

A REVISED MODEL OF SOLOMON ISLANDS CULTURE HISTORY

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The Solomon Islands play a uniquely important but curiously anomalous role in the modern understanding of Pacific prehistory culture history. Yet it seems probable that this seemingly curious role reflects the nature of the Solomon Islands' actual role in the past. In this paper we present a new formulation of the culture history of the region which summarises current evidence and critiques past assumptions that have influenced our understanding of both Solomon Islands archaeology and the archaeology of Pacific colonisation.

Today the Solomons are often considered to be a large under-researched zone (Kirch 1997:53) between the comparatively well-studied regions of the Bismarck Archipelago to the west and the area of Oceania south and east of the main Solomons, known as Remote Oceania. The pioneer work in the 1970s of the Southeast Solomon Islands Culture History Project (Green and Cresswell 1976, Yen 1982) both bridged the 400 km water-gap between Ulawa and the Reef/Santa Cruz Islands, which marks the boundary between Near and Remote Oceania (Green 1991a), and played a formative role in characterising the Lapita archaeological tradition, especially regarding the key issues of long-distance interaction and colonisation..

On the basis of archaeological and linguistic evidence it is generally accepted that people making Lapita pottery, decorated with distinctive motifs using a variety of techniques, and possessing obsidian from the Bismarck Archipelago, at least in the early stage of colonisation, were the first colonists of Remote Oceania. In the standard model of culture history for the region, archaeologists have apparently assumed that with additional research the Solomon Islands "gap" would be filled by archaeological evidence reflecting a graded continuum of culture, with the Bismarcks representing one pole and the southeast Solomons representing the other. Or put another way, the Pleistocene archaeological record of foragers found in the Bismarcks would be extended out to the eastern edge of Near Oceania and the Lapita pattern of settlement identified in the Reef/Santa Cruz Islands would be found both out into Remote Oceania and back through the Solomons toward

the Bismarcks. The large mass of mostly inter-visible islands from Buka to Guadalcanal during the late Pleistocene formed a nearly unified landmass (Green 1991a:496; Spriggs 1997:45, 2000:349). It is generally assumed that the movement of people through this area, especially colonisation movement, went from west to east, ever pushing the boundaries of the inhabited world. Following the Lapita spread another population movement from the west has been posited to explain general similarities in the styles of incised and applied relief ceramics seen from the Bismarcks to New Caledonia and Fiji (Spriggs 1997:158, 2000). Spriggs notes that this scenario is also employed to explain the more “Melanesian phenotype” seen in Vanuatu, New Caledonia and Fiji, assuming that these later populations mixed genetically with the earlier Non-Austronesian (NAN) populations of Near Oceania. The exception to this “out of the West” hypothesis was the back movement occurring in later prehistory associated with the settlement of Polynesian outliers by people linked linguistically to Western Polynesia (Green 1995, Kirch 1984, Kirch and Yen 1982).

In this article we show that these simplistic assumptions about the prehistory of the Solomons are repeatedly challenged as our knowledge of the archaeological record expands. Consequently, we propose a revised model, drawing upon archaeological, linguistic, biological and palynological data, that may be summarised by the following points.

1. The Solomon Islands archaeological record still had some gaps, but is substantial.
2. The Lapita occupation of the Reef/Santa Cruz Islands in the Early Lapita period leapfrogged the main Solomons, giving it some unique characteristics of significance for colonisation of Remote Oceania.
3. The northern and western Solomons as far as New Georgia were settled by Austronesian-speaking, food producing, ceramic making populations moving from the west over a NAN substrate in the Late Lapita period.
4. The central and southeast Solomons east of the Florida Group in Near Oceania were similarly colonised in the Late Lapita period by aceramic food producing populations moving west from the area of the southeast Solomons in Remote Oceania (e.g., greater Reef/Santa Cruz Group) that had initially been settled by early Lapita colonisers.
5. The boundary of these converging movements is marked in the central Solomons by the sharp linguistic division known as the Tryon-Hackman line.

RESEARCH COVERAGE:

Although the history of archaeological research in the Solomons does not have the sort of 19th century antiquity found in New Zealand or Hawai‘i, or the 20th century coverage known for Polynesia (Kirch and Green 2001: Fig 3.1), it is to a large extent comparable to that found elsewhere in Oceania. Figure 1 illustrates both the amount and chronology of archaeological research in the Solomons. Research was limited before the 1970s but has become significant over the last 30 years. It should also be noted that this survey does not explicitly take into account the very many other anthropologists and other interested parties who have been active in the area over the last 100 years. Some of these have expressed considerable interest in archaeological matters and have published on the topic (e.g., Davenport 1972, Ivens 1931, Ross 1970, Tedder and Barrus 1976, Thurnwald 1934, Wheeler 1928). Archaeologists have carried out some form of investigation in each of the major islands of the Solomons at least once, while a number of islands have been the subject of large, multi-season intensive projects, often as part of Ph.D. research programmes. The northern Solomons have been the subject of several major projects. In Buka and adjacent islets off the south coast Specht (1969) conducted multi-season surveys and excavations at a considerable number of productive locations. His research was followed up by Wickler (2001), who did intensive excavations and additional surveys in Buka and its small islands. In Bougainville, the main study by a team of archaeologists led by John Terrell (1976) consisted of surveys and excavations over a number of field seasons. This focused research investigated a series of locations extending the length of the island and included surveys of considerable lengths of the coast and excavations in small off-shore islands (e.g., Teobebe [Black 1977]). As a spin-off of this Bougainville project, Geoff Irwin, fresh from fieldwork in Bougainville, went over to the Shortlands where he did extensive surveying and test-pitting in the small island of Alu, locating over 40 ceramic-bearing sites, which formed the basis of his M.A. thesis (Irwin 1972). He also reported on its carved-paddle impressed pottery (Irwin 1974) and on prehistoric “man-land” interactions in the Bougainville Strait (1973). More recently Matthew Spriggs (1992) has done survey and excavation work at a number of locations in the Kieta region of Bougainville. The result of all this work has been the establishment of a baseline culture history stretching from 29,000 B.P. to the present.

In the western Solomons there have been three major projects. The first of these was a survey and limited excavation programme that was part of a Japanese anthropological tour of the area in the mid 1960s. Chikamori

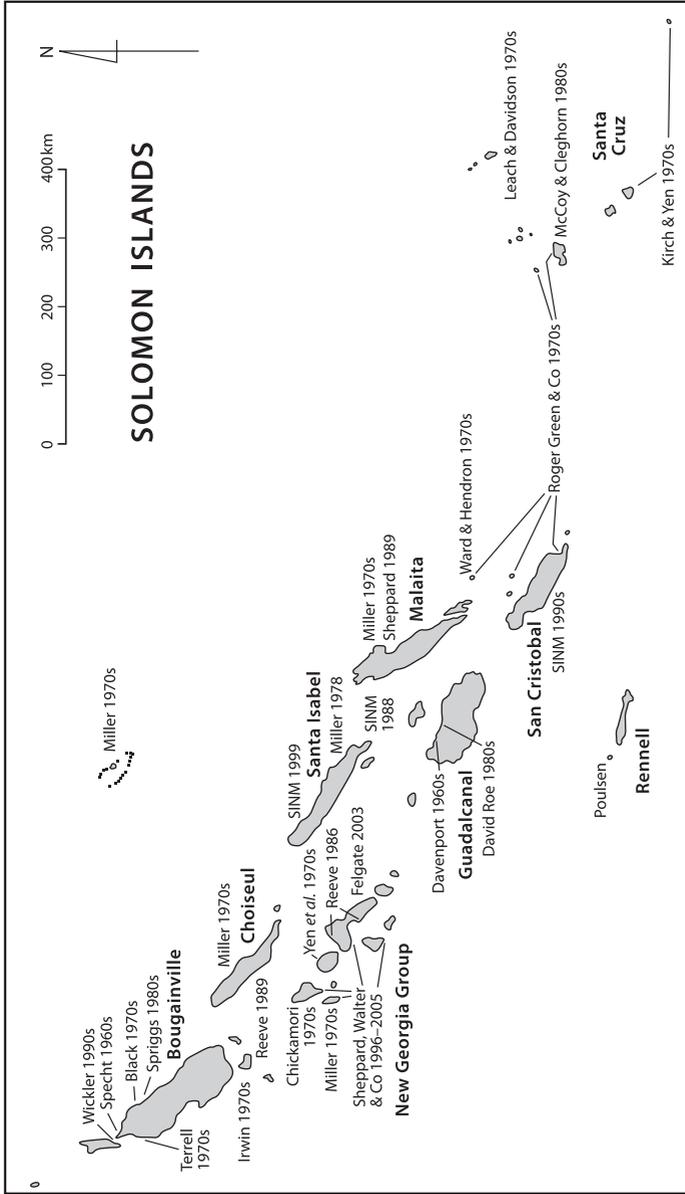


Figure 1. History of archaeological research in the Solomon Islands.

(1967) reported briefly on work centred in the interior of Vella Lavella, but also included visits to Simbo and Choiseul. In the late 1970s Daniel Miller, in his role as archaeologist at the National Museum of the Solomon Islands, initiated the National Site Survey programme (Miller 1979). This programme was the first attempt to create a comprehensive overview of the archaeological record of the Solomons and during 1976-78 involved surveys, mapping and test excavations in nine islands: Santa Isabel (Bughotu district), Simbo, Kolombangara, New Georgia (Viru Harbour), Vaghena (SE Choiseul), Choiseul (Nuatambu Region), Makira (Arosi district), Malaita (Kwaio district) and Ontong Java. David Roe, as part of the same recording project, extended this work during 1978-80 with surveys in seven islands: Kolombangara, New Georgia, Guadalcanal, Santa Catalina, Nggela, Shortlands and Malaita. In total the project recorded over 700 sites (Miller and Roe 1982). Although the work was most probably biased toward recent *kastom*¹ sites, it did represent considerable coverage. In the western Solomons it resulted in the discovery of numerous pottery bearing sites, leading Miller and Roe to conclude: "Pottery... appears to have been in use at some time throughout the greater part of the western Solomons" (1982:49). The most recent work in the western Solomons has been that of the authors. It began in 1996, initially (1996-2000) focusing on Roviana Lagoon along the south coast of New Georgia and more recently (2003-2006) on Vella Lavella. These projects have involved intensive surveys and excavations in targeted regions over multiple field seasons. The fieldwork was carried out in collaboration with staff from the National Museum and the Ministry of Culture (Western Province), and also supported a number of M.A. and Ph.D. students' research programmes. Additional research involved brief surveys and excavations outside the major study areas, including Marovo Lagoon, Seghe, Ghizo (survey only), and Rendova and Rannonga (survey and excavation). Additional spin-off research by Ph.D. students associated with this programme has included a coastal survey for inter-tidal sites in north New Georgia (Matthew Felgate), and survey and test excavations in Rendova (Tim Thomas). Coverage in this region includes surveys of both coastal and interior locations, mapping and excavation of *kastom* sites, rockshelters and caves, and in some areas systematic survey of the inter-tidal zone. The result has been the creation of a record that extends back into the Late Lapita Period and includes a large number of ceramic sites extending up to the recent past.

Although the central Solomons have been the centre of colonial activity, archaeological research has been more limited than in the islands to the east or west. Nonetheless, Guadalcanal has been the subject of one major Ph.D. project (Roe 1993), and it boasts the oldest and the largest volume of excavated deposit in the country at the site of Vataluma Posovi (Poha Cave) just outside of

the capital Honiara. The Honiara region has been subjected to the highest level of archaeological scrutiny of any area in the country. The capital, as the site of administration and location of the National Museum, concentrated the interest of both amateur and professional archaeologists and anthropologists, while also being the site of the most significant land disturbance and development in the country. The Vataluma Posovi Cave, located at the western margin of the city a short distance up the Poha Valley from the coast, attracted the early interest of colonial administrator Tom Russell (2003:152), who brought it to the attention of the anthropologist William Davenport. In 1966, they together began excavating the cave, which Russell continued over a period of two years with the assistance of fellow administrative officers. The site was the focus of research by David Roe (1993), who did additional excavations and reconstructed the stratigraphy and chronology recorded by the early excavators. Roe's excavations extended the age of the site back into the mid-Holocene, and provided evidence of the presence of a considerable deposit dating to the Lapita time period. Roe conducted additional survey and excavation work in the Poha region as well as at the western end of Guadalcanal. This work and his experience as an archaeologist for the Solomon Islands National Museum and for the Guadalcanal Province led him to conclude in his Ph.D. that northwest Guadalcanal was aceramic during the Lapita time period and thereafter (Roe 1993). Research elsewhere in the central Solomons has been confined to brief surveys or excavations. These include cave excavations by Rukia (1989) in the Florida Group, brief survey and excavation in the Kwaio district of Malaita by Miller (1979, 1980), and limited surveys by Sheppard along the Langalanga Lagoon coast of Malaita east of Auki in 1989. None of this work recovered any ceramics. In fact there is no archaeological evidence of prehistoric or historic ceramic use in this region.²

In the southeast Solomons Miller's Site Survey Programme built upon the site records provided by the Southeast Solomon Islands Culture History Project led by Green and Yen (Green and Cresswell 1976, Yen 1982). These records include unpublished reports of surveys and excavations involving multiple field seasons over two phases and employing numerous archaeologists (Green, Yen, Kirch, Ward, Hendren, Swadling, McCoy, Cleghorn, Leach and Davidson) in at least 11 islands (Kolombangara, Makira, Santa Ana, Uki, Ulawa, Reefs, Santa Cruz, Taumako, Vanikoro, Anuta, and Tikopia) (see Yen 1982). This presents an extraordinary effort and body of research, comparable to that conducted in many other island groups in the Remote Pacific. It is notable that the Project recovered ceramics from all islands visited in Remote Oceania and *none* in Near Oceania, with the exceptions of a few very small (c.20) pieces of plainware from rockshelters previously excavated by Davenport (1972, see also Swadling 1976) in Santa

Ana and Spanish ceramics at Pamua (Makira) (Green 1974). Both Swadling (1976) and Yen (1982) comment on the striking differences found in the archaeological record when crossing into Near Oceania. Members of the same team employing similar methodologies recovered very different records. In the Reef/Santa Cruz area finding ceramics was not too difficult and, as Green notes (1974:53), the first piece of Lapita pottery found was reported by an old man from Nenumbo village in the Reefs, while a girl from Nanggu reported finding similar pottery in her garden. Subsequently, surveys in the Reef/Santa Cruz Islands resulted in the discovery of 14 sites bearing Lapita pottery.

It is very difficult to argue from negative evidence, and there are to our knowledge no conventional methods to compare the results of survey methods or archaeological coverage of regions. How would we know when we had enough absence to be significant? Matthew Felgate attempted to examine this issue for the Solomons in his Ph.D. thesis (Felgate 2003) by carefully comparing the extent of coastal survey. After some quantitative analysis, he concluded that there may not have been enough coastal survey work carried out in the main Solomons to find early Lapita sites. But he notes that his analysis is subject to large errors arising from poor quality information. He also suggests that geological subsidence or uplift may have buried or destroyed much of the record (Felgate 2003:503). Such a scenario must be considered for old ceramic sites. However, the finding of inter-tidal sites with similar Late Lapita to post-Lapita ceramics in a number of islands (north, south and east New Georgia, Ghizo, Kolombangara and Vella Lella) with widely varying geologies and histories (Mann *et al.* 1998) of coastal movement (e.g., Ghizo has one of the highest rates of uplift in the region) suggests the geological processes may not be as much of a problem as earlier feared. What is not clear is how many Lapita sites have ever been found by archaeologists through systematic survey, but it seems probable that many finds, especially initial ones, were the result of local knowledge, as in the Reef/Santa Cruz case. The probability of finding ceramic sites would seem to be related more directly to the number of archaeological person-days spent in an area and the increasing knowledge by local people of the archaeologist's interest in ceramics. Yet as Felgate suggests, it is possible that radical differences in preservation or depositional context could create a biased record after a similar extent of survey. In the western and northern Solomons inter-tidal sites have produced numerous Late Lapita and immediately post-Lapita ceramics. It seems unlikely that any inter-tidal survey has been conducted in the central Solomons and this is an important gap in our knowledge that could be easily rectified. Yet if we simply compare the results of land-based surveys, then it remains true that virtually all surveys in the western and northern Solomons have produced ceramics of some form while, with the few exceptions noted

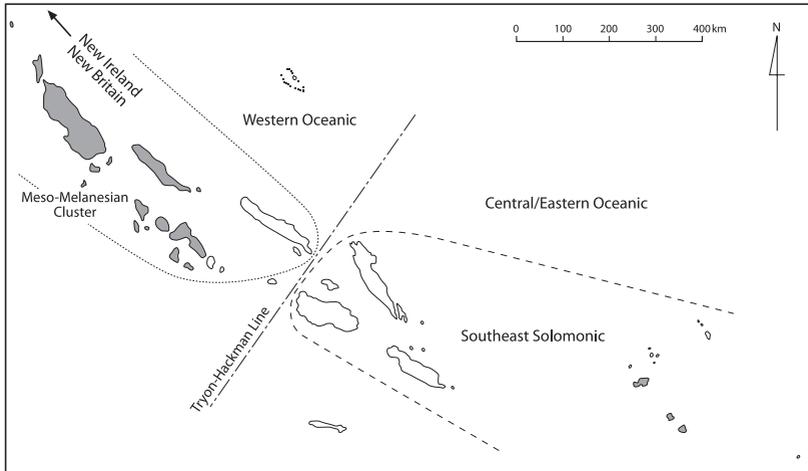


Figure 2. Distribution of ceramics (all periods) shown shaded and major linguistic divisions of the Solomon Islands.

above, none (Figure 2) are reported from the central Solomons and southeast Solomons west of the Reef/Santa Cruz Islands. It seems clear to us that there are real differences in the archaeological records of these regions, and that they are not the result of sample bias or lack of archaeological coverage.

CERAMICS IN THE WESTERN SOLOMON ISLANDS

Pottery is reported (Reeve 1989:61) or has been observed by us in all of the islands in the western and northern regions, and early Spanish explorers noted pottery use on Santa Isabel (Spriggs 1997: 230) in 1568. Pottery was manufactured in historic times in northwest Choiseul, Bougainville, the Shortlands and Buka (Chikamori 1967, Specht 1972), but in the islands to the east of Choiseul there are no recorded traditions of pottery manufacture.

Although Chikamori (1965) reported ceramics in the Sirebangara Cave site near Vurango village in Choiseul and Yen discovered some sherds in Kolombangara in 1971 (Miller 1979:148), the first excavations and broad understanding of the distribution of ceramics in the western Solomons (excluding the Shortlands) comes from the National Site Survey programme led by Miller (1979). Miller recorded four find spots in Simbo, five in Kolombangara and four in Choiseul, of which two were in the small island of Vaghena off the eastern tip of Choiseul. The most common decorative technique reported was shallow incising on a thin ware, although appliqué,

punctuation and notched rims were also mentioned. Unfortunately, there are no radiocarbon dates associated with this material. However, a test excavation in a deep deposit at Nuatambu Island (SC-7-6) off southeast Choiseul provided some stratigraphic information. Nuatambu Island is a small double islet made up of three basalt hills. Two are joined by a strip of sand that is under water during high tides. The location is historically significant for the manufacture of shell valuables (*kesa*), and pottery was found on the surface in association with the debris from shell ring manufacture. A total of 13 layers were excavated using natural stratigraphy to a depth of 1.8m, with 1m of deposit being below the water table. Miller (1979:71) interpreted the site as being formed through rapid subsidence of the islet, but it may have originally been an inter-tidal occupation. The metre of deposit below the sea level seemed particularly rich in ceramics. A variety of notched lip rims were found throughout the deposit, but brushed body sherds were found only in the bottom levels, where they seemed to precede the shallow incised decorative style. Miller noted (1979:78) that, although the sample was small, the sequence seemed to replicate that observed by Irwin (1972) in the Shortlands. To date this is the longest excavated ceramic sequence in the western Solomons, though since Miller's work it has become clear that older ceramic deposits can be found as intertidal sites throughout this area.

In the region east of Choiseul local pottery manufacture seems to have died out in later prehistory, yet we have found limited amounts of ceramic material in late prehistoric contexts in Roviana, Rannonga and Vella Lavella. Few of these ceramic deposits have been dated, however. In addition to small amounts of plainware associated with Late Period Roviana (New Georgia) shrines (Sheppard *et al.* 2004, Sheppard *et al.* 2000, Walter and Sheppard 2001), we have found *in situ* midden deposits (Site 25) containing plainware with notched rims securely dated to the 15th century A.D. (NZA-6235 468±62 CRA). During excavation work in the island of Rannonga associated with a large feasting platform in Nyamae village, pottery was found dispersed through the stratigraphic column that had most probably been disturbed by crab activity. Charcoal from the bottom of this excavation produced two dates before the 14th century A.D. (Wk-14489 747±32 CRA, Wk-14488 725±30 CRA). In Vella Lavella small amounts of plainware were seen on the surface of gardens adjacent to living sites, and a number of pieces of plain thickware were recovered in 2004 from the bottom of a rockshelter excavation at Kolokolo in association with nutshell dated to the late 18th century (Wk-16579 221±36 CRA). In our experience ceramics are commonly found in the western Solomons with only minimal research effort, an experience which has been replicated by researchers working through the northern Solomons into the Bismarck Archipelago (Garling 2003, Irwin 1972, Specht 1969, Terrell 1976, Wickler 2001).

LAPITA IN THE SOLOMON ISLANDS

Are there any Lapita sites in the Solomons? If by Lapita we mean terrestrial sites where decorated pottery is dominated by dentate stamping, then there are none from Buka east until we get to the Reef/Santa Cruz Islands where there are 14. The Buka sites are all inter-tidal, have limited amounts of dentate stamped decoration and are considered to be late, dating after 2700 B.P. (Wickler 2001) and grading into the incised and applied relief tradition of a similar age from New Britain (Watom), New Ireland (Lossu and Lasigi) (White and Murray-Wallace 1996) and Tanga (Angkitkita) (Garling 2003). A very similar pattern is found in the western Solomons (Figure 3) where we now have well over 20 inter-tidal sites recorded. Despite extensive surveys over ten field seasons, we have yet to identify a single terrestrial locale containing a comparable *in situ* ceramic assemblage. Although it was initially postulated that the inter-tidal sites were created through subsidence (Sheppard *et al.* 1999), the results of Felgate's study of sherd taphonomy and distribution strongly support the conclusion that the sites of the Early Roviana Ceramic Period were stilt-house settlements like those reported in Lapita contexts in Mussau (Kirch 1997), Buka (Wickler 2001) and Nissan (Spriggs 2000:355). Stilt-house settlements are described as single or small groups of houses built out over the water in lagoon or other sheltered settings.

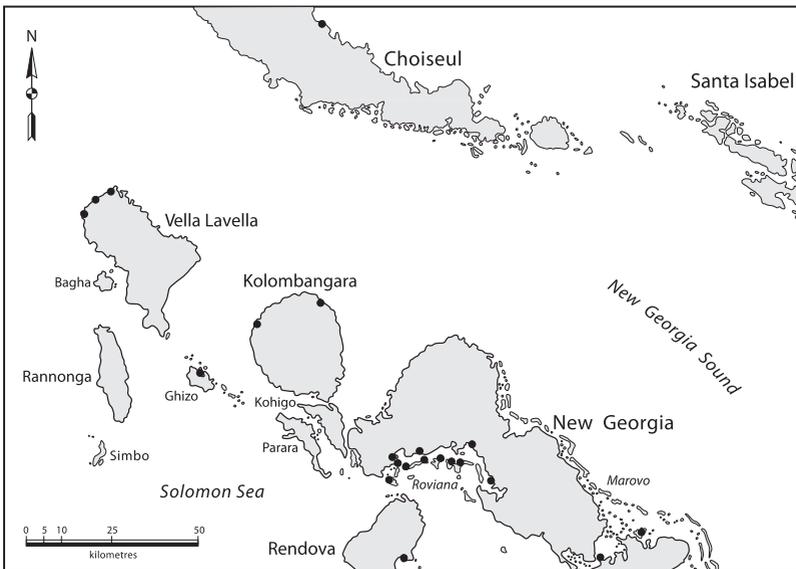


Figure 3. Location of inter-tidal ceramic sites in the western Solomons.

The New Georgia Group

Only four inter-tidal sites have any dentate stamped pottery and only in very small amounts, usually only a few pieces. The remainder of the decorated assemblage is composed of ceramics that seems identical in all respects to the incised and applied relief tradition of the Bismarck Archipelago. In Roviana where the most intensive survey has been conducted (Felgate 2001), out of more than 20 inter-tidal sites only a small number of dentate sherds have been recovered from two of them. These sites also contain the plano-lateral adze form found in the Buka and Tanga sites (Garling 2003:222). The age of these sites is hard to determine. Felgate has dated charcoal inclusions in a sherd from Paniavili (AA33504) to 2130±90 CRA [uncalibrated conventional radiocarbon age] and an exterior smoke-derived carbon deposit on a sherd from the Hoghoi site (NZA-1253) to 2619±45 CRA (Felgate 2001:48). Both of these sites contain rectilinear incised, punctate and pinched decoration as well as a variety of lip treatments, including crenulated or horizontally deformed lips. Most apparent is the shift from complex carinated pot forms in the potentially earlier Honiavasa site to simpler forms and often thinner wares in the post-Lapita sites (Felgate 2001:53), dating to the mid to late 1st millennium B.C. This suite of ceramic styles and apparent sequence is found in inter-tidal sites throughout much, if not all, of the western Solomons. In addition to the sites mentioned by Reeve (1989) in north New Georgia and Vella Lavella, we have seen similar pottery forms in the inter-tidal zone in Marovo Lagoon (Seghe Channel, Chea, Marovo Island), off the northern end of Ghizo Island, where we also recovered an obsidian flake, and most recently on the north end of Vella Lavella (three sites). Summerhayes and Scales (2005) have recently reported similar assemblages from Kolombangara that included a small number of dentate stamped sherds, and Felgate (pers comm. 2003) has found additional inter-tidal sites in north New Georgia. The dates for the Roviana sites are in keeping with the dates from the New Ireland and Tanga sites reviewed by Garling (2003: Table 1, Fig.8). Together they might date the period at which dentate ceramics effectively disappeared from what is obviously a continuing tradition after c.2700-2600 B.P.

The Central Solomons

Crossing from the New Georgia Group to the central Solomons the inter-tidal sites disappear. To our knowledge such sites, or sites that originally were stilt-house settlements, have yet to be found anywhere east of this point (Kirch 1997:184). Whether this is truly a change in a settlement pattern, the origins of which can be traced back into the Bismarcks, will require some targeted surveys of inter-tidal zones in sheltered areas in Remote Oceania (or for that matter in coastal Papua New Guinea). As noted above, the only ceramics found east of New Georgia in the main Solomons are those from

a series of rockshelters in the small offshore island of Santa Ana, originally excavated by Davenport (1972), and then re-examined by Green (Black and Green 1975) in order to improve their dating.

In the Feru II Cave the middle (70-130cm) of a deposit, which contained cultural material to a depth of 216cm, provided a small sample of plainware including a rimsherd with a serially incised lip (Davenport 1972:177). The rimsherd was dated by a charcoal sample collected from dispersed charcoal found within the 70-130cm zone, providing a date (I-2878) of 1275 ± 05 CRA (Kirch and Rosendahl 1976:235). Subsequently Green revisited and reinterpreted the stratigraphy, dividing it into upper and lower units separated by a sterile sand (Black and Green 1975:30, Kirch and Rosendahl 1976:235). Dates from a hearth at the base of the deposit indicated that the pottery-bearing layer was formed during the early 1st millennium B.C. (SUA-114 3050 ± 70 CRA combined *Tridacna* shell sample, SUA-113 2860 ± 250 CRA small charcoal sample) (Swadling 2000:366, Fig.1.). The sherd sample from the site is very small, but Green recovered additional sherds from Feru II (Swadling 1976:127). Davenport recovered an additional rim sherd (undecorated but missing the lip) at the Rate site located in a shallow cave some 2.5 miles along the shore from Feru II. This sherd was recovered from a depth of 106cm and is undated, but a charcoal date from 85cm (I-2882, 1910 ± 135 CRA) suggests it potentially dates to the 1st millennium B.C. In total about 20 sherds, mostly very small, were recovered from these sites.

The Reef/Santa Cruz Islands

Across the 400km gap from the central Solomons, which marks the first major water crossing encountered by people moving west from the Bismarcks, are to the Reef/Santa Cruz and neighbouring islands. Although first crossed in Lapita times and many times subsequently, this water gap helped maintain cultural differences throughout prehistory. These differences are expressed not only in language and genetics (see below) but also in material culture (Green 1976:13-15, Figs 2 and 3; see also Spriggs 2000). People encountering these islands during the Holocene would have discovered, probably for the first time in their experience, pristine islands rich in easily procured resources. Whether or not one describes the Lapita adaptation in Remote Oceania as “strand looping” (Davidson and Leach 2001), it is very likely that in the first few generations the promise of untouched islands rich in both marine life and terrestrial resources (e.g., birds, rich volcanic soils), stretching out east from the known lands, would have been a powerful motivator contributing to settlement and further exploration. The trigger to this behaviour may well have been the discovery of the Reef/Santa Cruz Islands as well as the five nearby islands or island groups that are all less than 100km from their nearest neighbour.

The Reef/Santa Cruz Islands are geographically and culturally unique, probably being the location of the first primary colonisation by Lapita peoples, although the zone may need to be extended to northern Vanuatu, in light of the rich sites being uncovered there (Bedford 2003). This uniqueness is reflected in the archaeological record of long-distance resource movement. Lapita people are often characterised as being long-distance traders, but this is not generally the case. The Reef/Santa Cruz Lapita sites present a unique record of very long-distance movement of obsidian from the Bismarck Archipelago, more than 2000km distant, and chert from the central Solomons more than 400km distant. Sheppard (1993) argued that large quantities of these materials were transported into the area (275kg of obsidian to just the three sites excavated by Green), and there is no evidence to suggest that this represented reuse of an initial supply. Instead we can make a reasonable case for repeat voyages and ongoing interaction over some hundreds of years. Such a long-distance voyaging pattern is unique. Although Bismarck obsidian is found in sites as far away as Fiji and New Caledonia, the total amount recovered in all the sites beyond the Reef/Santa Cruz Group is small and is probably heirloom material although sites with moderate amounts of obsidian may be present in nearby northern Vanuatu (Matthew Spriggs pers. comm. 2006). As noted by Green and Kirch (1997), the Reef/Santa Cruz Lapita sites and exchange system are clearly unusual and so far unique, for nowhere in the Lapita “homeland” of the Bismarck Archipelago can we see such a variety of sources and distances of transport. In the Bismarcks most obsidian comes from “close” sources (Specht 2002).

Green and Kirch (1997:29) describe the Mussau system as highly complex. In many respects the Reef/Santa Cruz resource procurement and interaction network looks like an expanded version of the Mussau system. The large number of long-distance relationships clearly evident in the Reef/Santa Cruz Group must, in our opinion, be indicative of far greater complexity and technical proficiency (Sheppard 2004). Green (1976:264, 1987) has suggested that the procurement linkages were stretched to their limit in order to maintain a continental style adaptation in a more limited environment. When people later moved further into Remote Oceania, the linkages may have been stretched beyond breaking point or rearranged, with the new “homeland” becoming the last inhabited land to the west, possibly the Reef/Santa Cruz Islands.

The extraordinary amounts of obsidian in the Reef/Santa Cruz sites and the absence of obsidian in sites to the west in the Solomon Islands suggest that during the Lapita period there was a direct, long-distance relationship between the Reef/Santa Cruz Islands and the Bismarck Archipelago. The insignificant quantity and distribution of obsidian further east out into Remote

Oceania shows that it was not a technologically necessary material. Indeed its presence may be more an incidental by-product reminiscent of important social relationships that were maintained one giant step from home, but rapidly became attenuated beyond this first step (Green 1996:125-26). Perhaps the resource rich “new found lands” and the new colonising dynamic rapidly liberated the new populations from social ties which were maintained for some time in the greater Reef/Santa Cruz region.

We will not review in detail the chronology and debate over the sequence of Lapita sites in the Reef/Santa Cruz region other than to suggest that the changes in raw material abundances over time (Sheppard 1993) is in keeping with the SZ-8, RF-2, RF-6 sequence developed and defended in Anson (1986, 1987) and Green (1978). Although this sequence has been criticised by Best (2002), Green (n.d.) has developed further support it in the distribution of pottery motifs. Further, based on the same data sets, Sheppard (n.d.) conducted bootstrap sampling experiments that also indicate that the number and diversity of motifs found in these sites cannot be explained solely by sample size effects, a possible bias of early attempts at seriation. Based both on radiocarbon dating and ceramic design, there are clearly early Lapita sites in the Reef/Santa Cruz. The radiocarbon ages from SZ-8 and RF-2 indicate settlement by at least a calibrated age of 3000 B.P. and, as Green (1991b:201) argues, settlement was likely well under way by 3100 B.P. The percentage of dentate stamped sherds in sites or site layers is always at least twice that of incised sherds (lowest is 64 percent dentate at RF-2, n=2445) in assemblages which have comparatively high percentages of decorated sherds (Donovan 1973). In all these features the Reef/Santa Cruz sites are clearly different to the Buka inter-tidal Lapita sites. Only the DJQ site in Buka has just over 56 percent (n=188) of decorated sherds dentate stamped, however this falls sharply to 1.9 percent (n=77) at DAF (Wickler 2001:108-12), with dentate stamping replaced by increasing proportions of unbounded incision, punctuation and appliqué relief. In terms of the abundance of obsidian and dentate stamping, the Reef/Santa Cruz sites are clearly Lapita sites whose closest direct antecedents are in the Bismarck Archipelago.

Current dating indicates this decorated Lapita tradition drops out c.2700-2600 B.P. in the Reef/Santa Cruz and is replaced by plainware, with ceramics rapidly disappearing completely over the next 500 years (Green 1995: Fig.7, 2003:107, Fig.4). This pattern is in keeping with that reported for Vanuatu by Bedford, although he suggests slightly earlier dates of 2800-2700 B.P. for the end of dentate stamped assemblages (Bedford 2003).

GENETIC EVIDENCE:

It has long been noted that the people of the northern and western Solomons generally looked different to their neighbours to the east and west. Notably skin pigmentation is documented as being among the darkest in the world in Bougainville where it cuts across the Austronesian/NAN linguistic division (Norton *et al.* in press). This feature extends east into the western Solomons. Friedlaender notes:

While we have not systematically surveyed people from the Shortlands and Western District of the Solomon Islands, a few individual readings on people from there, and from impressionistic visits to Ghizo, suggests to me that the people there would also join this most black group—once referred to by Douglas Oliver as “The Black Spot of the Pacific” (Oliver 1991:3). Peoples further to the south and east, including Guadalcanal, Malaita, Santa Cruz, and Vanuatu, are all considerably lighter. To judge from our earlier, less technically proficient surveys. (Friedlaender 2005a:58; see also Friedlaender *et al.* 2005b)

Available data indicates a similar geographic fall-off is found to the west with populations in New Hanover and northern New Ireland being closest to those in Bougainville with those in New Britain being considerably lighter and similar to samples from Mussau and the Sepik (Norton *et al.* in press: Table 6).

Modern study of the mitochondrial DNA evidence for the Solomon Islands is complicated. There is considerable data available for Bougainville (Friedlaender 1990, 2005a) and the Bismarck Archipelago (e.g., Friedlaender *et al.* 2005b; Merriwether *et al.* 2005) and reasonable data for the Reef/Santa Cruz (Friedlaender *et al.* 2002), but the data for the main Solomon Islands are limited and generally lumped together as an undifferentiated category. This makes it hard to investigate variation along the island chain. It is possible, however, to ask the general question, given available data, with which group is the Reef/Santa Cruz sample most comparable. A survey of recent work on mitochondrial DNA by Friedlaender, Schurr *et al.* (2005b:Table 2) shows that variation in the P and Q haplogroups indicates that the most similar sample to that from Reef/Santa Cruz is found in East New Britain, the only sample that has the same suite of haplotypes (P1, Q1, Q2, B). North Bougainville is missing Q2 and Q3 and the Solomon Islands sample contains none of the Q haplogroup, an absence it shares only with South Bougainville and the PNG islands of Misima and Rossel. Further disaggregation of samples within the Bismarck Archipelago reveals a number of samples in New Britain (Tolai

that lack all evidence of Q, as do all samples from New Ireland except one (Madak). In this regard they are most similar to the South Bougainville and Solomons samples. The Q2 haplotype is shared in Island Melanesia only by New Britain, Mussau, New Ireland, Santa Cruz, Vanuatu, New Caledonia and Fiji—all islands with early Lapita settlement. Study of the M haplogroup (Merriwether *et al.* 2005: Table 2) shows comparatively poor matches with Reef/Santa Cruz, which is characterised by a very high percentage of M28 and absence of M27, a feature it most closely shares with the West New Britain sample where M27 has one example. In contrast, the Bougainville and Solomons samples share high abundances of M27 and low frequencies of M28. The association of the Reef/Santa Cruz with New Britain is further indicated by the distribution of haplogroup VIII (Friedlander *et al.* 2002:464) that is found in East New Britain and the Reef/Santa Cruz Islands. This data is most usefully summarised in Friedlaender *et al.* (2005a).

In short, mitochondrial DNA research suggests strong linkages of the Reef/Santa Cruz samples with samples from New Britain and neighbours to the south in Remote Oceania. Samples from Bougainville and the undifferentiated Solomons sample are generally similar with some indication of connection to New Ireland. From this we can conclude that there is no evidence of a Solomons Lapita mitochondrial signal into Remote Oceania, although more detailed work in the Solomons is required to see if there is a Reef/Santa Cruz genetic signal back into the eastern Solomons. One recent study of Y-chromosome diversity in the Solomons provides some tantalising evidence of a genetic distinction of NAN speakers in Rendova in the western Solomons from a sample of people from Malaita currently resident in Honiara on Guadalcanal. This shows the M-M4/M106 lineage to be common (25 percent, N=12) in the Malaita sample but absent in Rendova and the O-M175 lineage to be very common (45 percent, N=20) in Rendova but absent in Malaita. This would normally be considered to correlate with language. However, as Cox and Lahr (2006:42) point out, the standard relationship established more broadly in Melanesia between these lineages and language is exactly the reverse of what is found. Their data indicate considerable admixture into Rendova from Austronesian neighbours, suggesting the sample may be more broadly representative of the western Solomons.

PALYNOLOGICAL RECORD:

We have very little direct archaeological evidence of horticulture during the Lapita Period of the Solomon Islands. Increasingly, however, we have indirect evidence from pollen cores, the latest results being four cores collected by John Dodson and Sarah Grimes as part of the New Georgia Archaeological

Survey. Although the results of this work are as yet unpublished (Grimes 2003), the sequence goes back over 3000 years and is comparable to the results reported by Haberle (1996) in Guadalcanal (Grimes 2003, pers. comm.). Haberle reported two pollen cores from the northern alluvial plains of Guadalcanal, which complemented the archaeological research by Roe (1993). The bottoms of both cores, based on interpolated sedimentation rates, dated earlier than 3000 B.P., although only one is dated before that time. Both cores show continuous charcoal influx and the Laukutu Swamp core shows appreciable fluctuation after 3200 and before 2100 B.P., but dramatic and sustained charcoal influx only occurs just before 2100 B.P. and after the tephra dated to 2650 B.P. (Haberle 1996:336). A very similar pattern of a dramatic rise in charcoal influx at c.2600 B.P. appears in all the Roviana cores (Grimes 2003: Fig.4.5, Fig.4.11, Fig.4.17, Fig.4.23) where, in general, intense burning would appear to develop in the later part of the 3rd millennium B.P. In Roviana this correlates with the oldest date available for the intertidal sites (Hoghoi). If we accept the sustained rise in the charcoal influx as a proxy for slash and burn horticulture and the radical transformation of the economy based on a Lapita horticultural complex, then sustained Lapita influence does not occur in Roviana until c.2600 B.P. or Late Lapita times, and in Guadalcanal sometime after that date and probably c.2200 B.P. when the Lapita ceramic sequence of the eastern and southeastern Solomons had ended with the loss of pottery production. We should recall at this point that, although the Vatulumu Posovi rockshelter cultural sequence in Guadalcanal extended throughout the Lapita time period, Roe (1993) found no evidence of any cultural features that could be clearly attributed to Lapita.

THE TRYON/HACKMAN LINE:

One of the most striking and least understood linguistic boundaries in Island Melanesia is that marked by the Tryon/Hackman line (Fig. 2). This line effectively bisects the Solomon Islands between Santa Isabel and Malaita, although it groups a language (Bughotu) in the easternmost tip of Santa Isabel with those of Malaita. From a biogeographic point of view, if one were to propose a cultural division in the main Solomons this might well be the point, since it separates two large clusters of inter-visible islands (Terrell 1977). Today this division is significant as it marks the boundary separating the peoples of the "West" who share many cultural features (Sheppard and Walter n.d.) from those in the central Solomons. This boundary is also expressed by current political struggles and ethnic characterisations, as well as a sharp break in the ability to communicate in languages other than Solomons Pijin. Although this division has been important in the recent past, linguistic research suggests a

more ancient separation that marks a major linguistic division that separates all Austronesian languages to the east extending out through East Polynesia from those to the west. Ross (1989) describes it as separating Western Oceanic, which includes the Meso-Melanesian (Santa Isabel west to New Ireland, New Hanover and northwest New Britain), Papuan Tip and North New Guinea language clusters, from Central/Eastern Oceanic, which includes "...all Remote Oceanic languages together with the southeast Solomons, Utupua and Vanikoro, the south Vanuatu, and possibly the Loyalties and New Caledonia groups" (Ross 1989:136)—in effect everything west of Santa Isabel.

The explanation of this boundary is problematic. Such a major boundary might be considered to mark the neighbourhood of the homeland of Proto-Oceanic. Ross discounts this on a number of grounds and notes that:

... the Tryon/Hackman boundary does not represent a "centre of diversity" but the "seam" between two Oceanic groups with obviously different histories. The Tryon/Hackman boundary runs between two groups of Oceanic languages whose differences are not as great as those of Western Indo-European groups like Romance, Germanic and Celtic, but the sharpness of the boundary is nonetheless more like that of the boundary between French (Romance) and German or between English (Germanic) and Welsh (Celtic) than between, say, French and Spanish or German and Dutch, where the precise placement of a language border is impossible because of dialect gradation. In the case of the boundary between French and German, we know that areas on what is now the French side of the border spoke Germanic dialects before the encroachment of Proto Romance ("vulgar Latin") under Roman rule. Similarly we know that large portions of England were Celtic speaking before the invasions of the Angles, Saxons and Jutes brought the Germanic dialects which became Old English ("Anglo-Saxon").

Since the Tryon/Hackman boundary is a sharp one, it is therefore best interpreted as the result of the encroachment of one group of Oceanic-speakers on another. The more likely encroachment scenario is that speakers of early Meso-Melanesian dialects encroached on territory already occupied by speakers of CEO dialects. (Ross 1989:139)

Such an encroachment onto an earlier CEO substrate should, however, leave some evidence in the languages of Bougainville and the western Solomons. Such evidence seems slight. Ross points to some anomalous Oceanic forms in the vocabularies of Bougainville Oceanic languages and adds: "A number of the Meso-Melanesian languages of Bougainville and the western Solomons, however, have a topic-initial clause structure suggestive of Southeast Solomonic or other CEO contact" (Ross 1989:140). He goes on to note, however, that the encroachment hypothesis raises a number of additional questions.

One is why no CEO languages have survived in Bougainville or the western Solomons; another is why encroachment apparently broke off so sharply in the central Solomons. I can offer no direct answers to these questions, but only point to the facts that the Tryon/Hackman boundary corresponds fairly closely to the furthest extent of linguistically attestable pre-Oceanic settlement, and that the stretch of water between Santa Ysabel and the southeast Solomons is, as Terrell has shown, a predictable biogeographic boundary.... The linguistic evidence therefore implies that the location of the Tryon/Hackman line is explicable in terms of the ways in which CEO and Meso-Melanesian speakers respectively interacted with pre-existent non-Austronesian speaking populations. (Ross 1989:140)

We are not linguists, but to us the evidence for this later encroachment seems slight. The western and northern Solomons have a significant number of NAN languages that are considerably older (Dunn *et al.* 2005) yet survive, despite on-going language replacement (Terrill 2003), to testify to the earlier linguistic history. The NAN speaking island of Savo, which lies just off the coast of Guadalcanal, is well within the Southeast Solomonian area and the Reef/Santa Cruz Islands support languages with NAN influences or roots (Tyron and Hackman 1983). The archaeological evidence for pre-Oceanic settlement in the main Solomons, outside of Buka, is only really present at Vatulumu Posovi in Guadalcanal (Roe 1993). The argument that the Tryon/Hackman boundary is explicable by differential interaction with, or distribution of, previous populations is in our opinion, with apologies to our linguistic colleagues, no longer tenable. Lynch *et al.* (2002) is the most recent attempt by linguists to consider the origins of Southeast Solomonian. They have argued that the direction of Southeast Solomonian “migration” could be tracked by looking at innovation in the languages, with Bugotu on the tip of Santa Isabel being the most conservative and languages becoming more innovative to the south and east, suggesting a west to east movement. However, they note that fine-grained subdivision based on phonological innovations generates complications “because there is a slight mismatch between the subgroupings just presented and the subgroupings we would expect from our reconstruction of migratory directions above” (Lynch *et al.* 2002:110).

Finding linguistic evidence of our alternative hypothesis that encroachment on a NAN substrate came from the southeast, is also difficult and beyond our expertise. Yet, we would draw attention to the linguistic evidence in support of the absence of ceramics in the eastern and central Solomons. In his study of “Pottery Terms in Oceanic”, Ross (1996) reports no cognate terms from Southeast Solomonian that refer explicitly to pots (cooking pots [POc *Kuron], large water storage(?) pot [PNGOc *b^wad(r)i] or shallow earthenware cooking pot or pan) as opposed to bowls, stoppers etc. that have wooden forms and

are commonly reported. He notes that the reconstructed Proto-Oceanic term for clay, *raRo(q), seems to be lost in Eastern Oceanic while it is common in Western Oceanic, and that the term *raro* for cooking pot is particularly common in the western Solomons.³ This pattern does not seem to reflect a sampling error since Osmond and Ross report the same pattern for ceramics in their study of Proto-Oceanic household artefact terms but find many cognate terms for wooden bowls in Southeast Solomonian languages in the same study (Osmond and Ross 1998:72).

From the linguistic perspective our model suffers because our scenario of leapfrogging CEO speakers before 3000 B.P., originating from a centre of diversity in the Bismarcks focused on the Willaumez Peninsula area of New Britain (Ross 1989:143)—something in keeping with the abundance of New Britain Talasea obsidian in the Reef/Santa Cruz Lapita sites—and moving out to the Reef/Santa Cruz, has left no clear evidence in the islands themselves since the languages now are mixed Austronesian and NAN (Mühlhäusler *et al.* 1996). It is conceivable that this very mixture may be more parsimoniously explained by our model as the ultimate result of interaction between a small founding Austronesian population and its more numerous NAN neighbours to the west. Interaction to the west is clearly shown by the transport of Malaita/Ulawa chert to the Reef/Santa Cruz Lapita sites (Sheppard 1993). Yet how the source becomes mixed and the remainder of Southeast Solomonian is unaffected (Ross 1988:384) remains to be explained. We can only suggest a more complex history of CEO NAN interaction in the region. Linguists seem to concur that the mixing involved a number of different Austronesian languages, occurred at several periods of time and possibly in different locations (Mühlhäusler *et al.* 1996:424). What the original CEO languages looked like might be revealed more clearly by the Austronesian languages spoken by the very close southern neighbours to Reef/Santa Cruz in the islands of Vanikoro and Utupua.

The islands of Utupua and Vanikoro each have three Oceanic languages, and those of Utupua in particular bear marks of Oceanic-Papuan contact. Perhaps more significantly, however, the six languages show an unexpected measure of diversity for the size and proximity of the islands, and, although we can recognise an Utupua family and a Vanikoro family, there are seemingly no innovations which allow us to attribute all six languages to a single group, let alone to relate them to the Southeast Solomonian or to the Southern Oceanic linkage.... (Lynch *et al.* 2002:112, citing Tryon and Hackman 1983:70-71, Tryon 1994).

The authors conclude that these languages represent first order separation from their neighbours and that the great amount of diversity among them indicates considerable age and isolation, possibly dating back to the time of early Lapita occupation of the neighbouring Reef/Santa Cruz Islands. In an earlier assessment of the historical linguistic relationships between Vanikoro and Utupuan, Green (1976:55-59) estimated a date in the range 2500-3000 B.P. for the breakup of Utupuan and a date several hundred years before that time for the breakup of “an Oceanic language in the Santa Cruz region from which all its present members developed...” (Green 1976:59). The degree of divergence noted in the region suggests to us an explosive movement out into Remote Oceania that was quickly followed by regional isolation.

* * *

We now return to the points we proposed to argue in support of our model at the outset.

First, we have documented that the Solomon Islands have been the subject of considerable archaeological research. These investigations show quite clearly that there is a major break in the distribution of ceramics throughout the main Solomon Island chain. In the north and west ceramics are commonly recovered, and they were made until the historic period. It is conceivable that a lack of inter-tidal survey in the central and eastern Solomons is partly responsible for the absence of an early ceramic record. Yet, the absence of any terms for pottery in Southeast Solomonian languages is congruent with our model and suggests that for speakers of those languages pottery has been absent for a considerable period of time. We believe it is very unlikely that the current picture of the ceramic record in the Solomon Islands will be altered significantly in the future.

Second, there is no evidence for early Lapita settlement in the Solomon Islands outside the record in Remote Oceania—primarily that in the Reef/Santa Cruz Islands. Settlement of Santa Cruz occurred comparatively early in the Lapita sequence and has a number of unique characteristics. The amount of obsidian from the Bismarcks and most specifically from New Britain—some 2000 km away—is not replicated anywhere else in Remote Oceania, and it is indicative of a special long distance relationship. The modern genetic make-up of the people of Reef/Santa Cruz, based on mitochondrial DNA, is most like populations in New Britain and populations to the south (Vanuatu, New Caledonia). The Austronesian languages of Vanikoro and Utupua, located within the greater Reef/Santa Cruz Islands, appear to be very early and are

arguably derived from the New Britain region. Based on the archaeological, genetic and linguistic data, it seems evident that the Reef/Santa Cruz Islands were settled directly by populations from New Britain with whom on-going relations were retained, while leapfrogging the Solomon Islands.

Third, despite considerable on-going research in the western Solomons and the discovery of a large number of inter-tidal sites, there is no evidence of Lapita settlement before 2700 B.P. Pollen data is in agreement with this suggestion. The pattern of inter-tidal settlement associated with very late Lapita sites and an on-going incised and appliqué tradition is common from New Georgia through the western and northern Solomons to at least New Ireland. Genetic data indicate that Bougainville and an undifferentiated Solomons sample are unlike Reef/Santa Cruz samples—indicating a separate history, at least at some point. Both the genetic data and skin pigmentation indicate the closest neighbours to the Bougainville and western Solomon populations are people in the New Ireland region. We suggest that the modern population of the region is heavily influenced by a late Lapita settlement of food producers who subsequently mixed with local NAN-speaking populations. On linguistic and biological grounds we would propose that this influence extended as far as eastern Santa Isabel.

Fourth, we agree with Bedford and Clark (2001) that there is little basis for relating post-Lapita incised and applied relief ceramic assemblages from the Bismarcks, the western Solomons, Vanuatu and Fiji. The incised and relief tradition found in the western Solomons shares a set of distinctive features among which perhaps the most significant is the crenulated or pie-crust type rim treatment that is found in sites from Marovo Lagoon in the east to New Ireland in the west (Felgate 2001, 2003:376; Garling 2003; Sheppard, *et al.* 1999; Specht 1969; White and Murray-Wallace 1996). These assemblages do not look like Mangaasi or like other ceramic assemblages in Remote Oceania. What this and generally similar traditions to the west have in common is their derivation from Lapita designs where all of these decorative techniques are also found. It seems likely that throughout this region whatever the impetus was for maintaining the complex dentate stamped decorative system was moderated, resulting in a systematic simplification. Throughout the Lapita region complex decorative techniques disappear in the order of effort of execution, until there is only plainware followed by loss of pottery manufacture, or plainware followed by new influences on the ceramic system taking it in new directions, as can be seen in Bougainville, Fiji and Southern Melanesia. There seems little need to postulate a late migration out of the west of people bearing either new pottery or new genes. Spriggs (2004:142)

recently seems to agree in general with Bedford and Clark's evaluation (2001), although he still sees a major problem in explaining the appearance of people in Remote Island Melanesia as they do not look "Polynesian". In his view this would require subsequent gene-flow from the west to create the modern "phenotype" (Spriggs 1997:159). In our view the Lapita settlers of Remote Oceania can be seen today in their direct descendents, who make up the modern populations of Fiji, Vanuatu and New Caledonia where most Lapita sites and ceramics are found. If there is a problem of culture history to be explained, it is the Polynesian phenotype and its development—something perhaps to be found in the prehistory of Samoa and Tonga.

Fifth, our weakest point is our proposed back movement from Remote Oceania into the eastern and central Solomons to form the Tryon-Hackman line. If we are correct, one would expect to find among the people of the eastern Solomons the distinctive genetic signature of the Reef/Santa Cruz and a marked genetic difference from the people of the western and northern Solomons. If we are not correct, we would be left with a rather awkward assumption proposing a very early movement of Austronesian speakers (Proto CEO) out of the Bismarcks, people who were either aceramic or rapidly lost the technology and all linguistic trace of it when they settled the area of Southeast Solomonian speakers. These people would also have left virtually no linguistic or distinctive biological trace of their passing in the western and northern Solomons. Such a move could be accounted for by an early leapfrog movement out into the Solomons in the vicinity of Malaita. For the moment we think our argument is more parsimonious as it pulls together data from the entire region and explains the Solomons biological, linguistic and archaeological data. It represents a baseline model for the genesis of modern cultural diversity within the Solomons and contributes to our understanding of the rate and nature of the settlement of Remote Oceania.

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NOTES

1. *Kastom* is the Solomon Islands Pijin word meaning ‘traditional’ or ‘customary’.
2. With the exception of an unconfirmed report of ceramics found at Sa’a Harbour (southeast Malaita) by Catherine Tyhurst, an anthropology student working in Malaita in the 1980s (Lawrence Foana’ota, pers comm. 2005, Childs 1986)..
3. Roger Green has also searched data available to him on this topic and concurs that there is no evidence of ceramic terminology in Southeast Solomonic.

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