

AN ARCHAEOLOGICAL EXPLORATION OF ROBINSON CRUSOE ISLAND, JUAN FERNANDEZ ARCHIPELAGO, CHILE

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A programme of archaeological and palaeoenvironmental research which aims to work on each of the remote eastern archipelagos of the South Pacific (Juan Fernandez Islands, Islas de los Desventurados and Galapagos Islands) is now in progress. It has a primary palaeoenvironmental focus, which seeks to reconstruct archipelagic environments before and after settlement by Europeans, and to formulate ways of separating natural from human induced changes in sedimentary and palynological records. Secondly, it looks to explore the possibility of prehistoric occupation. There has been some conjecture as to whether prehistoric Polynesians, or pre-hispanic South American Indians, might have reached one or another of the archipelagos in the remote eastern Pacific (Black 1980; Finney 1998; Green 1998; Heyerdahl and Sjølsvold 1956; Irwin 1992 and Terrell 1986) but the archaeological evidence remains exceedingly scarce and enigmatic. Through both approaches, the research programme seeks to contribute to our understanding of human colonisation across the Pacific.

The programme began with research in the Juan Fernandez Archipelago (33°50'S 80°00'W), an isolated group which lies 700km west of Santiago and beyond the known expansion of prehistoric Polynesians eastward across the Pacific. It is possibly one of the few groups that remained untraced by humans prior to European occupation some 400 years ago. The first fieldwork, in 1997 (Haberle n.d.), consisted of palaeoenvironmental investigations upon Alexander Selkirk Island (formerly Más Afuera, 57.6km² and up to 1319m in altitude). We report here the initial results of archaeological research in March 2001 on Robinson Crusoe Island (formerly Más a Tierra, 88km² and up to 930m in altitude).

THE JUAN FERNANDEZ ISLANDS

The Juan Fernandez Islands were discovered in 1574 and a small colony of Spanish and South American Indians was established in 1591-96. They introduced goats and pigs and cut firewood, grew vegetables and caught and dried fish for the Spanish colonies in Chile. Three years after their departure another colony was established for similar

purposes. It was abandoned by the time of the first Dutch visit in 1616, but in 1624 three Dutch sailors were put ashore voluntarily. Another Spanish colony, established in the late 17th century, introduced dogs to suppress the goats and thereby reduce the growing attractiveness of the islands to pirates and buccaneers, especially the English. The main English force arrived in 1680 under the pirate Bartholomew Sharp. The Spanish drove them off but a Mosquito Indian, called Will, was left behind, the first of a long line of resourceful castaways. Will was picked up in 1683 and then the pirate Edward Davis left 9 men ashore in 1687. They planted corn and vegetables, hunted the goats and seals and took muttonbirds, and they were recovered in 1690. In 1704 Alexander Selkirk took voluntary leave of Dampier's squadron and remained ashore for four and a half years - his experiences later becoming the basis of Daniel Defoe's allegorical romance *Robinson Crusoe*, published in 1719. During the early 18th century there were several other groups of castaways or deserters inhabiting the island for brief periods as British and Spanish interests competed for control. Anson's raids on Spanish shipping, which included a sojourn on Robinson Crusoe Island in 1741, induced the Spanish Viceroy eventually to order the formal colonisation and protection of the Juan Fernandez Islands in 1749. The first colony consisted of 62 soldiers, 171 colonists and 22 convicts, together with cows, sheep, mules, pigs and poultry. Another 275 colonists soon arrived from Concepción and a substantial fort was constructed in Cumberland Bay. By the 1790s the settlement, essentially a penal colony, consisted of about 300 people, and smaller forts had been constructed at Puerto Inglés and Puerto Francés. The islands were abandoned in 1814, the penal colony re-established in 1815 and then abandoned again in 1817, a pattern of official colonisation and abandonment that continued through the 19th century (Woodward 1969).

Concurrent with settlement was rapid change in the Juan Fernandez environment. The impact of European occupation since A.D. 1574 on the biology of the islands has been devastating. The native flora has suffered dramatic reductions in abundance and diversity due to logging, over-grazing by introduced mammals, fires, and introduced plants

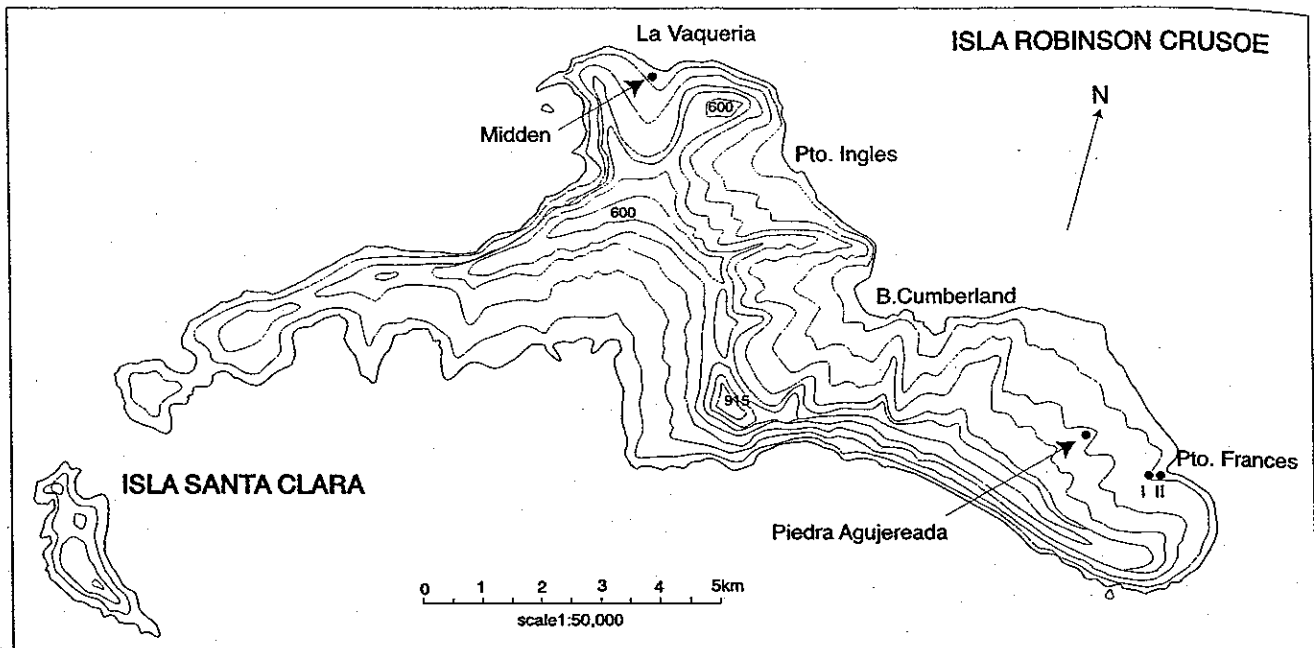


FIGURE 1. Robinson Crusoe and Santa Clara Islands, showing the main valleys and the location of sites described in the text.

(about five newly introduced species per decade). Similarly, the endemic fauna has suffered from introduced predators and over-exploitation (Castilla 1987; Wester 1991).

The flora and fauna had developed in isolation on three small volcanic islands, which began to emerge four million years ago. Plant communities exhibiting up to 70% species endemism, included survivors of many ancient groups that were once much more widespread in the southern hemisphere (Stuessy *et al.* 1992). The islands were heavily forested at discovery and remained so through the 17th and 18th centuries, despite occasional burning and felling. In 1835, however, the minor trade in sandalwood (*Santalum fernándezianum*, now extinct) rapidly intensified and that seems to have triggered a general deforestation for a regular trade in building timber and firewood (Woodward 1969:168). This activity was accompanied by frequent forest fires and soil erosion to the extent that further felling was banned in 1872 (although it resumed in 1877). Soil erosion seems to have accelerated during the late 19th century, and residents of San Juan Bautista describe substantial mudflows across the Cumberland Bay flats in the early 20th century, prior to reafforestation of the surrounding slopes.

There was similar but much earlier devastation of fur seal and elephant seal colonies – three million skins being taken from Más Afuera alone in 1797-1804. Populations of introduced animals also proliferated. As early as 1616, Schouten and Le Maire reported large herds of cows, pigs and goats, as well as introduced plants and vegetables growing wild (Woodward 1969:17, 118).

The historical evidence suggests that the human impact was exclusively post-European, and that seems to be the conclusion indicated by Haberle's (n.d.) initial palaeoenvironmental research. He focused on a peat deposit at 1000m altitude on Alexander Selkirk Island, just above the tree line where dense stands of *Dicksonia externa* form a sub-alpine community. The high-resolution pollen and charcoal record reveals that prior to European arrival the upland vegetation responded primarily to climate change and internal community dynamics, with fires only playing a minor role in the island ecosystem (Haberle n.d.). The arrival of Europeans and the subsequent introduction of goats and exploitation and burning of forests resulted in the progressive destruction of native vegetation, loss of native species diversity, and the invasion of introduced plants. This is marked in the pollen core by a rise to dominance of herbaceous taxa beginning at a point dated, Wk 9303, to 330 ± 60 B.P. (Haberle n.d.).

ARCHAEOLOGICAL FIELDWORK

Archaeological fieldwork in the Juan Fernandez group has been confined to Robinson Crusoe Island (Figure 1). It began in 1999 when Cáceres and Saavedra (Cáceres 2000; Cáceres and Saavedra 2000; Cáceres *et al.* 2000) initiated a project in Puerto Inglés. Their main purpose was to document historical remains in that area, in part as precautionary mitigation in the vicinity of a substantial treasure-hunting operation, directed by Bernard Keiser, which is currently mining the ridge and adjacent areas immediately behind Alexander Selkirk's Cave. Keiser is searching for a

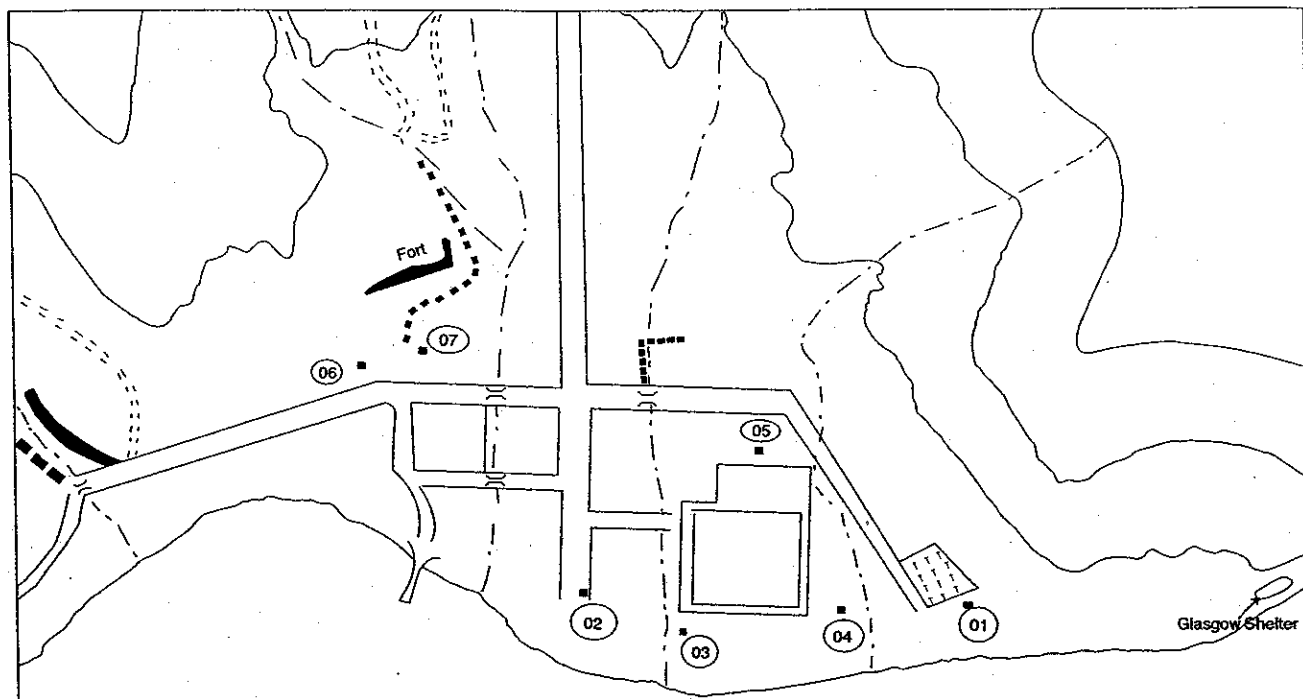


FIGURE 2. Cumberland Bay, showing the location of testpits. North is to the right and 20mm = 100m.

substantial hoard reputedly buried at this spot, under the sign of the scorpion (a somewhat indistinct natural rock marking) in A.D. 1713 or 1714 by the Spanish Vice-Admiral Juan de Ubilla y Echevezia. Five seasons of digging have yet to produce any treasure (Keiser pers. comm.).

Cáceres and Saavedra excavated inside and outside the cave. Archaeological remains consisted mainly of glazed and unglazed pottery, some fragments of which may have belonged to large and medium sized vessels used for the transport and storage of food and water. Some of the unglazed sherds found by Cáceres and Saavedra are similar to others found near the Spanish fort at Cumberland Bay, constructed in A.D. 1749-50. According to Orellana *et al.* (1975) these sherds are reminiscent of early Hispanic Mapuche pottery from southern mainland Chile. Cáceres and Saavedra (2000) obtained a TL date of A.D. 1625 ± 40 for a ceramic sherd from one of the test pits located in front of the cave. Excavations around several cannons near the beach and a battery on the northeastern slope of the bay (Sobrecasas 1962) revealed mainly 20th century remains.

Our main excavations were inside Alexander Selkirk's Cave, the largest and most accessible cave on the island, and one easily visible from the sea. The material from these, and from an excavation in Glasgow rockshelter, Cumberland Bay, is still being processed and will be the subject of a second report. It will suffice here to note that so far we see nothing at either site that is significantly

different from material recovered by Cáceres and Saavedra and we have no reason to think that we have encountered remains of pre-hispanic occupation.

Our archaeological survey concentrated upon the most probable areas of early occupation. Most of the high, cliffed, coastline of Robinson Crusoe Island is inaccessible by land and dangerous to approach by sea, especially on the more exposed southwestern side. Potential coastal occupation was essentially confined to the northeastern bays, especially Cumberland Bay which has been the main focus of settlement historically. The others are, in descending order of size, Puerto Inglés, Puerto Francés and La Vaquería. We searched each of these for archaeological remains of possible pre-hispanic age.

In Cumberland Bay, the coastal flat and nearby slopes are mostly covered by the small town of San Juan Bautista, but in the other cases the land is open and almost bare of vegetation, providing excellent surface visibility. However, it is apparent that there has been significant soil erosion in the recent past on Robinson Crusoe Island (above). This has resulted in extensive stripping of the steeper hill slopes and re-deposition in the lower valleys, often resulting in the accumulation of 1.5-3.0m of poorly-sorted colluvium, including clay, silt, gravel, and angular basalt clasts, upon the original rounded cobbles and boulders in the stream beds. Yet while archaeological sites must have had a low survival rate in the open landscape, some do remain

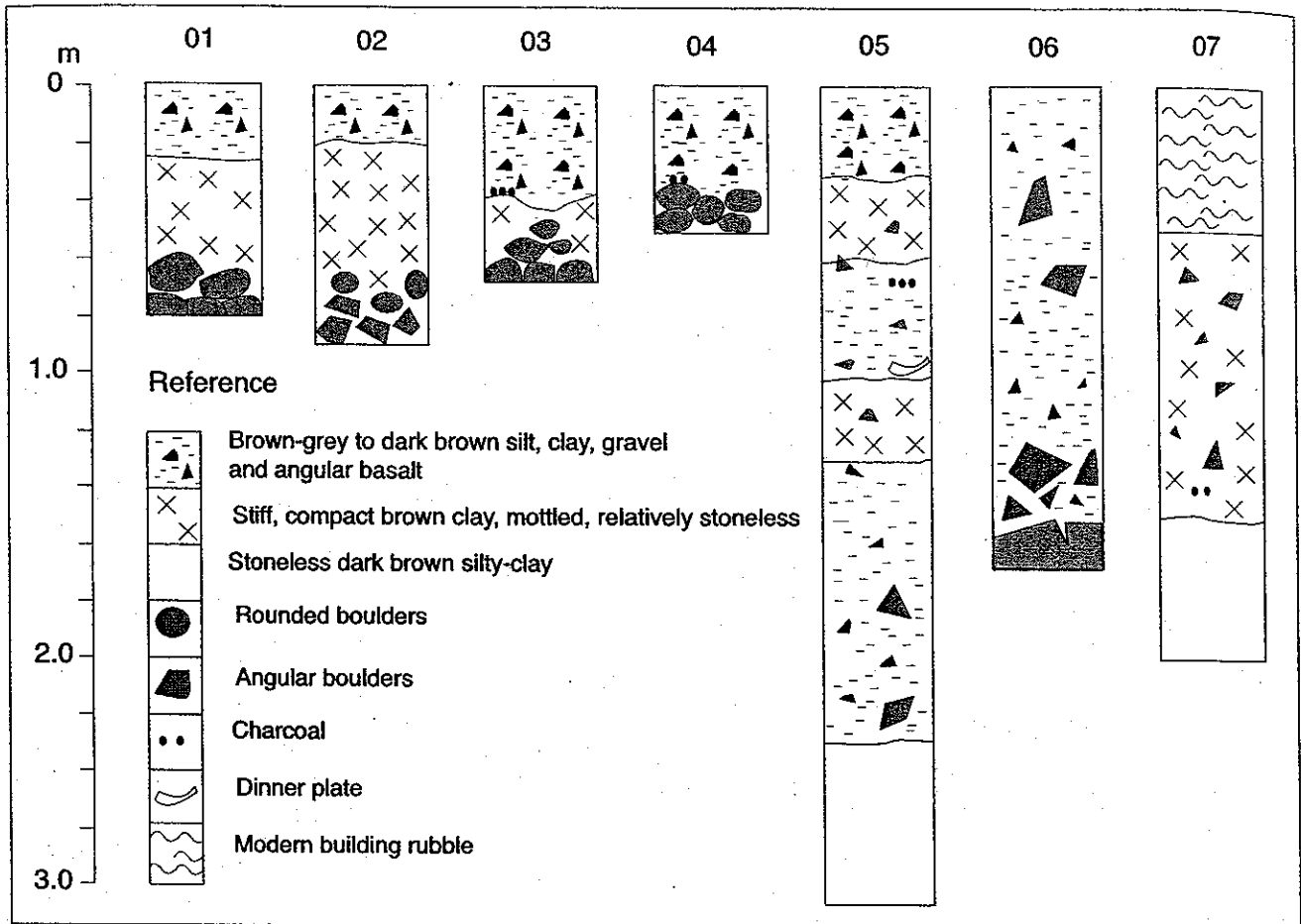


FIGURE 3. Stratigraphy of testpits in Cumberland Bay.

(below). We searched the open slopes of the lower valleys, cleaned-down and examined numerous watercourse banks, and inspected all rockshelters and caves, digging small test-pits in any features that looked at all promising.

The sites discussed here include seven test-pits dug in Cumberland Bay, several open sites, one partly-excavated, in Puerto Francés, and a site on high ground discovered by National Park (CONAF) staff. From this latter, Piedra Agujereada, exposed material was collected and the remaining intact section excavated.

Cumberland Bay

The testpits were situated to sample both the near-beach (testpits 01-04), and the back-beach (testpits 05-07) deposits. Exposures along the shore and in the testpits show that the flat ground in Cumberland Bay has a common upper stratigraphy consisting of layers of compact, often sticky, brown clays and clay-loams containing angular basaltic fragments and gravels. In testpits, 01, 03 and 04 this material was underlain by loose, rounded cobbles and

boulders, which, in turn, lay upon a cemented beach boulder platform. In testpit 02 the clay and angular basalt were so cemented at 0.8m that they could not be penetrated with a crowbar. Testpit 06 went down onto basalt bedrock, while test-pit 07 and 05 were terminated at 1.8m and 3.0m respectively in wet brown silty-clay (Figures 2 and 3).

In the upper 10-30cm of these test-pits there occurred modern artefactual materials, notably plastics and iron, mixed with ceramic fragments. Small and generally undiagnostic sherds occurred sparsely, along with charcoal, down to the top of the loose cobbles in testpits 01 and 04, and throughout 02. In testpit 03 there was an intervening layer of clay free of cultural material or charcoal. A piece of a modern dinner plate was recovered at 1.0m in testpit 05 and charcoal, without sherds, occurred very sparsely down to 2.0m. No sherds or charcoal occurred below the top 0.3m in testpit 06. A small charcoal sample was recovered at 1.4m in testpit 07 (Figure 3). No sign of a pre-ceramic artefactual horizon was observed in any testpit.

It is quite possible that our testpits, widely dispersed as they were, missed remains of a pre-hispanic colonisation site in Cumberland Bay. However, they showed at least that there is no evidence of a pre-hispanic horizon, marked by a palaeosol or charcoal band, in the stratigraphy of the coastal flat, nor any artefactual remains other than those of the historical era. Charcoal, where it occurs, is in individual pieces or small, discrete patches at varying depths and it is probably from forest fires associated with the deposition of the clay layers. These enclose modern material to at least 1.0m depth near the hill slopes and 0.3m near the shore, and ceramics down to 0.65m.

Puerto Francés

This valley has a small coastal flat and a constricted but easily negotiable lower course for several hundred metres before opening out into a broad middle valley with a side stream entering on the right bank. About 500m up the latter at an altitude of approximately 200m a.s.l. is a line of basalt overhangs. These are narrow and cover a floor area of 12m length by a maximum of 1m wide. Two testpits dug to 0.5m in fine silt and clinkery basalt encountered only rabbit bone. In the main valley low, eroded, spurs are littered with boulders. On the right bank at about 500m inland and 80m above sea level (about 50m above the stream bed) there is a curved line of five boulders but no associated cultural material. About 2kms along the boulder beach to the southeast of the stream mouth, where the main spur reaches the sea, is a small rockshelter, with a dry floor of fine silt over an area of 5m by 2.5m. A testpit to 0.7m reached stiff basaltic clay and rock without encountering any charcoal or cultural material. Two historical sites were located in the lower valley, Puerto Frances I and II.

Puerto Francés I

This site is situated about 350m inland on a low eroded spur about 20m above the stream bed, on the left bank. Its GPS location is 33° 39' 51" S by 78° 46' 49" W. It is entirely on the surface and consists of a 6m by 4m patch of pottery, bottle glass, broken basalt etc., on the top of the spur, with scattered material, mainly down the seaward slope, over an area of 20m by 10m. In the denser patch was a 50cm by 30cm piece of a slightly concave basalt grinding stone (probably a *metate*). Around it were 8 basalt flakes and a piece of a cylindrical implement, such as a cereal roller (*mano*), but which had also been used as a pounder or hammerstone. Heavily weathered bone fragments in the vicinity included a cattle phalanx and a goat incisor.

A single light olive green bottle was represented by seven pieces. It had a ground lip, deep wrench marks around the neck and a very crudely applied string rim, suggesting a date of manufacture earlier than the 19th

century (Newman 1987). Portions of two larger copper alloy spikes were present, one heavy square-sectioned specimen, more than 7cm in length. There was also a lead musket ball 15.6mm in diameter and 18.9gms in weight.

Thirty-six sherds were collected from the surface of the site. Subsequent inspection enabled this to be reduced to 21 sherds which cover all the variation in the larger set (access to the Juan Fernandez Islands is by small plane over some 700km of open ocean so we were obliged to keep removed sample weights to a minimum; discarded material was deposited with CONAF in San Juan Bautista). The procedure for analysing this and other assemblages from Robinson Crusoe Island was as follows. The sherds were sorted into different categories based initially upon paste composition (that is type, size and density of temper in the clay matrix), and then by sherd shape and size with base, handle and rim shapes being distinguished. Surface treatment and colour and sherd thickness (thin < 5mm, medium 5-8mm, and thick 8mm) were also recorded. No petrographic or physical analysis has been carried out. Interpretive grouping into types follows the work of Saavedra and Westfall (2000) for pottery assemblages recovered by Cáceres and Saavedra at the excavations in Puerto Inglés, especially from Alexander Selkirk's Cave.

The Puerto Francés I assemblage contains three groups of low-fired hand made earthenware vessels, in the Saavedra and Westfall (2000) Groups 1, 3 and 5 (Table 1). Group 1 is exclusively body sherds, buff brown on the

Puerto Francés I

Group 1	11 (52)
Group 3	1 (5)
Group 5	9 (43)
TOTAL	21 (100)

Puerto Francés II

Group 5	2 (15)
Group 7	11 (85)
TOTAL	13 (100)

Piedra Agujereada

	Area A	Area B
Group 1	19 (76)	11 (79)
Group 5	3 (12)	2 (14)
Group 14	3 (12)	1 (7)
TOTAL	25 (100)	14 (100)

TABLE 1. Distribution of pottery types by site and area: sherd numbers (% of site or area total in brackets).

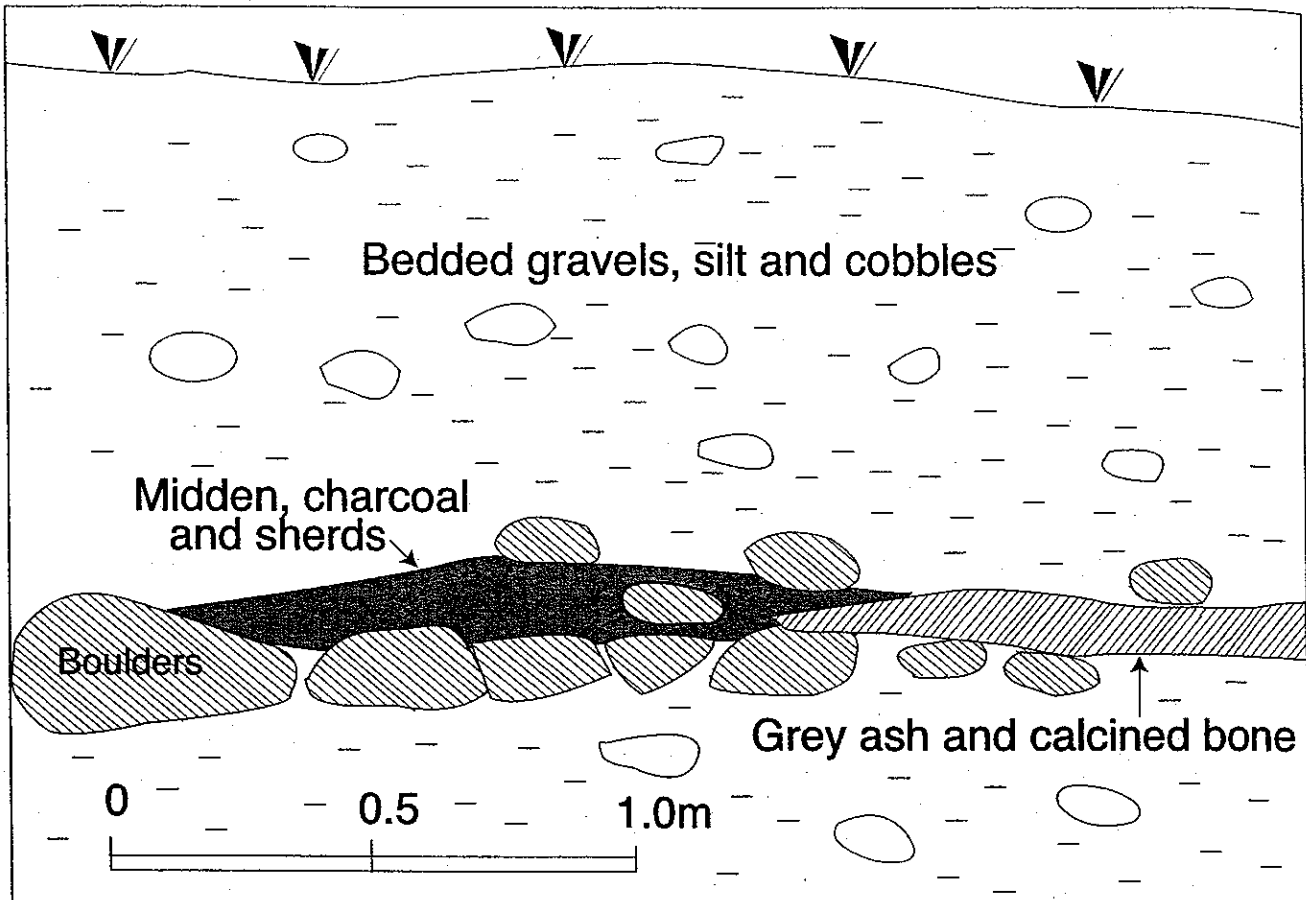


FIGURE 4. Stratigraphy of Puerto Frances II.

outside, with some pieces almost grey on the inside. In general the sherds are very badly fired, and disintegrate in prolonged immersion. Vessel walls are 6 to 7mm thick and vessel shapes cannot be reconstructed. Some sherds show black stains from an irregular firing process. Group 3 has only one body sherd, light brown to tan in colour, with a temper of fine black sand. The surface is slightly burnished. The Group 5 sherds have been fired in oxidation, although two pieces show smoked black surfaces on the outside. Two pieces are bright orange, having been fired to a slightly higher temperature.

Additionally, there are a few medium to high fired glazed, wheel-thrown earthenware pottery fragments, one of which is a black glazed earthenware fragment, of the kind which was used in 18th-19th century Chile during mourning. It was especially imported from England, for that purpose, by wealthy families. Other glazed fragments belong to large thick walled containers, most likely belonging to storage vessels used on ships for the transport of bulk grain and oil from Europe to South America in the 18th and 19th centuries.

Puerto Francés II

This site is exposed at a depth of 1m in the right bank of the stream at 120m inland and 8m above sea level. Its GPS location is 33° 39' 40" S by 78° 46' 34" W. The stratigraphy shows a shallow, heavily-fired deposit of ash and calcined bone in light-brown, horizontally-bedded, gravels and silt, contiguous with a dark brown layer of scattered midden, charcoal and ceramic sherds lying upon a layer of boulders. The site extended along approximately 3.0m of the bank and an area of 2.3m by 0.5m was excavated (Figure 4).

There were two fragments of dark green bottle glass, lacking any further distinguishing marks, three fragments of basalt cobble and 19 sherds, 13 of which were analysed (the remaining 6 being redundant, above). Eleven of them belong to Saavedra and Westfall's (2000) Group 7, a brown to black fairly well burnished pottery. Wall thickness of 4 to 5mm suggests fairly small vessels. As there are no rim, base or shoulder sherds it is impossible to reconstruct vessel form. The clay has had sand and small amounts of finely crushed shell added to it. The remaining

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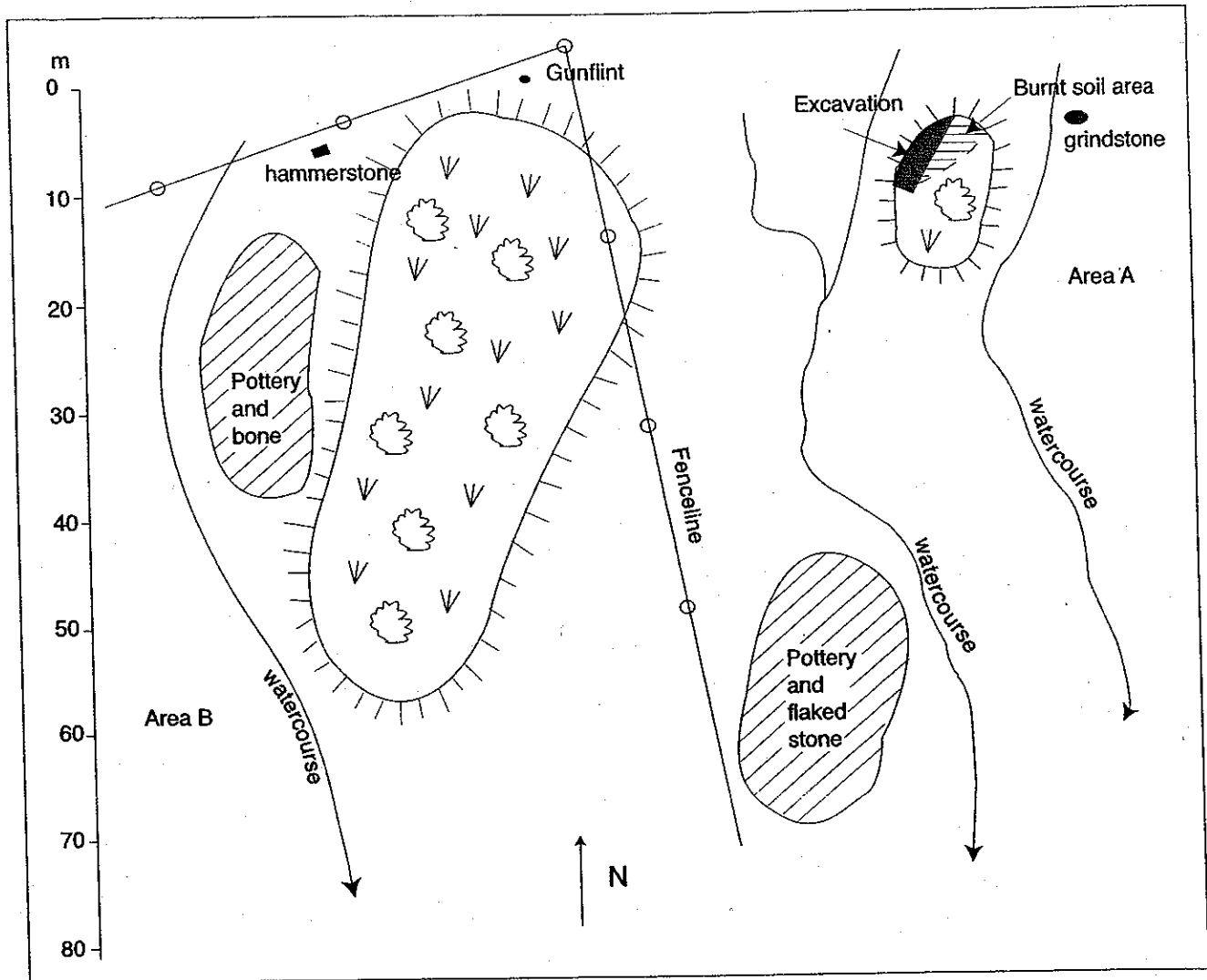


FIGURE 5. The site at Piedra Agujereada.

two sherds belong to Group 5. One is a body sherd and the other fragment comes from the base of a vessel, at the inflexion point between base and walls. However, there is not enough of it to infer the vessel shape.

Some of the most interesting material from this site consisted of faunal remains. Cattle are represented by a proximal tibia fragment, another long bone shaft fragment and 9 pieces of rib, one of them with cut marks. There was a section of an ovicaprid right mandible, broken anterior to the 2nd premolar and posterior to the 2nd molar, a distal tibia, two cervical and thoracic vertebrae, 6 long bone and rib fragments. Nine small pieces of turtle bone were recovered. Pink-footed shearwater (*Puffinus creatopus*) remains included broken pieces of humerus, ulna, carpometacarpus, radius and scapula, plus three phalanges. Two individuals are represented. Fish bone included the

remains of two medium-sized Carangids, probably jacks or trevallies and an additional individual of unidentified genus. Lastly, there were fragments of limpet shell.

Piedra Agujereada

This site lies on heavily eroded land at about 250m a.s.l. near the top of the main ridge to the southeast of the valley of the same name (Figure 1). Its GPS location is: 33° 38' 44" S by 78°, 47' 24" W. Two site areas, separated about 40m by a subsidiary spur, are exposed. Site Area A contained a partially intact cooking area and an extensive scatter of flaked stone and sherds. Site Area B consisted of a scatter of pottery sherds and cattle bone, a hammerstone and/or grinding stone, a gunflint (Kenmotsu 1990) and the base fragment of a dark olive green bottle (Figure 5).

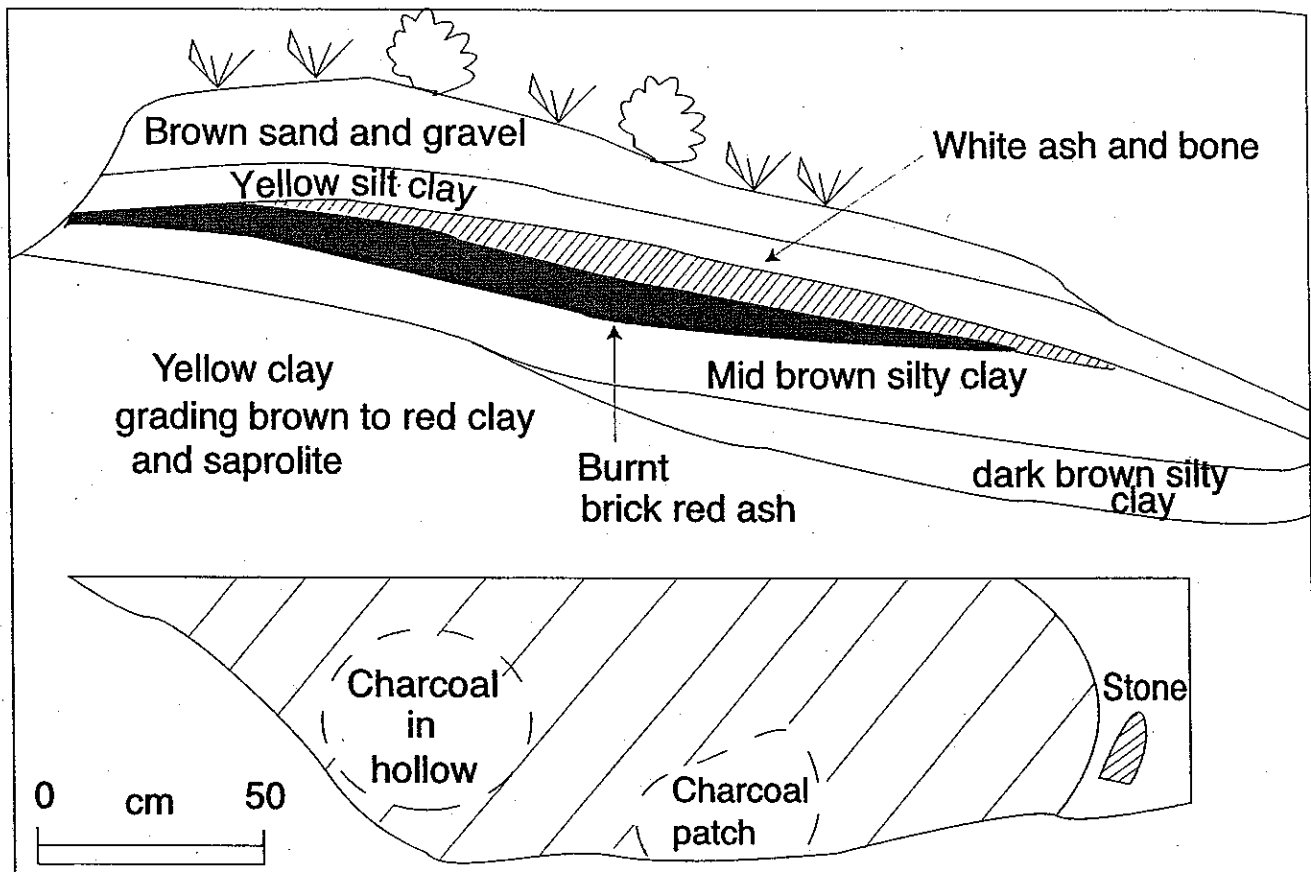


FIGURE 6. Excavation of the cooking area at Piedra Agujereada.

The cooking area (Figure 6) is approximately 2.4m long and consists of heavily broken and calcined bone in a matrix of wood ash lying in a slight hollow of burnt clay (Figure 5). Approximately half of the feature was excavated, the material being sieved to 3mm and all bone and charcoal retained. In addition, bulk samples, about 12kg in total, of the ash/bone mixture were carried over to San Juan Bautista and water-sieved to 3mm. However, the bone had been so heavily broken and then burnt, that almost none of it could be identified to species. There is some cattle rib evident, but the presence of ovicaprid or pig bone, for example, cannot be ruled out. One small rat mandible was located next to the fired area, and one large, burnt, limpet within it. In Area B were pieces of a cattle radius, metatarsal, femur, rib (with cut marks) and a molar.

Scattered across the site were the remains of several large stone implements. One was a flat, rectangular, sandstone slab, which had several deep, straight, score marks on one surface. Another, smaller implement of the same kind was represented by two fragments. A third artefact consisted of 63 scattered pieces, amongst the pottery sherds in Area A, of a heavily smashed basalt

implement that could be partly refitted to indicate a shallow, dish-shaped bowl. Judging by the shape and size and the very smooth and glossy dished surface, this was probably a *metate*. In Area B was a cylindrical basalt cobble, possibly a *mano*, broken into 14 pieces. One end of it has been heavily damaged by hammering or pounding. This assemblage of implements seems to represent two functions at the site; grinding or sharpening of knives or cutlasses and the grinding and pounding of some other material, probably grain or maize. However, the smashing of the implements is unusual and it has been carried out deliberately and to a fine degree of fragmentation. It may be suspected that this was an act of departure but of what motivation we can only guess.

All of the exposed ceramic sherds were collected and sorted on site. Because of restrictions in transport, 94 body sherds (35 from Area A, 59 from Area B) which were otherwise represented in the retained collection and had no other distinguishing features, were discarded. The sherds in general show signs of erosion, making it difficult to establish surface finish, or determine if the vessels had any slip decoration. There are two main groups of pottery, one

corresponding to low fired hand-built earthenware vessels, and the other to medium to high-fired glazed, wheel-thrown earthenware (Group 14).

The low-fired pottery assemblage is made up of two distinct groups, 1 and 5, within the categories established by Saavedra and Westfall (2000). Group 1 refers to medium-sized vessels with black sand temper present in medium to low quantities. Vessel walls are between 6 and 7mm thick and the only shapes we can infer are from one piece which shows a flat base with everted walls. Two shoulder pieces indicate that some of the vessels may have had composite shapes formed by rounded bodies with straight necks above the shoulder, known as "olla" in the traditional Chilean mainland pottery tradition, where flat handles come off on one or two sides from the rim down to the shoulder of the vessel. There is only one flat handle with a rim piece attached to it, and one rim piece which shows the insertion of a broken off handle. The vessels had been fired in oxidation at a low temperature to a buff brown colour. Some of the pieces almost disintegrated while being washed. Some body sherds show black stains from an irregular firing process.

Group 5 is quite similar to group 1, but the vessels have thicker walls and there is a high proportion of black sand temper; probably because bigger vessels need a stronger fabric to support the vessel walls during construction. The Group 5 pots had also been fired in an oxidising atmosphere to a low temperature, resulting in a buff brown colour.

Group 14 includes very large wheel-thrown, earthenware vessels, with walls that are over 15mm thick. The sherds probably belong to vessels used for storage of food, water and oil, although the shape cannot be reconstructed from the current remains. The outer surface has the eroded remains of a thin glaze coat. The vessel fabric has large quantities of black sand temper mixed with crushed quartz, which could well be part of the original clay composition. Finger marks from the wheel can be seen quite clearly on the inner surface of one of the body sherds.

DISCUSSION AND CONCLUSIONS

Explorations on Robinson Crusoe Island in 2001 have shown that a rich and diverse archaeological landscape remains to be studied. In addition to the known sites at and near Alexander Selkirk's Cave in Puerto Inglés, and the more obvious historical monuments, including the dispersed batteries of cannons, there are open sites remaining in the heavily eroded sediments, at least in the Puerto Francés district. Our investigations of these, and our testpits in Cumberland Bay were intended, in the first instance, to determine whether there was any evidence indicative of pre-hispanic occupation of the island.

The Cumberland Bay testpits show that charcoal can be found below the level of modern and historical artefactual remains. Radiocarbon dates have been obtained on very small fragments of unidentified charcoal from 2m depth at testpit 05 and from 1.35m depth at testpit 07. These (Table 2), suggest that there had been forest firing in the pre-European era, around the late first millennium and early second millennium A.D. While interesting and potentially significant, they do not provide a strong indication of prehistoric occupation in the absence of cultural remains or of any horizon of charcoal, burnt rock etc. Our inquiries of the Clerk of Works and long term residents in San Juan Bautista also failed to elicit any suggestion of charcoal, shell, burnt rock or anything other than hill-slope deposits in holes dug to 3m deep for construction, rubbish disposal etc., in the municipal area. On present evidence, then, there is nothing to suggest prehistoric occupation of Cumberland Bay. As this is the largest bay, one of the most sheltered, and with the greatest extent of coastal flat land to be found in the archipelago, it would almost certainly have attracted prehistoric occupation had any occurred in the islands. The date for Piedra Agujereada is on a sample of small diameter and twig-sized charcoal identified as the lowland forest tree *Myrcogenia fernandeziana*. The sample came from directly under the burnt brick-red ash (Figure 6). The age, though quite early, runs into the historical era and since it was clearly associated with remains of introduced animals it is probably indicating some inbuilt age. The modern date

Lab. No.	Site	Conventional Age B.P.	d13C	Calibrated Age A.D.
ANU-11633	Tp-07, 1.35m	1340 ± 40	-24.0	642 (666) 773
ANU-11634A	Tp-05, 2.0m	1010 ± 170	-26.6	663 (1020) 1298
ANU-11635	Piedra Agujereada	640 ± 210	-24.0	991 (1302, 1369, 1382) 1662
ANU-11637A	Puerto Francés II	210 ± 50	-24.5	Modern

TABLE 2. Radiocarbon ages for charcoal samples from Juan Fernandez Islands. Calibrations are Method A, two sigma, by Stuiver *et al.* (1998).

for Puerto Frances II is on a sample of charcoal identified as pieces of cut timber from the lowland forest tree *Fagaya mayu*. While the matter of prehistoric occupation cannot be closed, on the current radiocarbon and archaeological data, there is little to encourage the suggestion.

The question of why there appears to have been no prehistoric occupation of the Juan Fernandez Islands is one which requires a broad contextual discussion that we wish to leave until the analysis of the major rockshelter sites, but clearly all the factors of prehistoric voyaging geography in the far eastern Pacific were unfavourable: immense distance from East Polynesia; location in an otherwise empty ocean; relatively high latitude in heavier seas and prevailing easterly winds; the probable absence of a southern South American voyaging tradition, including of suitable vessels or any sailing technology, and so on. As in the case of the remote western islands of Polynesia (Anderson & White 2001), occupation was likely to have been either very brief (Norfolk Island) or absent (Lord Howe Island).

In its absence, so far as we could see, our interest turned to the historical sites, representative as they are, consequently, of the human colonisation era of the archipelago. The sites which we investigated describe fairly ephemeral events centred upon exploitation of introduced, probably feral, animals, especially cattle. In a sense they are megafaunal hunting sites, although not of the indigenous taxa of that kind, the seals and elephant seals, which are entirely absent amongst the remains (having been decimated in the earliest phase of settlement and, probably, little to the taste anyway of European colonists). Piedra Agujereada, lying on the misty uplands, with its very large cooking area and heavily calcined bone, its abundant flaked stone and its scatter of butchered bone and domestic artifacts is almost eerily reminiscent of an inland moa-hunting site and the coastal sites, especially Puerto Francés II with its remains of turtle, bird, fish and shellfish, as well as those of big game, have the broader maritime diversity of coastal Archaic Maori settlement (Anderson 1989). The similarity is not profound, of course, but it probably represents a common aspect of colonisation behaviour which is an emphasis upon foraging and the selective exploitation of large game, albeit feral animals in the Juan Fernandez case.

The domestic implements in these sites included cereal grinding stones (*metates* and *manos*), sharpening stones, water jugs and other ceramic vessels, glass bottles, various pieces of metal, gun flints and lead musket balls. They represent a standard range of basic functions: shooting, butchering, cooking, preparing cereal foods, and the carriage of water and some other fluids, probably liquor. The remains are fairly scarce and emphasise the small-scale and brief occupancy of the sites.

They also suggest something about the period of settlement and the ethnicity of the site occupants. The cereal grinding implements are characteristically South American rather than British. The pottery is mostly of common low-fired ceramics which, where the shape of the vessels can be inferred, as at Piedra Agujereada, is strongly reminiscent of mid 18th century wares from south central Chile (see also Orellana *et al.* 1975). The main features of this pottery are its thick walls, low quality in surface finish and the presence of flat handles placed on the rim of the pot. Pots of this period frequently have an inflexion or shoulder at the meeting point of body and neck. The presence of black sand tempered clay is a featured observed in the ceramic assemblages of the Maule area of south central Chile (Rees *et al.* 1996). This is not surprising because the people in the first substantial colony in 1749 came mainly from the Concepción Bay area in south central Chile (Guarda 1990). It is probable that most of the labour force was of mixed Mapuche ethnic origin. It may be that the shell-tempered pottery found at Puerto Francés II is of local manufacture, since shell temper is very rare in pottery made in mainland Chile. The frequent occurrence of struck basalt flakes is interesting, and might also reflect the activities of South American Indian settlers, although none of the flakes show any signs of secondary working or the manufacture of formal implements.

The open sites found so far do not represent the earliest colonisation era but rather the period when permanent settlement was becoming established on the island. Quite possibly they were associated with the expansion of military establishments in the mid to late 18th century when a battery of cannons was installed at Puerto Francés. There is a track to that bay from San Juan Bautista and it passes close to Piedra Agujereada. As the population had increased rapidly by deliberate colonisation, and a network of communications and defence expanded on the island, so may have systematic exploitation of the large reserves of feral animals. Analysis of the rockshelter sites, now in progress, may enable us to put this phase into a longer sequence of the colonisation era in the Juan Fernandez Islands.

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HONOUR
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