DETRITUS OF EMPIRE: SEVENTEENTH CENTURY SPANISH POTTERY FROM TAUMAKO, SOUTHEAST SOLOMON ISLANDS, AND MOTA, NORTHERN VANUATU

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We describe here the recovery and analysis of exotic pottery from the island of Taumako in the Duff Islands of the Southeast Solomon Islands and from Mota in the Banks Islands, Northern Vanuatu. The pottery was found during archaeological fieldwork carried out in the 1970s. It comprises a single surface-collected sherd from Taumako, and half of an amphora-like jar from Mota. Historical records and petrographic analyses point to the two separate pottery samples being non-Oceanic, almost certainly originally sourced from the Spanish colonial industries of Peru, and that they are most likely associated with the 1605-6 Spanish expedition to the Pacific led by the Portuguese navigator Don Pedro Ferdinand De Quiros. The archaeological remains and historic documents also provide further evidence of the strong indigenous inter-island connections of the period.

THE SPANISH IN THE PACIFIC

Spanish incursions into the Pacific region from the start of the 16th century marked some of the earliest contacts of Europeans with Pacific islanders and in many respects laid the foundations for more significant European expansion into the region some centuries later. They named and described, in varying detail, the islands and their inhabitants and attempted to establish colonies, all of which were ultimately unsuccessful. The extensive Spanish historical records (Kelly 1965) provide us with unique glimpses of the Pacific Islands and their inhabitants 500 years ago, and they have at the same time significantly supplemented the archaeological record (Doherty 2007, Leach and Davidson 2008, Spriggs 1997: 223-40).

Initial early 16th century Spanish interest in the Pacific Rim was centred on Central America, with explorations from "New Spain" (modern Mexico) to the north along the Californian coast, and to the south with establishment of settlements along the western coast of South America. One of the first Spanish expeditions (1519-1522) to visit the western Pacific was that led by Ferdinand Magellan who, during his ship's circumnavigation, was the first to sight and record islands of Micronesia (Pigafetta 1975: 60-61, Sharp 1960: 6-8). Further Spanish discoveries of Pacific Islands followed. Alvaro de Saavedra, the first to cross the Pacific from the Americas, departed with three ships from Mexico in 1527, encountered islands in the northern Marshalls on his outward journey and Manus and the Admiralty Islands on his first, failed attempt to return to Mexico. On his second attempt, Pohnpei (eastern Carolines) and Eniwetok Atoll were sighted and visited (Sharp 1960: 22). The typical trans-Pacific routes of the Spanish galleons were westward from New Spain north of the equator, returning eastward in an arc across the northern Pacific to catch favourable winds. However, apart from occasional signs of land, such as logs and birds, and even fewer sightings (Saavedra being one of exceptions), islands of the central and southwestern Pacific generally remained beyond Spanish knowledge. This situation began to change from the mid-16th century, following Spanish consolidation of their position in South America, when a series of expeditions left from the port of Callao on the western coast of Peru.

From the mid-16th century, expeditions were financed from New Spain with the explicit goal of exploring areas to the south, encouraged by romantic European notions of black souls and gold in islands to the west—"an Island called Solomon" (Jack-Hinton 1969:13)—and particularly the idea that a large continent existed which was thought to be required to balance the continents of the Northern Hemisphere. In November 1567 an expedition under the command of Alvaro de Mendaña y Neyra set out from Callao with these general objectives in mind. After almost two months at sea, the first land to be sighted was Tuvalu on 15 January. Continuing his westward passage, Mendaña encountered a substantial atoll north of the central Solomons and he made harbour—at "Bahia de la Estralla"—on the northern coast of Santa Isabel on 7 February 1568 (Amherst and Thomson 1901). The expedition spent several months there, building a boat to visit the coasts of Santa Isabel, Florida and Guadalcanal. They then established themselves on Guadalcanal, near the site of the present capital Honiara, from where they explored more of its coastline and the southwestern coasts of Malaita, Ulawa and Makira, subsequently moving to an anchorage near to the main island of Makira in June. Mendaña had mixed success in his relationships with the indigenous population, whose resources he often commandeered, and misunderstandings led to disputes and open conflict forcing him to move on (Amherst and Thomson 1901: 57). The

Solomons sojourn ended in August when Mendaña came to the conclusion that, during that voyage at least, settlement was not going to be possible. The expedition returned to New Spain in September 1569.

Mendaña was not at all discouraged by his initial experiences in the region but rather, as described by one author, "the isles, and their souls crying for salvation, became an obsession" (Spate 1979: 126). It was not for another quarter of a century, however, that he was able to attract sufficient support for a second expedition to the western Pacific. Finally in June 1595, he again set out from the port of Callao with nearly 400 men and women and six priests (Kelly 1965: 399) aboard four ships, intending to establish a religious colony in the "Isles of Solomon". One month later, with at least one of the ships now in somewhat desperate straits, three of the ships, minus the lagging *almiranta, Santa Isabel*, had reached the large island of Nendö, which Mendaña named Santa Cruz, and began construction of an interim settlement at Graciosa Bay on the northwestern coast. Dissension among the company led to duplicities and to the provocation of hostilities and the murder of the local leader, Malope, who had welcomed the settlers. Mendaña became ill and died, and soon thereafter the settlement was abandoned and "the first European colony in the South Seas ended its dismal and bloody existence of two months" (Spate 1979: 130). Don Pedro Fernandez de Quiros, the chief pilot, was selected by Mendaña's widow to lead the remaining would-be colonisers in their three ships on what would prove a harrowing voyage back towards the Philippines. His vessel, with Lady Mendaña aboard, made the journey, and a second smaller vessel may have done so somewhat later. It seems that the *almiranta, Santa Isabel*, had missed the earlier signal to turn to Santa Cruz and the safe harbour of Graciosa Bay altogether.

While historical documents have dominated the discourse relating to the Spanish voyages, archaeological investigations have also played a crucial role in elucidating some of the significant unrecorded and accidental aspects associated with the same voyages. This is particularly exemplified by the work of Jim Allen, Roger Green and others, working under the auspices of the Southeast Solomons Culture History Project (SESCHP), who discovered and excavated the remains of Mendaña's ill-fated 1595 settlement at Graciosa Bay (Allen and Green 1972) and solved the 400-year-old mystery concerning the location of a short-lived settlement linked with the wreck and survivors of the lost *almiranta* at Pamua on San Cristobal (Makira), Solomon Islands (Allen 1976, Allen and Green 1972, Dickinson and Green 1973, Green 1973). Informative investigations were also carried out at the same time on nearby contemporary and earlier period indigenous settlements at both Graciosa Bay (McCoy and Cleghorn 1988) and at Pamua (Green and Kaschko in prep, Spriggs 1997: 236-39).

One of the last Spanish expeditions, undertaken in the first decade of the 17th century, to further explore the Pacific for the fabled southern continent, its associated riches and to establish a settlement, was that headed by Quiros (Kelly 1966, Markham 1904, Spate 1979). Since piloting the voyage of 1595-97, Quiros had been determined to return to the western Pacific. He campaigned for funding to mount his own voyages of discovery and settlement, finally gaining support from the Pope in 1601 and subsequently King Phillip III of Spain. Quiros arrived in Lima in March 1605 to organise the voyage and three ships along with upward of 300 people planning to establish settlements, finally departed Peru at the close of 1605. Some 12 months was spent at sea but despite being the first Europeans to encounter the Tuamotu Archipelago, the Duff Islands and northern Vanuatu, the voyage was overwhelmingly characterised by fleeting visits to various islands most often in search of supplies, apart from 11 days at Taumako and six weeks at Big Bay, Santo (Fig. 1). The Spanish remained very much ship-based, albeit with regular and frequent forays from the ships to water sources, coastal villages and into the interior of Big Bay.

While some preliminary excavations were carried out at the Kahula site on Taumako (Leach and Davidson 2008: Ch. 7) and at Big Bay (Bedford and Spriggs 2008), no intensive archaeological investigations have as yet been undertaken at potential Quiros-related sites, but we could expect that archaeological remains at any of these locations to be ephemeral at best. No serious attempts were made to establish settlements as was the case with Mendaña's expeditions, nor were any ships wrecked leaving survivors and others who may have had access to a wealth of material over some time period, a percentage of which would have ultimately ended up in the archaeological record, as was the case for La Pérouse's ships on Vanikoro (Clark 2003, Galipaud and De Biran 2006).

THE 1605-1606 VOYAGE OF DON PEDRO FERNANDEZ DE QUIROS

Much has been written about the expedition of 1605-6 including translated and edited contemporary accounts (Kelly 1966, Markham 1904, Zaragoza 1876-82), later reassessments (Jack-Hinton 1969, Spate 1979) and recent works that have coincided with the 400th anniversary of the voyage which has recently been celebrated (Angleviel 2007, Luque and Mondragon 2005). Following hard-won approval and funding for the voyages, Quiros arrived in Lima in March 1605 and went about the selecting, refitting and provisioning of ships. Two large ships, the *San Pedro y Pablo* and *San Pedro*, and a shallow-draught vessel, *Los Tres Reyes* (Kelly 1966:26), finally sailed from Callao (the same port from where Quiros and Mendaña had sailed in 1595) in December 1605, and made their way across the Pacific (Fig. 1). They initially set out, with plans

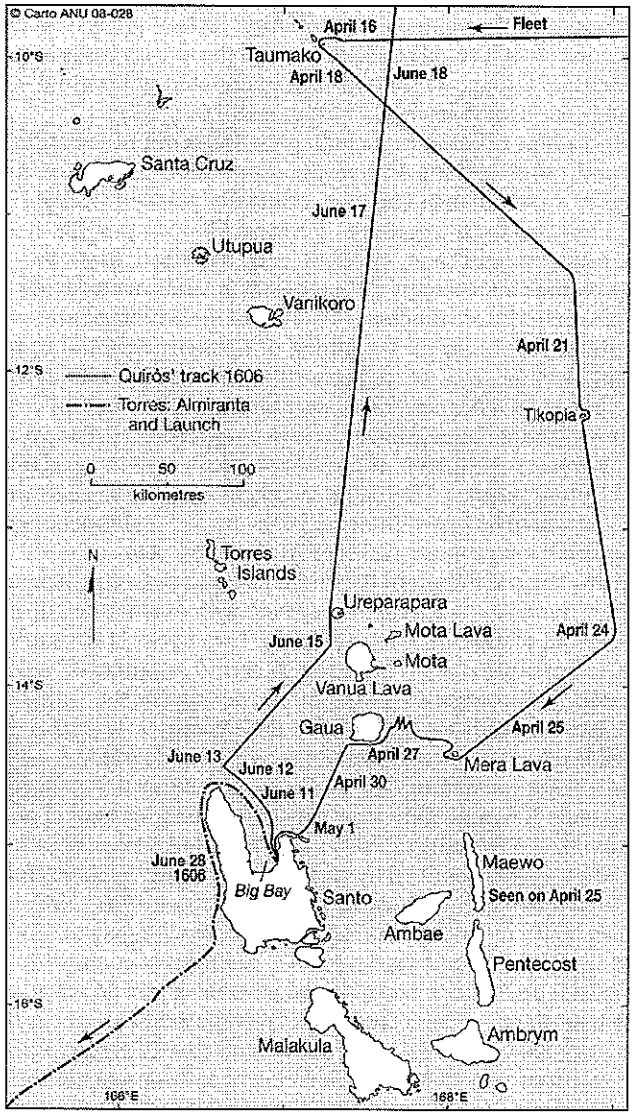

Figure 1. Map showing Quiros' expedition route (adapted from Markham 1904: Map 3).

for colonisation, on the continued search for a fabled "great southern land". Quiros imagined that it could be found south of the already discovered islands of the Marquesas Group, which had been interpreted as potential outliers of the assumed continent (Lugue and Mondragon 2005: 137).

For a whole host of reasons, including the influence of prevailing winds, only a month after leaving Callao the ships took a much more north-northwesterly direction than had been originally planned (Kelly 1966: 40). The region that had been targeted as the most likely to provide evidence of the "great southern land" had, in effect, been bypassed. From this point on the voyage became increasingly difficult, both in terms of achieving its stated aims and, on a much more fundamental level, of maintaining basic provisions such as a water supply. At the beginning of February they did come across the Tuamotu Archipelago, which temporarily raised hopes of an associated mainland, but even after several weeks and the discovery of a string of islands (mostly uninhabited), larger land masses remained elusive. Towards the end of February the matter of provisions became an increasingly urgent issue, and having reached 10°S latitude Quiros decided to head westwards to Santa Cruz where he knew, from the visits in 1595, safe anchorage and an accessible water source were available (Kelly 1966: 44).

Though the ships fell short of the initial Santa Cruz Group destination, on 6 April, after five months at sea, they arrived with much relief, at Taumako, the largest island of the Duff Group (Fig. 1). They spent 11 days at Taumako taking on various provisions including plentiful supplies of water. Once reprovisioned, Quiros again focused on the search for the "great southern land" and, having been told of islands to the south by a Taumako chief, left on 18 April heading southeast. Four days later they coasted by Tikopia and on 25 April, Mere Lava in the Banks Group was sighted. On 28 April they landed on Gaua. It was quickly ascertained that Gaua was not in any form a great continent, so they sailed further south reaching Santo and entering Big Bay on 1 May, a day described by one voyager as the "most joyful and the most celebrated day of the whole voyage" (Markham 1904: 240).

At almost 4000km^2 and with mountain peaks reaching up to 1879 metres, Santo was by far the largest landmass that had been encountered; for some weeks at least it could not be determined whether it was an island or in fact part of the legendary southern continent. Over the next two weeks the ships' crews made regular visits to the shore and interacted with the local inhabitants. However, relations very quickly turned violent and subsequent activities on shore were characterised by theft of local produce from villages and gardens. It was not until 14 May that Quiros claimed the territory, as far as the South Pole, for Spain and announced the plans for a permanent settlement (Kelly 1966: 220). The only record of anything being constructed, however, was a

rudimentary church and stockade (subsequently dismantled) made of local materials (Kelly 1966: 211, 213, 217). Disillusionment, disagreements, sickness and continuing skirmishes with local inhabitants, along with failed attempts to further explore the coast of Santo owing to bad weather, ultimately led to the abandonment of the Big Bay venture. Quiros, having been separated from the two other ships during severe storms in Big Bay, decided again to head to Santa Cruz as previously planned. However, this strategy was changed on 18 June when it was decided instead to return to New Spain. His ship ultimately arrived in Acapulco in November 1606 (Kelly 1966: 95). The two other vessels under the command of Luis Vaez de Torres passed along the western coast of Santo before heading south and then north-northwest through the Torres Strait, hugging the southern coast of New Guinea and finally arriving in Manila in May 1607 (Kelly 1965: 224).

EXCHANGE ITEMS AND CERAMIC JARS

Even though during almost a year at sea Quiros and his fellow ship-bound travellers spent little time on the shores of the many newly encountered islands, there were numerous opportunities and situations where exotic items including Spanish pottery might have entered the Pacific archaeological record, both directly and indirectly. From the experience of many previous exploratory voyages, the Spanish as a matter of course carried with them a whole range of materials specifically for trade or barter with indigenous inhabitants (Kelly 1966: 28). Many of these items, such as cloth and clothing, which is often noted as having been gifted or traded, would have had little chance of surviving in the archaeological record. Other objects, such as glass and metal items (as uncovered by Leach and Davidson [2008] at Taumako), or implements like knives, which were recorded as having been exchanged daily on Taumako for coconuts (Kelly 1966: 187), may well have fared better. Other items not specifically recognised by the Spanish as having been traded may simply have entered the record by chance. Pottery is one of the more durable and widespread artefact types found across the southwest Pacific and it proved to be similarly dominant and resilient in the sites associated with early Spanish settlement sites in the Southeast Solomons (Allen 1976, Green 1973).

After reading the historic records we should perhaps not be surprised that, if artefactual remains associated with Quiros' voyage are found, pottery would be one of the most likely. Pottery jars, primarily used in the storage of water, are regularly referred to throughout the historic texts. Water was an essential and ever-present concern on these exploratory voyages across the Pacific and listed among the provisions before heading out of Callao were 800 jars of water (Kelly 1966: 28). Once out into the Pacific, the constant need for replenishment and extreme apprehension in relation to water shortages

are regularly noted, and in some respects this concern for water and other provisions influenced the whole direction of the voyage. Passing through the Tuamotu Archipelago and other isolated islands, which were mostly small atolls, water was not found. By 10 February there was a "dire need of water" (Kelly 1966: 160) and by 10 March, it was noted that all were in great need of water, "because for over 40 days the ration had been only one *cuartillo* [one pint]" (Kelly 1966: 176, square brackets in source). Extreme water shortages led to some novel ways of shipboard water collection. Water was collected when it rained and great relief was recorded on 3 April when 50 water jars were filled during a storm (Kelly 1966: 182). Sea water was also distilled on board ship but supply hardly kept up with demand as distillation produced only two jars daily (Kelly 1966: 176). In relation to water distillation, Leza, the chief pilot of the voyage, noted that "the fire was lighted over the machine, and it began to give fresh water with much ease. This day they got three Peruvian jars full" (Markham 1904: 333).

Upon reaching Taumako after five months at sea, the Spaniards must surely have been greatly relieved to discover a freshwater source. Its enthusiastic collection was recorded when soon after arriving "the boats started bringing earthenware jars to collect water, of which there was a good supply at a brook" (Kelly 1966: 187). Local inhabitants also lent a hand. Leza noted that "our people told them by signs that we were in want of water, which they presently understood, and asked us what we had to put it into. Showing them a couple of jars they went to the land with them, over reefs, and for the jars they made baskets of green palm leaves well woven, and brought them back to us full of excellent water" (Markham 1904: 357). The rivers of Big Bay, Santo also provided a good water source, its collection noted on 10 and 11 May (Kelly 1966: 213) and again on 19 May (Kelly 1966: 228).

Water jars may well not have been the sole source for a stray Spanish pottery vessel to be absorbed into local communities and ultimately the archaeological record. This was demonstrated in the case of the pottery vessels associated with Mendaña's voyages where a wide variety of vessel forms of varying fabrics were recovered (Allen 1976, Allen and Green 1972, Dickinson and Green 1974, Green 1973). The historic records associated with Quiros' voyage paint a similar picture. Pottery vessels, apart from those used for water, are noted among the supplies as being used to store various items. These include jars of pickled fish (Kelly 1966: 250), the more provenance-specific Peruvian gunpowder jars (Kelly 1966: 338) and Peruvian jars to store almonds (Kelly 1966: 267). The central role of ceramic jars generally used during the Spanish Colonial period of the 16th to 18th centuries in transporting and storing produce and supplies has also been outlined in extensive literature (e.g., Deagan 1987, Goggin 1960, Marken 1994).

TAUMAKO SHERD

During the course of the "Southeast Solomon Islands Culture History Project" (SESCHP) one focus of investigation for several project members became Spanish explorers contacts in the Pacific during the late 16th and early 17th century. The archaeology of the proto-historic period, as this interval is sometimes called, was always deemed as important to the overall SESCHP programme as finding 3000-year-old Lapita sites, and so formed a part of the overall strategies built into the various individual field projects during a six year span.

As one component of the project, Green journeyed to the Duff Islands group of the Outer Eastern Island Solomons (OEIS) in February 1972 to conduct preliminary excavations at the site of Kahula on the main island of Taumako. As during previous surveys seeking potential sites for excavation, a watchful eye had been kept for surfaces yielding potsherds among the abandoned habitation zones recorded around that island, though none bearing ceramics were found. Indeed, the surfaces of most of the sites exhibited only portable artefacts, assigned in general to a period spanning the last 800 years. Although the attention was on discovering surfaces with sherds associated with the Lapita Cultural Complex or descendant local assemblages from an earlier time, Green was well aware that Quiros had briefly called at Taumako in April 1606.

On the morning of 29 February 1972 a newly hired crew of people from the nucleated settlement of Tahua on the artificial island built in the lagoon offshore from Taumako assembled to assist in the investigations at Kahula. The crew began by clearing the entire Kahula zone wherever there were indications of former habitation. Once the area was cleared, Green established a grided zone some 36m by 30m in size, divided up into 3m by 3m squares. He focused initially on two of these squares. Green's fieldnotes state: "On the surface we pick up eleven adzes, all in shell—hinge of giant clam, cassis lip and ventral margin of smaller clams. I find what I think is almost certainly a piece of pottery as well. Break it to be sure, and it sure looks like pottery. Hope there is more down below [the surface]" (Green MS. 1972 [VIII], p. 7). This proved a vain hope, as the entries in the field diary make clear: "Have found additional surface artifacts, but no more pottery" [during the ongoing excavations recorded in the intervening days to 3 March] (p. 13); "Despite much searching, I've not been able to find another piece of pottery—sob" (p.16 [4 March]).

Ultimately no other sherds were found during any of the subsequent excavation of more 3m by 3m squares, though these did allow the recovery of hundreds of other artefacts of indigenous manufacture, all in stratified

contexts. Subsequently the earliest of these deposits proved on the evidence of radiocarbon determinations to date back approximately 400 years (Black and Green 1977)—i.e, to the late 16th and early 17th centuries. There were also a few other items, some made of iron, clearly European imports, found in one square in deposits reflecting events towards the mid-to end points of the sequence. At that time they were not thought to be of Spanish origin as opposed to just being of general European origin.

The unexpected only happened upon Green's return to New Zealand, when he sent one of the pieces of the broken sherd to a geological colleague, William R. Dickinson. Green and Dickinson had already studied in detail the tempering inclusions in the sherds from various types of the ceramics found in the AD 1595 Spanish sites, both from Graciosa Bay and Pamua (Dickinson and Green 1973). Shortly thereafter a letter came back from Dickinson.

> I have a piece of startling information for you, and can hope only that it is not irreconcilable with other data. That miserable hunk of a weathered red sherd (BS-DT-2) from Duff Island is a piece of Spanish Porous Red Earthenware! Have a close look at it, and see if you can agree. On petrographic grounds I conclude that the sherd is indistinguishable from three "Redware" sherds described in Report WRD-45 and our draft ms. (Dickinson 1979, MS. 1979)

The draft manuscript subsequently published (Dickinson and Green 1973), pointed out the implications of finding sherds from various kinds of pots which had been acquired from Peru in 1595. Some of the plain wares appeared to point to the central western coasts of South America as their place of manufacture, while the tin glazed wares were probably from southern Spain.

MOTA ISLAND JAR

Graeme Ward began his doctoral fieldwork in the Banks Islands in June 1973, initially for a period of four months. Previously there had been only brief archaeological forays to the Group. In 1966 and 1967, as part of a northern Vanuatu project, Mary Elizabeth Shutler and Richard Shutler Jr made a brief reconnaissance of the islands of the Torres and Banks, but reported that these islands "lacked pottery in prehistoric times, and archaeological sites are few and shallow" (Shutler and Shutler 1967, Shutler 1970). In October and November 1972 Les Groube spent six weeks in the Banks during which he recorded a wide range of site types and made surface collections of an assortment of cultural materials including pottery. Deeply stratified deposits, dating back almost 2000 years, were found on the island of Pakea (Ward 1979: Appendix IV-2, 4-4).

During preliminary surveys in 1973, Ward visited all islands of the northern part of the Group and Gaua in the south (Ward 1979). During these visits he showed potsherds, adzes and flakes of obsidian to local informants. Connections and discussions of traditional roles were frequently forthcoming in relation to the obsidian and shell artefacts, but pottery was recognised only rarely and usually through an association with European wares. Often people emphatically denied that pottery had ever been used in the past. After extensive survey and recording hundreds of sites, Ward established that pottery was indeed present in the islands but that sites with *in situ* stratified deposits containing ceramics were rare; these rare exceptions were sites located in the large islands of Vanua Lava and Gaua and the islets of Aro, Rah and Pakea. Scattered sherds were found on Ureparapara and Motalava. At the time, the apparent rarity of ceramics and the general lack of local recognition or knowledge suggested the relative antiquity of ceramics in this area. Subsequent research has revealed that ceramics were in fact used until relatively recently in the Banks Islands but that owing to a range of geomorphological factors, including regular volcanic activity, the sites are often deeply buried (Bedford and Spriggs 2008).

During the surveys of the 1970s the large volcanic and raised-reef island of Mota was remarkable for its lack of ceramics. Groube had walked around Mota over three days; he showed pottery to local residents, which certainly excited interest but no pottery at all was found. Subsequently Ward covered more ground over nine days, but of the 50 sites he recorded in 1973 none contained pottery in stratigraphic context. On the day that he arrived, he was shown a sherd, typical of those found elsewhere in the Group, but its recent provenience was dubious (Ward MS. 1973 [3]: 100, 26 August 1973). A few days later, having traversed most of the island, he offered a reward at the school for anyone who brought *sauspan tanoa* (earthenware pottery) from any site (Ward MS. 1973: 68-81, 30 August 1973). News of the reward spread quickly and, along with continued discussions with anyone encountered during survey, some intriguing results began to emerge.

> Headmaster Alfred took me around the three classes in operation and we seemed to have no difficulty in getting the message over. Will be interesting awaiting results. Secondly went through Lotowan and Napoi villages and talked with several people on the way, showing them potsherds. Some positive response from one, Edward, who directed us to his garden near Lutwetbé. Meet Alban, who is constructing a fence to contain cattle, north of Lutwetbé. Kustom chief working with him, John, agrees to accompany us. Walk NW to Lutwetbé village; here awaiting inspection is a giant potsherd (circa 8 x 4x 1cm) found earlier by Alban and Lindsay while building a fence at a place called Lalañañei. Arrange to go to site tomorrow morning since PM is well on. (Ward MS. 1973 [4]:68-81, 30 August 1973)

On later reflection,

> I am not completely happy about potsherd found earlier: It appears very large; that is, (1) to make a large pot (that is unusually large for these islands on basis of sample so far); and (2), too large to have survived in ground for any length of time. Its texture also is unusual and gives the appearance of being layered and flinty rather than the crumbly material found at Gaua, for example; and it is in no way similar to the slipped ware found on Pakea. The inside is burnt over and sooty almost; but appears to have circular markings suggestive of wheel-throwing; the sherd looks to have come from around the shoulder, but appears to have no form of decoration on it; surfaces are pitted, and it looks like a laboratory cooking vessel that allows for evaporation; it is closely-packed and more dense than the Gaua or Pakea material, and it has a massive aspect unlike the more delicate vessels suggested by other sherds. Tomorrow might produce more. (Ward MS. 1973 [4]:68-81, 30 August 1973)

The following day a mound feature, close to where the potsherd had been found earlier, was visited and investigated.

> BN-MT-34 rubbish mound. Not far from Mt-33 and W of fence by ten metres is place where Alban had found potsherd yesterday. Place is a *votvot* (an elongated rubbish mound associated with garden clearance) of long standing in this position. Mound is circa 1.5 metres above adjacent areas. Test-pit to 75 centimetres revealed no change in rock/humus pattern. Intensive search on the surface of mound where sherd picked up produced another small one of the same type.... Go to nearby Napoi village for break circa 1200. Here awaiting the paying viewer is a collection, spread over two small sacks, of *sauspan tanoa*, in the same coarse ware that we have been looking for more samples of.... it came from the base of a coconut tree.... Potsherds here are very similar to ones picked up on *votvot* mound and may well be of the same pot [as subsequently proved to be the case]. Sherds are 10 x 20 centimetres; their diameter suggests part of the pot may have been 50 centimetres in diameter. Varying thickness—up to three centimetres thick. Took several sherds including the base one: which looks like a tripod leg. This and others have a tar-like substance on inside surface. (Ward MS. 1973 [4]: 85-91, 31 August 1973)

Apart from 19th century English pottery, and the sherd proffered on the first day by a man who worked on Pakea, this was the only pottery found on Mota. It was clearly from a large wheel-thrown vessel and the fabric was "non-Oceanic" in composition. The sherds were removed to the Research School of Pacific Studies archaeological laboratories in Canberra where the vessel was able to be partly reconstructed during post-fieldwork analyses (Fig. 2). The reconstituted jar measured more than 626mm in length and had a diameter at its widest point near the top of c. 265mm. The thickness of

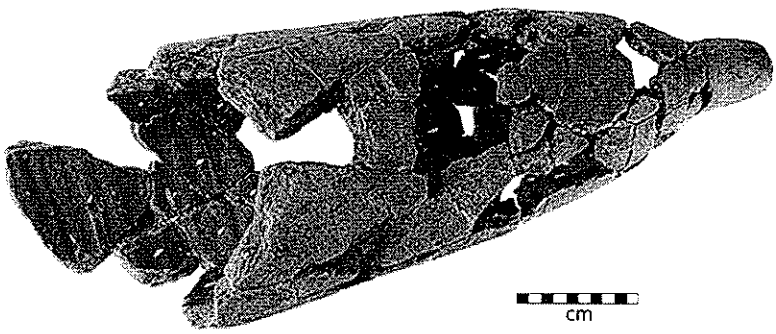

Figure 2. The Mota jar (photo: Darren Boyd, Department of Prehistory, RSPAS, ANU).

the sherds varied but 30mm was the maximum. The jar form can be placed in the general Spanish Olive jar or *botija* category, and more tentatively the "Type C" conical jars with pointed base (Deagan 1987: 30-35; Goggin 1960: 12-13, 28; Marken 1994: 41-52, 62-71). Although it is larger than currently recorded examples, it must be borne in mind that "Type C" jars are by far the most poorly profiled to date (Marken 1994: 129-38). Pitch was noted on the interior surface of a number of the sherds including the very base. This resinous substance was regularly used for both sealing the interior of vessels and the corks placed in their narrow mouths (Marken 1994: 116).

PETROGRAPHIC ANALYSIS

Petrographic analysis has played a crucial role in the study of ceramics across the Pacific and it has long been recognised as a standard analytical procedure (Dickinson 2006). One of the fundamental contributions of petrographics is the sourcing of sherds to specific regions and places of manufacture, which, in turn, can highlight aspects of trade and exchange and changing patterns of production. Petrographics were essential in establishing that the exotic sherds from the Solomons were non-Oceanic, that certain sherds from Graciosa Bay and Pamua were remarkably similar mineralogically and therefore likely to be associated with the same voyage, and that the recovered collection of sherds were most likely to have been sourced from either Spain and/or South America (Dickinson and Green 1973). The petrography of the pottery from Taumako and Mota has provided similar confirmation of their exotic status and hints also at a potential region for their source (Dickinson 1979, 1997).

Table 1. Mineralogical composition of sand tempers (percentages of grain types) in sherds of Spanish origin from the Solomon Islands and Vanuatu based on traverse or areal (Mota only) petrographic counts of *n* grains in thin section.

Island:	San Cristobal	San Cristobal	Santa Cruz	Taumako	Mota
Sherd:	D-23.285	BB-4-4-A-180	BS-SZ-1-A-50	BS-DT-2	BN-MT-3458-6
n (grains counted):	100	100	100	200	525
Mineral grains					
Quartz	8	12	14	11	21
Plagioclase	42	38	34	38	26
K-Feldspar	9	11	11	11	12
Oxyhornblende	4	6	5	9	4
Opaque Oxides	3	2	2	3	4
Rock fragments					
Granitic	18	17	15	11	13
Hypabyssal	7	6	7	8	5
Volcanic	9	8	12	9	6
Metasedimentary	-	-	-	-	9

The Taumako sherd is indistinguishable in both mineralogy and texture from three sherds of porous red earthenware of undoubted Spanish origin left on San Cristobal (Makira) and Santa Cruz by survivors of the Mendaña expedition (Dickinson and Green 1973: Table 2). Table 1 indicates the close similarity of the tempers in the four sherds. All differences in grain proportions lies within ±1 percent (or less) of the standard deviation of counting error for numbers of grains counted. Temper in the Spanish ware is mineralogically distinct from any indigenous temper sands known from either the Solomon Islands or Vanuatu (Dickinson 2006). Most notable are the comparative abundance of quartz (rare in most island tempers) and K-Feldspar (absent from nearly all island tempers), the prominence of granitic rock fragments (uncommon in island tempers) and the presence of blocky equant crystals of oxyhornblende (lamprobolite). The latter occurs in selected Oceanian tempers (none from the Solomon Islands or Vanuatu) only as acicular needle-like crystals in temper sands derived exclusively from volcanic rocks. Its ubiquitous occurrence in the Spanish sherds, both as separate mineral grains and as crystals within granitic rock fragments, stems from kiln firing that achieved higher temperatures than the bonfires used for indigenous Oceanian pottery making. Ordinary igneous hornblende was converted to oxyhornblende, unknown naturally from granitic rocks or derivative sands, by oxidation in kilns where high-temperature oxidising environments mimic conditions that produce oxyhornblende during volcanic eruptions. The various sand grain types in Solomons-Taumako Spanish sherds were derived dominantly from granitic rocks, with lesser contributions from associated hypabyssal dikes or sills and volcanic eruptives.

The Mota jar also contains oxyhornblende diagnostic of kiln-fired Spanish origin, but its better sorted and more abundant temper differs in mineralogical detail from tempers in the other four Spanish sherds (Table 1) and its clay paste is distinctly less silty. Contributions to the temper sand from varied metasedimentary rocks (quartzite, metachert, tectonite) in addition to igneous detritus imply the presence of metamorphic wallrocks as well as granitic rocks in the source area for the temper sand. An enhanced content of quartz and a higher ratio of quartz to feldspar (Table 1) probably also reflects sedimentary or metasedimentary sources of sand. Although a somewhat different origin for the temper and paste in the Mota sherd is implied by the petrographic data, the overall similarity of the granitic detritus in all five Spanish sherds points to their possible derivation from the same general location. As only three of 433 sherds of porous red earthenware from the Solomon Islands were studied petrographically, some others may contain tempers more similar to the temper in the Mota sherd.

The Andean region of South America is an attractive location for derivation of the temper sands (Dickinson and Green 1973: 296) and historic documentation of the presence of Peruvian water jars on the Spanish exploring vessels strengthens that inference. We have as yet been unable, however, to obtain any sherds of colonial Peruvian earthenware for comparative petrographic analysis, so the inference remains speculative. Petrographic analysis of the temper sands in two *pasta roja* sherds of colonial red earthenware from Panama, provided by Beatriz Rovira, show them to be quartz-poor sands (4 ± 1 percent quartz) of dominantly volcanic derivation (with 32 ± 2 percent volcanic rock fragments) containing few plutonic rock fragments (4 ± 1 percent), either granitic or more mafic, and are thus not a feasible match for tempers in the Solomons-Vanuatu Spanish sherds (Dickinson 2007). The only point of similarity is the presence in the Panamanian sherds of equant grains of oxyhornblende, though in much lesser amounts of ~1 percent. Their occurrence in colonial Panamanian sherds serves to confirm that oxyhornblende in Spanish sherds reflects the effects of kiln firing, and underscores the contrast between Spanish sherds and indigenous Oceanian sherds fired at lower temperatures.

DISCUSSION AND CONCLUSION

There were a total of six brief Spanish settlements in and numerous short visits to the islands stretching from Santa Isabel to Santo during the latter half of the 16th and the beginning of the 17th centuries. Both Taumako and Mota Islands are within the boundaries of these Spanish ventures. Some of the Spanish-associated sites, which generally have been subjected to only preliminary investigations, have returned abundant archaeological remains (Allen 1976, Allen and Green 1972, Green 1973). Others, such as those associated with brief visits and longer but primarily ship-based stays, as characterised by the six weeks of the Quiros expedition at Big Bay, have proved to be elusive (Bedford and Spriggs 2008). This is not unexpected but we might anticipate, as indicated by the historic records, that the odd exotic item made its way into the hands of indigenous inhabitants and ultimately the archaeological record (Leach and Davidson 2008). It appears that the pottery from both Taumako and Mota are of this latter category.

What we can say with confidence is that the pottery described here is non-Oceanic and associated with one of the Spanish voyages to the region. While we suggest that the voyage of Quiros in 1606 is the most likely source of the pottery, primarily on the grounds of the voyaging routes and islands visited, we cannot at this stage be more definitive. Both the method of manufacture and the petrographics indicate that the pottery is exotic and that both the Taumako

sherd and the Mota jar are very similar. The Taumako sherd is more similar to the Red Porous Mendaña sherds examined by Dickinson than is the Mota jar. However, it must be remembered that only three samples (n ~ 433) of the Red Porous Mendaña wares were examined. Further sampling of the Mendaña sherds could provide examples that were more similar to the Mota pottery or even highlight multiple sources in Peru and the difficulties of further refining their provenience. Mendaña and Quiros both sourced provisions and departed from Callao in Peru within a ten year period (1595 and 1605). If the Spanish-style pottery was locally produced and sourced from different suppliers it may not be possible to delineate between the Red Porous wares associated with the voyages of Mendaña and Quiros. Certainly it would require much more research into the Spanish Colonial period ceramics of Peru.

Green suggested long ago that the chronologically well-defined ceramics from the Mendaña sites "offer those working with ceramics of the Spanish Colonial period two closed assemblages whose immediate New World source and date of purchase are known" (Green 1973: 28-29). This suggestion remains as valid now as it was over 30 years ago and can be extended to the remains from Taumako and Mota. However, it is an aspect of research that remains to be taken up in any detail by researchers in South America. Investigation into Spanish Colonial ceramics remains very much in its infancy (Jamieson 2005: 359-60, Rice and Van Beck 1993, Rovira 2001). What the historical records associated with Quiros' voyages do provide, with their references to Peruvian jars, is solid evidence of a thriving colonial ceramics industry in Peru at least at the start of the 17th century. Quiros was perhaps more familiar with this aspect than most, as, when he arrived in Lima in March 1605 and was hard pressed for accommodation, he spent four nights with a potter (Markham 1904: 176).

While we can be certain the pottery is non-Oceanic and associated with Spanish expeditions to the Pacific, how it ultimately arrived in the archaeological record of Taumako and Mota is a matter that remains open to some speculation. The area encompassed by the Spanish voyages discussed in this paper was a region that was very well connected as evidenced through archaeological, historic and ethnographic records as well as oral traditions (Clark 2003, Davenport 1964, Firth 1961, Kelly 1966, Kirch and Yen 1982, Leach 1985, Leach and Davidson 2008). We cannot, therefore, be certain that these items were not traded or exchanged or absorbed into existing indigenous transfer systems in the same fashion, for example, as were the La Pérouse materials salvaged and distributed from Vanikoro (Clark 2003).

The most likely scenario for the sherd from Taumako was that it was derived from the 11-day visit of Quiros in 1606, although that it was not

a curio or stray pot brought back from Graciosa Bay, Nendö, by Taumako visitors, or alternatively brought by Nendö visitors to Taumako, cannot be discounted. Historic records indicate that the people of Taumako were aware of the Spanish visit to Nendö ten years before (Kelly 1966: 185, Markham 1904: 356). It is not inconceivable, although we consider it less likely, that the Mota jar also made its way to the island from Spanish sites or visits further to the west, where it might well have been seen as a prestige item, perhaps with magical or ritual connotations. Much stronger and closer proximal connections are seen between the Banks Islands and Santo (Bedford and Spriggs 2008, Huffman 1996: 184), making the transference of a Spanish jar from Big Bay to Mota, by whatever means, seems a more likely scenario.

In both cases, and without definitive petrographic data, we opt for an explanation of source for the sherds that gives greater weight to factors of geographical and voyaging proximity. However, as archaeologists have long been aware, cultural behaviour associated with interaction or procurement networks cannot be fully explained by using only basic mathematical and distributional models (Clark 2003). Future research may indicate that the sherds arrived where they were found through other means than the Quiros voyage. Greater focus on indigenous sites of the period in the immediate environs are likely to shed much light on aspects such as levels of interaction and impact and the sources of exotic objects (Green and Kaschko in prep., Leach and Davidson 2008, Spriggs 1997). Two pieces of non-Oceanic pottery found some 450km apart do not a detailed story make, but their discovery and recognition certainly highlight the myriad research possibilities that await application in relation to the period when Spaniards and Pacific Islanders first set eyes on each other.

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