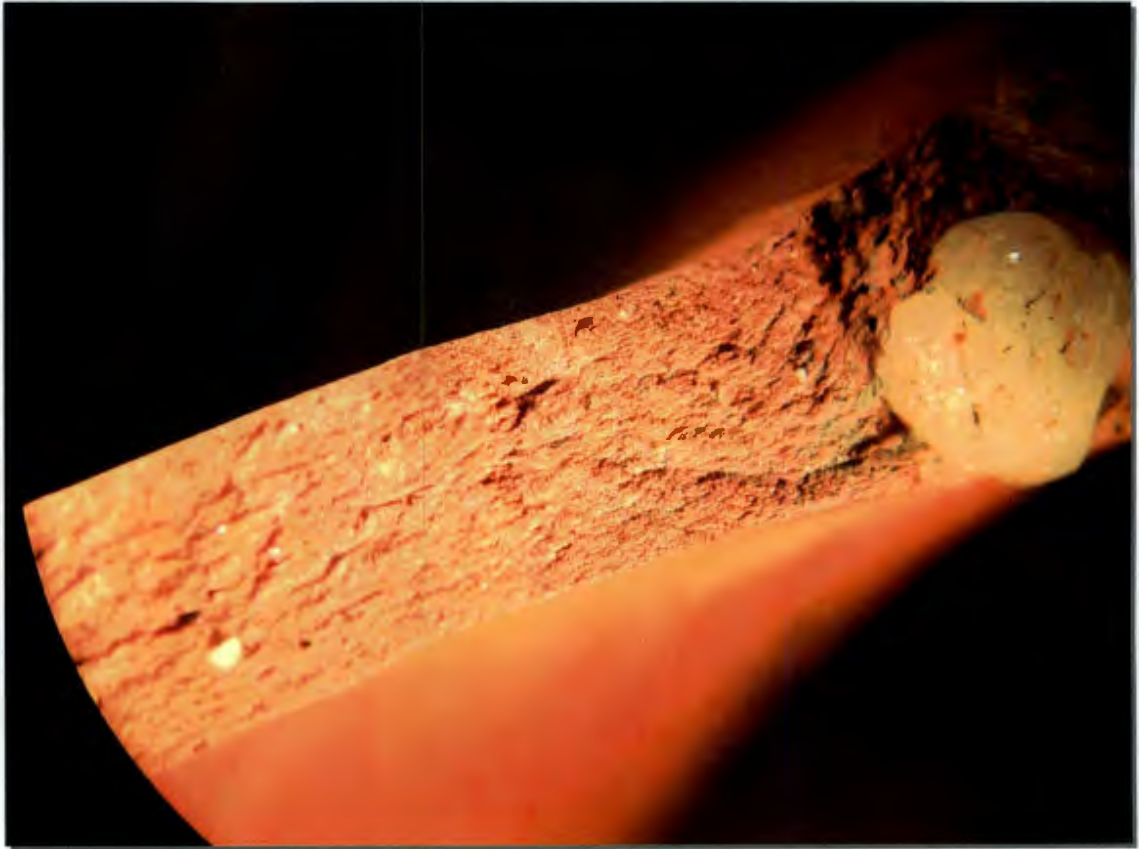


FIGURE 5.8. Aveiro-type fabric with white quartz inclusion, Ferryland, Newfoundland. (Photo by author, 2006).

In Porto, the Casa do Infante Aveiro material has been tentatively recognized as having three different paste types. These paste types, at present, have not been fully described and are awaiting further analysis. The publications on the Casa do Infante ceramics combine these three paste types into one ceramic type, *louça vermelha não vidrada de Aveiro e Ovar*, or unglazed redware from Aveiro and Ovar (Barreira et al. 1998: 169). The researchers at Casa do Infante have also recognized a lead-glazed redware which may have been produced in the Aveiro region (Paulo Dordio 2006, pers. comm.). There has been little work in the discovery of production provenance for lead-glazed coarse earthenware which occurs in Porto, especially concerning the sherds that are obviously not from Prado, i.e. sherds with a red/orange fabric. There has been some preliminary work on synthesizing and describing lead-glazed coarse earthenware which occurs in sites around the city (Osório et al. 1998). Lead-glazed earthenware is uncommon in the Ria de Aveiro sites, suggesting that Aveiro was not a major producer of lead-glazed ceramics, or perhaps lead-glazed production developed later in the area. However, as more sites are excavated in the region and more documents are examined, it is possible that a production area for lead-glazed ceramics can be found.

A wide range of vessel forms occur in the Aveiro fabric types. As mentioned above, this form range is well described due to the richness of the Ria de Aveiro A collection. The occurring vessel forms include *tigelas, pratos, caçoilas, testos, alguidars, púcaros, panelas, atanores, cântaros, bilhas, talhas, servidores, jarros* and *fogareiros*. There are several different variations and sizes of each of these forms (Barreira et al. 1998: 169- 173; Bettencourt et al. 2002: 23-83).

5.3.3 Coimbra

Although the city of Coimbra is known for its long term production of *faiença*, coarse earthenware was also produced locally. *Louça vermelha* was part of this production in the seventeenth century. The red earthenware produced in Coimbra is similar to that of the Aveiro style, however there are form and finish differences (Figure 5.9). Burnishing and slipping is common with the Coimbra produced ceramics. The *louça vermelha* of Coimbra is almost completely unstudied. This is likely due to the strong tradition of *faiença* production in the area and the greater focus of Portuguese archaeologists on decorated wares over plain wares. For this project I visited the Sta. Clara-a-Velha monastery collection. This collection has some good examples of locally produced coarse earthenware.

Coimbra is also known locally for the production of semi-fine earthenwares in the seventeenth century. These red earthenwares upon initial inspection are very similar to those of Estremoz, however, when examined, they are of a coarser fabric type. Instead of the incision, quartz inlay and fine burnishing typical of the fine earthenwares produced in Estremoz, the Coimbra wares are often have white painted designs, sometimes with incised outlines, and coarser burnishing (Figure 5.10). They are often larger and less intricate in form, yet are still quite fine within the context of most Portuguese earthenwares. It has been suggested that Coimbra was producing more accessible copies of the Estremoz wares (Dordio pers. comm. 2006). As mentioned in a previous chapter, it is hoped that a book dealing with Portuguese fine earthenware, currently in production, will address the Coimbra earthenware. Researchers at Casa do Infante in Porto have also found incised painted redware that they are associating with Aveiro productions and this

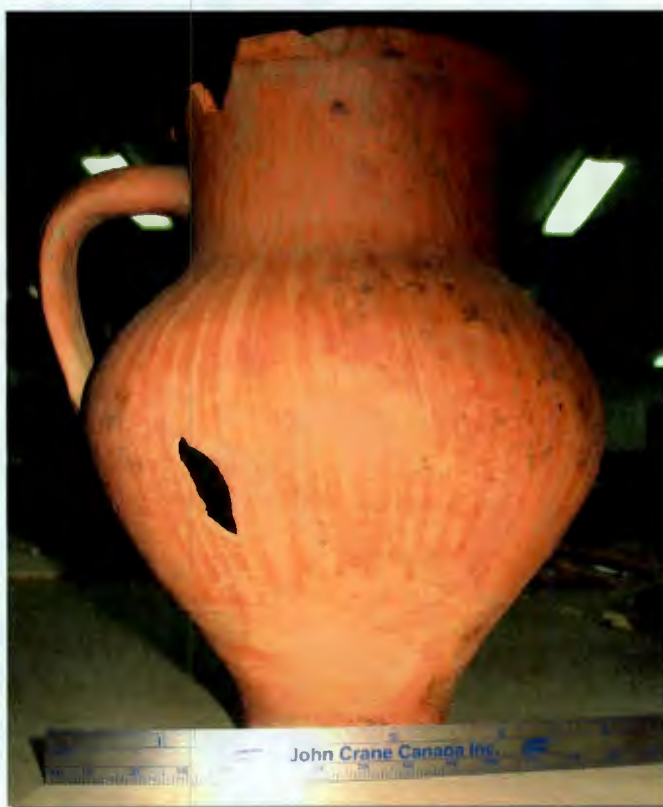


FIGURE 5.9. Coimbra *cântaro*, Sta. Clara-a-Velha, Coimbra. (Photo by author, 2006.)



FIGURE 5.10. Coimbra fineware, Sta. Clara-a-Velha, Coimbra. (Photo by author, 2006.)

leads to an amount of uncertainty when attempting to assign production provenience to the painted semi-fine earthenware (Barreira et al. 1998: 173).

Finally, Coimbra produced a distinctive lead-glazed ware. This ware has a light beige/grey fabric on which a green glaze has been applied onto the outside of the vessels. On the inside, an orange-yellow glaze is used. One of the more common forms for this ware are *servidores* (Figure 5.11)(Paulo Dordio 2006, pers. comm.). At the Sta. Clara-a-Velha collection there were also locally produced redware vessels that had lead-glazing in a clear orange applied onto them on the inside of the vessels.

5.3.4 Lisbon

Kilns in the city of Lisbon have had a long history of coarse earthenware production. Late medieval period ceramics from Lisbon have been relatively well studied, with some basic typologies published (Gaspar et al. 1997). Coarse earthenware from Lisbon changed both in form and in fabric from the late medieval period to the early modern period, with seventeenth-century examples bearing little resemblance to their medieval predecessors.

For the modern period, there has been some work developing typologies for the locally produced coarse earthenware (Diogo 1994). Lisboa redware is slightly pinker in fabric colour than Aveiro-produced redware and has less instances of heavy burnishing. The ware has the typical Portuguese attribute of heavy mica being visible throughout the fabric. There was a large production in Lisbon of glazed red earthenware, and this may be correlated with the lesser amount of burnishing. Vessels are glazed with orange, green, brown and combination of all. Often the vessels are not completely glazed, with



FIGURE 5.11. Coimbra *servidor*, Sta. Clara-a-Velha, Coimbra. (Photo by author, 2006.)

just the interiors glazed. Slipped vessels are also common (António Marques 2006, pers. comm.).

There are some vessel forms Portuguese archaeologists associate with Lisbon productions. One of these vessel forms is a horizontal-handled *panela* form that does not occur in the more northerly productions. Triangle lug handles are also seen regularly, something that is more uncommon with the other production areas (Figure 5.12). A plausible theory has been presented by Colin Martin (1979), in his study of Spanish Armada ceramics, that kilns in Lisbon were producing for an export and/or military market. Unfortunately no provenance studies have been undertaken for any of the suggested Lisbon-produced ceramics which have been found outside of Portugal. Shipping records have also not been well studied for Lisbon, for the city's destruction in 1755 and the loss of a great deal of early modern documents hinders such research. There has been at least one kiln site excavated, Rua Benfornosoz. However, as of yet this material has not been studied.

5.3.5 *Alto Alentejo*

The Alto Alentejo region has long been cited in English publications as the production area for Portuguese Redware. This is not the case for the Portuguese, who generally associate the Alto Alentejo, particularly the city of Estremoz, with the production of fine earthenware. Redware is associated more often with production areas along the coast and in Lisbon, as discussed above. However, coarse earthenware was certainly produced in Alto Alentejo, and there are sites that have been excavated that



FIGURE 5.12. Lisboa *panela* (top) and triangle handle (bottom), Rua Benfornosoz, Lisbon. (Photo by author, 2006.)

reflect this (Resende 1986; Catarino 1995). It is more logical that the kilns that produced coarse earthenware shipped to Newfoundland were located in the coastal areas; areas with greater exposure and participation in the Newfoundland trade. It is less likely that many coarse ceramics were brought from Alto Alentejo to trade in the coastal regions when there is strong evidence indicating thriving ceramic production in several coastal areas. There is evidence that there was a ceramic trade in fine earthenware from Estremoz to coastal cities such as Porto, but these ceramics were of exceptional quality and would have warranted special trading circumstances (Paulo Dordio 2006, pers. comm.).

5.4 Conclusion

Even though coarse earthenware was produced in many Portuguese regions in the early modern period, the ceramics all share the basic identification characteristic of a great deal of mica in the fabric. The sherds found in Newfoundland are generally sparkly and this is an ideal characteristic for consistent identification. The Newfoundland sherds, for the most part, are most similar to the Aveiro-produced material. The next chapter will discuss this similarity further and present a typology of the forms encountered in Newfoundland. It will also provide a description of the fabric types of Portuguese Redware found on the island and discuss the possibility of some of the production of the ware being for an export market.

Chapter 6

Typology Theory and the Newfoundland Typology

6.1 Introduction

This section will discuss Portuguese Redware in Newfoundland contexts. Although I have identified all the basic forms found to date in Newfoundland contexts, the forms included in this typology, there are definitely variations within the forms that have yet to be identified. This is due to the sampling strategy and sheer amount of unidentified and misidentified material. It is hoped that this typology will form a basis for further identification of Portuguese Redware form variations as archaeological collections expand in Newfoundland. A list of other forms and their descriptions is located in the appendix. This list includes some forms that were encountered in Portugal through the research for this thesis. The list will aid in the identification of new forms in the future that may have not been encountered thus far in Newfoundland contexts. This list, however, may also not be complete, as there is evidence for export productions of Portuguese Redware. These are forms that are found in non-Portuguese contexts, but do not occur in Portugal. Therefore there may be some forms that have yet to be correctly identified. This chapter will present a typology for Newfoundland forms as well as descriptions of the fabric types associated with Portuguese Redware in Newfoundland. It will conclude with a discussion of the relative frequencies of vessel types in Newfoundland contexts and a further examination of vessels thought to be manufactured for export.

6.2 Methodology and Purpose

With classificatory analysis there are three main terms: classification, taxonomy and typology. Each term describes a system in which objects are defined and grouped by characteristics; however, each term carries a different significance. Classification has been used as the over- arching term for this type of methodology (Rice 1987, Adam and Adams 1991). Classification simply means to systematically arrange things into groups. The system of classification relies on specific object attributes in order to deduce to which group the object should be placed. These groupings can be non-hierarchical or ordered, or, in the case of taxonomy, they can be hierarchical or otherwise ordered (Rice 1987, Adam and Adams 1991). Taxonomy also utilizes broader "types", or groups of attributes more often isolating and defining specific attributes and variables. Taxonomic method is often used with ethnographic data, as it can incorporate the hierarchical properties which people have imbued on the materials which surround them (Rice 1987, Read and Russell 1996). Typology is a term which encompasses ordered or non-ordered groupings, but only groupings which have been constructed for the purpose of solving problems or questions. Typology construction has a theoretical orientation and differs from forms of basic classifications which are constructed merely to categorize objects as an end result (Kluckhorn 1960, cited in Rice 1987). Therefore, the purpose behind the ceramic groupings that will be described in this chapter must be discussed.

When this research was started, it was assumed that the typology would be constructed on a blank slate. No viable, applicable and logical typology had been previously constructed to deal with Portuguese Redware in Newfoundland, nor had a comprehensive typology been published in any English source. The typology would be

constructed to answer questions of the range of different vessel types and the variation within each type. As the sherds were examined, then the relative frequency of the types would be revealed, and then the underlying question of what Portuguese Redware was being brought to Newfoundland would be answered and inferences could be made as to why this happened. However, there was another important facet to this thesis research. This was to facilitate greater communication between Portuguese and English archaeologists and to break away from the previous isolationism in studies of Portuguese Redware in Newfoundland.

Research that was undertaken in Portugal unearthed a small but solid basis of previous typological work that had been made with the early modern coarse earthenware there. There is not yet a pan-Portuguese typology for *louça vermelha*, however there is now some consistency in vessel form names and descriptions among archaeological projects and publications. After consultation with Portuguese archaeologists familiar with red earthenware, it was determined that most of the Newfoundland forms fit into the developing Portuguese typological system. The typology that will be used here, therefore, is not constructed on a blank slate. As far as possible I have used the Portuguese names for vessel forms, as well as the current standards of descriptions. It is very important that Portuguese names were used, especially when many of the form types are now consistently called by specific labels in the Portuguese literature. The use of Portuguese names will add to clarity in description of the forms and will lessen the inherent biases which happen when utilizing, for example, English vessel names for Portuguese forms. It will also facilitate discussion between Portuguese and English researchers, as there will be a great deal less confusion when attempting to describe

specific vessels. The Portuguese naming system is not perfect, but it is very likely to be far better than using English terms designed for English ceramics. English equivalent names for some forms have been included to aid in the identification of vessels by English-speaking researchers. The purpose behind the construction of this typology is twofold. First, it will present coherent descriptions of Portuguese Redware vessel forms as well as attempt to clarify the range in variation within the forms in Newfoundland contexts. Secondly, it is a typology that is relevant within the Portuguese study of early modern coarse earthenware. The typology has been built upon a foundation of previous Portuguese research and was constructed through active consultation with Portuguese archaeologists, which I hope will facilitate better communication between Portuguese and English researchers in the study of Portuguese Redware.

There are a couple of forms that have been found in Newfoundland, as well as in England and other places where Portuguese goods were traded, that were not familiar to the Portuguese archaeologists or were very rare in contemporaneous Portuguese contexts (Hurst et al. 1986; Pope 1986; Blanchard 1989; Allan et al. 1992; Barreira et al. 1998; Gutiérrez 2000; Crompton 2001). The possible reasons for the appearance of these vessels primarily outside of Portugal will be discussed at the end of the chapter. The name for one of these forms, the olive jar, will be in English, and this is appropriate, as they may have been commissioned for production by English merchants. The vessels already have a widely-recognized English name which will be used in this typology for the sake of consistency. The other form has been called a specific, yet confusing and erroneous, name. The name of this vessel, the "globular costrel" will be abandoned in

favour of the Portuguese *cantil*, which is the name of this loosely used by Portuguese archaeologists.

The typology will follow the Portuguese fashion of grouping the vessels by rim style, either open or closed, rather than by use or other attribute. This grouping is used to make future comparisons with this typology and the Portuguese typologies more efficient and easier. The typology will be followed by a discussion of Portuguese Redware in Newfoundland contexts.

6.3 The Newfoundland Typology



FIGURE 6.1. *Tigela* (bowl), 1:2. Ferryland, Newfoundland. (Drawing by author, 2007.)

Name: *tigela* (bowl)

Description: Bowl form with a rounded rim. Body profile is either rounded or lightly carinated. Interior of vessel is rounded through the base. Foot ring on base of vessel.

Finish: Sometimes burnished concentrically on the interior. Exterior burnishing is more rare. Line or lines are often incised directly below the rim on exterior. Slipped.

Possible Usage: Food preparation and serving.

Sources: Beaudry et al. 1983: 26; Bettencourt et al. 2003a: 21-32.

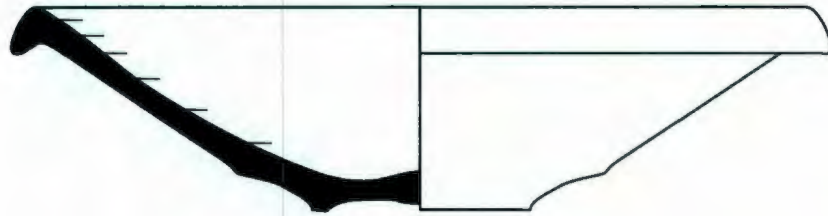


FIGURE 6.2. *Prato* (plate), 1:2. HMS *Sapphire*, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

Name: *prato* (plate)

Description: Plate form. Rim has overhanging, rounded lip. Flat sided and shallow, although there is a form variant with a constriction in the middle of the vessel wall.

Interior walls of the vessel are rounded through the base. Foot ring on base of vessel.

Finish: Sometimes burnished concentrically on the interior. Exterior burnishing is more rare. Slipped.

Possible Usage: Food preparation and serving.

Sources: Beaudry et al. 1983: 26; Barreira et al. 1998; Bettencourt et al. 2003a: 33-35.

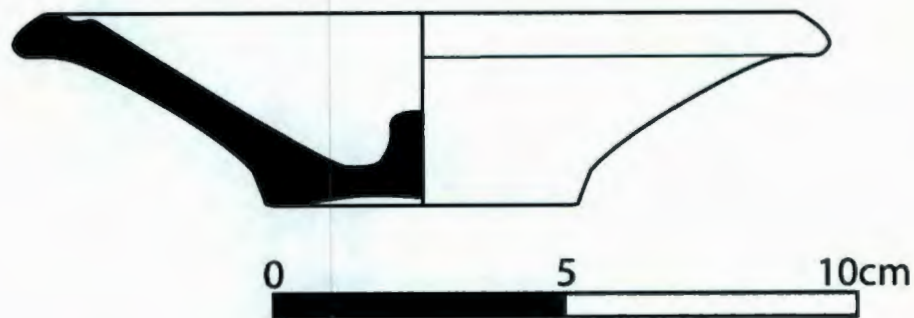


FIGURE 6.3. *Testo* (lid). (Adapted from Bettencourt et al. 2003a: 42.)

Name: *testo* (lid)

Description: Lid form. Sharply everted walls ending in a rounded rim. Interior is either rounded through base or the walls come to the base at a shallow angle. Either a shallow foot ring or no foot ring. A small, rounded knob handle on the top side of the vessel at the centre of the base.

Finish: Sometimes burnished concentrically on the top and bottom sides. Slipped.

Possible Usage: Serve as lids for other vessels, most commonly *cântaros* and *panelas*.

Occasionally occur without handles, thereby functioning as a lid and a shallow bowl.

Sources: Bettencourt et al. 2003a: 42.

Name: *caçoila* (Figure 6.4)

Description: Slightly inverted rim with rounded lip. Ridge on neck. Carinated shoulder.

Base is convex and is separated from the body by an open angle carination. Two horizontal handles, attached just below the shoulder carination and have an oval profile.

The angles of the handles are sharp and they twist as they attach onto the body.

Finish: Slipped. Sometimes burnished.

Possible Usage: Kitchen usage, food preparation.

Sources: Barreira et al. 1998; Bettencourt et al. 2003a: 38-39.

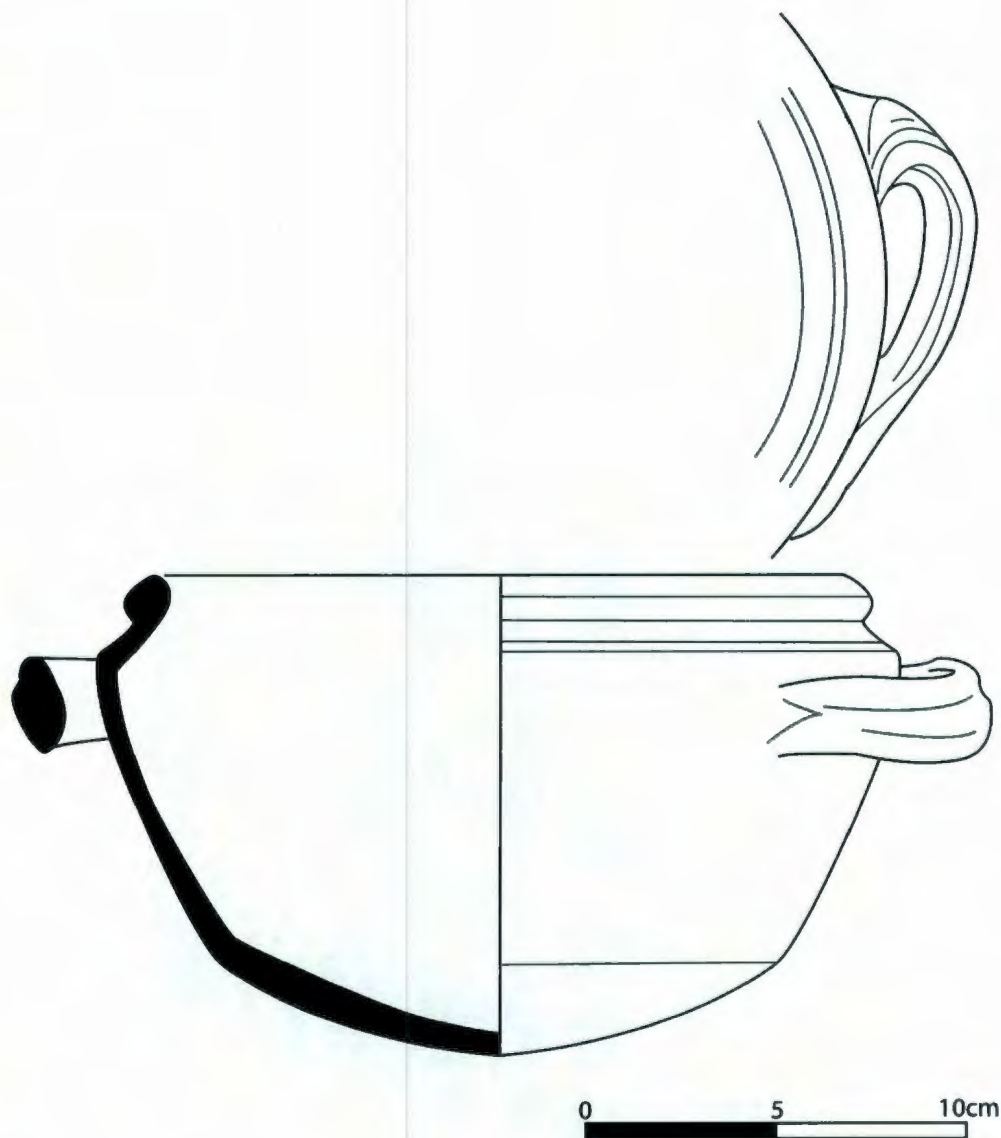


FIGURE 6.4. *Caçoila*. (Adapted from Bettencourt et al. 2003a: 38-39.)



FIGURE 6.5. *Alguidar* (pan), 1:2. ChAc-02, Bay Bulls, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

Name: *alguidar* (pan)

Description: Pan form. Overhanging rim with rounded, triangular shaped lip. Conical body shape that is truncated with a flat base and no foot ring. Interior of vessel is not rounded, with the angle between the walls and the base visible. The vessel walls can either be thick, or can be thinned around the middle of the vessel. The bases are always thick.

Finish: Slipped and often burnished on the interior with concentric rings. More rarely burnish on the exterior.

Possible Usage: Domestic usage (kitchen, laundry, etc.), food preparation.

Sources: Beaudry et al. 1983: 28; Barreira et al. 1998; Bettencourt et al. 2003a: 40-41.

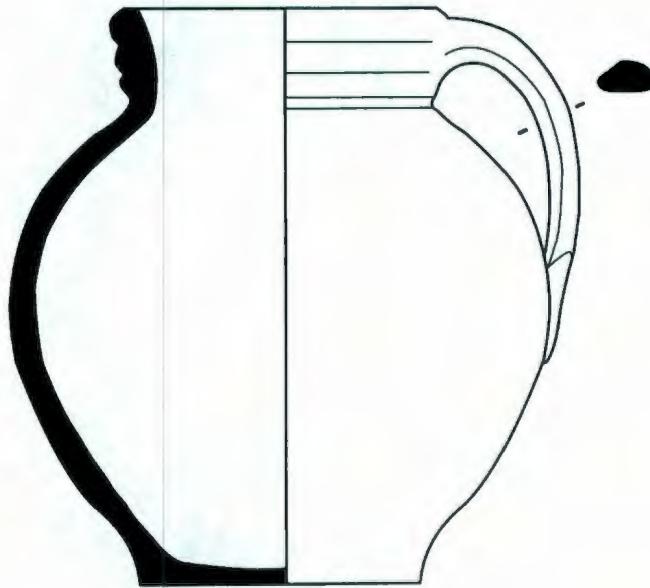


FIGURE 6.6. *Púcaro*, 1:2. CfAf-09, Kingman's Cove, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

Name: *púcaro*

Description: Slightly everted, rounded rim with a short collar that has pronounced rounded ridges. Joins onto globular body, which becomes more narrow and cylindrical at base. Sometimes this narrowing is quite pronounced. Flat base, no footring. One vertical handle with a rounded triangular profile which joins at rim/collar and mid-body.

Finish: Slipped. Often burnished with horizontal burnish lines. Can be burnished with a diamond pattern. Incised line or lines at shoulder.

Possible Usage: Liquid serving, food conservation.

Sources: Bettencourt et al. 2003a: 43-48, 53-54.

Name: *panela* (pot) (Figure 6.7)

Description: Rounded somewhat triangular rim with a short neck that has pronounced ridges. Two main shoulder forms: Slightly everted rim/collar has a sharply inverted shoulder which joins to ovoid body. Slightly inverted rim/collar has a slightly inverted shoulder which joins to ovoid body. Ovoid body is truncated into a flat base. No foot ring. One handle if it is a vertical handle. Vertical handle joins at rim and mid body. Occasionally, panelas occur with triangle lug handles on the rims of the vessels.

Finish: Slipped. Can be glazed on interior with some glaze spilled onto outside of vessel. Can be burnished.

Possible Usage: Liquid storage, food preparation, food storage, food conservation.

Sources: Beaudry et al. 1983: 29; Barreira et al. 1998; Bettencourt et al. 2003a: 55-57.

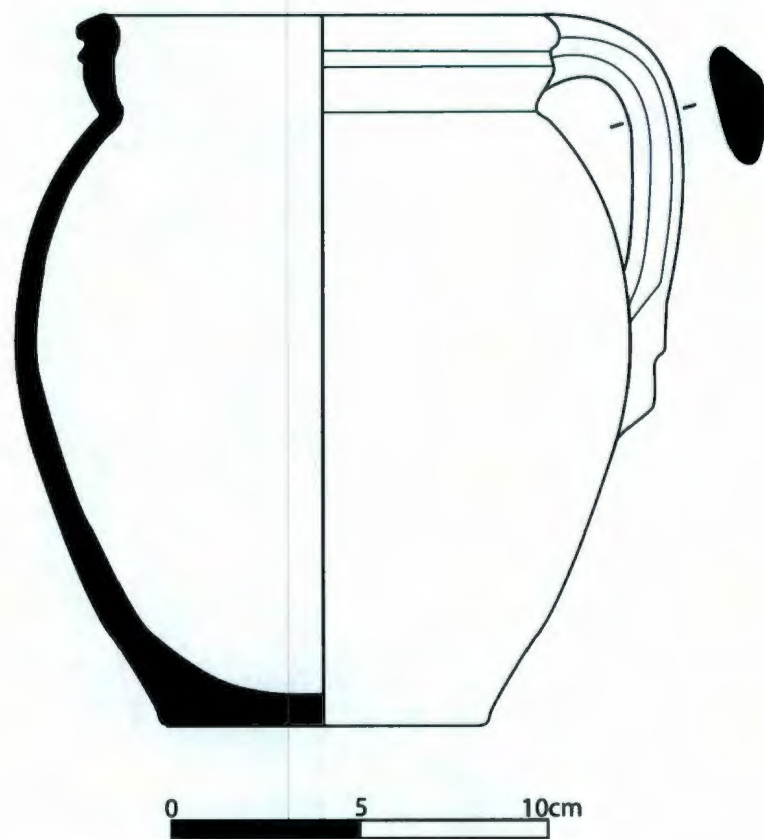


FIGURE 6.7. *Panela* (pot). (Adapted from Bettencourt et al. 2003a: 55-57.)

Name: *cântaro* (jug) (Figure 6.8)

Description: Flared, sub-triangular rim. Slightly concave collar, with pronounced ridge at base where the collar joins the neck. Cylindrical neck and shoulder which opens up to an elongated ovoid body. Body narrows back to a cylindrical base. Flat base with no footring. One vertical handle with rounded triangular, sometimes quite flattened, profile which joins at collar ridge and mid-body. Variance in vessel size.

Finish: Slipped. Decorative burnishing which begins as vertical lines on neck of vessel. Incised horizontal line at the point where the shoulder joins the body of the vessel. Vertical line burnishing continued on body of vessel. Sometimes the lower body of the vessel has horizontal burnish lines.

Possible Usage: liquid transport, storage and serving. Larger cântaros would have been appropriate for liquid transport and storage, with the smaller vessels appropriate for table service. The smaller cântaros are sometimes referred to as *cantarinhos*.

Sources: Beaudry et al. 1983: 23; Barreira et al. 1998; Bettencourt et al. 2003a: 60-65.

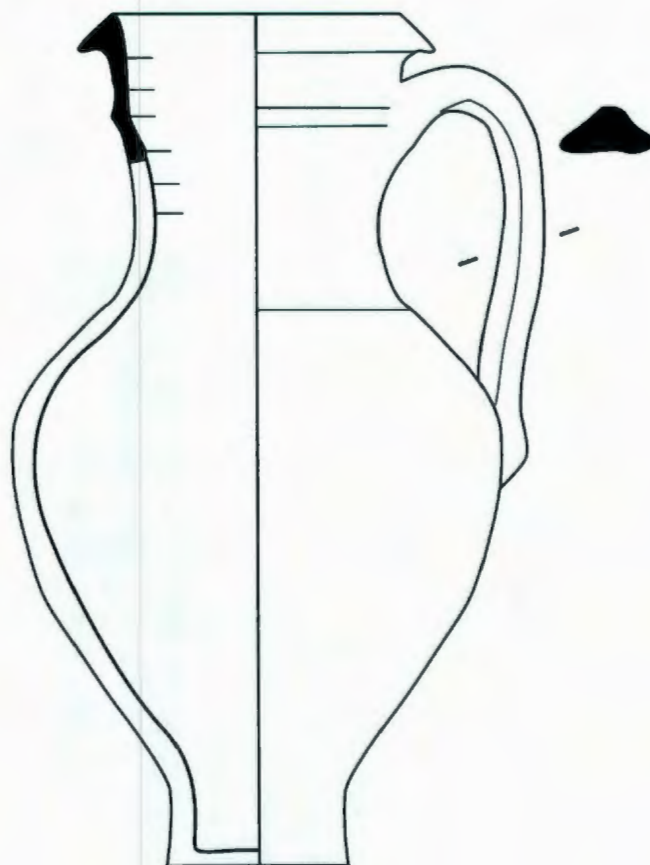


FIGURE 6.8. *Cântaro* (jug), 1:2. Renews, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

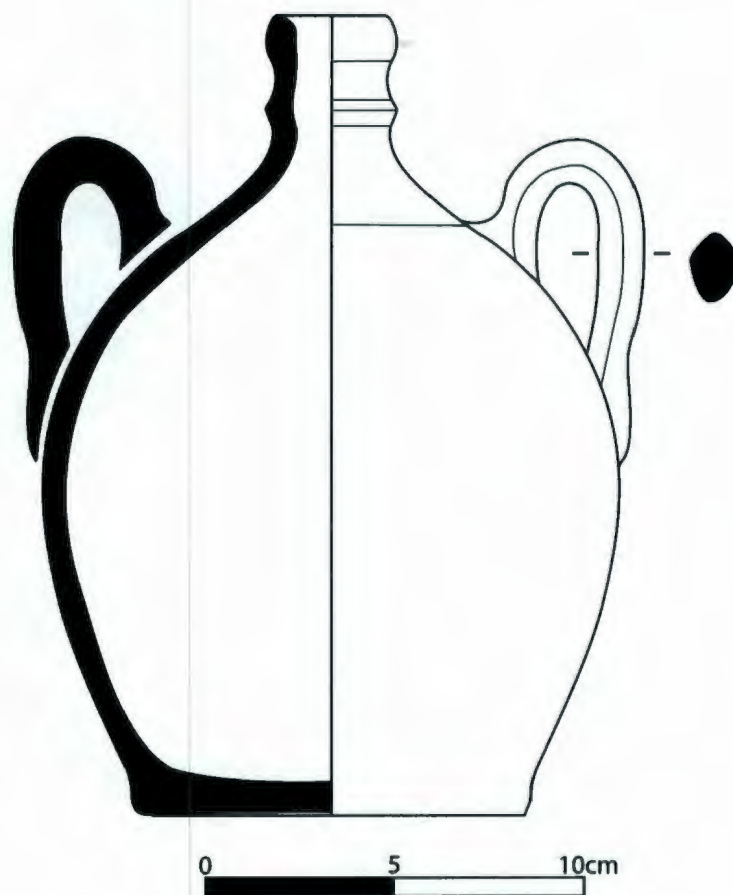


FIGURE 6.9. *Bilha A* (bottle A). (Adapted from Bettencourt et al. 2003a: 66-71.)

Name: *bilha A* (bottle A)

Description: Bottle-like rim and neck. Neck often has one or more ridges on the middle to upper section. Neck is very narrow and pronounced. Neck opens up to a globular or ovoid body which is truncated to a flat base with no foot ring. Two vertical handles which join at shoulder and mid body. In the English-language literature, this form has been previously called a “standing costrel”.

Name: *bilha B* (bottle B) (Figure 6.10)

Description: Rectangular rim with small diameter. Narrow upper neck which opens into a globular form and then narrows again above shoulder. This second narrowing is punctuated by a ridge and an incised line. Shoulder opens into an ovoid body which is truncated to a flat base with no foot ring. One vertical handle with a flattened triangular profile which joins at the base of the top globular section and at the mid body.

Finish: Slipped. Decorative burnishing in vertical lines. Incision lines common at shoulder of vessels.

Possible Usage: Liquid storage, serving and transport. *Bilha B* likely has further usage, either esthetically or practically, due to its unique form.

Sources: Beaudry et al. 1983: 24; Barreira et al. 1998; Gutiérrez 2000: 77; Bettencourt et al. 2003a: 66-71.

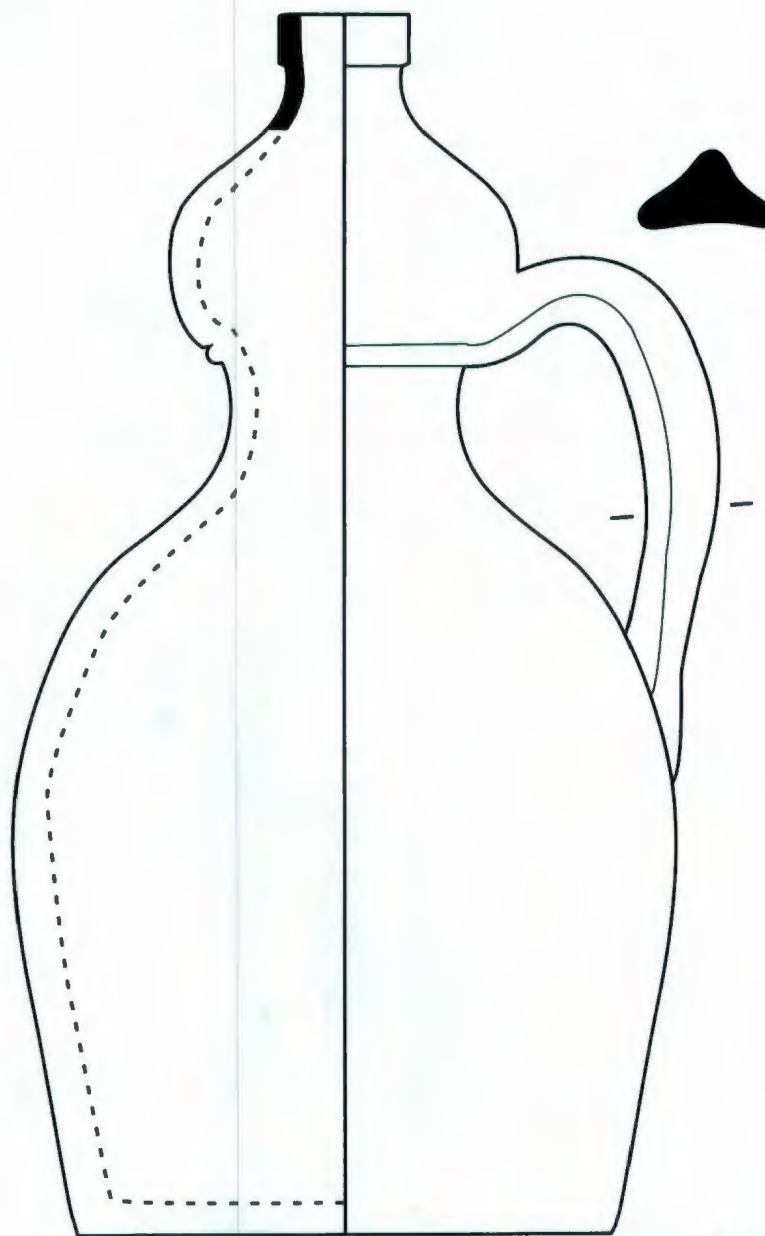


FIGURE 6.10. *Bilha B*, 1:2. ChAe-09, Bay Bulls, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

Name: *jarro* (pitcher) (Figure 6.11)

Description: Rounded rim with deep groove directly below. Two sides of the rim and upper neck have been compressed to form a spout. Narrows gradually to shoulder and then widens into an elongated ovoid body which is truncated to a flat base with no foot ring. One vertical handle which attaches mid neck and mid body and has a rounded triangular profile.

Finish: Slipped. Burnished. Two incised lines separated by a small rounded ridge at shoulder of vessel.

Possible Usage: Liquid serving.

Sources: Beaudry et al 1983: 24; Bettencourt et al. 2003a: 79; Bettencourt et al. 2005b:

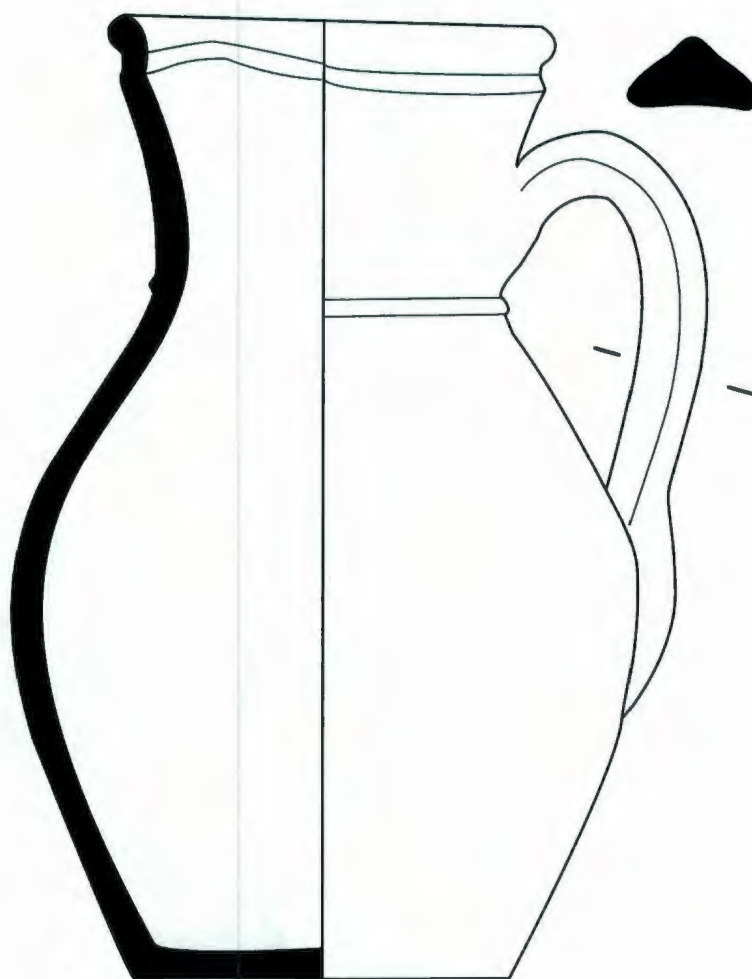


FIGURE 6.11. *Jarro* (pitcher), 1:2. CgAf-03, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

Name: *cantil* (Figure 6.12)(Figure 6.13)

Description: Bottle-like rim and neck. Rim is upright and narrows at lip. Neck is punctuated mid-length with a sharp edged ridge. Neck opens sharply at shoulder to a horizontal oval body with a rounded base. Base is slightly flattened so that vessel can be stood upright. Bodies of these vessels thrown either as a whole or in two parts to form a closed oval shape and then the rim and neck were attached to the side of the oval. The opposite side of the oval forms the base. A triangular lug handle is attached at each end of the oval. In the middle of the oval, two vertical handles are attached, one on each side of the neck. The handles are sharply angled, attaching at the lower shoulder and at the upper body and have a rounded triangular profile. In the English-language literature, this form has been previously called a “globular costrel”.

Finish: Slipped. Body is burnished with lines horizontally radiating from lugs.

Possible Usage: Liquid storage. This vessel has a specialized form which may have been developed for use on a ship.

Sources: Hurst 1986: 71; Bettencourt et al. 2003a: 80.

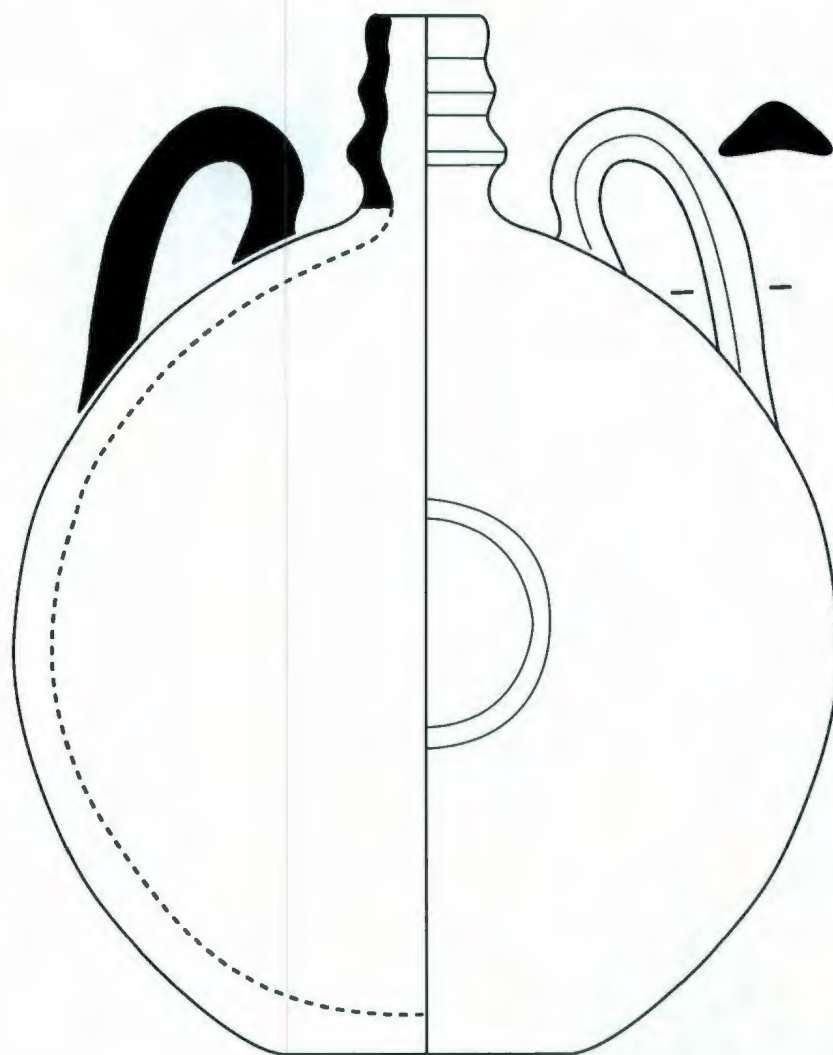


FIGURE 6.12. *Cantil*, 1:2. ChAe-09, Bay Bulls, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

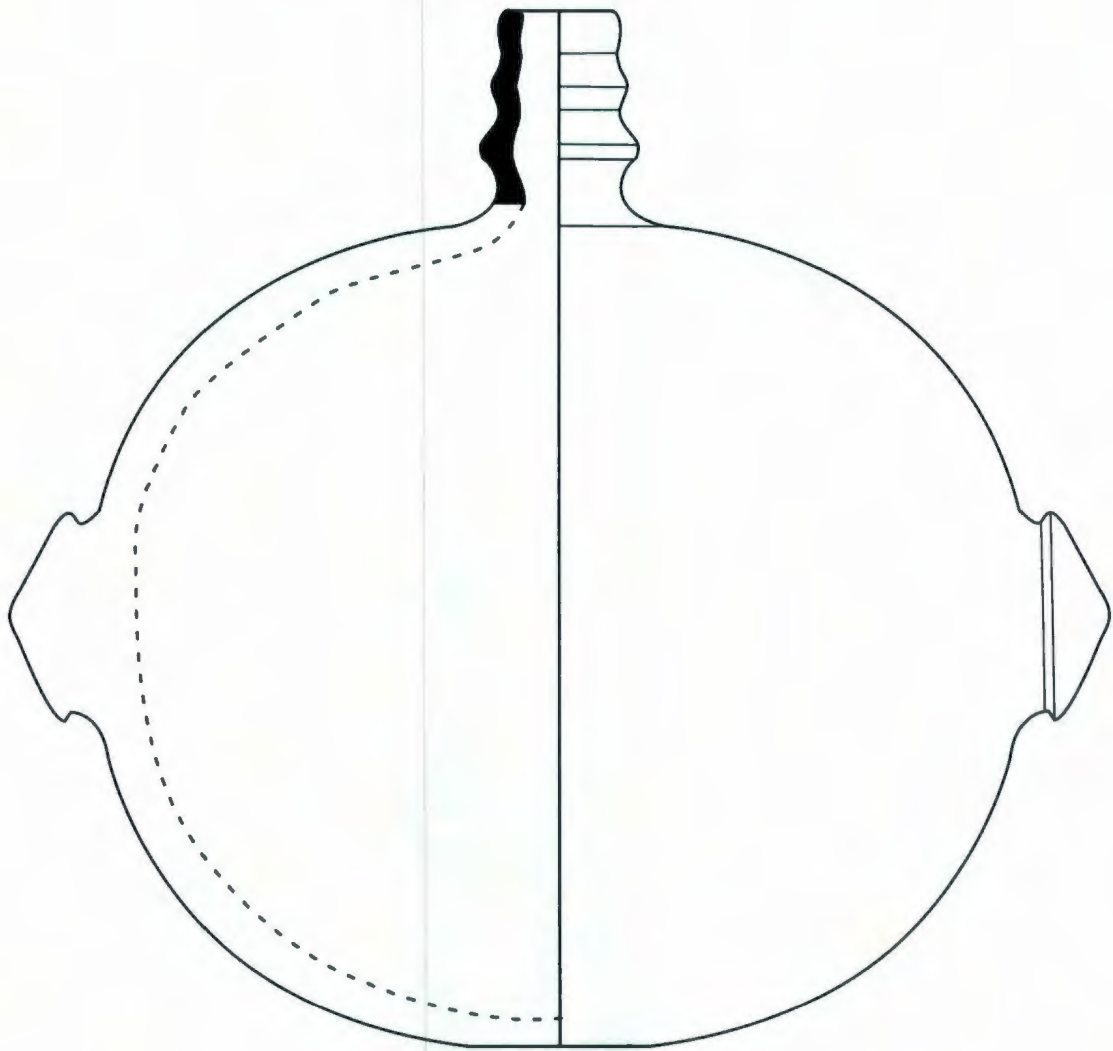


FIGURE 6.13. *Cantil*, 1:2. ChAe-09, Bay Bulls, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

Name: *olive jar* (Figure 6.14)

Description: Rounded triangular rim with a narrow diameter neck. The opening diameter of the vessel is also narrow. Neck opens to a flat, downward sloping shoulder which has an open carination to an ovoid body. The ovoid body narrows to a conical base. The lower quarter of the vessel is marked by two wide, shallow incised lines.

Finish: Slipped: sometimes with white, sometimes with a terra cotta colour. Jars are occasionally burnished or occasionally glazed on the interior and parts of the exterior.

Possible Usage: Storage, food or liquid transportation.

Sources: Gutiérrez 2000: 160.

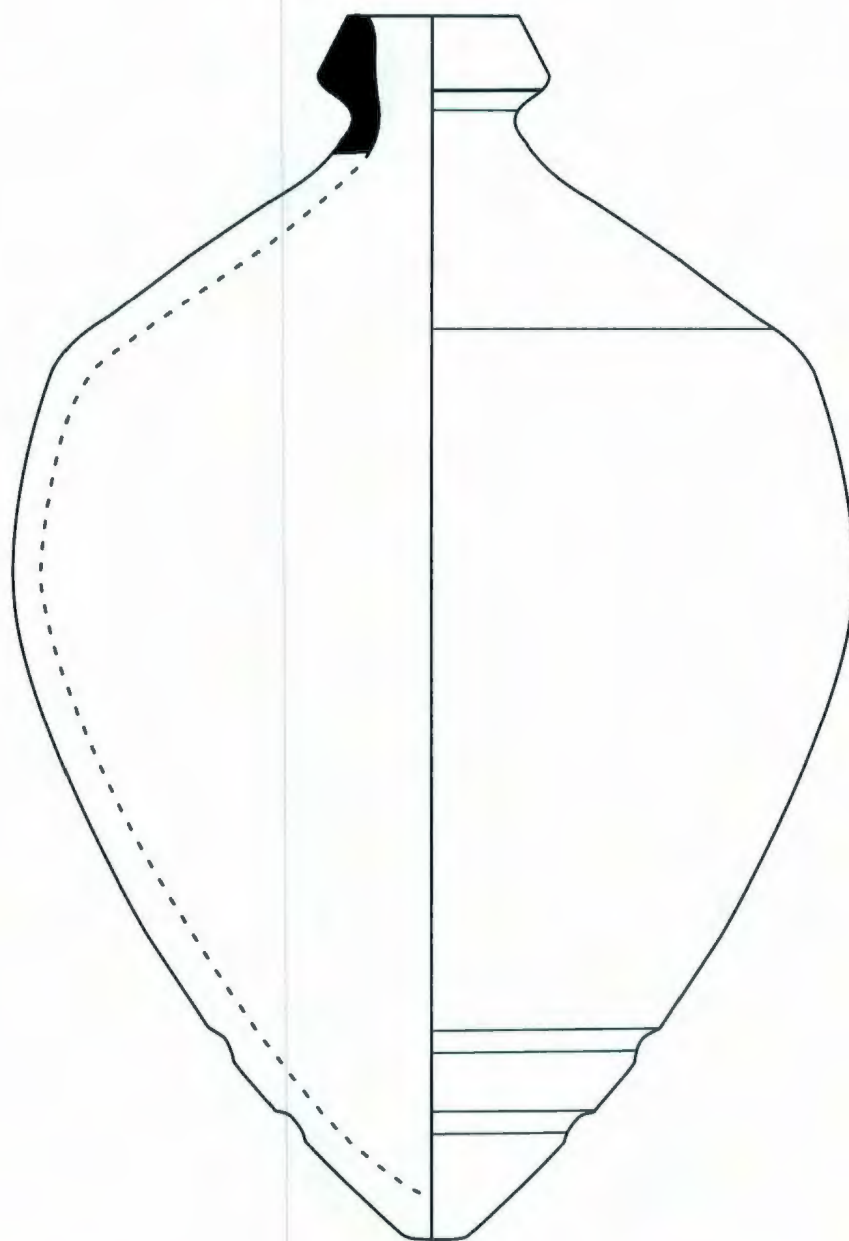


FIGURE 6.14. *Olive Jar*, 1:2. CfAf-09, Kingman's Cove, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Drawing by author, 2007.)

6.4 The Fabrics of Portuguese Redware in Newfoundland

“Merida-type” fabrics in non-Portuguese contexts, have previously been researched both petrographically and chemically (Williams 1984; Gaulton and Mathias 1998; Castro et al. 1999; Brown 2002; Sousa et. al. 2003; Cranfill 2004). However, these studies have been very much preliminary. A lack of solid definition as to what constitutes “Merida-type” wares has lead to inconsistency in fabric types that have been described. All the previous studies have called for further research.

For the present research, ceramic fabrics were examined visually as well as being tested for elemental composition. The element testing will be discussed in a subsequent chapter. For the visual examination, sherds were viewed macroscopically as well as under a microscope at 10X and 20X powers. In the Newfoundland collections, Portuguese Redware predominantly falls into three main fabric types. The difference in fabric seems to be correlated with specific vessel forms.

As stated above, all Portuguese Redware in Newfoundland has some basic fabric characteristics. These characteristics are:

1. A significant amount of mica with muscovite being the most prominent, although biotite is also present. Mica is always visible on the surface of the ceramic.
2. Inclusions of quartz, feldspar and grog.
3. A colour which has orange tones.

Beyond these basic characteristics, the sherds that were examined for this thesis can be grouped into three main types.

Type 1, Coarse Brown-Orange: A homogenous fabric which contains a large amount of quartz, feldspar and grog inclusions. The quartz inclusions range in size from very small to large, with some quartz visible poking through the surface of the ceramic. Quartz occurs in both clear and opaque forms. The fabric has a coarse appearance and is medium-hard. The colour of this fabric tends to be in the brown-orange range (Figure 6.15).

Type 2, Smooth Orange-Red: A homogenous, compact fabric which contains quartz, feldspar and grog inclusions. The feldspar and grog inclusions are very small, with the quartz inclusions ranging in size from very small to very large. Occasional very large white, opaque quartz inclusions are typical in this fabric. These quartz inclusions are often seen poking through the surface of the fabric. The fabric is regular, smooth and compact in appearance. It is also relatively hard. The colour of this fabric is an orange-red (Figure 6.16).

Type 3, Soft Marbled: A soft, marbled fabric which contains quartz, feldspar and grog inclusions. The quartz inclusions range in size from very small to large, with some quartz which pokes through the surface of the fabric. The fabric is marbled with an orange-pink clay and a soft, powdery white material. The marbling can occur in parts of the fabric, or throughout (Figure 6.17).

Type 1, Coarse Brown-Orange fabric is associated in the Newfoundland collections with vessels that are unburnished or glazed. It is also associated with some of the larger vessels, and occasionally with olive jars. Type 2, Smooth Orange-Red fabric is

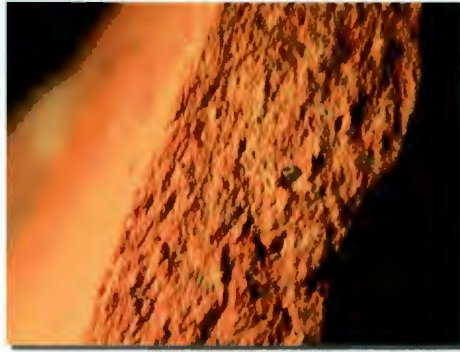


FIGURE 6.15. Fabric type 1, Coarse Brown-Orange. (Photo by author, 2007.)

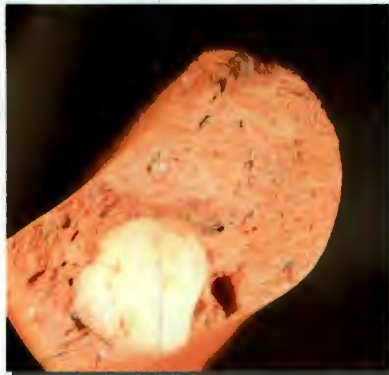


FIGURE 6.16. Fabric type 2, Smooth Orange-Red. (Photo by author, 2007.)



FIGURE 6.17. Fabric type 3, Soft Marbled. (Photo by author, 2007.)

the most recognizable Portuguese Redware fabric and is associated with vessels that are burnished. Type 3, Soft Marbled fabric is a softer fabric with distinct marbling. This fabric is associated with the olive jar forms, particularly with jars that have been slipped with white.

Although mica is a defining characteristic of Portuguese Redware, it is also common in other wares from Western Europe and England. Portuguese Redware seems to have a greater amount of mica than most other wares, with the mineral being apparent on the surface of the vessels. When identifying Portuguese Redware in contexts where other highly micaceous wares occur, like Landieul or North Devon Smooth, one must use a combination the ware's fabric attributes, such as inclusions, to be sure of an identification.

6.5 Export Forms

There are a couple of forms which have been identified in early modern Newfoundland contexts, as well as in collections in England that do not regularly occur in contemporaneous Portuguese contexts (Hurst et al. 1986; Pope 1986; Blanchard 1989; Gutiérrez 2000; Crompton 2000; Paulo Dordio 2006, pers. comm.; Patrícia Carvalho and José Bettencourt 2006, pers. comm.; Claudio Brochado 2006, pers. comm.; António Marques 2006, pers. comm.; Gutiérrez 2007). It could be suggested that due to their common appearance in collections outside of Portugal and rarity inside of the country, these vessels were produced for an export market. One form, the olive jar, is the most common of the Newfoundland Portuguese Redware vessels. The other form, the *cantil*, is one of the more well known Portuguese Redware forms.

The most common form of Portuguese Redware in Newfoundland is the olive jar. These jars are distinct from Spanish jars, both in fabric, but also in rim and body form (Goggin 1968; James 1988). They come in slipped and glazed varieties, although the slipped vessels are more common. The jars all have two incised rings near their bottom and triangular rims (Figure 6.18). Many of the jars have a soft, marbled, highly micaceous fabric. When pictures and descriptions of the Portuguese Redware olive jars were shown to various archaeologists in Portugal, the repeated response was that these jars were uncommon in Portuguese contexts, but it was likely that they were produced in Portuguese kilns (Paulo Dordio 2006, pers. comm.; Claudio Brochado 2006, pers. comm.; José Bettencourt and Patrícia Carvalho 2006, pers. comm.; António Marques 2006, pers. comm.; Isabel Pareda 2006, pers. comm.; António Silva 2006, pers. comm.). The elemental composition of several olive jar sherds were tested for this project and the results will be discussed in a subsequent chapter. Two Portuguese Redware olive jars were encountered during the Portuguese collections research, both of which had unknown provenance, but were thought to be of Portuguese production. What is thought to be Portuguese olive jars have been found on a late seventeenth century Portuguese wreck near Mombasa, as well as at Fort Jesus, a Portuguese fort in Kenya, in seventeenth-century levels (Kirkman 1974: 119-120; Sassoon 1981: 119-120). The presence of the jars in these contexts supports the theory that they were produced for a market outside of Portugal. Sassoon (1981) and Kirkman (1974) argue that the Portuguese olive jar was a form which was popular throughout the seventeenth century. Portuguese Redware olive jars have been previously described and illustrated in England by Alejandra Gutierrez (2000: 160), where she recognized a slipped and plain type.



FIGURE 6.18. Olive jar rings. CfAf-09, Kingman's Cove, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Photo by author, 2007.)

In a sample of 130 sherds from the Ferryland collection, approximately 46 percent of the sherds were from olive jars. Many of these sherds were previously identified as "bottles", due to their narrow necks and sloping shoulders. A valid estimation for the proportion of olive jar sherds in Ferryland's total Portuguese Redware collection would be 29 percent to 30 percent. A high percentage of olive jars occur at other sites in Newfoundland where Portuguese Redware is found in quantity. At 327 Water Street, where the entire collection was examined, 42 out of 50 sherds attributable to specific vessel forms came from olive jars. This collection, like Ferryland, has several olive jars which were misidentified as "bottles".

There are possible reasons for the high percentage of olive jar forms in Newfoundland. Their presence may be related to the foodstuffs that were being utilized on English ships. Their relatively homogenous size and shape suggests that they were being produced for a specific storage task. The incised lines on the bottom of the vessels may be related to the way they were stored on ships. The lines could also be production marks or maker's marks. There is not a great deal of evidence that these jars were being used in a context other than storage, as burned or use-worn sherds are uncommon in the Newfoundland collections. If they were being used solely for storage and were not being commonly reused in any capacity, it makes sense if they were viewed as disposable, thereby making their abandonment in Newfoundland more likely. This is in contrast to the more intricate and higher quality Portuguese Redware serving and multi-use vessels, which would have had a higher rate of curation and a range of reuse. The olive jars have the coarsest and lowest quality production when compared to these other wares, and this further suggests a uselife which ends in disposal rather than repeated reuse. Sassoon

suggests that the jars were used to store oil or wine, both of which would have been useful supplies on the long journey to Newfoundland and were also products that were easily obtainable by the English in Portugal (Sassoon 1981).

The second possible export form is the *cantil*, which was identified early in the English historiography of the ware by John Hurst as a “globular costrel” (1977). He asserted in 1986 that the costrel was a form that had been continually produced from the thirteenth century onwards and was “the only type really traded” (Hurst et. al. 1986: 69). This statement is erroneous, as a wide range of Portuguese Redware forms have been found in English and New World sites. His description of costrels confused *bilhas* (“standing costrels”) and *cantils* (“globular costrels”) as two variations of the same basic form. *Cantils* have a distinct form, described above, which makes their identification relatively simple. All of the solidly identified examples in Newfoundland have fabric and decoration attributes which point to a production in the Aveiro region. Although recognized, *cantils* are rare in seventeenth-century Portuguese collections with ceramics from the Aveiro region. It was suggested by several Portuguese archaeologists working in Porto and Aveiro that *cantils* have a specialized function to be used on board a ship (Paulo Dordio 2006, pers. comm.; Claudio Brochado 2006, pers. comm.; Patrícia Carvalho 2006, pers. comm.). Clues to this function are in the lug handles, which could be used for hanging the vessel, or fitting it into a holding frame, both which would have been very useful on a boat. This form may have not been produced solely for export, but it was certainly a form that was consumed regularly by the English it seems more frequently than by the Portuguese. It is not clear if *cantils* were a common presence on Portuguese ships in the seventeenth century although on the sixteenth-century

Portuguese-supplied Armada ships, the *cantil* has not been identified (Martin 1979; Marken 1994). *Cantils* were not found on the seventeenth-century Portuguese wreck off Mombasa (Sassoon 1981). Mitchell Marken also did not identify the *cantil* in any of his seventeenth-century Spanish wrecks which had other Portuguese Redware aboard (Marken 1994). This absence, when compared to the relative frequent presence in English sites of the *cantil* suggests that this form may have been, if not produced for a English market, a form that was marketed to and consumed eagerly by the English (Hurst 1986: 69-74; Blanchard 1989; Gutiérrez 2000: 74-79).

6.6 *The Aveiro Connection*

If one overlooks the olive jars, the majority of securely identified Portuguese Redware in Newfoundland exhibits characteristics very similar to the ware produced in the Aveiro region. The Newfoundland forms and fabrics are analogous to contemporaneous samples from Porto and Aveiro that were produced in the Aveiro region. The ratio of glazed to unglazed ceramics is also similar to seventeenth-century contexts containing Aveiro-produced ceramics in Porto (Paulo Dordio 2006, pers. comm.). If there was a large amount of Lisbon or Coimbra produced redware, one would expect to see vessel forms unique to these areas in greater quantity. This is especially the case with the classic Lisbon horizontal-handled *panelas*, which are ubiquitous in contexts where Lisbon produced redware are present (Diogo and Trindade 1995; António Marques 2006, pers. comm.; Paulo Dordio 2006, pers. comm.). Instead, what one sees with the Newfoundland collections is a plethora of uniquely Aveiro-style vessel forms with a small number of vessel forms that could be attributed to areas like Lisbon. These other

vessel forms include a small amount of triangle-lug-handled *panelas* and a few sherds that are glazed that exhibit the pinker Lisbon style fabric. There is a possibility, as stated in a previous chapter, that wares from Prado or Braga could be occurring in small quantities in Newfoundland but have been merely un- or misidentified. Nevertheless, the majority of the non-olive jar redware sherds and vessels found in Newfoundland from Portugal seem to have been produced by Aveiro *barrios*.

The Portuguese Redware olive jars in Newfoundland inhabit a category unto themselves. They do not, as discussed below, occur normally in Portuguese contexts, and yet are the most numerous redware vessel type that occurs in Newfoundland. On first glance they are visually dissimilar to a typical Aveiro style form and fabric. However, upon closer examination of the fabric, the olive jars exhibit many similarities to the known Aveiro fabrics. The inclusions are the same, the general colour is similar and the olive jars often exhibit one of the main Aveiro-style fabric markers, which is the large opaque quartz inclusions. The main differences is the marbling of the fabric and its softness. The olive jars are often slipped with white, but they can be burnished, plain or glazed; all of the latter result in sherds that are very similar to the Aveiro style. More tellingly, when tested for trace elements, the olive jar sherds matched well with the other Newfoundland sherds that had been visually identified as being from Aveiro. This will be further discussed in the next chapter.

What may have happened with the olive jars is they were being produced in Aveiro from lower quality clays and with less care than the other Aveiro vessels. They may have been mass produced for an export market for basic storage use. This may have resulted in a lower quality expectations, which would have resulted in the use of lower

quality clays. This being said, Portuguese olive jars are still of much higher production quality than typical Spanish olive jars of the seventeenth century (Mintz 1968; Sassoon 1981; James 1988). Their fabric is finer and their vessel shape is more regular. This fits with the historians' assertion that ceramic production was being regulated in Aveiro from the late sixteenth century onwards, leading to quality vessel production (Bettencourt 1995). The Aveiro region was also known for actively marketing its wares outside of the region, which would make production of a vessel almost exclusively for an export market part of a larger context (Bettencourt 1995).

6.7 Overall Relative Frequencies of the Ware

Portuguese Redware is a commonly occurring ceramic in seventeenth-century English contexts in Newfoundland. It is found at sites where there is a significant amount of ceramic material recovered. It is also found in small quantities in French contexts at Placentia (Amanda Crompton 2007, pers. comm.; Stephen Mills 2007, pers. comm.). In order to discuss the frequencies of Portuguese Redware in Newfoundland collections, the sherd numbers and attributes from two sites will be examined here. There are two main collections of Portuguese Redware in Newfoundland that have enough sherds to make examining the patterns of appearance relevant. These two collections are Ferryland (CfAf-02) and 327 Water Street (CjAe-08) in St. John's. These collections have been well documented and their databases and sherds were made available for this research. A third collection, the wreck of *HMS Sapphire*, also yielded a great deal of Portuguese Redware, but was examined partially as it does not reside in its entirety in Newfoundland. It therefore did not yield numbers comparable to the two other collections. Ferryland and

the Water Street site, although both having strong seventeenth-century components, are not entirely comparable as whole sites. This is mainly due to the scale of the sites, as well as their differing occupations. However, there are some interesting possible reasons behind the differences in frequencies of Portuguese Redware between these sites and these are worth discussing. Examining the two different scales of site also demonstrates the differences of the makeup of Portuguese Redware collections that can occur in English sites in Newfoundland. The Ferryland collection, due to the large amount of Portuguese Redware sherds (over 9000), was sampled. Since CjAe-08, has only a total of 227 Portuguese Redware sherds, I was able to examine it in its entirety.

At CjAe-08, approximately 24 percent of the coarse earthenware sherds recovered are Portuguese Redware. At Ferryland, approximately 13 percent of the coarse earthenware is Portuguese Redware. The possible reasons behind this higher percentage of redware at Water Street will be discussed in the next section. Of 227 Portuguese Redware sherds from CjAe-08, 10 sherds or approximately 4 percent were identifiable as rims, handles or bases. Another 40 body sherds were attributable to specific forms. The remainder of the sherds were either too small, too fragmented or too worn to be diagnostic. Many of the redware sherds from CjAe-08 are water-worn. At this site, 65 sherds are glazed, with the remaining 162 sherds unglazed. Slips on the Water Street sherds were difficult to reliably identify, due to the worn surfaces of the sherds. The worn surfaces of the sherds also lead to difficulty for the cataloguers in identifying some sherds as either North Devon Smooth or Portuguese Redware.

Of the 9282 identified Portuguese Redware sherds at Ferryland, as of 2005, approximately 8 percent of the sherds are diagnostic; identified as rims, necks, shoulders,

bases, etc. The larger collection and superior ceramic preservation at Ferryland explains the higher percentage of diagnostic sherds. The rest of the Portuguese Redware at Ferryland is relatively fragmented, although there is a great deal of cross mending that still needs to be undertaken. It is difficult to infer the vessel form for many of the body sherds. The redware at Ferryland contains a lower percentage of glazed sherds than Water Street, with 780 sherds identified as glazed. Approximately 900 sherds were identified with white slip, which is a marker of the olive jar form. The low percentage of glazed sherds (which is lower than that of one slip colour) fits well with the known ceramic production from the Aveiro region. The region is not well known for producing glazed ware, but it is well known for producing slipped and burnished vessels. If the Portuguese Redware at Ferryland exhibited a high percentage of glazed sherds, that would be more congruent with ceramics that had been produced in Lisbon or Coimbra.

The higher percentage of glazed material from the Water Street site raises questions of the ceramic's production provenience. This site also has a higher than average total percentage of Portuguese Redware, with this being particularly apparent on a beach context which was sealed in the later seventeenth century (Pope 2003: 10; Pope 2004b: 186). Several of the site's events have more Portuguese Redware than any other type of coarse earthenware. The project director has suggested that this may be evidence of direct Portuguese activity at the site (Pope 2003: 10; Pope 2004b: 186). Although the site has yielded a high percentage of redware olive jars, this still may fit the pattern of a possible Portuguese presence, as redware olive jars have been discovered on at least one Portuguese ship that was engaged in long distance commerce (Sassoon 1981). The olive jar presence may also be reflecting the mixed occupation of the site, which was certainly

not solely utilized by one group. Overall, the CjAe-08 sherds do not fit well with a strong Aveiro production provenience. There is a higher percentage of glazed ware, and the fabrics of the Waterfront sherds tends to be pinker, which is one attribute of a Lisbon-produced ceramic. With all of this taken into account, Dr. Pope's suggestion may be a valid one, with the higher amount of glazed ware perhaps signifying a crew presence from Lisbon, or, simply a differing depositional pattern, one which deviates from the usual English pattern.

6.8 The French Sites

At Placentia, Portuguese Redware was identified in seventeenth-century French contexts. There was not a great deal of material identified in contexts that were absolutely identified as French, however their presence is still significant. This is because it could be a result of non-French trade associated with the French colony. The late seventeenth- eighteenth-century Castle Hill site has the most Portuguese Redware examples in the French Placentia collections. At the older Vieux Fort, only a few sherds of Portuguese Redware were recovered, with only one (relatively) identifiable vessel; a panela (Figure 6.19). At the New Fort, where excavations only recently concluded and events have not been yet assigned as French, English or mixed, the only examples present were interpretable as olive jars.

With the Castle Hill site, the majority of the ceramics are from Spanish olive jars (Grange 1971: 275-287). This is in contrast with the Vieux Fort, which has only one sherd of Spanish olive jar fabric (Amanda Crompton 2007, pers. comm.). Roger Grange, the project director of the Castle Hill excavation and site report author, did an admirable

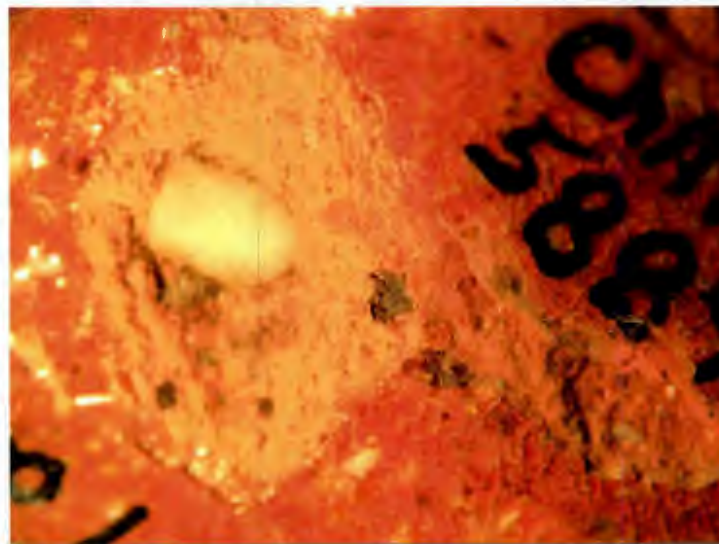


FIGURE 6.19. *Panela*. Vieux Fort, Placentia, Newfoundland. (Photo by author, 2007.)

job describing the ceramics from this site. He was not familiar with the ceramics, so he did his best just describing what they were. The Portuguese Redware that was recovered was labeled "Orange Paste Earthenware, Glazed and Unglazed" (Grange 1971: 287-333). Not all of the ceramics that were labeled "Orange Paste Earthenware" are Portuguese, however. The category was quite broad and could be incorporating other ceramics, including other French earthenwares. At least six unglazed vessels and six glazed vessels were identified recently by Amanda Crompton as Portuguese and occurred in the French levels of the site. One of these vessels is from a solid French context and is burnished in the Aveiro style. Overall, there is a greater amount of glazed Portuguese sherds coming from solid French contexts at the site, with the unglazed ceramics more prevalent in the "likely French" contexts or mixed contexts. Although this is an interesting pattern, the Portuguese sample size at this site is too small to make any firm hypotheses about it. The appearance of Portuguese Redware in French contexts in these sites will be discussed further in a subsequent chapter.

6.9 Form Frequency

As discussed above, the majority of identifiable Portuguese Redware vessels in Newfoundland are olive jars. Olive jars form 59 percent of the solidly identified vessels. After the olive jars, *alguidars* and *cântaros* are the next common forms to be identified. *Panelas*, type A *bilhas*, *tigelas* and *púcaros* are next, followed by type B *bilhas*, *caçoilas*, *cantils* and *testos*. Only one *prato* and one *jarro* were identified (Figure 6.20).

It was often difficult to firmly identify vessels from the sherds available, as many of the collections had highly fragmented ceramic material. Some of the initial

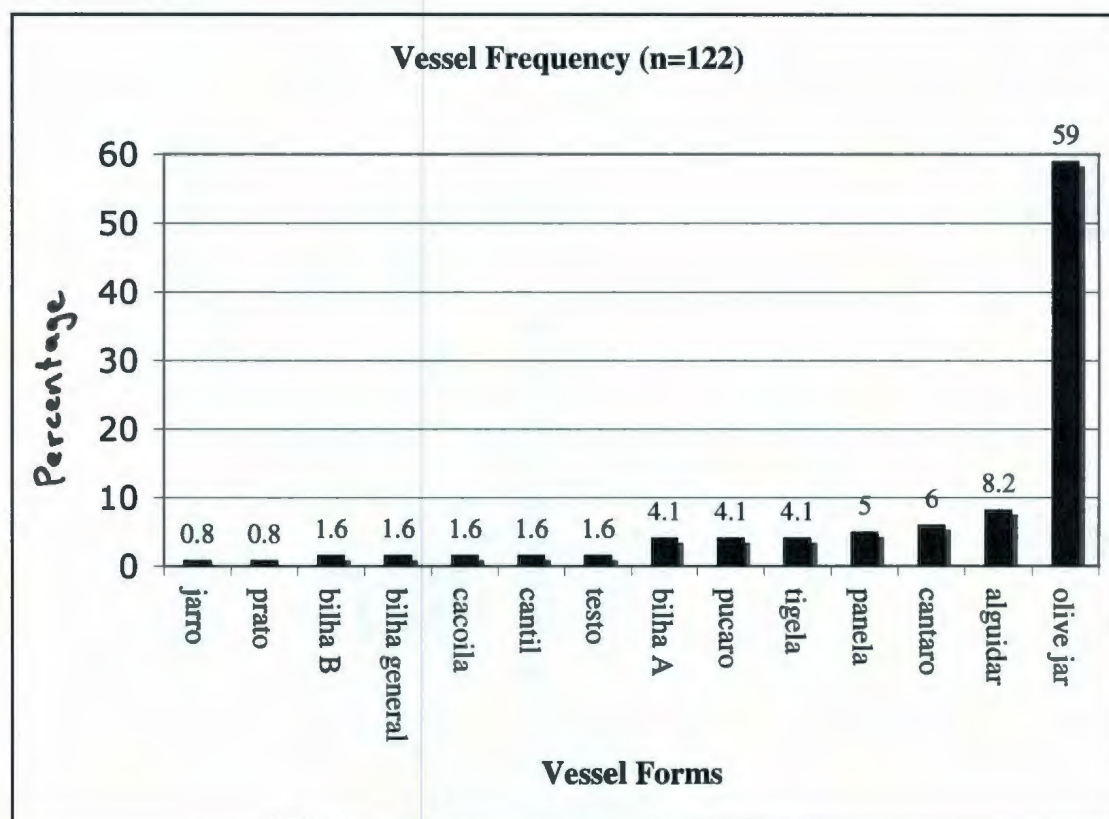


FIGURE 6.20. Form frequency of Portuguese Redware vessels in Newfoundland. Note that only solidly identified vessels are included, save for the “bilha general” category, which are bilhas which do not have enough material to be identified as A or B type.

identifications had to be reevaluated after the research in Portugal, as vessel forms thought to be one type, ended up being another type upon further research. One of the main confusions was between *bilhas* and olive jars. The body sherds of these vessels look similar when broken into small sherds. Some of the main distinguishing characteristics between these forms are the fabric and finish of the sherds. The olive jars in Newfoundland commonly exhibit the marbled fabric, which is rare to non-existent in *bilha* forms. *Bilhas*, when burnished, have vertical burnish lines on the body, and olive jars do not exhibit vertical burnish lines. The olive jars are commonly slipped in white as well, which does not occur on the *bilha* forms. In some previous identifications rim and necks were identified as “bottles” or “costrels” when they were actually olive jars (Pope 1986; Crompton 2001; Pope 2003: 13). *Bilha* rims and necks are finer and more narrow than that of olive jars. The olive jar rims always have a pronounced triangular profile and the necks are short and truncated by a sharp angle to the shoulder. In *bilhas*, the necks are longer and there is a more open angle to the shoulder.

There were some vessels encountered in the study that merit further specific discussion. First, it was noticed that two styles of *cântaro* exist in the Newfoundland collections. The first style is a larger, coarsely burnished vessel that has an internal rim diameter of approximately 11cm. The second is a smaller, sometimes finely burnished vessel, which is best exemplified by a reconstructed example from Renews. The internal rim diameter of the Renews vessel is only 6.5cm. When compared to the larger *cântaros* found at Ferryland, the Renews vessel is almost a miniature. At the Casa do Infante collection, there were examples of this size difference in vessel types, particularly *fogareiros* produced in the Aveiro region (Paulo Dordio 2006, pers. comm.). With the

Newfoundland *cântaros*, even though the size difference is significant, the forms are very similar and do not warrant separation into a different vessel category. In fact, when photographed without scale, the small *cântaro* is almost indistinguishable from the larger examples, save for the finer decorative burnishing. The *cântaros* were multi-use liquid holding vessels, therefore the larger examples could have been used for storage and serving, whereas the smaller vessels may have been reserved for table use.

In the CjAe-08 collection, the only glazed *tigela* was encountered. All of the other *tigela* examples in Newfoundland recorded for this project were burnished. The Waterfront *tigela* consisted of a rim section which was glazed with a dark green glaze on both the inside and the outside of the vessel. The rim was quite waterworn. The Waterfront collection, as discussed above, has a high percentage of glazed Portuguese Redware sherds. The *tigela* has a lighter, pinker fabric than the typical Aveiro-style *tigelas* and is closer in fabric to that of a Lisbon production. This fits in line with the general composition of the CjAe-08 Portuguese Redware fabrics, and the fact that the *tigela* is glazed is another attribute pointing to a Lisbon production for the vessel. CjAe-08 yielded a great deal of sherds from olive jars which were glazed in a green to green-yellow glaze and fewer sherds that exhibited burnishing or white slip, which occur on the olive jars at Ferryland.

Finally, an unusual vessel was found at ChAe-02, in the Rooms collection. This vessel was thus far unidentified. It consists of a rim and neck section. The rim is rectangular in profile and the neck has a pronounced ridge. The outside rim diameter is 14cm. This vessel is not a *panela* or *cântaro*, as both of these vessel types either have rounded or triangular rim profiles. It may be an example of a type of *talha*, or large, flat

bottomed storage jar. It is unknown if the vessel had a handle or not. It is slipped with a terra cotta coloured slip and has an Aveiro-like fabric type. Its flat, rectangular rim profile is unique in the Newfoundland collections, and another vessel of this rim type was not encountered in the sample (See figure in Appendix A).

6.10 Conclusion

This chapter presented a typology for the Newfoundland Portuguese Redware forms. It is hoped that this typology will assist in the further and clearer identification of Portuguese Redware in Newfoundland archaeological contexts. The fabrics of Portuguese Redware were discussed and possible production proveniences, as well as possible export forms were presented. The composition of Portuguese Redware collections from both Ferryland and 327 Water Street were examined and reasons for the differences in these collections were discussed. The Portuguese Redware presence at French sites in Placentia were also discussed. Finally vessel frequencies from the pan-Newfoundland sample were presented and specific vessel examples were examined. This chapter presents an overall view of the Portuguese Redware in Newfoundland and should help to clarify the definition of the ware for present and future identifications.

Chapter 7

Laser Ablation Inductively Coupled Plasma Mass Spectrometry and Portuguese Redware in Newfoundland

7.1 Introduction

To supplement the visual identification and classification of Portuguese Redware in Newfoundland, a preliminary study of the ware's trace elements was undertaken utilizing laser ablation inductively coupled mass spectrometry (LA-ICP-MS). A sample of sherds from three sites in Newfoundland, Ferryland (12 sherds), 327 Water Street (3 sherds) and the Vieux Fort at Placentia (4 sherds), as well as one site in Portugal, Casa do Infante (9 sherds), were tested. This chapter will begin with a discussion of the LA-ICP-MS technique. It will then move onto a description of the methodology used. The results of the testing will be presented in the next section. Finally, the results will be examined and some possible interpretations will be presented. How the results fit with the visual identification of the sherds will also be discussed.

7.2 The LA-ICP-MS Technique

There are many options when one decides to undertake compositional analysis of ceramics. Some of the more popular methods which have been successfully used, and widely published on, in the past include instrumental neutron activation analysis (INAA), X-ray florescence (XRF) and proton-induced X-ray emission (PIXE) (Barclay 2001; Spearman and Neff 2005). Another technique that is being chosen more and more often is inductively coupled plasma mass spectrometry (ICP-MS). In the Archaeology Unit at

MUN, ICP-MS has been previously used on historical ceramics, with encouraging results (Gaulton and Mathias 1998; Hughes 2008; Pope and Batt 2008).

ICP-MS has been used in archaeometric studies from the late 1970s onwards (Speakman and Neff 2005). ICP-MS is a technique which can detect elements at a lower level than most other techniques; with elements being detectable from the low parts-per-million to parts-per-trillion (Gratuze et al. 2001; Kennett et al. 2004; Speakman and Neff 2005: 4). It also has the ability to detect almost any element. This is in contrast to other techniques, such as INAA, which are limited to the amount of elements they can detect (Barclay 2001; Speakman and Neff 2005). The ability of ICP-MS to detect a very wide range of elements to minute amounts can lead to a high degree of resolution when studying the chemical composition differences between ceramic samples (Hughes 2005). ICP-MS also has the capability of processing a great deal of samples at one time (Barclay 2001). ICP-MS is also cost effective, when compared to high cost techniques such as INAA (Barclay 2001).

ICP-MS is normally performed using a sample of the ceramic dissolved in solution (Barclay 2001; Pillay 2001; Kennett et al. 2004; Speakman and Neff 2005). The preparation of this solution is time consuming. Although it requires a smaller amount of ceramic, which is powdered for dissolution, than other techniques, it can still be destructive to the ceramic samples (Kennett et al. 2004). There is, however, another method of processing samples by ICP-MS. This is by using laser ablation (LA-ICP-MS), rather than a solution. Laser ablation is being used more as the technique is refined and has been proven to be extremely effective with archaeological material (Speakman and Neff 2005). This is the technique which was chosen for this project.

LA-ICP-MS is a technique which ablates a small area of the sample, therefore vaporizing the material and allowing the ICP-MS system to detect the elements within. Because the area of ablation is so small (generally smaller than 1000 by 1000 microns less than 30 microns deep), the technician can choose very carefully what area of the sample will be analyzed (Speakman and Neff 2005: 2). This is particularly useful in ceramic analysis, as the temper in a sherd can be avoided, therefore testing only the clay matrix. This is difficult to do when utilizing solution processing, as the inclusions in the sample are often powdered with the clay, therefore potentially affecting the element levels. LA-ICP-MS, due to this precision of vaporization, has much potential for the testing of glazes or slips (Gratuze et al. 2001). Even with the small areas tested, LA-ICP-MS has proven an effective technique for the bulk chemical characterization of ceramics, with results that are comparable to other techniques, such as INAA, and solution ICP-MS (Speakman and Neff 2005: 3). There are a number of studies that have concentrated on the application of LA-ICP-MS to archaeological material if more information is desired (Devos et al. 2000; Gratuze et al. 2001; Mommsen 2001; Pillay et al. 2001; Speakman and Neff 2002; Tsolakidou and Kilikoglou 2002; Hill et al. 2004; Kennett et al. 2004; Klein et al. 2004; Gliozzo et al. 2005; James et al. 2005; Speakman and Neff 2005; Sinopoli et al. 2006; Bartle et al. 2007).

7.3 Methodology

The LA-ICP-MS testing was performed at the Earth Sciences department Analytical Geochemistry Group lab at MUN under the supervision of Wilfredo Diegor and Pam King. Although it is possible to perform in-situ LA-ICP-MS testing, therefore

causing almost undetectable damage to the artifact, the MUN Earth Sciences lab ICP-MS instrument is not equipped to test full artifacts (Bartle et al. 2007). Therefore, for these tests, very small fragments of the sherds were broken off, taking care not to damage the rest of the sherd. The fragments that were removed did not cause much notable damage to any of the sherds. These fragments were then mounted in epoxy. The epoxy was then sanded to expose a smooth, flat surface of the fragments. The epoxy was then washed off and let to dry prior to being placed in the laser sample cell (Diegor 2007). The system used was a HP4500 ICPMS instrument with a New Wave (Universal Platform) UP213 nm NdYAG laser ablation system attached (Diegor 2007). Thirty nine elements were analyzed in twenty eight sherds. One Ferryland sherd, from an *alguidar* which had, visually, the typical Aveiro-style fabric, was tested three separate times in order to examine the variance in the elements within one sherd. Each sample had four to seven ablations performed, from which a mean was taken and the standard deviation from the mean was noted. Several ablations per sample were needed in order to give an accurate impression of the sample's composition. Diegor's full methodology is included in Appendix C. This methodology covers the settings of the ICPMS instrument as well as the maximum limits of detection for the elements.

This project is the first time Portuguese Redware has been tested, in any significant amount, for elemental composition. The sherds for the testing came from the 327 Water Street, Ferryland, the Vieux Fort site in Placentia as well as the Casa do Infante site in Porto. Because there has yet been no testing of clays from Portugal, nor is there a base of sherds that have been previously tested which can be compared with these sherds, there is not a great deal which can be inferred from the results as to the

provenance of the samples. Early modern ceramic provenance studies in Portugal are relatively new, as are compositional analyses of these ceramics. The sherds from Newfoundland were tested for this project in the hopes that it would spur more interest in Portugal in this method and encourage further testing, as well as cooperation between labs. Reaction to the project has been positive thus far and it is hoped that further analysis and cooperation will result. The compositional study of Portuguese Redware has only just started, therefore the results here will be presented as a preliminary analysis. This project is an initial exploration into the elemental composition of Portuguese Redware. More specifically, it is an exploration of the Portuguese Redware of Newfoundland which includes several sherds from Porto as a basic comparison.

7.4 The Results: Numbers and Discussion

The testing undertaken for this thesis was a preliminary exploration of the trace element composition of Portuguese Redware. At the present time, it is not possible to expand beyond a preliminary discussion as there has been no comparable research undertaken concerning ceramic production areas in Portugal, or elemental composition of other Portuguese Redware sherds in collections outside of Portugal.

Upon initial impression, it is clear that the samples from Newfoundland have similar elemental composition (see Appendix C). Most of the elements exhibit amounts that are within a similar range. Figure 7.1. illustrates two elements, lutetium and thulium, that were tested and exhibited similar amounts through all the samples. This is encouraging as the samples come from the three different types of Portuguese Redware fabric that I have recognized.

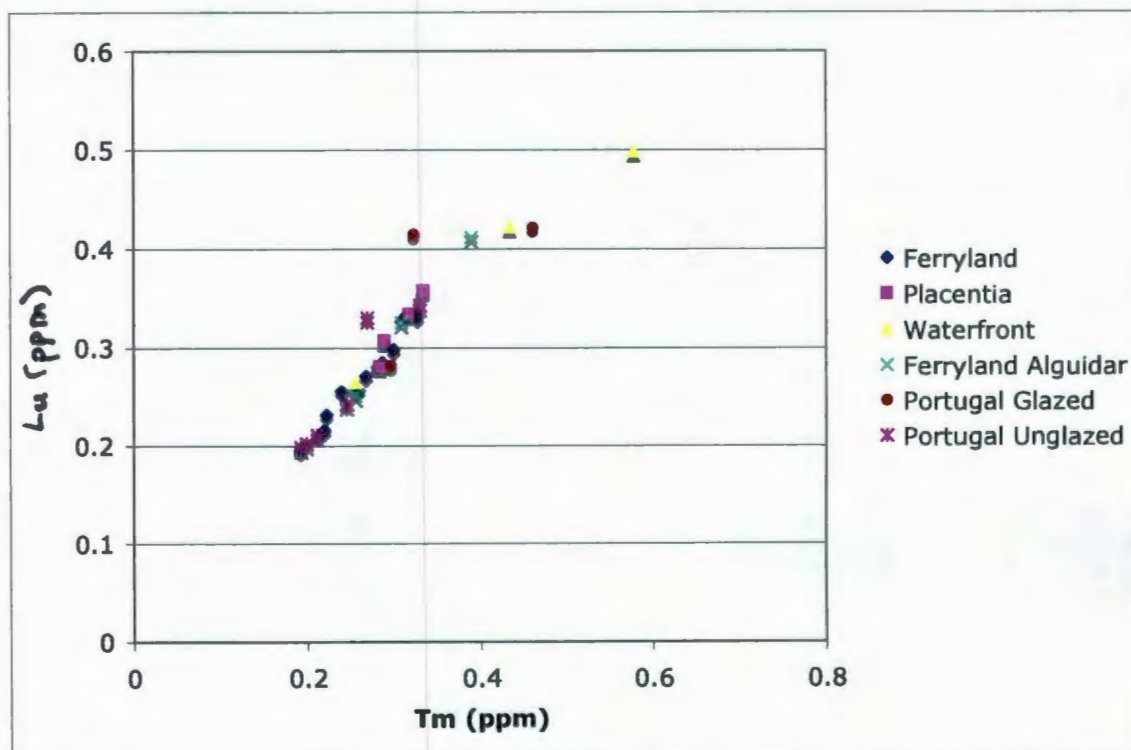


FIGURE 7.1. A graph displaying the amounts of lutetium (Lu) and thulium (Tm) within the sample, separated by site.

More encouragingly, the samples that are from the typical olive jar fabric, the Soft Marbled, seem to be composed of similar amounts of trace elements, which could signify a similar production provenance to that of fabrics visually identified as Aveiro-style. Beyond seeing a similarity in the pattern of composition, however, there is not much more one can glean from these numbers until they are placed within a greater context of clay, soil and further ceramic testing. This was realized when the numbers were examined from the Ferryland *alguidar* sherd which was tested multiple times. This sherd exhibited a degree of variation in trace element composition, specifically with zirconium and hafnium. The sample taken closest to the outside of the sherd exhibited elevated levels of these two elements, which could point to the elements being affected by metals leaching into the sherd from the soil in which it was buried. Zinc numbers also varied greatly, as did silver numbers (Figure 7.2). Element testing of the context soils for all of the sample sherds would be a useful next step in order to determine what elements in the sherds could be affected by the soil environment. This would also be an essential step in the comparison of the Portuguese samples with the Newfoundland samples.

Although the samples from Porto exhibited a similar general pattern of element amounts, there were elevated levels of copper, zinc, rubidium and silver when compared to the Newfoundland samples (Figure 7.2). Whether this is from the sherd themselves, or, more likely, from their soil contexts, is unknown as there has not been an analysis of the soil composition for these layers at the Casa do Infante site. Visually, the unglazed

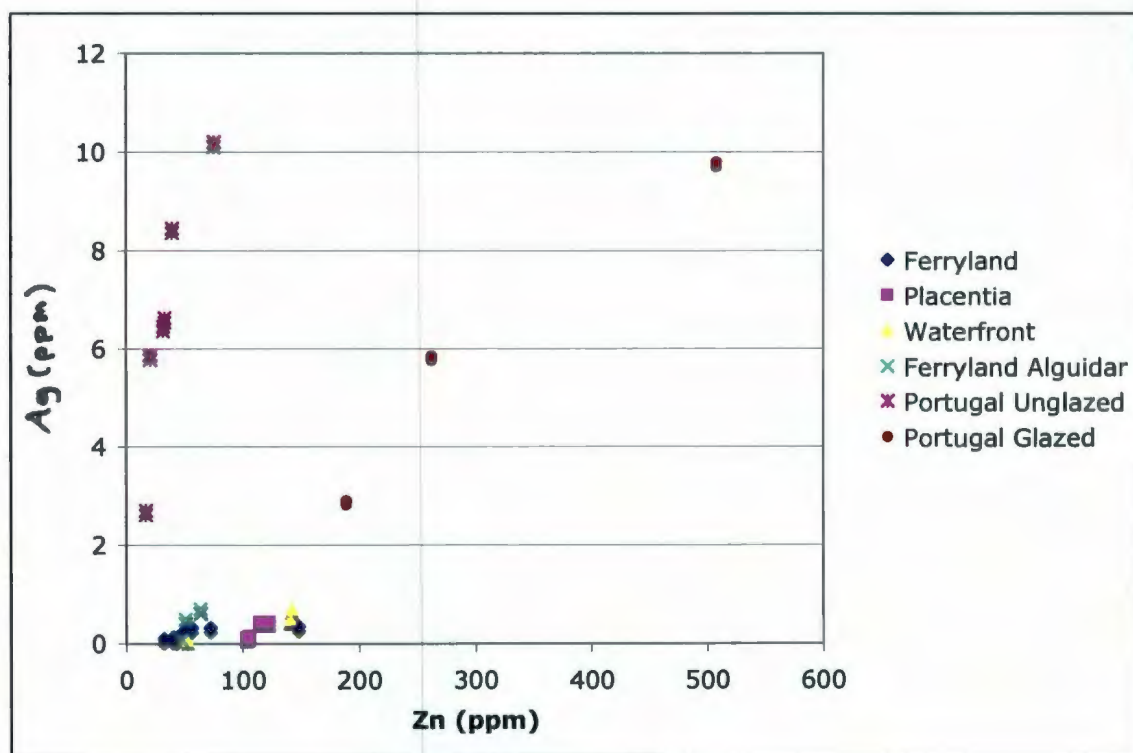


FIGURE 7.2. A graph displaying the amounts of silver (Ag) and zinc (Zn) within the sample, separated by site.

samples from Casa do Infante are basically indistinguishable from the Aveiro-type sherds from Ferryland and the similarity in the element amounts, save for the metals mentioned above, reflects this similarity.

Initial chemical testing with XRF of Redware sherds from Casa do Infante showed similar levels of rubidium to what this testing showed in the Porto samples, although the levels did vary, which could be signifying that the sherds are being affected by the soil chemistry at the site (Castro et al. 1999: 224). The samples from Casa do Infante tested here show similar element levels to the Redware samples tested by Castro et al., although they were only able to test a limited amount of elements, of which only Al_2O_3 , TiO_2 , Ba, Zr, Sr and Rb were also tested for this project. Further work will be needed to determine if any significant differences in element levels could be caused by the differences between LA-ICPMS and XRF testing.

A serious issue with the testing for this project was the inability to record viable numbers for lead levels. The lead levels in the sherds varied widely, and it is thought that they were skewed due to the possible contamination of some samples with glaze (Diegor pers. comm. 2007). The samples that showed the most elevated levels of lead were, in fact, from glazed sherds and these levels may have been due to glaze leaching throughout the fabric of the ceramic. Even minute amounts of lead glaze can seriously affect the numbers the testing generates. For subsequent tests, it will be imperative that any contamination by glaze is eliminated. The numbers from the lead will not be included here as they were skewed enough to be irrelevant.

The main issue with these tests is that they were performed in a vacuum, without comparable Portuguese clay trace element compositions available. There has also been almost no trace element analysis performed on early modern Portuguese coarse earthenware anywhere in the world, so there is not much comparable data. Within the confines of an MA project, it was not possible to test a large enough sample to generate a significant amount of background data.

7.5 Conclusion

This chapter and the data within is meant to serve as an initial exploration into the trace element composition of Portuguese Redware sherds in Newfoundland. Although the testing is very preliminary, patterns of similarity are seen between the Newfoundland samples across different fabric types and sites, potentially signifying a similar production provenance. The Newfoundland samples are also similar to the samples tested from Casa do Infante, although there are differences in levels of several metals which may be due to soil contexts from which the sherds were recovered. I hope that this testing will encourage the use of LA-ICPMS, as well as other trace element testing of Portuguese Redware samples from both Portuguese and non-Portuguese contexts. LA-ICPMS proved to be an inexpensive, non-destructive technique which produced valid measurements of the element composition of the sherds. The worth of these numbers will greatly improve with further testing of more samples, testing of context soils as well as clay sources in Portugal. LA-ICPMS has the potential to be an extremely useful technique for processing a large amount of samples effectively and cheaply. I will be

encouraging further use of LA-ICPMS for the testing of sherds in Portugal which is being currently planned and will also offer the numbers generated through this project for comparison.

Chapter 8

Consumption Theory

8.1 Introduction

This chapter will present the theoretical framework which underlies the discussion of factors affecting the consumption of Portuguese Redware and how this relates to the occurrence of the ware in Newfoundland. This theoretical framework is consumption theory. The chapter will begin with a few simple definitions and move on to explain the theory and how it is applied.

8.2 Definitions

In a discussion of a particular theoretical discourse, it is useful to begin with some basic definitions. With consumer behaviour models, a definition of what a consumer is would be the most appropriate. In contemporary material culture studies, a consumer is narrowly defined as a person (or household, or group) who partakes in the mass purchasing of goods that is indicative of Western society (Miller 1995). In many historical studies, consumers are seen as people who actively took part in the revolutions of mass production/consumption occurring from the sixteenth century onwards in Europe and America (Shammas 1993, Weatherill 1993). For the most part, these are the definitions of “consumer” followed by archaeologists. Therefore, consumption behaviour models in archaeology have largely been applied to historical sites in North America and Europe.

8.3 *Consumption Theory*

The earliest consumer behaviour theories were based on economic models of human activity (Campbell 1993). These theories directly correlated increases in income to increases in commodity consumption. The motivations behind these increases in consumption were simply explained by class and status. Hence, the choice to buy certain goods was directly motivated by the need to demonstrate upward class and status movements. This motivation has been called the “theory of conspicuous consumption” (Henry 1991, Veblen 1934). In archaeology, this theory is best demonstrated by the ceramic indices developed by George Miller (1980). These indices link types of ceramics found on nineteenth-century sites with the economic status of the household in which they were associated. With this theory, the consumer choices of a household will certainly reflect its income by way of the value of the goods being discarded. These indexes were better suited to explaining consumption’s effect on households, rather than reasons why households consumed certain goods (Klein 1991). Frustration grew when a 1987 workshop run by the Society for Historical Archaeology failed to meaningfully consolidate ceramic indexes taken from urban sites across the United States. The data from the consolidated indexes were inconclusive, and did not present the strong patterns of consumption that were expected to emerge (Klein 1991). Why did this happen? The income-based ceramic index system did not take into account the many variables that occur with the consumption of goods (Klein 1991). Colin Campbell (1993) argued for an abandonment of “‘mono-motive’ perspectives” when examining consumption and,

although he is a historian, this idea of multi-motive consumer behavior began to infiltrate archaeological theory in the late 1980s.

In 1991, the Society for Historical Archaeology published a journal volume devoted to the development of consumer behaviour theories (*Historical Archaeology* 25 (2)). In the volume, Susan Henry outlines a basic model for consumer behaviour, synthesizing much of what was archaeologically applicable in history, anthropology, as well as sociology and economics. She notes two main categories of influence over consumer behaviour. The first, external influences, consisted of influences coming from sources such as marketing and the "socio-cultural environment" (Henry 1991:5). The second, internal influences, came from the consumer themselves. These influences were such things as self perceived "needs" (physiological, social and otherwise) and psychological influences such as perception, attitude and personality (Henry 1991:9). She surrounds the internal influences with a "black box" and suggests that the archaeological record is not conducive to investigating these influences. She also argues that archaeologists must examine not only the influences surrounding consumer behaviour, but also the post-use deposition of the goods they were consuming. She states this because not all goods that are being purchased (especially in a historical context) are appearing in the archaeological record because of factors such as reuse. She argues that factors such as reuse can skew the patterns of consumer behaviour on a site and suggests that the use of documentary evidence, such as purchase and probate records, could help to alleviate some of this distortion (Henry 1991:11). The reality of the reuse of objects and the effects that reuse has on the study of consumer behaviour is important in the study of

material such as pottery discarded by seamen living and working in harsh or unfamiliar conditions. The pottery may have been manufactured for a specific purpose and may also have been originally purchased to be used for that purpose, but may end up having a multi-functional use life expanded from the original manufactured purpose due to the necessities of nautical existence. In the case of Portuguese Redware purchased by foreign sailors, this pottery may have been originally purchased with the intention of a multi-functional use life.

In the same volume of *Historical Archaeology* Charles Lee Decker published what he argued to be the key concepts of consumer behaviour research. Like Henry, he includes a variety of influences, but instead of using ones from internal sources, he expands the external influences by including such variables as “regional market characteristics”, whether the consumers lived in urban or rural environments, if they were consuming durable or expendable goods, ethnic or socioeconomic class and household income (Lee Decker 1991: 33). Lorna Weatherill, whose 1993 paper was published in the influential volume *Consumption and the World of Goods*, argues that the household’s evolution over time will affect its consumers’ decisions. Temporality and evolution of a household seems to be one issue that is not fully addressed in the archaeological theories. Weatherill states, especially at the beginning of the mass commodity “revolution”, households went through changes that fundamentally affected consumer choice: for example, the development of separate rooms for cooking (Weatherill 1993: 214-215). Placing the household in the correct time and stage in its evolution is essential for deducing the motivations behind consumption. Although the people who were involved

in the purchase of the Portuguese Redware which made its way to Newfoundland were not purchasing these goods for a household in a traditional sense, they certainly would have been influenced by the general changes in households which fundamentally affected consumer choice. They would have also been affected by how their households, the ships and networks connected to them, changed over time.

In the above papers the internal influences, and therefore the place of human agency, have been downplayed in favour of external factors. But one cannot ignore the influence of the consumers themselves on the purchases they make. The example of the 1991 *Historical Archaeology* volume shows that historical archaeologists were concerned with recognizing motives behind the consumption of the goods they were finding on sites. They began to look out of the field into historical and anthropological research, both of which had been dealing with the problem of consumer motives for years. One of the main theories that was being developed in both these fields was the addition of human agency into the consumer equation. In 1986, Arjun Appadurai, an anthropologist, suggested that "consumption is eminently social, relational, and active rather than private, atomic, or passive" (Appadurai 1986: 31). This conflicted with the economic model of consumers being passive participants in the cycle of production and consumption, or "universal, utility maximizing, free standing human agents" (Appelbaum 1998).

The issues of human agency in consumption have been thoroughly addressed by historians and anthropologists. Campbell explores the influence of "character" on consumer choices. In his argument, eighteenth-century Britains strove to justify self-identification into a series of character groups. He argues that it was more than pure

external social factors that caused people to buy certain goods to “fit in” with the groups they associated; there was a need for personal justification and a sense of belonging. Not all purchases were meant to uplift social status, many were to entrench and justify the current status of the individual (Campbell 1993). Adding to the theory of agency, there is the economic anthropologist Daniel Miller. Miller has been a longstanding advocate of including human agency in consumer behaviour models. He is one of the first researchers to study shopping behaviour (Miller 1998). With the study of shopping, he examines the personal and symbolic reasons for purchases, and tends to look at the process as individualistic. He is an active advocate of de-vilifying consumer studies and separating consumption from capitalism. He argues that studies of consumption have negatively linked with the over-consumption which often comes with a capitalist economy, and that this should not be the case; the drive to buy goods is a fundamental part of human nature (Miller 1995).

8.4 Conclusion

The motivations behind the acquisition of Portuguese Redware by seamen coming to Newfoundland can be examined by looking at the external factors affecting consumption behaviour, such as the economic systems, but also with some of the potential internal factors, such as agency. Before these factors can be discussed in detail, we need to understand the background of North Atlantic trade in the sixteenth and seventeenth centuries. The next chapter will consider the context in which the consumption of Portuguese Redware occurred.

Chapter 9

Why? The Consumption of Portuguese Redware and Its Appearance in Newfoundland

9.1 Introduction

This chapter will discuss the reasons behind the possession of Portuguese Redware by the English and French in Newfoundland in the late sixteenth century through the seventeenth century. The Newfoundland ceramic material that was examined for this thesis came from mostly seventeenth-century contexts, with some examples coming from possible late sixteenth-century contexts. Therefore, this discussion will focus on the consumption variables in seventeenth-century commercial relationships between Portugal, England and, to a lesser degree, France, that played the greatest roles in the appearance of Portuguese Redware in Newfoundland. Direct Portuguese activities in Newfoundland will not be discussed in detail, as the great majority of the material studied for this thesis occurred in either English or French contexts. The factors behind the consumption of redware by the Portuguese are different than that of English or French consumption and are entirely beyond the scope of this thesis.

The chapter will begin with a brief overview of the early English activities in Newfoundland and how these activities evolved into a “triangle trade” between England, Newfoundland and Portugal through the seventeenth century. The French participation in the triangle trade will also be discussed. Following this, specific attributes of the commercial activities of this triangle trade will be examined as factors affecting the

consumption of Portuguese Redware. Other factors that may have affected consumption, such as attributes of redware itself, will also be discussed. Through these discussions, this chapter will present a framework of factors influencing the consumption of Portuguese Redware and its appearance in Newfoundland in the late sixteenth century through the seventeenth century.

9.2 North Atlantic Trade in the Sixteenth and Seventeenth Centuries

The study of Portuguese Redware in Newfoundland is a study of English and French archaeological contexts. Although a direct Portuguese presence has been documented in the sixteenth century, no solid archaeological evidence has been recovered for specifically Portuguese activities in Newfoundland in the sixteenth and seventeenth centuries. There is also argument as to the size and importance of the early modern Portuguese presence in Newfoundland (Abreu-Ferreira 1995; 2003; Barros in press). There is little argument, however, concerning the importance of Portuguese ports in the trade of Newfoundland cod (Russell-Wood 1993; Abreu-Ferreira 1995, 2003; Pope 2004; Studnicki-Gizbert 2007). Cod from Newfoundland's waters was an important commodity in the North Atlantic trade system in which Portugal was an integral member. This section will discuss the early modern English and French presence in Newfoundland in relation to their trade of cod to Portugal.

9.3 The Early English Presence in Newfoundland

The English began their connection to Newfoundland in the late 1400s with the explorations of John Cabot in 1497 (Pope 1997a: 5). Although it is not entirely clear where Cabot landed, it is well known that his voyage had the underlying purpose of expanding the economy of merchants in Bristol (Jones 1997: 74-75; Pope 1997: 15-16). This expansion of economy is central to most, if not all, of the early English activities in Newfoundland (Cell 1969; Pope 2004). The competition for Newfoundland's resources begins early. It has been argued that even before Cabot's arrival, Newfoundland's fisheries were being exploited by European fishermen, although the evidence for these very early voyages is speculative and sparse (Cell 1982: 1; Pope 2003b: 5-7). Certainly after Cabot's "discovery" of Newfoundland the European presence in the waters around the island expanded. Pope argues that by 1530s the Newfoundland fish resources were being seasonally exploited by the French, Spanish, Basques and, by a lesser extent, the Portuguese and English (Pope 2003a: 123-124). Although the English were the first to formally discover Newfoundland, their activities in the first half of the sixteenth century are of a much smaller scale than that, say, of the French. This is explained when one views the time context of the early presence. The fishery in Newfoundland developed in the time directly before England became a major international imperialist force. Pope argues that in the early sixteenth century England was "a client state of Spain", and was cooperating with the Catholic powers of both France and Spain, therefore limiting the competition for land and resources in the New World (Pope 2004: 17). When the Catholic Queen Mary died in 1558, however, and the Protestant Elizabeth I took over the

throne is when England began to engage in serious competition and expansion in the North Atlantic (Innis 1940: 44-59; Pope 2004: 17). This is not to suggest that this competitive ability miraculously appeared upon the arrival of Elizabeth as queen. The majority of the English fishermen and merchants that became involved in the Newfoundland trade were from the West Country of England, specifically Devon. Devon has a rich and extensive past in international trade which stretches well back into the fourteenth century (Friel 1992: 202-231; Kowaleski 2003: 202-231). The ports of Plymouth and Dartmouth were the major centres for trade in Devon and the material culture from these ports, often in the form of ceramics, is regularly present in sixteenth-century English archaeological contexts in Newfoundland (Pope 2004). Dartmouth fishermen and merchants began to actively exploit the Newfoundland fish resources by 1565 and the very earliest English ceramics found in St. John's are a type of earthenware from the Dartmouth area in Devon (Pope 1999; Pope 2003b: 16). Keith Matthews argues the West Country fishermen were the first from England to seriously exploit the Newfoundland fishery. He accounts for the expansion due to the depression of the West Country economy in the early 1500s and its distance from the centres along the east coast of the larger Icelandic fishery, which supplied England with the majority of its fish (Matthews 1968: 39-40). Because of these factors, West Country merchants were willing to take the risk to send fishing ships to Newfoundland.

Initially, the fish caught in Newfoundland was sold in English markets, specifically to fill the small demand for dried cod in the West Country (Matthews 1968: 40). The domestic English market preferred locally caught fish and fish from the

Icelandic and Irish fisheries (Innis 1988: 51-53). Harold Innis argues that there was a market in England for the cod during wartimes for naval provisions, but the majority of the English cod caught and processed in Newfoundland was being shipped to French and Iberian markets (Innis 1940: 31-32; Pope 2004). Matthews argues that there was a complex group of factors which caused the expansion to these foreign markets (Matthews 1968: 44-45).

English caught Newfoundland fish was not exported in any great degree to continental Europe until the 1560s (Matthews 1968: 40). This decade marked the beginning of an era of turmoil for France, Spain and Portugal; the main consumers of dried cod. As the continental European Newfoundland fisheries declined due to warfare, England was able to fill the demand for dried cod and by the 1570s and 1580s had become a vital supplier (Matthews 1968: 45-47; Grafe 2004: 7). Matthews argues that the English began their exporting activities with the French and expanded to the Iberian countries as warfare increased in the late sixteenth century (Matthews 1968: 45-50). Both the French and English fisheries in Newfoundland produced air-dried cod which was particularly suitable for the Iberian market (Pope 2004; Abreu-Ferreira 2004: 99).

As the Iberians became involved in serious conflicts in the late 1500s, their fishing exploits in Newfoundland declined. Portugal was absorbed into Spain in 1580 and in 1588 Spanish and Portuguese fishing vessels and fishermen were pressed to serve against England in the Armada (Matthews 1968: 52; Pope 2004: 17-18). War also affected England's other competitor in Newfoundland; the Basques. The Spanish crown began to tax the Basque fishery as well as pressed Basque fishing vessels into Armada

service (Pope 2004: 18). The conflict between England and Iberia and its effects on the Newfoundland fishery was well summarized by Sir William Monson in his *Naval Tracts*:

The English have had more absolute trade to Newfoundland since the year 1585 than ever before for in that year the war broke out betwixt Spain and us; whereupon the queen sent certain ships to take such Biscaines and Portuguese as fished there; a service of great consequence to take away the ships and victuals from our enemies subjects; and since that they have almost abandoned their fishery thereabouts (Innis 1940: 30).

The official aggression between England and its Catholic counterparts to the south, however, did not stop trading between the countries. Iberian pottery is found in English archaeological contexts in Newfoundland throughout the end of the sixteenth century and into the seventeenth century, suggesting continued trade with Portugal and Spain (Pope and Gaulton pers. comm. 2006). Daviken Studnicki-Gizbert argues that close trade ties between English and Portuguese merchants that were established prior to the late sixteenth century period of warfare facilitated continuing trade through periods of crown imposed embargos (Studnicki-Gizbert 2007: 37).

After the cessation of warfare by 1600, the trade between England, Newfoundland and Iberia increased dramatically and is well demonstrated by the significant amounts of Iberian ceramics recovered in seventeenth-century Plymouth archaeological contexts (Allan and Barber 1992). Ceramics, along with wine and other Mediterranean goods were brought to Plymouth through the trade of Newfoundland cod by English vessels in Spain and Portugal. Plymouth, as stated above, was one of the major ports in England

sending fishing vessels to Newfoundland (Pope 2004). English trading with Portugal and Spain increased in the first part of the seventeenth century (Pope 2004: 94-95). Darlene Abreu-Ferreira argues that by the mid-1600s the English had become the major trading force in Porto (Abreu-Ferreira 2003). The amount of Newfoundland cod traded by the English to Porto fluctuated over the seventeenth century, with a decrease in trade due to war and piracy. Even with these decreases, however, Abreu-Ferreira argues that port records from Porto indicate England remained the major supplier of cod over the century (Abreu-Ferreira 1995: 311-315). With the consistent significance of English caught cod in Porto, it is likely that the English played a significant role in other Portuguese ports, albeit perhaps not to the same degree.

9.4 The French

The French fishery in Newfoundland, which began in the mid sixteenth century, did not decline like that of Spain and Portugal, although it was disrupted due to war (Pope 2003a). Fishermen from Brittany and Normandy continued to play a role in the Newfoundland fishery into the twentieth century (Pope 2003b: 18). The French also established a colony on the southwest shore of the Avalon Peninsula in the mid seventeenth century; Plaisance or Placentia (Grange 1969). Abreu-Ferreira argues that the French played a significant role in the trade of Newfoundland cod to Porto and also argues that by the mid seventeenth century the cod trade in Porto was controlled almost exclusively by English and French merchants and ships (Abreu-Ferreira 2004: 99). From her examinations of archival records in Porto, she determined that before the 1650s

the French were supplying roughly half of the cod imported into the port (Abreu-Ferreira 2004: 99). Unfortunately, her research does not include the larger port of Lisbon. Lisbon suffers a dearth of surviving port records for the modern period, making archival study of the cod trade difficult (Abreu-Ferreira 2003, 2004). It is also unwise to assume that the pattern of trading activity reflected in the Porto records would be the same for Lisbon, as Lisbon was and is a much larger port city. The occurrence of Portuguese Redware in French contexts in Newfoundland is relatively rare, in comparison to English contexts. The ceramics have only been found, thus far, on the sites at Placentia. There has not been any Portuguese Redware recovered from the Petit Nord sites on the Northern Peninsula. It will be interesting to see if Portuguese ceramics are found on the Petit Nord sites in Northern Newfoundland as they are further explored and solid early seventeenth- or sixteenth-century contexts are excavated.

9.5 The Triangle Trade

By the 1620s there were two main groups in the fishing economy. That of merchants who participated in the migratory fishery by fishing and that of merchants who participated in the fishery by way of the sack trade. Sack ships were ships that came to Newfoundland in ballast or, later, with provisions for colonies. The sack merchants bought fish at the Newfoundland fishery and then brought the fish to markets in Western Europe to exchange for goods more readily saleable to the British market (Pope 2004: 11-121). These sack ships were not only of English origin; the Dutch invented the trade beginning around 1589 (Pope 2004: 98). The fishermen (both migratory and resident)

sold cod to the sack ships. Both types of English merchant brought the fish back to Europe, first bringing the fish to England before trading it to the continental countries, but as the trade evolved, the fish was brought directly to French and Iberian markets (Pope 2004: 93). The French, as mentioned above, were also bringing Newfoundland cod directly to Iberian markets, albeit in lesser quantities than the English (Abreu-Ferreira 2004). Portugal, in particular, was a good choice of market for fish from Newfoundland, as there was an active demand for cod, particularly as the Portuguese offshore fishing activities declined in the latter part of the sixteenth century and throughout the seventeenth century (Abreu-Ferreira 1995). Portugal also produced goods that were readily saleable in England, such as wine and olive oil, both of which, when traded for Newfoundland cod, could make an English merchant profit when the goods were sold in England, as the cod had a lower value when brought directly to English markets (Pope 2004: 91). The triangular trade, which encompassed Newfoundland as one corner, was uneven because two legs, from Newfoundland to continental Europe, and from the continent to England were flush with trade goods, whilst on the leg from England to Newfoundland the ships carried so few goods they often came in ballast (Pope 2004: 91). Therefore the material culture that the seamen were bringing from England to Newfoundland was largely for personal consumption. These goods have the potential to give a clearer interpretation of the activities of the people and ships as they made the journey around the triangle.

9.6 The Acquisition of Portuguese Redware

The complex series of reasons and motives behind the acquisition of Portuguese Redware by foreign merchants and seamen are both interesting and difficult to discern. In the case of the English seamen arriving to fish off the coast of Newfoundland, as well as the early permanent English residents on the island, there was ready access in their home ports in Devonshire to English wares similar in quality and type to the Portuguese wares. Portuguese Redware is regularly found in contexts with North Devon smoothware in seventeenth-century Newfoundland archaeological sites (Mills 2000; Crompton 2001; Pope 2004). Portuguese Redware is a relatively common ceramic type in English seventeenth-century sites on the island. Although the sherd percentages of Portuguese Redware to total ceramic counts on sites is lower than that of the North Devon types, the Portuguese ceramics are found consistently (Gaulton pers. comm. 2006). This suggests that although the English seamen and merchants had access to a wide range of English-produced ceramics, they were actively and consistently choosing to supplement these ceramics with Portuguese manufactured wares.

The presence of Portuguese Redware in French contexts in Newfoundland is less consistent. The French sites of the Petit Nord on the Northern Peninsula, although having seventeenth century components, have thus far been devoid of Portuguese Redware (Pope 2007). These sites were utilized by Breton and Norman fishermen and were seasonal in occupation during the sixteenth and seventeenth centuries (Pope 2007). As stated above, one reason for the lack of Portuguese material from the Petit Nord is that there has not been a solid sixteenth- or early seventeenth-century component of a site excavated thus

far. There has been some mixed contexts excavated, however, which contain some late seventeenth-century material, and these have not yielded any Portuguese material.

Portuguese Redware has appeared in small quantities in the French contexts of the sites at Placentia, Newfoundland. The percentage of Portuguese ceramics at these sites is lower than that of English contexts around Newfoundland. The wares do not occur consistently throughout the seventeenth-century French components of the site, and are more of a sporadic occurrence (Grange 1969, Amanda Crompton pers. com 2007). Although found in small amounts, the Portuguese sherds that have turned up are significant, as they reflect a material culture component that is not French, even though the colony was supplied via French government contracts. It must be clarified that although the Placentia sites all have both English and French components, the ceramics discussed here were unearthed in known and certain French contexts. There are many mixed French/English contexts on these sites, especially the Castle Hill site (Grange 1969). It is likely that the Portuguese redware in the mixed contexts were from English, rather than French sources.

There is an added dimension of consumption when one examines material from sites such as Ferryland or the forts in Placentia. The seventeenth century saw the establishment of permanent residence at these sites. This means that a part of the Portuguese Redware found at these sites may have been imported for household rather than shipboard usage.

9.7 Factors Affecting the Consumption of Portuguese Redware

Portuguese ceramics arriving via English ships to Newfoundland in the late sixteenth and throughout the seventeenth centuries are an excellent reflection of the strong English merchant presence in Portuguese ports. English participation in Portuguese markets was not a new phenomena by the sixteenth century. Commercial contact between England and Portugal was established by the thirteenth century, and continued steadily through the centuries (Shillington and Chapman 1970; Shaw 1989: 15; Childs 1992). Trade was facilitated by laws decreeing the protection of commercial activity between the two countries (Shillington and Chapman 1970; Sideri 1970; Shaw 1989; Childs 1992). The trade began as the Portuguese brought their goods to England, but as the trade evolved, the English merchant presence in cities such as Lisbon increased (Shillington and Chapman 1970: 46-51). Protestant English merchants were able to trade and live in Portugal, despite facing serious prejudice and, by the end of the sixteenth century, potential persecution from Inquisition activities (Shaw 1989: 26-31). Lisbon evolved into a thriving, multinational port which played host to a plethora of foreign trade.

Although the English taste for Portuguese oil, wine and fruit began with the trade, cloth, instead of cod, was what the English initially offered in return (Shillington and Chapman 1970; Shaw 1989; Childs 1992). It was not until the English Newfoundland fishery developed that cod became a major English import into Portuguese ports. The trade specifically between Newfoundland and Portugal was facilitated by the demand for salted cod in Portugal, as well as the English demand for

Portuguese products such as wine, fruit and oil. Portuguese fishing declined dramatically in the sixteenth century with the country's absorption into Spain and this pattern of decline continued through the seventeenth century (Abreu-Ferreira 1995; Barros 2006). English (and French) caught Newfoundland cod provided a valuable resource to the Portuguese. In the case of the English, better prices could be attained for cod in Iberian markets, rather than in English ones.

In Portugal, cod could be traded for more readily saleable products, such as wine or oil (Pope 2004: 11-121). Pope argues that during the seventeenth century in most English populations, wine was a middle class enjoyment. However, in the maritime population, wine was consumed at a higher rate than average (Pope 2004: 382). The maritime population would have included the Newfoundland population in the seventeenth century, both seasonal and permanent. This active market for wine consumption surely contributed to closer trading ties between Newfoundland and Portugal via English merchants. The English consumption of Portuguese wine was significant by the fifteenth century, although in lower quantities than that of French wine (Childs 1992). Portuguese wine production increased in the seventeenth century, as Douro valley vineyards were developed and English consumption of this wine increased as the acquisition of French wine declined due to conflict between England and France (Sideri 1970: 25-26). The consumption and trade of wines between Portugal, England and Newfoundland is reflected by the presence of high percentage of Portuguese ceramics in Newfoundland contexts which are for either storing or serving liquids. It is reasonable to suggest that a large portion of Portuguese Redware that ended up in

Newfoundland was initially obtained directly through the trade of wine and oil, as these vessels, the olive jars, likely served as the containers in which these liquids were shipped and stored.

Newfoundland ships going to Portugal were not necessarily dealing with Portuguese merchants. Commercial transactions were often conducted through English merchants living in Portugal (Shillington and Chapman 1970; Abreu-Ferreira 1995; Shaw 1989; Studnicki-Gizbert 2007). These are the merchants that suffered difficulty during times of war or religious persecution, however, they certainly solidified trade. It has been argued by several historians that England began to overtake the Portuguese economy in the seventeenth century, with this trend being exacerbated by Portugal's increased reliance on importation for basic goods as well as the ongoing conflict with Spain, culminating in the Portuguese separation from Spain in 1640 (Sideri 1970; Shaw 1989: 11; Studnicki-Gizbert 2007). This local presence of English merchants may have affected the types of ceramics that the English were acquiring. As it has been discussed throughout this thesis, there are some fundamental differences in the makeup of Portuguese coarse earthenware archaeological collections from coastal collections within Portugal versus collections in Newfoundland, notably the presence of black coarse earthenware in conjunction with red earthenware, an attribute which is ubiquitous in seventeenth-century Portuguese collections but which is absent or very rare in Newfoundland collections (Dordio pers. comm. 2006). Although the main reasons for this difference may have been due to the English consumption of much Portuguese Redware for the goods inside the vessels, rather than the vessels themselves, whether this

difference may be partially due to an Anglicization of the ceramics available for trade to Newfoundland-bound ships is an interesting thought.

The strong trading connections between the English and Portuguese are not solely reflected materially in Newfoundland by the appearance of Portuguese Redware. Portuguese *faiença* is also well represented at Ferryland, with mid-seventeenth-century contexts often containing a higher than average amount when compared to other contemporary English sites (Stoddart 2000; Pope 2004: 373). Ferryland also has the only examples of Portuguese fine earthenware in North America, which could be attributed to the close merchant connections between Newfoundland and Portugal. There is a chance that this fine earthenware was attained in Antwerp markets, but Pope argues that it is more likely that the ceramics were purchased in Portugal while Newfoundland cod and Portuguese wine was being traded (Pope 2004: 374-375). As discussed throughout this thesis, Portuguese Redware is a ceramic frequently found in Newfoundland English sites, and in conjunction with the appearance of both Portuguese *faiença* and fine earthenware, this is demonstrating strong trade connections between the English and Portuguese. This chapter has explored one of the reasons behind this trade; the saleability of Newfoundland cod in Portuguese markets and the English demand for Portuguese perishables. The peripheral acquisition of Portuguese Redware along with these cod to wine/fruit/oil transactions would have been quite natural. However, were there other, more individual reasons for the consumption of Portuguese Redware by English seamen? These individual reasons would be behind the acquisition of non-storage vessels; the serving ware and the multi-use ware.

English seafarers had access to wares, such as North Devon earthenware, that, in some cases, is almost indistinguishable from Portuguese Redware. Indeed, these two wares are often mixed up in artifact identifications in Newfoundland. Some of the most common Portuguese Redware multi-use vessels mirror North Devon forms, such as the *alguidar*, *tigela*, and *panela* which are similar to the milk pan, bowl and pot respectively (Grant 1983: 137). Research conducted on Mediterranean import pottery coming into England has suggested that these wares could be almost twice the price of locally produced wares. At quayside in Portugal, the initial prices of redware could have been closer to that of local English wares, but when customs fees and transportation is factored in, these prices were inflated (Gutiérrez 2000: 176). For Portuguese Redware consumption by the resident Newfoundland population, this inflation would have been even higher. Of course, as the amount of goods traded increased, these price inflations would have been less. However, it is still apparent that English consumers in the seventeenth century would have had to pay higher prices for Portuguese earthenware than similar, locally produced wares. And yet, the locally produced wares, at least in Newfoundland, seemed to be regularly supplemented by Portuguese Redware.

Some of the consumption factors behind the acquisition of the more costly Portuguese coarse earthenware may have included attributes of the ceramic itself and the social environment that the English nautical community existed in. First, Portuguese Redware serving and multi-use vessels, were, for the most part, very well produced. This is especially the case with Aveiro-produced vessels. These vessels have hard, homogeneous fabrics and are often well burnished. Their forms are regular, particularly

in the case of *alguidars* and *tigelas*, and aesthetically pleasing. With these vessels, their quality production may have added to their functionality and use-life. There are some vessels which have unique forms, like the *bilhas* and *cantils*, which may have served a specialized purpose, in the case of the *cantil*, but which may have also served to increase their esthetic to a foreign consumer. Therefore, in the case of redware which was not obtained for what it held, quality construction and pleasing aesthetic may have motivated the consumer to purchase it in spite of an increased price.

A slightly less concrete reason behind Portuguese Redware consumption may exist within the society of the English nautical community. Iberian pottery would always be viewed as an exotic product. Today it is still viewed as an exotic product to English consumers. Even though it may occur regularly throughout seventeenth-century English contexts, for the most part, Portuguese earthenware constitutes a small percentage of the ceramic collection of these sites. This is particularly true when one examines the amount of serving and multi-use vessels in the Newfoundland collections. This relative rarity, when compared to more common earthenware, such as the North Devon wares, would have added to the exotic nature of Portuguese products.

An evolution of consumer behaviour was well underway by the seventeenth century and the maritime community was on the cusp of the changes (Pope 2004: 349-393). The argument that mass consumption evolved solely within the social hierarchy, with higher status consumers beginning a consumption trend and the lower status consumer following as the trend trickled through the hierarchy, is refuted by researchers who argue that the consumer revolution was more complex than this, with consumption

behaviours being changed by a variety of factors (Gutiérrez 2000: 175-195; Pope 2004: 356). The areas, and the accessibility of goods to these areas, played a role on the development of consumer behaviour. Urban centres and ports, with their higher amount and variability of goods available, affected the consumption rates of goods. If a large and varied range of goods are available, then it is more likely that a large and varied range of goods would be consumed by a wider range of society, than that of a more rural area where the basic access to goods was lower. Of course, there are many other factors which can change this behaviour, such as local attitudes towards consumption and the state of economic development in the area. Even if the goods were available, if certain sectors of the community did not have the means with which to acquire these goods, then they would not be obtained (Weatherill 1998: 60). The sector of society that was involved in the early modern economy of Newfoundland did, however, have many of the factors which were conducive to this wide ranging consumption.

The maritime community, fishers, sailors, merchants and their families, associated with Newfoundland did not necessarily follow the same consumption behavior than that, for example, of contemporary land-based communities in England. Gutiérrez states that in England, Mediterranean pottery is most apparent in contexts associated with the higher ranks of society (Gutiérrez 2000: 182-184). However, Pope argues that in the seventeenth-century Newfoundland community the consumption of wine was widespread and not only associated with higher status. The maritime community was on the forefront of the consumer evolution that happened beginning the sixteenth century, because they were a sector of society that was exposed to the greatest variety of goods

and were not hindered as much by social constructs limiting the acquisition of goods. They also had access to the purchasing power that was required to obtain these goods. They were one of the first sections of society to have expendable income. Pope argues that the maritime community culture encouraged the acquisition of new and exotic goods and allowed for the access to these goods (Pope 2004: 349-406). So therefore, the maritime community associated with Newfoundland would have been primed to obtain exotic ceramics, such as Portuguese Redware, even if the cost was higher than domestically produced ceramics. The cachet of its non-English production may have played a part to the maritime community consumption of the ware. Finally, the maritime community in Newfoundland was not a poor one. The English were not in Newfoundland for the weather. The Newfoundland cod fishery was a risky, but lucrative economy (Innis 1940, Matthews 1968, Cell 1969, Pope 2004). The maritime community existed on the island to make money. One can then infer that there was a certain amount of disposable income available to people working the Newfoundland economy. This is the sort of disposable income that would have made the consumption of expensive or exotic ceramics possible, and possible for perhaps a wider range of consumer, rather than solely the upper ranks. This income would also have made Portuguese goods, such as wine and ceramics, more accessible and viable for a wide range of maritime consumer. The values and structure of the seventeenth-century maritime community associated with Newfoundland encouraged the consumption of exotic goods, while the availability of a degree of disposable income to a wide range of society facilitated the acquisition of these goods.

The consumption of Portuguese Redware in Placentia by French colonists may have been influenced by different factors than that of the English. Although the base factors could be the same, as the French colonists existed in a similar nautical environment to that of the English. The French were involved in the Newfoundland to Portugal trade and they would have existed in a similar maritime economy which encouraged the consumption of non-domestic goods (Abreu-Ferreira 2004). However, the colonists at Placentia were being supplied by the French crown, via merchant contracts with French and Basque merchants (Proulx 1979). The colony was not well supplied and often goods would arrive sporadically and would not cover the colonists' needs. Because the amount of Portuguese Redware is small at Placentia, its presence could be due to the colonists supplementing their government-sanctioned supplies with goods that were available in Newfoundland. The handful of vessels that have been found in unmixed French contexts in Placentia could have been acquired from ships that were arriving in the colony for the fish trade. The amount of Portuguese ceramics in these contexts is not significant enough to suggest that the colonists were actively consuming Portuguese goods, rather it seems as though the Portuguese ceramics were a minor and peripheral acquisition within the larger supply of the colony. It will be interesting to see if further Portuguese ceramics are unearthed in seasonal French contexts, such as those of the Petit Nord, as these are ceramics that could be a reflection of the French Newfoundland to Portugal trade.

9.8 Conclusion

During the seventeenth century most Portuguese Redware arrived in Newfoundland on board English ships. The English presence in Newfoundland, as discussed in this chapter, evolved from the mid-sixteenth century onwards. By the mid-seventeenth century the English were active and dominant participants in the triangle trade between Newfoundland and Iberia. The English penchant for Portuguese-produced products, such as wine and oil, combined with a good Portuguese market for cod and close mercantile ties between the two countries facilitated the acquisition of Portuguese Redware and its subsequent journey to Newfoundland. Adding to these situational factors of consumption was the maritime culture which placed the people involved in the Newfoundland fishery at the cusp of the evolution of consumer behaviour which was happening in earnest through the seventeenth century. The maritime community had not only the exposure and access to foreign goods, such as Portuguese Redware, but they also existed in a culture where consumption of these goods was acceptable for a wide range of society. In Newfoundland, there was often income available to spend on goods such as wine, a luxury which was consumed by a larger segment of society in Newfoundland than in England. Finally, attributes of the ware, such as aesthetics and quality manufacture, likely added to its consumption by the English, resulting in a consistent presence of Portuguese Redware in seventeenth-century contexts in Newfoundland. The presence of the ware in French contexts at Placentia is much more sporadic and was likely due to irregular local consumption of ceramics to supplement the materials that were supplied to the colony.

Chapter 10

The Conclusions

10.1 Conclusions and Directions for Further Research

There are several main conclusions that I have presented throughout this thesis. First, I argue that the main production area for Portuguese Redware occurring in Newfoundland is the Aveiro region, with Lisbon being the secondary production area. I believe that it is possible for Portuguese Redware produced in other areas, such as Coimbra or Prado, to occur in Newfoundland contexts but that the Portuguese Redware vessel forms and fabrics that have been thus far excavated on the island suggest an Aveiro region or Lisbon production provenance.

I have concluded that the olive jar is the most prominent Portuguese Redware vessel form in seventeenth-century site contexts in Newfoundland. The prominence of the olive jar is consistent with all of the Newfoundland collections studied for this thesis. I argue that the Portuguese Redware olive jar is an export form, as it occurs in quantity in non-Portuguese contexts, yet is very uncommon in contemporaneous contexts in Portugal. I suggest that the *cantil* may also be an export form due to its frequent occurrence in English and Newfoundland contexts and relative rarity in Portuguese contexts as well as its specialized form. I present a typology applicable to Portuguese Redware vessel forms in Newfoundland which is very similar to typologies constructed to describe Portuguese collections which have ceramics from the Aveiro region. The typology furthers my argument that the main production provenance for Portuguese

Redware in Newfoundland is the Aveiro region. I argue that there are three main fabrics occurring in Portuguese Redware in Newfoundland. These fabrics are Type 1: Coarse Brown-Orange, Type 2: Smooth Orange-Red and Type 3: Soft Marbled. I argue that each of these fabric types are associated with different vessel forms and finishing techniques. I also present a preliminary examination of the trace element composition of Portuguese Redware fabrics in Newfoundland.

Finally, I argue that the presence of Portuguese Redware in sixteenth- and seventeenth-century contexts in Newfoundland reflects the strong trade connections between England, France and Portugal at that time. These trade connections, facilitated by the trade of Newfoundland cod to Portuguese markets, allowed the Newfoundland maritime community ready access to Portuguese products. I argue that due to the accessibility of goods, a wide range of society consuming exotic or status commodities and a greater degree of disposable income allowing people to purchase these commodities, the Newfoundland maritime community was well suited to the acquisition of Portuguese Redware. I also suggest that attributes of the ware itself, such as its quality construction, aided in its consumption by English and French consumers.

The conclusions presented here, especially those related to production provenance, are more comprehensive than anything else previously written concerning Portuguese Redware in Newfoundland. That being said, the research on this ware is still only in its preliminary stages. Further research into production areas needs to be continued, as does research of the forms and fabrics of the ware. In the Newfoundland collections the study of Portuguese Redware forms would be greatly facilitated by more

vessel reconstruction and study of the collections. The next stage in the study of Portuguese Redware in Newfoundland certainly will be to associate vessel forms and fabrics with specific archaeological and temporal contexts and to see if any patterns emerge suggesting changes in consumption over time. More elemental testing of the ceramic and archival research into the trade of Portuguese Redware will also be useful in further research.

This thesis represents an initial attempt at greater contact between archaeologists and researchers working in Portugal and Newfoundland and I hope that this research will be continued in the future. The close historical ties between the Portuguese and Newfoundland maritime communities make continuing contact a worthwhile undertaking. Further collaboration will result in new and innovative perspectives on early modern North Atlantic trade and social connections; perspectives that could be difficult to obtain in isolation.

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Appendix A : Further Vessel Photographs



Prato. HMS *Saphire*, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Photo by author, 2007.)



Pûcaro. CfAf-09, Kingman's Cove, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Photo by author, 2007.)



Cântaro. Renews, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Photo by author, 2007.)



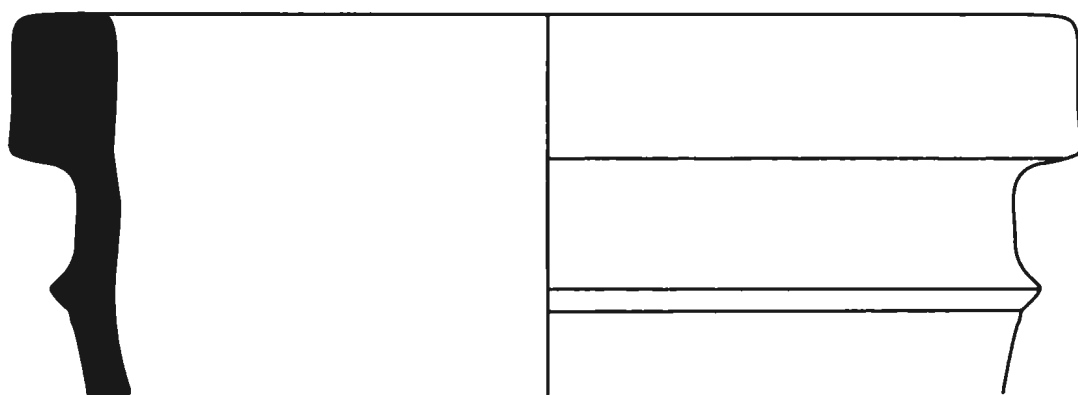
Bilha B. ChAe-09, Bay Bulls, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Photo by author, 2007.)



Jarro. CgAf-03, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Photo by author, 2007.)



Cantil. ChAe-09, Bay Bulls, Newfoundland. From the Collections of the Rooms, Provincial Museum, Newfoundland. (Photo by author, 2007.)



Unknown vessel. ChAe-02, Newfoundland. From the Collections of the Rooms,
Provincial Museum, Newfoundland. (Drawing by author, 2007.)

Appendix B : Further Vessel Forms and Fabric/Form Correlation

Name: *atanor*

Description: A panela-like form with a square rim and two vertical handles. This form is larger than a typical panela.

Possible Usage: Storage.

Sources: Bettencourt et al. 2003a: 58-59.

Name: *caneca* (cup)

Description: A cup form with a truncated cone body (the rounded rim of vessel truncates the top of the cone) which ends in a sharp carination to a flat base. A variety of caneca has a rounded base. One vertical handle which attaches at mid-body and the beginning of the carination.

Possible Usage: Liquid serving.

Sources: Bettencourt et al. 2003a: 49-52.

Name: *fogareiro* (brazier)

Description: A brazier-type form which has a bowl-like top which sits on a truncated cone base. The point at which the top part of the vessel joins is closed and slotted on the inside. The base part of the vessel has a large, angular opening (either square or square with a triangular top). Two vertical handles which attach at the rim and where the top of the vessel joins the bottom. Ranges in size. Can be glazed or unglazed.

Possible Usage: Shipboard cooking/heating.

Sources: Barreira et al. 1998: 174.

Name: *servidor*

Description: Conical vessel with an everted, flaring rim with a rounded lip. Flat base.

Two vertical handles which attach at the rim and mid-body. Relatively large vessel, generally over 15cm at base diameter. Can be glazed or unglazed.

Possible Usage: Personal hygiene?

Sources: Barreira et al. 1998: 173; Bettencourt et al. 2003a: 76-77.

Name: *sertã*

Description: A shallow pan form with slightly everted sides and a rounded rim . Flat bottom. Can have two horizontal handles.

Possible Usage: Cooking, and this is generally apparent by scorching on the outside of the vessel.

Sources: Barreira et al. 1998: 164-165.

Name: *talha* (storage jar)

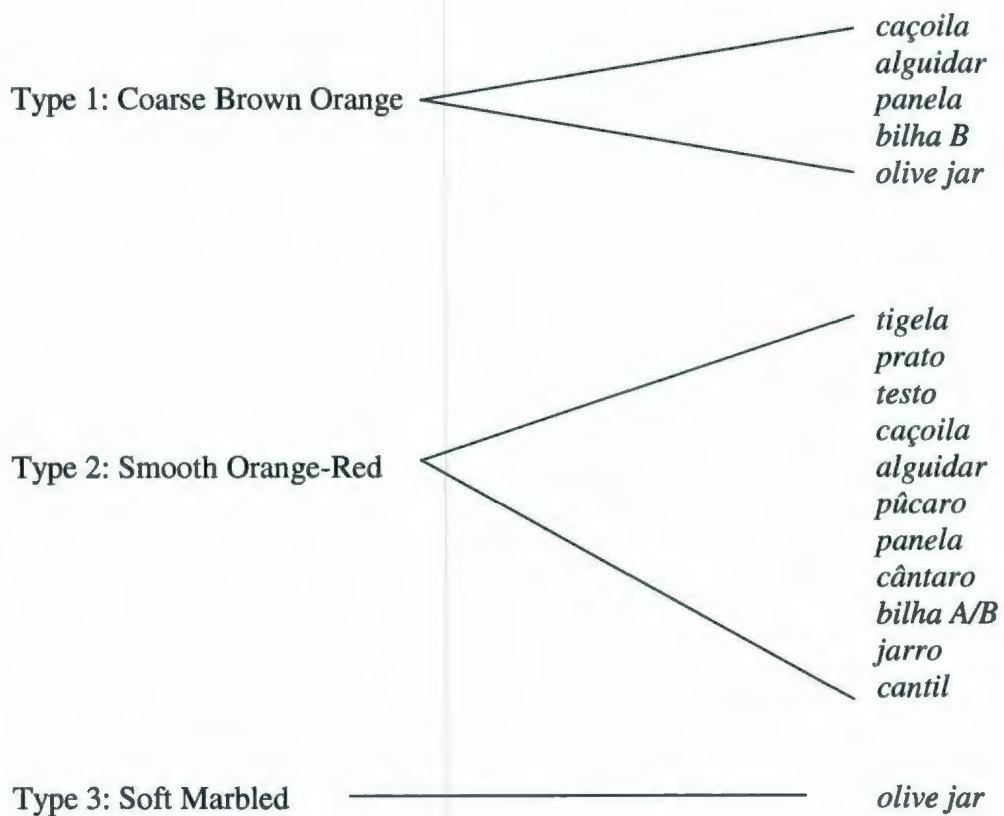
Description: A vessel which has a pronounced overhanging rim with a rounded lip.

Narrowed neck which opens up to an ovoid body, which narrows to a conical base. The lip section of the rim can easily be confused with rims from tigelas. Two vertical handles which attach at body. Vessels can be quite large.

Possible Usage: Liquid or dry storage.

Sources: Barreira et al. 1998: 170; Bettencourt et al. 2003a: 73-75.

Fabric types and the Newfoundland forms occuring in each type



Appendix C: LA-ICPMS Methodology and Data

Sample preparation and LA-ICPMS analysis

by Wilfredo Diegor, MUN Earth Sciences

Small fragments were broken off pottery pieces taking care not to produce unnecessary cracks in the main remaining piece. Preferred sites from where these were taken were corners that lend themselves to easy chipping off. Good sections were ensured so that analysis can be done across them. Samples were then mounted in epoxy, and after hardening, were polished with suitable grades of lapping film to expose a flat, fine surface, washing with distilled, deionized water. The mounts were dried in a HEPA-filtered air environment prior to setting in the laser sample cell.

Element concentrations were determined by laser ablation-inductively coupled plasma mass spectrometry (LA-ICPMS). The analytical system is an HP4500 ICPMS instrument with a New Wave (Universal Platform) UP213 nm NdYAG laser ablation system attached. Ablations were performed in helium carrier gas, which was combined with argon just prior to the feed to the torch. Nebulizer flow rates were about 0.9 l/min He and 0.75 l/min Ar. Laser energy was from 0.28 mJ (about 22 J/cm²) at a laser repetition rate of 10 Hz, 100% power, producing a 40 µm diameter spot on the sample, to 1.6 mJ (about 2.3 J/cm²), 10 Hz, 100% power, producing a 225 µm spot.

Time resolved intensity data were acquired by peak-jumping in pulse-counting mode with 1 point measured per peak for analytes Al, Si, Ca, Ti, V, Cr, Fe, Co, Ni, Cu, Zn, Rb, Sr, Y, Zr, Ag, Sn, Sb, Cs, Ba, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm,

Yb, Lu, Hf, Ta, Pb, Th, U. The internal standard element was Si, the concentration of which was estimated from publications. Quadrupole settling time was about 2 msec and the integration time (or dwell time) was 10 msec on each analyte mass. The sampling time per sweep was 0.4625 sec with an acquisition window of about 100 sec.

Approximately 25-sec of gas background data (with the laser beam off) were collected prior to each 50-sec ablation of standards and unknowns. NIST glass NBS 610 was used as reference (calibration) material and analyzed in the first 2 and last 2 positions of each run. Basalt glass (USGS) BCR-2G was analyzed as an unknown twice in a run. Element values for NBS 610 were from Pearce *et al.* (1997) and for BCR-2G were from compilations at MUN (S. Jackson, unpub. data).

Data were reduced using MUN's in-house CONVERT and LAMTRACE spreadsheet programs, which employ procedures described by Longerich *et al.* (1996). The error for the method is better than 10% relative standard deviation based on the reproducibility of results for most elements in reference materials analyzed as unknowns. Maximum limits of detection were as follows:

Al ₂ O ₃	Wt%	0.003	La	ppm	0.021
SiO ₂	Wt%	0.048	Ce	ppm	0.019
CaO	Wt%	0.147	Pr	ppm	0.015
TiO ₂	Wt%	0.001	Nd	ppm	0.063
V	ppm	1.139	Sm	ppm	0.066
Cr	ppm	2.203	Eu	ppm	0.021
FeO	Wt%	0.004	Gd	ppm	0.053
Co	ppm	0.444	Tb	ppm	0.010
Ni	ppm	3.371	Dy	ppm	0.030
Cu	ppm	1.589	Ho	ppm	0.010
Zn	ppm	1.326	Er	ppm	0.022
Rb	ppm	0.491	Tm	ppm	0.009
Sr	ppm	0.857	Yb	ppm	0.039

Y	ppm	0.076	Lu	ppm	0.009
Zr	ppm	0.155	Hf	ppm	0.021
Ag	ppm	0.066	Ta	ppm	0.008
Sn	ppm	0.075	Pb	ppm	0.043
Sb	ppm	0.058	Th	ppm	0.009
Cs	ppm	0.026	U	ppm	0.007
Ba	ppm	0.141			

Standard error for all the runs in this project is, as follows:

	AVG	MAX		AVG	MAX
Al ₂ O ₃	2.8%	15.8%	La	1.8%	4.1%
SiO ₂	0.0%	0.0%	Ce	1.4%	3.0%
CaO	2.5%	5.2%	Pr	1.6%	3.8%
TiO ₂	5.4%	16.1%	Nd	2.0%	4.1%
V	1.5%	2.9%	Sm	1.9%	4.0%
Cr	1.4%	2.6%	Eu	1.8%	3.5%
FeO	19.3%	47.0%	Gd	2.0%	4.0%
Co	1.4%	2.5%	Tb	1.9%	4.1%
Ni	2.3%	4.8%	Dy	2.0%	4.2%
Cu	2.6%	6.3%	Ho	2.0%	4.2%
Zn	2.5%	6.7%	Er	2.1%	4.4%
Rb	1.2%	3.3%	Tm	2.1%	4.4%
Sr	1.5%	3.4%	Yb	2.1%	4.6%
Y	1.6%	3.4%	Lu	2.1%	4.8%
Zr	1.6%	3.6%	Hf	2.3%	4.9%
Ag	1.4%	2.5%	Ta	2.4%	4.8%
Sn	1.2%	2.9%	Pb	2.2%	4.0%
Sb	1.3%	3.4%	Th	2.4%	4.7%
Cs	1.6%	4.7%	U	2.1%	4.3%
Ba	1.7%	3.2%			

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Mean and Standard Deviation of LA-ICPMS results.

Al₂O₃, SiO₂, CaO and TiO₂ = weight%

Remainder elements = ppm

Element	Mass	F1		F2		F3		F4		F5		F6		F7	
		Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.
Al ₂ O ₃	27.00	21.87	1.85	25.91	1.16	21.10	0.77	18.55	1.21	17.56	2.46	21.23	4.08	19.65	1.67
SiO ₂	29.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00
CaO	43.00	0.31	0.05	0.24	0.04	0.21	0.03	0.23	0.03	0.27	0.05	0.63	0.14	0.17	0.05
TiO ₂	49.00	0.89	0.27	0.84	0.13	0.72	0.03	0.74	0.34	0.51	0.07	0.78	0.13	0.54	0.07
V	51.00	92.23	14.95	109.24	3.35	83.88	6.79	58.26	5.40	65.90	6.33	130.07	23.46	74.25	11.37
Cr	52.00	69.55	7.55	87.79	2.38	65.52	2.49	46.18	4.57	47.94	6.90	115.23	21.03	60.02	7.59
FeO	54.00	4.07	1.87	2.76	0.27	3.23	0.18	2.76	0.24	3.05	0.31	4.41	0.90	3.49	0.45
Co	59.00	10.89	4.27	9.00	0.88	8.44	0.45	8.74	1.02	8.52	1.29	16.61	4.80	7.40	0.81
Ni	60.00	20.24	1.69	25.90	2.34	21.92	1.32	16.66	1.05	16.56	1.65	40.83	7.22	18.63	2.80
Cu	65.00	14.04	1.74	19.79	1.55	11.79	1.46	9.95	1.02	11.79	2.08	37.63	28.86	12.09	3.43
Zn	66.00	72.24	13.64	50.52	4.97	50.37	6.88	46.22	6.27	39.88	3.52	148.08	28.78	44.36	5.77
Rb	85.00	259.75	14.16	264.34	19.02	294.29	13.54	286.58	31.44	269.38	60.21	218.47	42.64	265.30	25.33
Sr	86.00	77.23	15.74	70.31	4.85	69.27	4.91	75.44	7.83	71.25	11.31	140.64	30.90	72.81	3.33
Y	89.00	17.79	3.02	21.76	2.67	18.63	4.96	14.85	5.15	13.04	2.69	17.80	5.15	15.62	1.29
Zr	90.00	137.50	55.14	136.68	41.70	237.70	345.59	149.79	138.71	88.68	31.86	135.49	45.52	104.34	36.65
Ag	107.00	0.23	0.05	0.34	0.09	0.32	0.17	0.13	0.10	0.09	0.01	0.31	0.22	0.14	0.04
Sn	118.00	12.19	0.98	12.53	1.29	13.23	1.42	11.68	1.28	12.11	2.63	15.90	12.38	11.78	1.61
Sb	121.00	0.97	0.17	1.35	0.12	0.74	0.15	0.68	0.21	0.66	0.06	0.94	0.24	0.63	0.10
Cs	133.00	23.09	2.23	24.05	1.79	23.57	0.94	23.59	1.93	22.24	3.39	15.18	2.78	22.78	2.31
Ba	137.00	396.16	99.60	426.35	19.52	341.10	28.55	306.83	24.42	287.79	56.63	483.10	88.45	321.35	13.71
La	139.00	28.95	6.43	35.96	2.99	28.50	4.88	29.81	4.77	30.67	5.09	29.39	15.03	29.59	4.81
Ce	140.00	57.64	15.80	72.00	2.48	55.56	9.61	59.35	10.10	58.79	9.72	60.19	28.95	54.64	10.10
Pr	141.00	6.23	1.89	7.83	0.48	6.20	1.08	6.10	1.06	6.11	0.93	6.97	3.19	6.26	0.95
Nd	146.00	23.21	7.28	29.73	2.27	23.21	4.10	22.05	3.83	22.61	3.18	26.49	12.39	23.60	3.55
Sm	147.00	4.76	1.49	6.11	0.44	4.67	0.83	4.27	0.74	4.32	0.58	5.51	2.29	4.69	0.61
Eu	151.00	1.06	0.25	1.26	0.10	1.00	0.16	0.84	0.16	0.85	0.10	1.25	0.45	0.95	0.10
Gd	157.00	3.66	0.81	4.56	0.27	3.70	0.64	3.16	0.66	3.10	0.49	4.15	1.38	3.57	0.36
Tb	159.00	0.61	0.12	0.75	0.08	0.59	0.11	0.51	0.13	0.48	0.09	0.64	0.18	0.56	0.04
Dy	163.00	3.58	0.65	4.25	0.45	3.36	0.79	2.94	0.97	2.65	0.54	3.66	0.99	3.03	0.24
Ho	165.00	0.70	0.13	0.82	0.09	0.66	0.16	0.55	0.19	0.50	0.11	0.72	0.20	0.57	0.05
Er	166.00	1.94	0.39	2.19	0.25	1.73	0.50	1.48	0.53	1.32	0.30	1.95	0.54	1.48	0.16
Tm	169.00	0.28	0.05	0.33	0.04	0.26	0.09	0.22	0.08	0.19	0.04	0.30	0.08	0.22	0.02
Yb	173.00	2.03	0.34	2.40	0.34	1.86	0.75	1.68	0.74	1.39	0.34	2.20	0.61	1.51	0.21
Lu	175.00	0.28	0.04	0.33	0.04	0.27	0.13	0.23	0.10	0.20	0.05	0.33	0.09	0.22	0.03
Hf	178.00	3.89	1.46	3.84	1.16	6.96	10.36	4.55	4.72	2.60	0.90	4.12	1.34	3.12	1.09
Ta	181.00	2.01	0.23	1.84	0.13	2.07	0.41	2.04	0.58	1.69	0.53	1.19	0.22	1.75	0.49
Th	232.00	13.43	3.51	14.55	1.18	11.59	1.13	11.59	2.36	11.21	2.02	11.11	3.27	12.04	2.02
U	238.00	5.58	0.63	5.64	0.86	5.24	2.57	5.01	1.21	4.77	0.83	3.67	0.87	4.01	0.53

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Mean and Standard Deviation of LA-ICPMS results.

Al₂O₃, SiO₂, CaO and TiO₂ = weight% Remainder elements = ppm

Element	Mass	F8		F9		F10		F11		FT		FM		FB	
		Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.
Al ₂ O ₃	27.00	20.82	1.76	19.70	2.03	20.06	1.65	20.98	1.26	15.18	1.47	16.44	2.18	19.16	2.18
SiO ₂	29.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00
CaO	43.00	0.19	0.04	0.25	0.04	0.19	0.04	0.23	0.10	0.31	0.03	0.32	0.03	0.40	0.17
TiO ₂	49.00	0.83	0.59	0.74	0.08	0.79	0.24	0.65	0.08	0.58	0.03	0.59	0.03	0.78	0.25
V	51.00	80.29	10.75	98.12	13.06	88.79	6.44	65.06	4.78	73.41	7.29	75.50	3.44	81.84	7.09
Cr	52.00	64.04	5.71	78.84	26.74	69.58	6.26	54.96	3.04	57.17	11.97	53.61	4.16	61.45	7.99
FeO	54.00	3.94	0.33	2.39	0.32	2.09	0.23	3.14	0.17	2.94	0.22	3.20	0.41	4.91	3.41
Co	59.00	8.13	0.68	6.37	0.56	6.31	0.43	12.83	1.68	9.34	0.99	10.25	0.61	11.89	3.44
Ni	60.00	21.41	2.73	17.84	2.66	18.61	2.62	23.38	2.64	21.24	2.21	22.97	3.24	25.04	4.54
Cu	65.00	12.12	1.32	11.48	1.71	14.82	2.84	10.55	2.18	17.73	1.49	16.92	3.80	18.23	4.90
Zn	66.00	46.37	4.70	32.24	4.18	40.04	6.32	55.81	6.08	47.22	7.33	50.61	4.75	63.50	37.24
Rb	85.00	280.25	23.28	222.26	20.79	223.05	20.85	290.19	21.92	286.52	66.04	273.68	17.09	285.45	22.79
Sr	86.00	71.83	5.49	62.08	9.38	63.76	5.07	109.67	10.64	66.54	10.15	60.15	4.56	66.88	8.08
Y	89.00	19.12	3.94	15.06	2.94	16.48	3.91	18.31	1.41	18.24	1.53	20.05	2.78	25.04	8.77
Zr	90.00	100.22	46.54	108.86	34.31	184.05	150.44	110.76	28.30	114.29	72.71	275.06	243.20	1047.61	2417.44
Ag	107.00	0.16	0.05	0.09	0.03	0.14	0.03	0.18	0.16	0.16	0.14	0.11	0.02	0.17	0.18
Sn	118.00	13.17	1.31	9.19	0.64	10.57	2.85	14.06	1.11	10.96	0.78	11.17	0.86	11.29	1.57
Sb	121.00	0.72	0.20	1.10	0.10	1.24	0.22	0.66	0.10	0.82	0.12	0.88	0.11	1.03	0.36
Cs	133.00	24.85	2.66	20.03	2.12	19.76	1.51	27.74	1.60	23.09	4.86	22.45	1.89	22.59	2.08
Ba	137.00	369.83	52.28	352.10	41.28	353.67	22.57	305.16	26.40	305.34	35.89	301.63	36.47	311.96	35.03
La	139.00	31.84	4.08	28.92	4.58	31.44	4.18	37.41	2.90	35.83	8.88	34.25	3.66	34.47	4.95
Ce	140.00	57.91	4.74	57.37	10.37	63.86	8.82	75.79	6.98	78.43	21.56	75.24	8.43	73.30	12.97
Pr	141.00	6.71	0.70	6.19	1.15	6.97	1.01	8.05	0.69	8.65	2.26	8.38	0.97	8.26	1.09
Nd	146.00	25.74	3.02	23.66	4.65	26.90	4.13	30.38	2.34	32.67	8.26	32.17	4.01	31.54	4.39
Sm	147.00	5.25	0.62	4.69	0.86	5.30	0.82	5.97	0.37	6.47	1.49	6.53	0.88	6.57	0.92
Eu	151.00	1.10	0.09	0.95	0.15	1.06	0.17	1.16	0.09	1.28	0.17	1.41	0.18	1.44	0.22
Gd	157.00	4.24	0.55	3.40	0.63	3.92	0.68	4.34	0.28	4.74	0.80	4.92	0.67	5.12	1.04
Tb	159.00	0.67	0.10	0.53	0.10	0.63	0.12	0.69	0.06	0.72	0.09	0.76	0.11	0.85	0.22
Dy	163.00	3.74	0.71	3.01	0.58	3.48	0.72	3.72	0.22	3.88	0.41	4.18	0.62	4.80	1.54
Ho	165.00	0.73	0.15	0.59	0.11	0.66	0.15	0.73	0.06	0.71	0.07	0.78	0.11	0.96	0.33
Er	166.00	1.92	0.43	1.60	0.33	1.81	0.42	1.91	0.13	1.82	0.16	2.07	0.33	2.68	1.15
Tm	169.00	0.27	0.05	0.24	0.05	0.31	0.12	0.29	0.03	0.26	0.02	0.31	0.05	0.39	0.16
Yb	173.00	1.82	0.39	1.70	0.36	2.00	0.50	1.96	0.17	1.80	0.14	2.22	0.39	2.85	1.35
Lu	175.00	0.26	0.05	0.26	0.06	0.30	0.09	0.29	0.02	0.25	0.02	0.33	0.06	0.41	0.21
Hf	178.00	2.97	1.33	3.26	1.06	5.22	3.67	3.23	0.62	3.22	1.74	8.32	7.98	24.35	54.15
Ta	181.00	1.97	0.60	1.74	0.36	1.67	0.47	2.16	0.29	1.63	0.20	1.69	0.08	1.96	0.29
Th	232.00	12.80	1.43	11.07	1.83	13.29	2.27	13.25	0.62	12.11	3.21	12.00	1.53	14.38	4.35
U	238.00	5.94	3.57	4.01	0.64	4.62	0.87	3.42	0.18	4.43	0.38	5.53	1.13	5.41	1.30

Mean and Standard Deviation of LA-ICPMS results.

Al₂O₃, SiO₂, CaO and TiO₂ = weight%

Remainder elements = ppm

Element	Mass	W1		W2		W3		P1		P2		P3		P4	
		Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.
Al ₂ O ₃	27.00	22.44	1.70	21.12	2.49	22.13	2.67	22.52	0.79	24.33	3.41	23.38	1.46	22.45	3.95
SiO ₂	29.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00
CaO	43.00	1.02	0.19	1.26	0.42	0.24	0.12	0.39	0.06	0.36	0.07	0.45	0.12	0.45	0.11
TiO ₂	49.00	1.00	0.27	1.09	0.27	0.76	0.13	0.75	0.14	0.83	0.13	1.07	0.27	0.79	0.17
V	51.00	134.88	7.00	137.27	12.94	81.98	5.73	143.56	8.82	145.73	17.24	161.67	14.78	154.74	29.03
Cr	52.00	119.42	7.34	113.59	11.00	63.72	6.25	114.91	6.24	129.03	21.76	122.85	6.20	114.97	21.37
FeO	54.00	4.64	0.57	4.53	0.61	3.53	0.23	5.66	0.80	4.97	0.89	4.45	0.79	4.95	1.12
Co	59.00	13.35	1.14	12.39	2.10	9.19	1.01	12.84	1.31	13.08	2.50	12.12	1.31	12.40	2.65
Ni	60.00	40.77	2.82	38.49	5.30	20.78	4.85	45.00	3.23	46.78	8.42	43.50	6.16	45.80	11.10
Cu	65.00	34.75	6.74	25.21	16.85	10.39	2.02	32.79	2.57	33.65	3.68	31.95	3.68	32.88	6.33
Zn	66.00	141.73	17.04	140.35	24.06	52.40	5.46	114.30	5.81	122.57	19.35	105.47	15.02	103.32	22.70
Rb	85.00	219.48	20.14	205.40	22.48	282.95	50.11	188.33	10.91	190.72	18.91	193.65	15.59	182.48	30.36
Sr	86.00	146.48	14.11	162.93	26.80	72.27	7.30	111.40	9.78	109.29	11.96	123.67	7.93	115.64	23.92
Y	89.00	28.67	9.92	42.65	38.40	16.83	4.75	19.14	1.78	18.27	3.73	18.12	2.55	21.56	7.19
Zr	90.00	216.00	75.40	150.28	30.02	125.97	29.25	745.53	1442.44	130.07	119.34	83.28	12.65	152.36	129.70
Ag	107.00	0.49	0.45	0.70	1.47	0.07	0.04	0.44	0.48	0.43	0.58	0.12	0.09	0.14	0.10
Sn	118.00	7.21	0.82	7.28	2.32	13.92	6.15	7.46	0.80	10.21	1.76	6.47	1.28	6.57	1.26
Sb	121.00	0.94	0.12	1.33	0.85	0.80	0.09	1.53	0.16	2.17	0.33	1.77	0.36	1.50	0.33
Cs	133.00	15.22	1.61	13.47	1.67	22.80	2.39	14.02	0.75	13.04	1.17	14.05	1.97	13.64	2.38
Ba	137.00	556.78	42.31	606.16	88.79	382.60	54.13	394.32	10.00	426.72	47.48	422.55	32.49	400.76	68.80
La	139.00	37.28	12.72	39.70	29.52	29.24	3.68	38.83	6.67	49.66	10.46	45.70	11.59	43.86	8.09
Ce	140.00	72.66	23.67	77.89	53.97	59.39	8.33	74.20	12.49	93.47	19.94	88.79	25.49	81.77	14.19
Pr	141.00	8.61	2.70	10.09	9.28	6.25	0.97	8.31	1.38	10.50	2.11	10.12	3.16	9.34	1.57
Nd	146.00	34.90	11.15	41.42	40.57	23.17	3.18	31.75	5.09	40.76	7.25	37.62	10.49	36.03	6.22
Sm	147.00	7.37	2.29	9.06	8.88	4.57	0.72	6.00	0.82	7.43	1.45	7.13	1.64	6.87	1.02
Eu	151.00	1.60	0.40	2.29	2.30	0.96	0.16	1.33	0.13	1.58	0.30	1.51	0.24	1.48	0.20
Gd	157.00	6.05	1.91	8.49	8.01	3.50	0.70	4.24	0.52	4.87	0.88	4.85	0.60	4.99	0.76
Tb	159.00	0.98	0.35	1.47	1.33	0.55	0.11	0.66	0.04	0.71	0.14	0.70	0.05	0.78	0.17
Dy	163.00	5.66	2.01	8.49	7.65	3.14	0.76	3.75	0.16	3.88	0.74	3.84	0.37	4.40	1.06
Ho	165.00	1.10	0.40	1.66	1.48	0.63	0.14	0.74	0.03	0.74	0.14	0.76	0.10	0.85	0.23
Er	166.00	2.88	0.97	4.14	3.45	1.72	0.42	2.05	0.22	1.97	0.42	1.93	0.25	2.31	0.66
Tm	169.00	0.43	0.14	0.58	0.44	0.26	0.06	0.32	0.06	0.29	0.07	0.28	0.03	0.33	0.10
Yb	173.00	2.92	0.84	3.76	2.44	1.87	0.48	2.44	0.67	2.13	0.62	2.01	0.28	2.41	0.76
Lu	175.00	0.42	0.12	0.50	0.27	0.26	0.06	0.36	0.15	0.31	0.10	0.28	0.04	0.33	0.10
Hf	178.00	6.02	2.12	4.08	0.74	3.66	0.94	17.96	34.00	3.78	3.62	2.36	0.33	4.23	3.25
Ta	181.00	1.24	0.22	1.30	0.17	2.22	0.55	1.06	0.14	1.23	0.28	1.19	0.22	1.02	0.21
Th	232.00	11.87	4.04	17.44	17.62	12.13	1.43	12.21	0.83	14.59	2.59	14.23	3.74	13.31	2.63
U	238.00	3.89	1.15	4.21	0.62	5.94	0.69	3.21	0.82	3.40	0.71	3.05	0.48	3.21	0.83

Mean and Standard Deviation of LA-ICPMS results.

Al₂O₃, SiO₂, CaO and TiO₂ = weight%

Remainder elements = ppm

Element	Mass	PU1		PU2		PU3		PU4		PU5		PU6		PG1	
		Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.	Mean	SDv.
Al ₂ O ₃	27.00	20.16	0.89	20.26	1.56	18.80	1.17	22.18	1.05	21.12	2.27	21.76	2.41	27.19	0.91
SiO ₂	29.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00	55.00	0.00
CaO	43.00	0.22	0.04	0.23	0.05	0.18	0.07	0.31	0.05	0.37	0.05	0.22	0.01	0.52	0.07
TiO ₂	49.00	0.57	0.10	0.63	0.08	0.59	0.23	0.63	0.09	0.61	0.09	0.60	0.07	1.02	0.13
V	51.00	97.77	4.14	88.87	8.78	87.52	8.18	74.27	6.12	76.78	7.08	87.67	6.26	91.73	8.40
Cr	52.00	66.94	6.67	72.58	3.79	67.57	7.03	60.28	5.52	60.06	4.30	79.66	8.51	84.80	1.69
FeO	54.00	5.27	0.65	5.38	0.34	5.02	0.39	3.76	0.39	3.56	0.25	5.48	0.46	5.84	0.38
Co	59.00	12.29	1.74	9.05	0.62	8.44	1.15	11.80	0.41	11.38	0.71	9.90	0.85	22.12	10.74
Ni	60.00	29.31	4.79	24.70	3.23	25.37	2.91	28.52	3.48	31.97	5.87	56.28	28.30	62.51	10.80
Cu	65.00	31.30	3.60	20.40	2.27	16.83	4.02	38.85	6.95	32.53	9.62	75.12	19.00	229.83	26.88
Zn	66.00	76.94	9.50	67.98	2.63	66.62	11.54	69.49	3.85	68.17	8.97	96.36	22.96	508.20	30.53
Rb	85.00	362.47	38.30	354.80	21.12	366.89	14.81	356.03	23.29	343.16	27.28	334.36	22.49	345.31	14.12
Sr	86.00	67.04	7.83	68.08	5.66	66.63	3.81	76.55	8.09	67.37	5.81	71.97	11.29	85.29	6.87
Y	89.00	19.00	4.28	12.45	2.59	12.07	3.88	20.45	2.59	19.25	2.87	13.14	5.42	39.16	10.36
Zr	90.00	95.16	25.47	92.63	21.35	93.39	37.82	120.15	16.39	102.33	21.96	90.49	16.91	50.95	14.97
Ag	107.00	10.20	3.70	5.87	5.34	2.70	1.84	6.64	2.93	6.45	2.49	8.46	4.79	5.85	2.85
Sn	118.00	20.35	12.36	18.05	2.57	20.55	2.95	16.87	1.42	20.69	9.06	18.33	2.76	34.60	2.94
Sb	121.00	2.44	0.56	1.16	0.11	1.11	0.23	1.49	0.41	2.65	0.96	2.89	1.19	2.06	0.91
Cs	133.00	29.07	1.33	32.34	2.20	32.38	1.41	30.11	1.77	29.93	1.80	31.34	1.79	29.36	2.18
Ba	137.00	371.68	97.25	291.58	35.76	288.14	10.44	303.44	41.27	255.44	20.07	324.00	36.70	522.76	54.93
La	139.00	37.37	13.63	35.04	6.63	30.20	12.69	41.11	3.96	34.97	3.17	29.63	2.41	57.73	10.25
Ce	140.00	83.53	30.22	68.34	11.05	59.90	29.05	74.82	7.44	66.79	6.43	49.34	1.50	139.88	22.66
Pr	141.00	8.88	3.02	7.52	1.56	6.04	2.76	7.81	1.22	7.16	0.77	5.02	0.16	15.96	3.53
Nd	146.00	31.43	12.56	25.94	3.91	21.04	8.85	33.77	10.02	28.15	3.19	18.28	3.01	61.11	15.28
Sm	147.00	7.37	5.23	4.97	0.78	4.51	2.22	5.14	0.65	5.66	1.10	3.36	0.55	13.71	3.14
Eu	151.00	1.30	0.43	1.04	0.14	0.83	0.13	1.26	0.25	1.19	0.22	0.76	0.30	1.71	0.20
Gd	157.00	4.50	1.57	3.86	1.60	2.82	0.87	4.44	0.43	4.44	0.34	2.12	0.40	9.59	3.28
Tb	159.00	0.68	0.23	0.48	0.11	0.44	0.11	0.79	0.11	0.72	0.10	0.58	0.29	1.47	0.53
Dy	163.00	3.52	0.89	2.71	0.45	2.47	0.67	4.43	1.19	4.09	0.60	2.24	0.71	7.78	2.85
Ho	165.00	0.69	0.15	0.49	0.07	0.46	0.12	0.77	0.08	0.78	0.08	0.49	0.31	1.49	0.44
Er	166.00	1.76	0.39	1.25	0.15	1.29	0.37	1.85	0.19	1.91	0.36	1.31	0.15	3.56	1.06
Tm	169.00	0.25	0.05	0.20	0.02	0.19	0.06	0.27	0.11	0.33	0.09	0.21	0.08	0.46	0.16
Yb	173.00	1.73	0.39	1.48	0.18	1.50	0.57	2.24	0.20	1.87	0.39	1.31	0.49	3.67	1.29
Lu	175.00	0.24	0.04	0.20	0.03	0.21	0.09	0.34	0.04	0.33	0.05	0.20	0.09	0.42	0.15
Hf	178.00	2.62	0.66	2.91	1.21	2.83	1.36	3.36	0.63	3.27	0.53	2.72	0.63	1.60	0.45
Ta	181.00	1.63	0.19	1.83	0.26	1.70	0.18	2.17	0.35	1.91	0.28	1.65	0.11	2.32	0.40
Th	232.00	12.01	2.42	17.50	7.07	13.49	4.69	15.12	3.31	13.80	0.93	12.55	1.38	31.07	9.44
U	238.00	4.91	0.74	5.81	1.38	4.92	1.01	3.77	0.34	6.12	0.82	4.90	0.65	23.15	2.47

Mean and Standard Deviation of LA-ICPMS results.

Element	Mass	PG2		PG3	
		Mean	SDv.	Mean	SDv.
Al ₂ O ₃	27.00	19.56	1.22	24.02	2.35
SiO ₂	29.00	55.00	0.00	55.00	0.00
CaO	43.00	1.17	0.56	0.62	0.05
TiO ₂	49.00	0.75	0.30	0.85	0.16
V	51.00	137.87	25.69	172.18	26.00
Cr	52.00	116.43	27.01	146.17	16.72
FeO	54.00	3.77	0.67	6.66	3.73
Co	59.00	12.05	3.04	18.62	2.77
Ni	60.00	46.32	5.73	68.71	24.56
Cu	65.00	385.38	333.52	70.91	21.82
Zn	66.00	188.74	18.27	262.66	107.22
Rb	85.00	237.56	26.58	286.95	30.50
Sr	86.00	67.96	10.46	82.68	23.83
Y	89.00	17.84	4.52	19.45	5.10
Zr	90.00	109.44	26.36	149.39	46.12
Ag	107.00	9.79	1.77	2.91	1.27
Sn	118.00	13.00	5.05	8.94	0.63
Sb	121.00	2.21	0.45	2.57	1.36
Cs	133.00	16.20	2.33	19.36	1.58
Ba	137.00	418.83	50.71	561.07	58.94
La	139.00	17.03	3.67	22.01	5.01
Ce	140.00	37.52	7.43	43.64	10.99
Pr	141.00	4.01	0.40	5.30	1.41
Nd	146.00	18.10	5.19	22.69	5.40
Sm	147.00	4.16	0.89	5.05	1.15
Eu	151.00	0.86	0.16	1.15	0.29
Gd	157.00	4.39	2.60	5.54	2.15
Tb	159.00	0.55	0.16	0.75	0.26
Dy	163.00	3.05	0.64	4.03	1.50
Ho	165.00	0.67	0.12	0.91	0.21
Er	166.00	1.63	0.28	2.16	0.63
Tm	169.00	0.30	0.05	0.32	0.03
Yb	173.00	1.93	0.15	2.23	0.91
Lu	175.00	0.28	0.04	0.41	0.15
Hf	178.00	2.99	0.70	3.82	0.71
Ta	181.00	0.93	0.33	1.15	0.18
Th	232.00	8.25	1.96	10.42	1.55
U	238.00	4.54	0.94	4.57	1.06

Al₂O₃, SiO₂, CaO and TiO₂ = weight% Remainder elements = ppm*Notes (Bordon. Catalogue Number for Newfoundland samples):*

F1 - CgAf.02.194426 (<i>Fabric 3</i>)	P3 - ChAl.04.7081 (<i>Fabric 2</i>)
F2 - CgAf.02.281945a (<i>Fabric 3</i>)	P4 - ChAl.04.7064b (<i>Fabric 2</i>)
F3 - CgAf.02.341126 (<i>Fabric 1</i>)	PU1 - Casa do Infante unglazed
F4 - CgAf.02.379332 (<i>Fabric 2</i>)	PU2 - Casa do Infante unglazed
F5 - CgAf.02.380724 (<i>Fabric 2</i>)	PU3 - Casa do Infante unglazed
F6 - CgAf.02.419913 (<i>Fabric 1</i>)	PU4 - Casa do Infante unglazed
F7 - CgAf.02.436523 (<i>Fabric 2</i>)	PU5 - Casa do Infante unglazed
F8 - CgAf.02.438965 (<i>Fabric 2</i>)	PU6 - Casa do Infante unglazed
F9 - CgAf.02.519236 (<i>Fabric 3</i>)	PG1 - Casa do Infante glazed
F10 - CgAf.02.529314 (<i>Fabric 2</i>)	PG2 - Casa do Infante glazed
F11 - CgAf.02.537987 (<i>Fabric 2</i>)	PG3 - Casa do Infante glazed
FT (<i>alguidar inside</i>) - CgAf.02.421154 (<i>Fabric 2</i>)	
FM (<i>alguidar middle</i>) - CgAf.02.421154 (<i>Fabric 2</i>)	
FB (<i>alguidar outside</i>) - CgAf.02.421154 (<i>Fabric 2</i>)	
W1 - CjAe.08.187e10841 (<i>Fabric 2</i>)	
W2 - CjAe.08.191e10580 (<i>Fabric 3</i>)	
W3 - CjAe.08.196e10967 (<i>Fabric 1</i>)	
P1 - ChAl.04.7062 (<i>Fabric 2</i>)	
P2 - ChAl.04.7168 (<i>Fabric 2</i>)	



