‘The focus should be on large islands within regions where rockshelter sites have never been seriously investigated: the Solomons, Vanuatu and New Caledonia. Such an approach would certainly put to the test most of the ideas presented in this essay. Whatever the outcome of such a campaign, it has to provide a more complete and more realistic picture of Melanesian prehistory’ (Gorecki 1992:44).

This chapter outlines in detail the various sites where excavations were carried out and includes descriptions and illustrations of stratigraphy along with site plans. Descriptions of individual layers include colour (Munsell Soil Color Charts 1975), consistency and form along with general summaries of any recovered artifacts and other midden debris. More detailed information, summary tables and discussion regarding midden remains are presented in relevant chapters and appendices. A full list of all radiocarbon dates associated with this research is presented in Appendix 1. Dates that have been interpreted as being anomalous are identified with an asterisk*.

All of the excavations were carried out using trowels and hand shovels. Apart from some areas of the Ponamla and Arapus sites (see below) all excavated material was dry sieved then wet sieved through 2mm screens and sorted into separate categories on site. Datums were generally established adjacent to the excavated areas and depths were consistently measured from those points. The relative position of the datum points to the surrounding topography was calculated in relation to their height above sea (asl) which in all cases except for Mangaasi was an approximation of the mean high tide level. In the case of Mangaasi the datums were related to their height above a live coral datum (mean sea level) (see Appendix 2). Sites were initially excavated in spits of 10 or 20 cm until distinctive stratigraphic layers could be identified. Thicker stratigraphic layers were excavated in spits facilitating the identification of finer temporal change within those layers. The layer depths for the various test pits and excavated areas are given as centimetres below datum (cm bd). The chapter content is divided by island i.e. Erromango, Efate and Malekula.
Erromango

Two sites were excavated on the island of Erromango, namely Ponamla in the north and Ifo in the southeast (see Fig. 2.2). As noted in Chapter 2, both sites had been previously investigated, although somewhat briefly in the case of Ponamla, by Matthew Spriggs and Jerry Taki.

Ponamla 1994–5

This site was initially identified in the last few days of Spriggs’ 1994 field season. The potential of the site had been recognised and brought to Spriggs’ attention by former Vanuatu Cultural Centre fieldworker Sempit Naritantop, who identified pottery brought to the surface during posthole digging for a fence around the hamlet of Ponamla. The one by one metre test pit excavated in 1994 confirmed the rich nature of the site’s deposits. In 1995 Matthew Spriggs and the author returned to the site for over five weeks of excavation. The work was again carried out with the assistance of Jerry Taki, the incumbent Vanuatu Cultural Centre fieldworker for Erromango, and a crew of local landowners.

Ponamla is a bay at the northern end of Erromango facing the island of Efate. It is a prime location for settlement with its sheltered bay facilitating canoe access and reliable freshwater supplied by the Ponamla River. The main site area appears to be a remnant Pleistocene alluvial terrace, subject to talus slope encroachment from the limestone hillslope at its eastern edge. Ponamla is a relatively undisturbed settlement site with cultural deposits dating from c. 2800 to 2500 BP. An areal excavation, Area A (Fig. 3.1), revealed what appeared to be a former cooking area, possibly also associated with pottery production. The presence of ash, charcoal and cooking stones, mixed with shellfish and faunal material indicated that the remains from hearths and ovens were being deposited in this area. Thousands of sherds, along with an assortment of other artefacts such as Tridacna adzes and arm rings, Conus shell rings, shell beads, a drilled shark tooth, bone needles, scoria abraders and stone flakes were recovered. Structural features were also recorded at the site. These were stone terraces which appear to have been constructed to form flat areas for the construction of houses and/or activity areas (Fig. 3.2). At least three levels of structural features were identified within the almost two metre deep cultural deposit. These features and the associated stratigraphy have been discussed in more detail by Spriggs (1999). The consistent and tight range of radiocarbon dates and the evidence for stylistic change in pottery within the deposit confirmed the stratigraphic integrity of the site.
A series of test pits (TP) were also excavated across the site (see Fig. 3.1). These were designed to determine the extent of the site, any spatial or temporal variation and to identify any distinct activity areas. The stratigraphy of the test pits (Fig. 3.3) is outlined in detail in Appendix 2. They were spread across the entire site and therefore often demonstrated quite different stratigraphies. Although several corresponding layers can be identified between the various test pits, the stratigraphic layers are labeled separately and discussed as per each test pit. Initially five test pits (TPs 5.1–5.5) were excavated across a north-south transect A–A', followed by another four test pits in various locations (TPs 6–9). Only the stratigraphy of Area A will be discussed in detail here.

Area A (12.64m asl, datum at south eastern corner). The areal excavation which covered an area of some 20m$^2$, ran along the central ridge of the most northerly mound feature (see Fig. 3.1). Five distinct layers were identified, although in only three square metres was the stratigraphy excavated to the basal sterile, namely the eastern and western ends of the excavation area (see Fig. 3.2). The excavated material from much of the central section of Area A (TP.1.3/2.3–1.9) was only partly sieved. Concentrated *in situ* midden along with the associated stone platforms were contained within Layers 2, 3 and 4. Full details of the recovered midden materials are presented in other relevant chapters.

Layer 1 consisted primarily of a black (10YR 2/1) humic soil with frequent basalt cobbles. It has been formed after the intensive early occupation of the site through the agencies of slopewash and humic accumulation. The cobbles seem likely to have been associated with clearance activities, perhaps for gardening. The recovered artifactual material from this layer, nearly all associated with the initial settlement of the area, appeared largely to be in secondary deposition. Shellfish were sparse as were charcoal and ash deposits. Much later, more ephemeral use of the site was indicated at the western end of the excavation by a lens of shell midden (see Fig. 3.2) which would appear to correspond to a period dating to around 1600 BP (1660±90 BP [ANU-9510] 1816–1349 BP and 1670±80 BP [ANU-10293] 1806–1390 BP. An early date of 2590±80 (ANU-10299) 2449–2062 BP from a marine shell recovered from Layer 1 suggests it was in secondary deposition and that the date is more likely to relate to Layer 2. Layer 1 covered all of Area A, varying in thickness from 20–45cms. The very different matrices of Layer 1 and 2 provided a sharp delineation between the two layers.
At the interface of Layers 1 and 2, two marine shell samples [2620±70 BP (ANU-10073) 2462–2121 BP; 2750±70 BP (ANU-10297) 2702–2304 BP] provided a terminus ad quem date for the early occupation site.

Layer 2 marked the appearance of the in situ cultural remains. Large coral boulders which delineated the structural remains (platforms) were recorded in association with concentrated basalt and coral cobbles which provided an infill. Grayish brown (10YR 5/2) sandy silt and concentrated midden were also present. The pattern of boulders and cobbles was patchy across much of Area A at this level reflecting the presence or absence of stone platforms. Three radiocarbon determinations were returned from this layer, two from charcoal samples, namely 2560±140 BP (ANU-9507) 2950–2333 BP and 2470±90 BP (ANU-9509) 2758–2336 BP, and one from a marine shell 2840±70 BP (ANU-9508) 2745–2349 BP.

Layer 3a lay directly beneath the upper level of stone platforms and consisted of a friable very dark grayish brown (10YR 3/2) sediment, with large quantities of oven rake-out and associated midden debris up to 20cm in thickness. Ash lenses and charcoal concentrations were recorded throughout the layer. The build-up of the layer can be largely attributed to midden dumping. A single radiocarbon determination on a charcoal sample returned a date of 2550±70 BP (ANU-9508) 2745–2349 BP.

Layer 3b was very similar to above but the sediment was a darker brown (very dark brown 10YR 2/2). These layers could have been combined but the colour variation and the appearance of another platform at the eastern end of the excavation justified their separation. The delineation also provided a greater control on any temporal change through the somewhat thicker layer. The two dates gleaned from marine shell and charcoal samples respectively at either ends of the

Layer 4 again comprised a very dark brown (10YR 2/2) sediment along with concentrated basalt cobbles. It was only recorded in the western end of the excavation and appears to be associated with an earlier stone terrace feature. This layer sat directly on top of sterile alluvium which provided a distinct boundary. A charcoal sample from the lowest level of this layer returned a radiocarbon date of 2550±70 BP (ANU-10078) 2779–2359 BP.

Layer 5 comprised of loosely compacted sterile very pale brown (10YR 8/3) river sand and silt with occasional limestone boulders and basalt cobbles. No cultural material was recovered from this layer. It represents a probable Pleistocene-age river terrace (Spriggs 1999) which at the time of human arrival provided a suitable flood-free environment for settlement. A 50cm deep sondage was excavated into this basal layer, confirming its sterile nature.

Discussion
The test pitting program enabled the extent of early settlement to be pinpointed. In situ midden and associated structural features were largely restricted to the mound features located on the eastern area of the river terrace. Stone terraces and platforms were constructed above the flood zone of the river and sea. These features became the focus for habitation and cooking activities and areas where refuse accumulated. After the abandonment of the site these features also became foci for the buildup of slopewash and humic accumulation. In areas away from the mound features the midden appeared to be generally in secondary deposition, the pottery was often worn in appearance through exposure and had been shifted around over long periods of time through various post-depositional processes. The recovered pottery also indicated that there does not appear to be any great temporal variation across the site. No doubt there were distinct activity areas within the site but the limited nature of the test pitting failed to reveal any evidence of this. Those test pits closer to the sea or river displayed limited stratigraphic depth before the sterile former beach or river terrace were reached. These areas appear to have only been utilised in the relatively recent past, either because of a drop in relative sea level or because tidal or river action has removed early deposits.

The post-occupational buildup was most dramatically demonstrated in TP 6 where over 160cm of overburden lies on top of the in situ deposit. It was not possible to determine the eastern extent of the site due to the increasing depth of overburden nearer the hillside.

Initial human occupation appears to have been relatively short-term and intensive with the site being abandoned after a few hundred years. The area appears to be a secondary colonising settlement on Erromango, perhaps 2–300 years after it was first settled by Lapita colonists possessing the full suite of dentate-stamped ceramics (see Ifo below). People arrived to colonise the area c. 2800 BP at a time when dentate-stamped Lapita was generally no longer being produced. Initially plainware dominated but over time fingernail and incised ceramics appeared. The ceramics are culturally transitional between Lapitoid plainware and a fingernail and incised tradition. People moved into a pristine environment and commenced an intensive exploitation of the local fauna and marine resources, highlighted by the rapid stratigraphic accumulation and overlap at two standard deviations of most of the radiocarbon dates from Layers 2 and 4. There is some indication of abandonment after 2500 BP, probably due to dual factors of resource depletion and the attraction of other readily available pristine environments. The first indication of a return to the area are dates of around 1600 BP associated with a shell midden suggesting ephemeral use of the area. People left with the ceramic tradition intact and returned without.

Ifo 1983 and 1996
This site is located on the southeast coast of Erromango (see Fig. 2.2), a coast that comprises an extensive area of recently raised coral reef known as the Imponkor Limestone (Colley and Ash
1971:48–49). Although tectonic uplift has increased the chances for the preservation of the earliest settlement sites, the raised coral reef along much of the south eastern coast presents today a very hostile environment in terms of canoe access. It may well be that this was not the case in the initial settlement period prior to this uplift.

Ifo is located near a reef passage and river outlet, a few hundred metres from the shore, on the north bank of the Ifo river which provides canoe access. The site is concentrated on a series of linear mound formations (Fig. 3.4). A number of these ridges run parallel to the river and appear to be former beach ridges while others run at right angles and are primarily made up of cultural material. Scattered cultural debris was noted over an area covering approximately 60 by 80m. The site is some 7–8m above sea level (mean high tide).

As noted earlier Spriggs and Taki recorded and tested the site in 1983 (Spriggs and Wickler 1989). The site was re-visited by the author in 1996 for six weeks in June and July during which time, again with the assistance of Jerry Taki along with a team of local landowners, a series of test pits and larger areal excavations were completed (Figs 3.4 and 3.5). The results from this period of excavation are outlined below. After a test pitting program (13, 1 by 1m test pits) to determine the area of the site and any temporal/spatial variance (see Appendix 2 for test pit details), it was found that the most productive and undisturbed area at Ifo was the ridge that Spriggs and Taki had tested in 1983. Upon completion of the test-pitting program, a larger area on this same east-west aligned ridge was excavated. Two parallel trenches some five metres apart and on either side of the ridge were excavated from the edge of the ridge into the centre and connected by a trench along the spine of the ridge (Trenches B, C and D), a total area of sixteen square metres (Fig. 3.4). This strategy was employed to gain information on the structure of the ridge and how it had been formed, along with the added goal of establishing the cultural sequence that was to be found within it.

**Trenches B, C and D**

These trenches accounted for the bulk of the excavated area at Ifo (16m²) along with the greatest quantity of recovered midden remains. This excavated ridge consisted of a central core of flattish
cultural material of up to 1.5m. The nature of the depositional processes involved at the site make it inevitable that some mixing of deposits would have occurred. Evidence of this is highlighted by the inversion of a number of the radiocarbon dates from the upper levels of the site. Despite this, the recovered midden remains and the clearly delineated layering of the mound features tend to indicate overall stratigraphic integrity. The datum for these trenches was located adjacent to B5 and was 9.07m above the high tide mark.

The most detailed stratigraphic record was found only towards the centre of the mound features and became less complete, particularly evidence of the earliest layers, towards the periphery (Fig. 3.7). Concentrated midden remains also tended to be located in the central spine of the mounds. Five distinct layers were identified:

Layer 1 consisted of concentrated water worn coral cobbles and firecracked basalt cobbles within a black (10YR 2/1) humic sediment. Recovered materials included frequent pottery, shellfish, bone and occasional artefacts. At the lowest level of this layer, two radiocarbon determinations, on charcoal and marine shell respectively, returned dates of 2690±70 BP (ANU-10681) and 3059-2735 BP.
The date on the charcoal (ANU-10535) at least would seem, on the grounds of stratigraphic position and artefact association, to be somewhat anomalous. The recovered ceramics from this layer which are dominated by fingernail decoration associated with a single vessel form tend to support overall stratigraphic integrity. This layer graded into the layer below as the cobbles became less frequent with depth.

Layer 2 was a black (10YR 2/1) silty sediment with only occasional coral and basalt cobbles. Midden material was again frequent with patches of ash and charcoal also being recorded throughout the layer. Fingernail decorated ceramics continued to dominate. From the upper level of the layer a charcoal sample returned a date of 2510±60 BP (ANU-10534) 2753–2355 BP while at the lower level charcoal and marine shell samples respectively returned dates of 2170±70 BP (ANU-10533) 2334–1952 BP and 2780±60 BP (ANU-10537) 2706–2332 BP.

10535) 2948–2736 BP* and 2650±70 BP (ANU-10536) 2498–2149 BP. The date on the charcoal (ANU-10535) at least would seem, on the grounds of stratigraphic position and artefact association, to be somewhat anomalous. The recovered ceramics from this layer which are dominated by fingernail decoration associated with a single vessel form tend to support overall stratigraphic integrity. This layer graded into the layer below as the cobbles became less frequent with depth.

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A distinctive change in the composition of the matrix signalled the presence of Layer 3. It consisted of concentrated basalt cobbles and coral boulders and flattish blocks amongst a very dark gray (10YR 3/1) sandy sediment. This layer was associated with early human activity in the area where level surfaces were being cleared of miscellaneous coral debris to facilitate settlement. Linear alignments of coral blocks and boulders then became foci for the regular dumping of midden. Frequent midden remains were encountered and it was from this layer that dentate-stamped and linear incised, calcareous-tempered sherds began to appear. Layer 3 was clearly defined only in the central core of the mound features. A marine shell from the upper part of this layer returned a radiocarbon determination of 2630±50 BP (ANU-10523) 2407–2174 BP.

Layer 4 lay beneath the concentrated coral debris and marked the interface of this earliest cultural layer and the sterile weathered coral terrace. It consisted of a dark yellowish brown (10YR 4/4) sandy sediment. Occasional coral cobbles and blocks were recorded. Midden materials were sparse but included a number of dentate-stamped Lapita sherds which were generally calcareously-tempered. Layer 4 was only recorded in the central core of the mound features. Marine shell and charcoal samples from the lowest level of Layer 4, returned radiocarbon determinations of 3120±60 BP (ANU-10680) 3060–2753 BP and 2700±80 BP (ANU-10520) 2868–2750 BP respectively.

Layer 5 was the cemented yellowish brown (10YR 5/4) gritty coral sand of the weathered coral terrace. A marine shell from this layer returned a radiocarbon determination of 3770±70 BP (ANU-10521) 3877–3526 BP, giving some indication of the time when the terrace was uplifted above sea level.

The above layers, where in evidence, could be directly related across the whole site (see Fig. 3.5 and Appendix 2). Water-borne pumice pebbles associated with regional volcanic activity were recorded throughout much of the excavated stratigraphy, particularly in the lower levels. In TP 3 a band of concentrated pumice pebbles (Layer 4a) lay directly on top of the coral terrace and would appear to relate to regional volcanic activity prior to human arrival at the site.

**Trench A**

This 4 by 1m trench was located south and opposite the areal excavation (Trench B–D) on the north facing slope of a linear mound feature. The trench ran from the centre of the mound to its edge. The datum, located at the southern end of the trench, was 8.72m above sea level (mean high tide). Five distinct layers were identified in the 130cm deep stratigraphy (Fig. 3.5). Midden remains, although sparse, were recovered from throughout the excavation.

Layer 1 consisted of a black (10YR 2/1) humic soil with concentrated water worn coral and basalt pebbles. Cobble content decreased with depth. This layer graded into the layer below. *In situ* midden remains included pottery, shellfish and bone. The recovered sherds were predominantly decorated with fingernail impression.

Layer 2 was characterised by an increasing sand and gravel content amongst the black (10YR 2/1) silty sediment with less frequent cobbles. However, toward the centre of the mound a concentration of cobbles was recorded which may represent an intensive clearance phase of use. Pottery (fingernail impressed), bone and shellfish were again recovered.

Layers 3 and 4 were recorded only in the central core of the mound and consisted of a concentration of flat coral blocks and boulders within a dark brown (10YR 3/3) sandy sediment. Several calcareously-tempered sherds were recovered along with sparse shellfish and bone. These layers, as previously noted above, are associated with the initial human settlement in the area, although evidence was somewhat ephemeral in this part of the site. Layer 5, the basal uplifted coral terrace, was encountered across the excavation at 130cm bd, at which point the excavation terminated.
**Discussion**

The excavation in 1996 was able to define comprehensively the nature, extent and cultural chronology of the Ifo site. Two predominant factors influenced the results of the excavation. Firstly, it was only excavation in the centre of the mound features that produced both more prolific midden remains and a complete stratigraphic history of the site. On the periphery of the mounds midden was more dispersed and the earliest cultural layers of the site were generally not present. Secondly, a number of the linear mound features were primarily made up of natural deposits and lay outside the area of settlement associated with ceramic use. These are taken to be predominantly naturally accumulated beach ridges. This was the case with TPs 8 and 14.

The remains of the initial colonising Lapita settlement, dating to c. 3000 BP, were concentrated south of the recent logging road as far as Trench A. Its most easterly extent is defined by the north-south aligned linear mound into which TP 12 was excavated (Fig. 3.4). Later occupation associated with distinctive fingernail and incised ceramics was concentrated in this area as well but was also thinly dispersed across a wider area of the site. Ceramic production may have continued up to around 2200–2100 BP (the most recent date recovered from Ifo was 2170 BP) but then disappeared from the cultural repertoire.

**Efate**

**Mangaasi 1996–1999**

The eponymous site of Mangaasi, located on the northwest coast of Efate, (Fig. 3.8) once again became the focus of archaeological investigation in August 1996 when Matthew Spriggs supervised four weeks of excavation at the site. This was the first year of the Australian National University-Vanuatu National Museum archaeological research and training program (Bedford et al. 1998, 1999) which continued at the site and nearby environs through to 1999 (Bedford and Spriggs 2000) and then again at the Arapus site from 2001 to 2003. The research at the site was designed to develop further the pioneering work of Garanger on the ceramic remains from the site, partly in light of the questions concerning the central Vanuatu pottery chronology raised by Ward in his 1979 thesis (see also Ward 1989). Garanger noted that he had some difficulty in interpreting the stratigraphy of the site and this is reflected in his summing up of the ceramic chronology. Researchers have questioned the validity of Garanger’s Early to Late Mangaasi ceramic sequence and his proposed termination date for pottery production and use (Ward 1979, 1989; Spriggs 1997:179–81).

In 1996 four test pits (TPs 1–4) were excavated at Mangaasi both near to the earlier excavations carried out by Garanger and further inland (Fig. 3.9). This area of Efate experiences regular tectonic uplift estimated to have been some four to five metres in the last 3000 years. This was confirmed with the excavation of test pits, adjacent to the area excavated by Garanger, which reached the former reef at 3.6m below the ground surface (Fig 3.10, TP 3). This was up to some two metres below the basal levels of Garanger’s earlier excavations in the same area and consisted of a series of former beach deposits. Water-worn pottery was found throughout the stratigraphy and although it was not possible to assign it to any particular style due to its condition, temper analysis carried out by Dickinson (see Appendix 3: WRD-138) on a number of waterworn sherds from the lowest levels of the test pits confirmed them as being of Efate origin. The presence of pottery in these levels suggested that people had been dumping refuse onto the beach below the high tide mark from a settlement further inland than the locations excavated in 1996. The recovered pottery from TPs 1 to 3 was broadly similar to material labelled Mangaasi by Garanger. However TP 4, some distance inland, revealed in its lowest layers (Fig. 3.11) ceramics similar to those excavated by Garanger at Erueti on the south coast of Efate, and called by him Erueti Ware.
Excavations in 1997 directed by Spriggs and Bedford extended the test pit transects further inland and parallel to the present shoreline. Relatively undisturbed, deeply-stratified (up to 2m), concentrated cultural deposits relating to an earlier occupation at the site were located and tested in 1997 through the excavation of seven 1 by 1 metre test pits (TPs 5–11) (Figs 3.10, 3.11, 3.12 and 3.13). Two of these were later expanded, namely TP 9 (2 by 2m) and TP 7 (3 by 1.5m). Pottery recovered from the more inland areas closest to the creek (primarily TP 9) consisted totally of Erueti-style ceramics. Mangaasi-style ceramics were generally recovered from the uppermost layers of the site or in test pits that were closer to the sea and thus clearly date to a later phase of occupation at the site. In a number of the test pits excavated in 1997 tephra layers were recorded. These are tephras that were initially thought (Bedford 2000b; Bedford and Spriggs 2000) to be associated with very large volcanic eruptions on Ambrym around 2000 years ago (Robin et al. 1993) and later of Kuwae in the Shepherds some 500 years ago (Robin et al. 1994). Subsequent analyses of the tephas have shown that the Ambrym tephra is in fact from nearby Nguna and the dates also suggest it was event that occurred several hundred years earlier than Ambrym at around 2200 BP. The later tephra may also be from Nguna but this has yet to be clarified. It does date to a similar period to that of the Kuwae eruption and until confirmed otherwise will continue to be referred to as such. However whatever their origins, in test pits where these distinctive tephas were detected, they provided crisp chronological definition. When recovered from in situ deposits, Erueti-style pottery was found beneath the earlier Nguna tephra while the Mangaasi-style pottery was sandwiched between this tephra and that related to the Kuwae eruption (Fig. 3.12).
Figure 3.10 Mangaasi testpits 11, 3 and 18 east sections

Figure 3.11 Mangaasi testpits 2, 4 and 5 east sections
Excavated sites: plans, stratigraphy and dating

Figure 3.12 Mangaasi profile TP 1- TP 9.1 east sections

Figure 3.13 Mangaasi testpits 6, 7 and 8 east sections
In 1998 a further six 1 by 1m test pits (TPs 12–17) were excavated by Spriggs and Summerhayes primarily to define further the limits of the site and investigate the complex stratigraphy which included the evidence of tidal waves and other flood events along with the series of tephras (Fig. 3.14). These test pits confirmed the results of the previous years’ work and enabled tighter delineation of the various phases of settlement. In 1999 a single 1 by 1m test pit (TP 18) was excavated at Mangaasi to complete the grid pattern of investigation (Fig. 3.10).

Figure 3.14 Mangaasi testpits 13, 14 and 16 east sections

**Arapus 1999**

The main thrust of excavations in 1999 directed by Spriggs and Bedford was the investigation of the stratigraphy southwest of the Pwanmwou Creek, on the opposite bank to the Mangaasi site. A grid of test pits orientated to the cardinal points and spaced at 25m intervals was laid across the site. This was an extension of the same grid system utilised at the Mangaasi site. As was also the case at Mangaasi, this southwest side of the river showed signs of habitation from the more recent past in the form of a number of low coral boundary walls across the site demarcating former households and gardens. A total of 24 one by one metre test pits were excavated during the six week field season (Fig. 3.9). These test pits were generally trowelled only and not sieved as the major emphasis in 1999 was to delineate the areal extent of the site.

The archaeological remains uncovered during the 1999 season proved to be quite spectacular and have greatly extended our knowledge of the settlement history of the area. Excavations on the southwest side of the Pwanmwou Creek have revealed much more extensive remains than those located at Mangaasi (Bedford and Spriggs 2000; Spriggs and Bedford 2001). These include an earlier phase of settlement than that identified at the latter site. This earlier phase of settlement appears to be associated with the first human arrival in the area and with a distinctive type of pottery cooking vessel i.e. plain globular pots with outcurving rims which are almost always
notched on the lip. The pottery from this early phase has been named Arapus after one of the ancestral house areas where it was initially identified.

The test pitting program has confirmed what had earlier been indicated at Mangaasi, that the archaeological stratigraphy of the area is both horizontal and vertical. Settlements were located on or near beach ridges on the coast. However, intermittent tectonic activity during human habitation of the island had encouraged continual realignment of settlement which was required to compensate for the continually prograding shoreline. With the now well-dated and defined pottery sequences, namely Arapus, Erueti and Mangaasi, it is possible to chart both the settlement pattern in the area and the associated cultural transformations which occurred over time (Fig. 3.9). The Mangaasi site itself can now be seen as an outlier of the much larger site complex on the southwest side of the Pwanmwou creek.

At the Arapus site these various phases of settlement associated with the former beach ridges continue parallel to the present beach in a south westerly direction for at least 125 metres (established to 1999). The south western boundary of the settlement was not reached in 1999 but further research carried out in 2001–2003 has managed to establish that the site extends as least as far as the next creek to the southwest, a further 400 metres. Tephra layers related to the eruptions of Nguna and Kuwae could be identified in many of the test pits at Arapus, as was the case in the 1997 and 1998 excavations at Mangaasi (Figs 3.10–3.14). The excavations at Arapus also revealed the presence of a third, as yet unidentified tephra, directly underlying the initial human occupation of the area.

Despite the spectacular nature of the results from the excavations at Arapus, the limitations of thesis research and publication deadlines require some restriction and definition of research boundaries. Although only the results from the excavations at Mangaasi are presented here in any detail, it has been necessary to include key aspects of the stratigraphy recorded from the excavations at Arapus. Three Arapus test pits (Fig. 3.15) are outlined in some detail, namely TPs 4,
14 and 17 (see also Appendix 2). They provide evidence relating to the initial settlement of the area including deposits of the distinctive Arapus-style pottery and demonstrate the transition from Arapus to Erueti ceramic styles. Key elements of the recovered ceramics from Arapus, including an expanded repertoire of motifs and vessel forms along with chronological information have also been incorporated into relevant chapters, as have aspects of the faunal and non-ceramic artefact remains.

Mangaasi stratigraphy
Due to the complex nature of the stratigraphy and the chosen excavation strategy it was necessary to assign all layers that were found across the site a numeric label. In the case of the tephra layers (2 and 5) Roman numerals have been added to further distinguish variation. These layers only are able to be correlated across the whole site. This is in contrast to other layers where differentiation within a layer is shown by the addition of a letter to a layer’s numeric designation. These letter designations are not correlated across the site but are test pit specific. The layers are not labelled serially and in some cases numeric inversion was inevitable. All 18 test pits are described in detail (Appendix 2) and are accompanied with stratigraphic illustrations (Figs 3.10–3.14). The descriptions of the test pit stratigraphy have been established through a combination of sedimentally and culturally defined layers. A total of 18 distinctive layers and/or primary cultural horizons were identified across the site (see below).

Four broad primary cultural layers were defined at the site. The most recent post-dates the eruption of Kuwae in 500 BP. Remains were sparse (ceramics were not a component of the cultural repertoire) and consisted principally of concentrated coral pebbles from former house floors and occasional burials and other features. Many of these features may relate to the settlement associated with the legendary Chief Roy Mata (Garanger 1972). The three other cultural layers, namely Mangaasi, Erueti and Arapus, were defined principally from ceramic remains. Primary deposits of these three cultural layers displayed some consistency, comprising very dark gray to black (10YR 3/1–2/1) charcoal-rich silty sediments with concentrated coral and basalt cobbles and midden remains.

Figure 3.9 shows both the layout of the test pits and the respective areas where Erueti and Mangaasi cultural horizons were concentrated. A north to south aligned transect (TP sections 1/15, 17, 10, 12 and 9) demonstrates the horizontal and vertical nature of the stratigraphy (Fig. 3.12) and the relationship between the Erueti and Mangaasi cultural horizons.

The in situ Erueti cultural horizon was identified in five test pits (TPs 9, 12, 10, 4 and 5) located at the rear of the site and close to the Pwanmwou Creek while the in situ Mangaasi cultural horizon was largely restricted to test pits closer to the sea namely 1, 2, 15, 17, 16 and 10. Only in TP 10 was the transition from the Erueti to the Mangaasi cultural horizons clearly demonstrated stratigraphically (Fig. 3.12). Seven of the excavated test pits (TPs 6, 7, 8, 11, 13, 14 and 18) lay largely outside the area of concentrated settlement. The stratigraphy of TPs 13 and 14 comprised principally of alluvial deposits (Fig. 3.14) while the stratigraphy of TPs 6, 7, 8 and 18, located on or near the base of the slope at the rear of the site, was dominated by weathered or more pure tephra deposits transported by slopewash from the hillside.

The 18 layers identified at the Mangaasi can be summarised as follows:

1) A black to dark gray (10YR 2/1 to 10YR 4/1) humic topsoil which was found across the whole site. In most cases patches of concentrated coral pebbles were found in the upper levels of this layer which are associated with former house floors from the latest phase of occupation of the site (post 500 BP).

2i) A very dark gray (10YR 3/1) developed soil derived principally from weathered Kuwae tephra. Coral pebbles were absent and midden remains were sparse and if recovered generally in secondary deposition (post 500 BP).
2ii) A dark gray (10YR 4/1) less weathered Kuwae tephra differentiated by its high tephra and low soil content ratio (post 500 BP).

2iii) Light brownish gray (10YR 6/2) sterile Kuwae tephra associated with the eruption of Kuwae in 498 BP (Robin et al. 1994). This layer was easily identified at test pits near or on the slope at the rear of the site where the layers were up to one metre in thickness. In a number of test pits, only patches of pure Kuwae tephra were recorded. These appeared to be the remnants of layers that had been mixed through subsequent gardening activities. An extra layer of this tephra was noted in TPs 6 and 7 which appeared to be derived from slumping due to slope failure.

3) The primary Mangaasi occupational layer dating from c. 2200–1200 BP was located in test pits further towards the sea but also concentrated near the Pwanmwou Creek. The overall matrix of this layer comprised a very dark gray to black (10YR 3/1–2/1) charcoal-rich silty sediment with concentrated coral and basalt cobbles and midden remains. Ash and charcoal lenses were also often recorded.

4) A tidal wave deposit was identified across TPs 1, 15, 2, 3, and 16. It consisted of coral debris such as sand, cobbles and coral blocks. The stratigraphic integrity of the up to 40cm thick layer indicates it was a sudden event (well before 600 BP and post 2200 BP, probably c. 1400 BP).

5i) A dark gray (10YR 4/1) developed soil derived largely from weathered Nguna (post 2200 BP).

5ii) A less weathered grayish brown (10YR 5/2) Nguna tephra, differentiated by its high tephra and low soil content ratio (post 2200 BP).

5iii) A light gray (10YR 7/1) marine deposited sand with a high (Nguna) tephra content was recorded in TPs 16 and 17. These layers lay directly on top of the foreshore deposits.

5iv) Gray (10YR 5/1) Nguna tephra (c. 2200 BP). This layer was clearly identified in test pits close to the slope at the rear of the site. As noted this tephra was previously mis-identified as deriving from Ambrym. Our dating of the site has enabled us to tentatively date this Nguna tephra-fall to around 2200 BP or slightly earlier.

6) A very dark gray (10YR 3/1) developed soil from the two mixed, weathered tephras. This tephra-rich layer occurred in areas of the site where there was no evidence of settlement between the two eruptions, nor remnants of more pure tephra, to provide a clear delineation between the Kuwae and Nguna tephra content.

7) Grouped together here simply as alluvial deposits, these layers were restricted to test pits near the Pwanmwou Creek (TPs 13, 14). The deposits demonstrated clear stratification and are described in detail in Appendix 2.

8) White to light gray (10YR 8/1–7/1) marine deposited sands derived from cyclonic events were recorded in TPs 10, 12, 9 and 4 (Figs 3.11, 3.12). These tended to be only 5–10cm thick and were restricted to the earlier period of the settlement. The marine sands confirmed the close proximity of these locations to the former foreshore.

9) The primary Erueti occupational layer dated from c. 2800 to 2200 BP and at Mangaasi was concentrated in the inland area of the site close to the Pwanmwou Creek. As noted above the matrix of the layer consisted largely of a very dark gray to black (10YR 3/1–2/1) charcoal-rich silty sediment with concentrated coral and basalt cobbles and midden remains. Ash and charcoal lenses were also often recorded.

10) The primary Arapus occupational layer dating from c. 2900 BP to 2800 BP was found only on the southwest side of Pwanmwou Creek at the Arapus site (Figs 3.9, 3.15). See above (Layer 9) for matrix description.

11) Former foreshore deposits comprised of water worn coral debris including branches, cobbles and pebbles and gravel. A number of these foreshore layers were excavated to the former reef platform. Water worn pottery was found in all test pits closer to the sea indicating that
earlier settlements were dumping midden into the inter-tidal zone. This layer was exposed in all test pits.

12) A very pale brown to white (10YR 7/3–8/2) tephra mixed with the former foreshore deposit. This layer was found in only one test pit at the Arapus site (TP 14, Fig. 3.15) and is an earlier unidentified tephra which pre-dates human arrival in the area (pre 2900 BP).

13) The former reef platform was exposed only in TPs 3, 5 and 12. It is some 7m above the live coral datum (mean sea level).

Discussion

Through the intensive test pitting program comprising a total 25.5m² at Mangaasi and 24m² at Arapus it has been established that the complex stratigraphy in the area is both horizontal and vertical and has been affected by cataclysmic events such as volcanic eruptions, tidal waves and/or cyclones along with more low key but regular activities such as gardening. The initial settlement pattern in the area was focused on beach ridges above and parallel to the foreshore which was continually prograding over time. The regular tectonic activity during human habitation of the island led to continual realignment of settlement to compensate for the shifting shoreline. The results of the excavations have further confirmed the related nature of the ceramics on Efate.

Malekula

Fieldwork on Malekula began in 1995 and continued in 1996 with the assistance of Jimmy Sanambath, the Vanuatu Cultural Centre fieldworker for northwest Malekula. The work consisted of an intensive survey along a ten kilometre stretch of the Northwest coast from Tenmiel to Tenmaru (Fig. 3.16), along with a series of transects into the interior. A number of perennial rivers drain from the interior and are often associated at their mouths with sheltered bays which represent prime areas for settlement. Malo Island with its numerous Lapita sites, can be clearly seen from the Northwest. Some 50 caves and/or rockshelters were recorded at varying altitudes. In an initial attempt to define the cultural sequence of the area some fifteen of the caves and four open sites (Malua Bay, Nuas, Fiowl and Chachara) were excavated (Fig. 3.16). The details of a number of the cave sites are presented first (in sequentially recorded order) followed by the open sites. A number of the excavated cave sites (Waprap Mk-3-30, Oochmenoch MK-3-38, Peckhara Mk-3-45, Ndavru Mk-3-46) returned what could be generously described as meagre cultural remains and they have been excluded from this publication. However a full report of all excavated cave sites can be found in Bedford 2000b. Recovered materials are presented in detail in relevant chapters.

Malekula cave sites

Woplamplam (Mk-3-26)

This cave site is located several hundred metres northeast of the present Tenmiel village some 60m above sea level. The cave is used for shelter during hurricanes. Numerous firecracked stones and fireplaces were noted on the ground surface. A 2 by 1m test pit, some 4m inside the cave entrance, was excavated to a depth of 1.05m (Fig. 3.17). The stratigraphy indicated the cave had been occupied intermittently with a series of fireplaces and cultural horizons being recorded throughout. Accumulation of sediment at the site could also be attributed to intermittent slopewash from the cliff above the entrance of the cave.

Layer 1a (10–18cm bd) consisted of a powdery ash and grayish brown (10YR 5/2) sediment. Frequent firecracked cooking stones were recorded. It was very similar to Layer 1b below but
separated by a thin ash lenses at 18–22cm bd which covered the whole square. Bone, pottery and shellfish were recovered.

Layer 1b (22–46cm bd) was essentially the same as that above and graded into the layer below. Frequent fire-blackened coral cobbles and occasional basalt cobbles were noted. Three firescoop hearth features were recorded within the layer. Concentrations of small intact bones suggested that much of the material was related to the cave being used as an owl roost. Fishbone was also present along with sparse shellfish. No pottery was present within this layer.

Layer 1c (46–54cm bd) was similar to above but more hard-packed and darker (dark grayish brown 10YR 4/2) due to more sediment content from slopewash. Frequent coral cobbles were noted along with continued evidence that suggested (concentrated bone) the cave had been used...
as an owl roost. Sparse shellfish and plain pottery (6 sherds) were also recovered. Much of Layer 1 can be attributed to accumulated debris from cooking and temporary occupation with an added component of slopewash.

Layer 2 (54-80/105cm bd) marked the basal cultural layer of the cave and comprised of a gray (10YR 6/1) powdery sediment with frequent angular coral cobbles and boulders, possibly roof-fall caused by tectonic activity. A distinct boundary between this layer and the lower layer could be identified. From the bottom level of this layer (80–105cm bd) a charcoal sample was dated (145±74 BP [ANU-10526] 311–0 BP*). The date seemed inconsistent both with the depth of stratigraphy and the ceramic remains. Fishbone was prevalent and in association with sparse shellfish remains and two calcareously-tempered sherds.

Layer 3 was the basal limestone of the cave floor. A thin largely sterile dark yellowish brown (10YR 4/6) silt lay directly on top of the basal limestone. It would appear to represent material accumulated through the natural weathering of the cave bedrock prior to human arrival. Two calcareous-tempered sherds recovered from this layer clearly derived from the layer above.
Intermittent occupation was seen throughout the stratigraphy at Woplamplam in the form of firescoops and cooking debris. Sediment accumulation can also be attributed to intermittent slopewash. The dispersed charcoal sample from the lowest cultural level of the cave seemed to be inconsistent with both the one metre of stratigraphic accumulation and the recovered midden remains. Bone, shell and pottery were recovered from throughout the three distinct layers (Fig. 3.17). Many of the bone remains which were often in nested deposits appear to be the result of owl roosting in the cave (Steadman pers. comm.). The recovered pottery comprised only (13) plain sherds, thicker in the upper layers and thinner and calcareously-tempered in the bottom layer.

**Bartnator (MK-3-32)**

This wave-cut coastal rockshelter is located north of Espeigle Bay some 100m above the coastal road and 30m above sea level. A freshwater creek is located nearby. A 1 by 1m test pit was excavated to a depth of 1.35m (Fig. 3.18). A total of six layers were identified.

Layer 1 (4–12cm bd) was a light gray (10YR 7/1) ashy sediment with concentrated fire-cracked stone representing more recent cooking activities. A single thick sherd of pottery which had been thoroughly burnt was recovered from amongst the stone debris and seemed likely to have been incorporated with and re-used as an oven stone. No other midden materials were recovered.

Layer 2 (12–45cm bd) consisted of a powdery dark gray (10YR 4/1) silt with frequent small-medium fire-cracked rocks. The lack of ash clearly separated this layer from that above and the firescoop below. Slopewash appeared to have contributed at least partly to the build-up of this layer. Sparse shellfish remains only were recovered.

Layer 3 (45–65cm bd) essentially comprised a substantial firescoop which covered the entire test pit. Although technically a feature, rather than a layer it was designated as a separate layer. It consisted of a light gray (5YR 7/1) ashy sediment with concentrated
burnt coral pebbles and cobbles, further evidence of cooking activities. Sparse shellfish remains were all that were recovered.

Layer 4 (65–85cm bd) was clearly delineated from the layer above by a change in colour and the disappearance of any ash content. It comprised a dark reddish gray (5YR 4/2) silty sediment with frequent coral cobbles and pebbles. Accumulated slopewash appeared to account for much of this layer. Again shellfish only were recovered.

Layer 5 (85–130cm bd) marked the first use of the shelter and comprised a hard-packed dark reddish brown (5YR 3/3) silty sediment with sparse coral pebbles or cobbles. A clear break could be identified between it and Layer 4. An ash lens was recorded over half the test pit at the top of this layer and another at the bottom of the layer. This lower ash lens marked both the interface of the former foreshore (Layer 6) and Layer 5 and the first use of the shelter. Shellfish were the only midden material recovered. It was from this lowest level (110–135cm) of the shelter that a dispersed charcoal sample was recovered which returned a date of 980±80 BP (ANU-10074) 1056–729 BP. Both cooking debris in the form of the ash lenses and slopewash have contributed to the stratigraphic buildup of Layer 5.

Layer 6 the former foreshore consisting of sterile compacted pinkish gray (5YR 6/2) coral sand and water rolled pebbles was reached at a depth of 135cm bd.

Bartnator returned very limited amounts of midden remains, comprising principally shellfish and much lesser quantities of pottery (two sherds). Intermittent use of the shelter was identified through the presence of ash lenses and debris from cooking fires. The radiocarbon determination 1056–729 BP from the lowest cultural level of the shelter is a relatively late date for initial human use and suggests that the shelter may not have been suitable for use, due to its proximity to the sea, until the last 1000 years.

Waal (Mk-3-39)
This small cave is located some 30m above sea level behind the present Malua Bay village. The rear of the cave is almost completely infilled with slopewash. A 1m high dry stone wall marks the entrance (Fig. 3.19). On initial inspection the cave appeared to have limited prospects but the discovery of a notched applied relief sherd, similar in style to what was recognised at the time as ‘late Mangaasi’ pottery, on the
floor surface encouraged further investigation. A test pit measuring 1 by 1.5m was excavated some 3m inside the entrance to a depth of 65cm bd. Recovered materials included shellfish, bone, pottery and a shell pendant.

Layer 1 (0–35cm bd) was characterised by a dark gray (10YR 6/1) powdery sediment with frequent small coral pebbles and cobbles. It appeared to be largely formed from slopewash which had entered the rear of the cave. Evidence of intermittent cooking activity in the form of patches of ash and charcoal was also recorded within this layer. Two sherds, sparse shellfish and bone remains were recovered.

Layer 2 (35–65cm bd) was made up of concentrated small to medium sized pebbles and cobbles amongst a dark gray (10YR 4/1) silty sediment. The radically increased cobble content provided a clear boundary between the layers. Calcareous tempered sherds were recovered from this layer along with shellfish and a shell ornament. This layer signals the first human use of the cave which appears to be characterised by sporadic short-term visits and occupation. It rests on top of a sterile layer of tightly packed small to large coral limestone cobbles and boulders.

**Malua One (Mk-3-40)**

This cave is located some 40m above sea level behind Malua Bay village at the northern end of Malua Bay (Fig. 3.20). The limestone cave has been subjected to substantial infill and now is rarely used due to the increasingly low roof. The entrance of the cave is some 2m high, reducing to 1.2m in the centre and only 70cm at the rear. Faint charcoal drawings were recorded at the rear of the cave at ground level. A 2 by 1m test pit was excavated 2m inside the entrance of the cave to a depth of 2.3m. Nine distinct layers were identified (Fig. 3.20).

Layer 1 (5–30cm bd) consisted of a gray (5YR 5/1) powdery sediment with frequent coral gravel inclusions. A fire-scoop

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**Figure 3.20 Malua One testpit section and plan**
filled with white ash and fire-cracked rock was exposed from the surface and was cut into the layer. Several shells and sparse bone were recovered.

Layer 2 (30–40cm bd) was easily distinguished by the frequent fire-cracked rock set amongst a light gray (10YR 7/1) ashy sediment. The layer appeared largely to have derived from rakeout from a nearby fireplace. Several shells were recovered.

Layer 3 (40–50cm bd) comprised a dark reddish brown (5YR 3/3) powdery silt with frequent gravely inclusions derived primarily from slopewash. It graded into Layer 4. Shellfish only were recovered.

Layer 4 (50–65cm bd) was a dark gray (5YR 3/1) silty sediment with frequent charcoal and gravely inclusions along with white ash patches indicating brief use of the cave. Recovered cultural materials consisted of occasional shellfish. A clearly defined boundary could be identified between this layer and the layer below.

Layer 5 (65–80cm bd) consisted of a black (5YR 2.5/1) silty sediment with frequent gritty inclusions derived from the weathering of the cave walls and roof. The occasional medium to large limestone boulder added further to the suggestion of surface weathering. The silt component of the layer appeared to be made up largely of slopewash. The layer was relatively sterile (occasional shellfish) and graded into the layer below.

Layer 6 (80–95/115cm bd) was similar to the layer above but was distinguished by more frequent cobbles and boulders and a dark reddish brown (5YR 3/3) sediment with frequent gravel inclusions. Four plain sherds and infrequent shellfish remains were recovered.

Layer 7 (95–120cm bd) was identified from a distinct change in the matrix. It consisted of a dark brown (7.5YR 3/2) silty sediment with few coral cobbles or boulders. Sparse plain sherds (3) and shellfish were again recovered.

Layer 8 (120–150cm bd) comprised a black (5YR 2.5/1) sediment with concentrated limestone cobbles and boulders. These remains would seem to be a further indication of the erosional impact caused by human use of the cave and surrounding environment. Sparse cultural materials included calcareous-tempered plain sherds (3) and shellfish.

Layer 9 (150–230cm bd) consisted of a very hard-packed black (5YR 2.5/1) sediment with frequent limestone gravel inclusions rather than cobbles. It was some 80cm thick, again indicating radically altered environmental regimes brought about by human arrival. Sparse shellfish only was recovered. Excavation terminated at a depth of 230cm bd when the basal limestone was encountered.

The stratigraphy of Malua One was characterised by a series of largely sterile layers formed through slopewash. Ephemeral use of the cave was indicated by firescoops and ash lenses and associated cultural remains. Recovered materials were sparse and included bone, shellfish and pottery (10 sherds). Initial human use of the cave is associated with a number of thin calcareous-tempered sherds collected from the bottom of the test pit. Thick non-calcareous tempered sherds were found in the upper layers of the test pit. No sherds were recovered from the first 1m of stratigraphy and as pottery was used up until the last few hundred years on Malekula this lack of remains might be a further indication of the rapid accumulation of sediment in the cave.

Woapraf (Mk-3-41)
This site comprises a 30m long 2–3m wide shelf at the base of a limestone cliff located at the back of Malua Bay some 30m above sea level. The cliff rises to a height of 75m and marks the seaward edge of a large uplifted terrace which is used extensively for gardening. The shelf is said to have been a stopping off point for those visiting the coast from the interior. At the western end of the shelf a 1 by 1 metre test pit was excavated to a depth of 2.3m (Fig. 3.21). A total of seven layers were identified.

The surface (0–12cm bd) of the test pit consisted of recent humic accumulation devoid of any midden materials.
Layer 1 (12–40cm bd) comprised a series of firescoops and associated rakeout. The matrix was characterised by a light brownish gray (10YR 6/2) ash with frequent charcoal and fire-cracked rock. The layer was trowelled without sieving and no midden materials were recorded.

Layer 2 (40–55cm bd) consisted of a concentrated gravel (weathered cliff face) and very dark gray (10YR 3/1) sediment (slopewash) which provided a distinct boundary between Layers 1 and 3. No midden materials were recovered.

Layer 3 (55–80cm bd) was characterised by concentrated firecracked rock, light brownish gray (10YR 6/2) ash and frequent charcoal. It represented a firescoop and associated rakeout which cut into Layer 4 below with the contrasting matrices providing a clear delineation. Occasional shellfish and bone were recovered.

Layer 4 (80–93cm bd) consisted of a dark gray (5YR 4/1) powdery sediment, with concentrated gravel. This layer returned little in terms of cultural remains and appeared to be largely made up of slopewash debris. An ashy lens, recorded at a depth of 93–110cm bd was an indication of short-term use. The first pottery (1 plain sherd) was recovered from this layer along with occasional shellfish and bone.

Layer 5 (110–115cm bd) was characterised by a dark grayish brown (10YR 4/2) silty sediment. An ash lens was recorded at a depth of 115cm bd. The layer was cut by a firescoop located on the western side of the test pit. Cultural remains were sparse with only a single plain sherd being recovered along with scattered shell. A further ash lens was recorded at a depth of between 148–150cm bd. A distinctive stratigraphic break was then identified.

Layer 6 (150–190cm bd) was a hard packed black (10YR 2/1) silty sediment, with frequent coral pebbles/gravel (weathered cliff face). Nine sherds were recovered and all were calcareously tempered. Occasional shellfish were also recovered. It was from this layer (175–200cm bd) that a
dispersed charcoal sample was dated (1930±80 BP [ANU-10076] 2055–1634 BP). The date does not seem to be consistent with the ceramic remains which at other sites have been more securely dated to c. 2700–2500 BP. This is not totally unexpected at a site of this nature where some mixing of the cultural and slopewash deposits can be expected. This layer graded into Layer 7 which became increasingly sterile with less silt content.

Layer 7 (190–230cm bd) comprised a dark brown (10YR 3/3) clay and concentrated gravel (cliff fall) with little soil content. One plain sherd along with scattered shellfish, bone and charcoal were recorded from the upper part of layer. At a depth of 2.30m the sterile basal limestone was encountered.

The stratigraphy at Woapraf revealed rapid accumulation of sediment, much of which appeared to be slopewash, but included evidence, in the form of fireplaces and rakeout, of intermittent use. Little artifactual material was recovered. The sparse collection of pottery demonstrated a consistent pattern with that of other excavated cave sites on the Northwest coast of Malekula. Thin calcareous-tempered wares were recovered from the base of the cultural stratigraphy. These are superseded by slightly thicker calcareous wares and much later by thick non-calcareous globular pots. Limited quantities of shellfish and faunal material were recovered from the test pit.

Navaprah (MK-3-47)
This cave is located near Lekhan village some 20m above sea level and adjacent to the coastal road. There is a level area located at the entrance of the cave but after several metres the floor slopes downward towards the rear. Large limestone boulders (roof-fall) dominate the rear of the cave (Fig. 3.22). In 1995 a 1 by 1.5m test pit (TP 1) was excavated some 2m from the entrance of the cave. Further squares, namely TP 2 (3 by 1m) and TP 3 (1 by 1.5m) were excavated in 1996 (Fig. 3.22). These excavations both provided a larger ceramic sample and further confirmation of the stratigraphy and cultural sequence hinted at in the 1995 excavation. The stratigraphic sequence was made up of five distinct layers (Fig. 3.22), although their presence and appearance varied across the cave. As indicated by the recovered ceramics and associated dates there is also some internal division within layers. The four radiocarbon dates recovered from the cave site were all from charcoal samples collected from TP 1.

Layer 1 (10–70cm bd) largely comprised a series of cooking firescoops and associated rakeout which had rapidly accumulated. Several older residents of the nearby village recalled either having camped or cooked in the cave. The matrix consisted of concentrated fire-cracked stone mixed with white (10YR 8/2) through to gray (10YR 5/1) coloured ash and frequent charcoal. Shellfish and bone although sparse dominated the recovered materials. Seven plain sherds were found only in the very bottom of the layer. The layer thickness varied across the three test pits but was up to 50cm in some areas of all three test pits. The initial 30–40cm bd of TPs 2 and 3 were trowelled but not sieved. The identification of a new layer was marked by a distinctive change in the matrix.

Layer 2 (60–90cm bd) was characterised by a dark gray brown (10YR 4/2) powdery sediment with frequent charcoal and occasional rock. It would appear to indicate a less intensive period of use of the cave and some contribution to the infill is attributable to slopewash. Layer 2 was up to 25cm thick in TP 1 but petered out towards the rear of the cave, virtually disappearing in TP 2. In TP 3 it was 10–15cm thick. Shellfish and bone were recovered along with five plain sherds. A date of 510±50 BP (ANU-10540) 629–497 BP was returned from charcoal from the 50–75cm level of Layer 2 of TP1 (Fig. 3.22).

Layer 3 (60–140cm bd) consisted completely of a large oven feature filled with white (10YR 8/1) ash. The remains were clearly identified across TP 1 and 2 and were up to 80cm thick. In TP 3 however, some distance from the main oven feature the layer comprised only a thin compacted
layer of white ash. Shellfish and bone were recovered from the white (10YR 8/2) ash matrix but only from TP 1. Six plain sherds were recovered from TP 1. Burnt coral and basalt cobbles were frequently present along with concentrations of charcoal. A radiocarbon date of 630±50 BP (ANU-10539) 669–536 BP was recovered from this feature in TP 1. The oven cut deeply into the lower layer and much of the earlier archaeology in TP 2 had been removed due to this event. An abrupt change in layer composition could be seen between this layer and the layer below.

Layer 4 (80–160cm bd) was the lowest cultural layer, made up primarily of a dark gray (10YR 4/1) powdery sediment with fire-cracked rock in increasing quantity towards the base. As noted above, identifying internal divisions within this layer was difficult and it appeared to be

Figure 3.22 Navaprah testpit section (1 and 2) and plan
relatively homogeneous across the cave. Analysis of the ceramics and radiocarbon dates clearly demonstrates a long period of accumulation. From the upper level of Layer 4 (115–130cm) a date of 1240±70 BP (ANU-10538) 1293–973 BP was recovered. The ceramics associated with this date were large thick-walled globular pots with everted notched rims. The same material was also recovered from the lowest levels of TP 2. The earliest radiocarbon date was retrieved from a charcoal sample from the bottom 10cms of Layer 4, and dated to 2450±80 BP (ANU-10075) 2749–2336 BP. This was associated with a thin-walled plainware with calcareous temper. It was found only near the entrance of the cave in TPs 1 and 3 in the earliest cultural layers. The earliest evidence for use of the cave appears to be concentrated nearer the entrance and it is only later that larger areas of the cave were utilised. Increasing quantities and concentrations of pottery (52 sherds) and bone were noted towards the bottom of this layer. Much of the recovered bone material from the cave again appeared to be the result of owl roosting. In TP 3 concentrations of small bone were noted in all spits of Layer 4 lying against a large limestone boulder. There was an abrupt and distinctive layer change between this layer and the one below.

Layer 5 (from 160cm bd) represented the former foreshore. It consisted of a light yellowish brown (10YR 6/4) sand with concentrated water-rolled coral pebbles/branches and shellfish. A sondage was excavated in TP 1 to a depth of 230cm, confirming that the layer was culturally sterile.

Navaprah appears to have first utilised some 2700–2500 years ago. The earliest cultural layer contained relatively abundant quantities of calcareous-tempered pottery. Its restriction to the lowest level of this layer and the homogeneous nature of the ceramics suggests that it was a short-term occupation. A period of less intensive use or possible abandonment of the area is indicated by the decrease in midden content and a date in the upper level of the lowest layer of 1200 BP. Much of the upper layers of the cave were disturbed by a large oven feature but sparse pottery, bone and shellfish were recovered throughout. Pottery disappears from the record in the uppermost layer of the cave, dated to some time after 500 BP. The abundant bone recovered from the excavations can be partly attributed to owl roosting in the cave.

Yalo South (Mk-3-48)
This cave is located adjacent to the entrance to Yalo B, a large cathedral-like limestone cave with a rich collection of rock art. It is 35m above sea level and some 75m from the current shoreline. Two metres inside the entrance of this much smaller cave a 1 by 1.5m test pit was excavated to a depth of 2m (Fig. 3.23). Seven distinct layers were identified.

Layer 1 (6–12/18cm bd) was a dark grayish brown (10YR 4/2) ashy sediment with frequent fire-cracked rock. It appeared to consist of very recent (slopewash) accumulation resting on top of two fireplaces which were recorded some 10–15cm below the surface. These features had been cut into Layer 2 and comprised concentrated ash and charcoal. Shellfish and bone were recovered from Layer 1 along with a single sherd from one of the fireplaces.

Layer 2 (12–74cm bd) consisted of a dark grayish brown (10YR 4/2) silty sediment, largely sterile slopewash with occasional pebbles and cobbles of weathered limestone roof-fall. Recovered materials included pottery (at 50cm bd) bone and shellfish. The matrix of the layer had little apparent layering apart from an ash lens covering part of the surface of the square at some 50cm below the datum, indicating temporary use of the cave. A further ash lens with charcoal covering the whole square was identified at 75cm below datum.

Layer 3 (76–100cm bd) was again characterised by a dark grayish brown (10YR 4/2) silty sediment with occasional roof-fall limestone. The layer was partly divided by an ash and charcoal lens at 100cm bd and terminated at 100–115cm bd with the presence of a much thicker ash and charcoal lens covering the entire square which provided a clear division with the lower layers. Layers 2 and 3 appeared to indicate rapid accumulation in the cave although cave use appeared to be very intermittent, suggesting slope wash from human-induced landscape change was more of a
contributing factor to the buildup. Shellfish and bone were recovered from this layer but no pottery.

Layer 4 (110–130/135cm bd) consisted of a distinctive hard-packed dark yellowish brown (10YR 4/6) sediment with some weathered limestone from the cave walls. Pottery, shell, and bone were recovered from within this layer. It appeared to mark the initial human use of the cave. The pottery was typical of the thin calcareous-tempered sherds found at the basal levels of other caves which dated to c. 2700–2500 BP.
Layer 5 (130–150cm bd) was characterised by a series of thin interspersed lightly compacted brown (10YR 5/4) sediment and white ashy lenses. It appeared to represent a tephra from volcanic activity in the region that had been washed into the cave over a short period of time. Limited worn shell and bone only were recovered which seemed likely to have derived from the layer above.

Layer 6 (150–165cm bd) consisted of a dark brown (10YR 4/4) silty sediment representing slopewash which was devoid of midden material.

Layer 7 (165–195cm bd) was the sterile basal layer which consisted of a reddish brown (5YR 4/4) sediment similar to Layer 5 which incorporated a series of thin lenses of white ash and charcoal. These had been washed into the cave and could have been related to volcanic activity on the nearby island of Ambrym. At the bottom of this layer the weathered limestone bed-rock of the cave was exposed across the square.

The excavation of Yalo South revealed a series of occupation layers punctuated by periods of non-use. Much of the accumulated stratigraphy can be attributed to slopewash. Near the base of the cultural stratigraphy thin lenses of tephra, which appear to have been washed into the cave, were recorded. Recovered artifactual material was somewhat meagre with ceramics (17 sherds) dominating. The recurring pattern of thin calcareous-tempered sherds at the base being later replaced by thicker non-calcareous tempered globular pots was again noted. The presence of the calcareous-tempered sherds in the lower layers of the site suggest a date of c. 2700–2500 BP for the initial human use of the cave. Shellfish were recovered but not in any concentrated midden deposits. The bone remains were relatively abundant. The high proportion of bone, particularly rat, in nest-like deposits, suggests much of the material is debris associated with an owl roost. The cave also has a number of rock engravings and charcoal drawings, many of which are near ground level, indicating substantial accumulation within the cave.

Wambraf (Mk-3-56)

This rockshelter is located some 40m above sea level behind the present Tenmiel village. A 2 by 1m test pit located in the middle of the shelf created underneath the boulder overhang was excavated to a depth of 1.40m at which point the former foreshore was reached (Fig. 3.24). The stratigraphy could be clearly separated into four layers.

Layer 1 (0–70cm bd) consisted of an unconsolidated light brownish gray (10YR 6/2) silty sediment with frequent angular limestone pebbles and cobbles. The top 5cm was sealed by more recent humic buildup. A firescoop filled with white ash, coral cobbles and charcoal was recorded in the southern half of the square near the surface. The edge of a further firescoop was recorded at a depth of 40–50cm below the surface and located within Layer 1. Quantities of bone, frequent shellfish and pottery (15 sherds) were recovered from the layer.

Layer 2 (70–90/110cm bd) was characterised by very concentrated coral cobbles, many of which were burnt or fire-cracked, set within a dark gray (7.5YR 4/0) sediment. This distinctive matrix provided a clear boundary between this layer and the layers above and below. A firescoop was recorded at the top of Layer 2. A large limestone boulder marked the bottom of Layer 2 in the western half of the square. Recovered materials included bone, shell and pottery (2 sherds).

Layer 3 (90–140cm bd) was made up of an unstratified gray (10YR 5/1) powdery soil with occasional coral cobbles, partly resting on top of the basal limestone and Layer 4 the sterile, former foreshore deposit. A distinct boundary between Layers 2 and 3 could be seen with the dramatic change in coral cobbles content. Layer 3 signalled the initial human use of the cave. It was from the lowest part of this layer (100–120cms bd) that a charcoal sample for dating was collected (1030±70 BP (ANU-10529) 1063–788 BP). Bone, frequent shellfish and pottery (3 sherds) constituted the total recovered remains.

Layer 4 was made up of the sterile dark yellowish brown (10YR 4/6) former coral foreshore which included coral sand / gravel, water worn coral pebbles, cobbles and branches.
The test pit excavation at Wambraf revealed a series of layers showing intermittent use of the shelter over the last 1000 years. Much of the accumulated stratigraphy can be attributed to slopewash but several firescoops and concentrations of fire-cracked or burnt cobbles are associated with short-term occupation and use of the site. Bone and shellfish remains were recovered along with a limited number of sherds (20) which showed little change in form or fabric from the top to the bottom of the stratigraphy.
Navepule Caves
Three caves were recorded in the area known as Navepule. The caves are located amongst the ‘second step’ of raised coral limestone terraces, some 1.5km inland from the coastal village of Mbenenavet at an altitude of around 200m asl. Rock art was recorded in all three caves and clear evidence of more recent use in the form of fireplaces and firecracked rock was noted on the surface. A series of 2 by 1m test pits were excavated several metres inside the cave entrances.

Navepule A (Mk-3-38)
Navepule A is a large high roofed cave measuring some 15 by 17m in area. Large limestone roof-fall boulders dominate the centre of the cave. Soil from the surrounding slope is washed into the cave in the northern part of the entrance and along the dripline. A 2 by 1m test pit was excavated to a depth of 70cm at which point the test pit was reduced to a 1 by 1m and excavated to the basal limestone at 105cm bd (Fig. 3.25). Three distinct layers were identified.

Layer 1 (5–50cm bd) was a hardpacked matrix of black (10YR 2/1) silty sediment with occasional basalt cobbles and more frequent limestone pebbles and cobbles, much of which appeared to be roof-fall. A firescoop was noted on the surface of the layer in the southern end of the test pit. A further firescoop along with an associated ashy lens was noted at 30cm bd. An abrupt change was identified between Layers 1 and 2. Recovered materials from Layer 1 included eight plain pottery sherds, sparse bone and fossilised shellfish derived from the cave walls and bed-rock.

Layer 2 (50–70cm bd) consisted of black (10YR 2/1) silty sediment that was increasingly compacted with depth and contained concentrated limestone pebbles and boulders. These appeared not to be associated with cooking activities (i.e.; not fire blackened, little charcoal or ash) and are more likely to be derived from roof-fall encouraged by frequent human use of the cave. A firescoop was noted in the northern part of the test pit.

Figure 3.25 Navepule A testpit section and plan
pit. A dispersed charcoal sample from this layer (55–65cm bd) returned a date of 950±70 BP (ANU-10527) 972–707 BP. Sparse worn shellfish and pottery (3 sherds) only were recovered from this layer.

Layer 3 (70–105cm bd) was again primarily made up of a black (10YR 2/1) sterile silty sediment with frequent limestone gravel and pebbles. With increasing depth the layer graded into a lighter coloured (very pale brown 10 YR 7/3) more clay-like matrix. At the bottom of the layer concentrated limestone cobbles were noted resting on top of the basal limestone. This layer would appear to represent a largely natural, steady buildup on top of the cave floor through the agencies of slopewash and weathering of the basal limestone. Sparse charcoal throughout the layer suggests some human influence although at a much less intensive level than that which occurred later. There were no other midden materials recovered from this layer.

The excavation of the test pit at Navepule A provided evidence for the intermittent use of the cave. Firescoops and concentrations of firecracked rock were interspersed within more sterile deposits derived from slopewash. Midden remains were sparse and consisted largely of shellfish and pottery (11 plain sherds), none of which were calcareously tempered. The radiocarbon date from the lowest cultural layer suggests that increased human use of the cave and surrounding environs dates from around 1000 BP.

Navepule B (Mk-3-59)
A test pit measuring 2 by 1m was excavated some 5m inside the dripline of this cave. Recent use of the cave was indicated by a number of fireplaces on the surface. Surface indications also suggested that much of front entrance was regularly scoured out during heavy rains. The rear of the cave appeared to be subjected to regular slopewash. The somewhat less than suitable occupational environment of the cave was quickly confirmed through excavation. Only the top 20cm returned any cultural material with the remaining stratigraphy, to the basal limestone at 130cm bd, proving to be largely sterile. Twenty one sherds of pottery were scattered across the surface of the cave. Much of the material appeared to have been washed into the cave.

Layer 1 (5–20cm bd) consisted of a very dark gray (10YR 3/1) clay with frequent limestone gravel and charcoal flecks. Two firescoops were noted on the surface of the layer. This layer graded somewhat into the layer below. At the bottom of Layer 1 the test pit was reduced to a 1 by 1m square. Very occasional shellfish were recovered but all appeared to be fossilised and eroded from the walls of the cave. A single decorated sherd was also recovered.

Layer 2 (20–130cm bd) comprised an increasing clay-like matrix with depth and graded from a very dark grayish brown (10YR 3/2) to a dark yellow brown (10YR 4/6). It was virtually sterile except for the very occasional fossilised shell. This layer would appear to represent largely natural infill of the cave which has been hastened by human activity in the area. There were no recovered midden materials.

Navepule C (Mk-3-60)
The third cave of this cluster is Navepule C. It is again a relatively large cave measuring 10 by 11m in area with a high roof. It appears also to be more stable than the other two with very little evidence of roof-fall on the surface of the cave. The remains of recent cooking fires were recorded on the floor surface of the cave. A 2 by 1m test pit was excavated some 2m inside the dripline to a depth of 110cm bd (Fig. 3.26). Four distinct layers were identified.

Layer 1 (0–15cm bd) comprised a dark gray (10YR 4/1) silty sediment with occasional coral and basalt cobbles. Remnants of cooking fires were further confirmed with patches of ash and charcoal being recorded. Sparse shellfish and bone and two plain pottery sherds constituted the total recovered materials.

Layer 2 (10–50cm bd) consisted primarily of the remains of a large earth oven feature and provided a clear delineation from the layers above and below. The matrix comprised a white
irregular human use of the cave dating from 2305–1880 BP. However much of the accumulation in the cave can be attributed to slopewash, as was the case in the other two Navepule caves. The recovered materials were sparse comprising largely shellfish and occasional pottery and bone. None of the recovered sherds were calcareously-tempered. Initial human use of this area appears to be very ephemeral and date to a much later period than initial coastal settlement. More frequent use of the caves and increased localised landscape change dates from around 1000 BP.

**Malekula Open sites**

**Chachara (MK-3-43)**

This is an inland site 250m above sea level, some 300m west of the modern village of Metkhun which is approximately 2km inland from the coast (Fig. 3.16). The site consists of two distinct areas (designated south and north), centred around low stone platforms some 75m apart (Figs 3.27 and 3.28). These
stone platforms, which vary greatly in size and height above ground level are a common site type in Malekula and much of Northern Vanuatu. They can also be associated with a series of upright stones set within the platform or in a linear alignment nearby. The stone platforms, known as nasara, are associated with ceremonial activities. Ethnographic accounts (Deacon 1934; Layard 1942; Speiser 1996[1923]) indicate that they were generally located within or adjacent to an associated village. The surface remains at the above site appeared to further confirm this. Discrete concentrations of pottery and firecracked stone, separate from the platforms were visible on the surface of the site.

The stone platforms were cleared and mapped. At Chachara South a series of test pits were excavated to clarify the stratigraphy of the site and collect a representative sample of the pottery. It very quickly became clear that the cultural material was largely restricted to the ground surface or no more than 20cm below it. Extensive surface collections of pottery were thus undertaken at Chachara North and South. At Chachara North a mound feature some 5m southwest of the platform provided more in situ and variable midden debris (Fig. 3.28). This feature appears to have been initially formed from the clearance of the area for settlement and later became a focus for midden dumping. The central core of the mound was made up of an assortment of limestone
boulders and a black humic soil. Throughout the mound, amongst the rocks and sediment, midden remains were recovered which included shellfish, bone (largely pig), a shell adze and numerous sherds. Again, stratigraphically the mound feature appeared to represent a short term, single phase occupation with essentially only one cultural layer being identified.

All test pits excavated at Chachara South (7m²) comprised two layers only (Fig. 3.27). Layer 1 was a black (10YR 2/1) humic topsoil with occasional limestone pebbles and cobbles ranging in depth from 10–15cm, which contained limited quantities of cultural material, almost exclusively pottery. This layer graded into a lighter coloured clay beneath. All test pits were 1 by 1m in area except TP 21 which was 2 by 1m.

Layer 2 was a very dark brown (10YR 2/2) clay which with depth graded in colour to a dark yellowish brown (10YR 4/6). This basal layer was completely sterile and dates to a period prior to human settlement of the area.

Chachara North is located some seventy metres to the north west of Chachara South. A 4 by 2m area was excavated across the mound feature situated adjacent to the *nasara* (Fig. 3.28). Three stratigraphic layers were identified and as noted above, concentrated midden was recovered from this feature. *In situ* cultural material was restricted to Layer 2. A radiocarbon determination from

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Figure 3.28 Chachara North test pit sections and plan
a single shell recovered from TP 1 (Layer 2, 40cm bd) returned a date of 980±60 BP (ANU-10525) 654–489 BP.

Layer 1 (0–10cm bd) consisted largely of the more recent buildup of humus and black (10YR 2/1) topsoil. Occasional sherds were recovered and frequent limestone pebbles were noted.

Layer 2 (30–70cm bd) comprised a black (10YR 2/1) silty sediment with concentrated limestone pebbles and cobbles and towards the central core of the mound some much larger limestone boulders. Occasional burnt basalt cobbles were also recorded. Concentrations of sherds were recovered from throughout this layer along with sparse shellfish remains and more frequent bone. The pottery was all of similar vessel form and fabric. A single Tridacna shell adze was also recovered.

Layer 3 (below 70cm bd) provided a clear delineation from Layer 2. It consisted of a sterile dark yellowish brown (10YR 4/6) clay bereft of any cultural material with an accompanying dramatic decrease in the limestone pebble and cobble content. It represents the pre-settlement subsoil of the area.

The excavations at Chachara have provided a large sample of the late period ceramics found across much of Malekula often in association with nasara. The homogeneous nature of the ceramics at the site suggest a relatively short-term period of occupation dating to sometime around 654–489 BP. Other midden remains included a single shell adze, bone (dominated by pig) and sparse shellfish. The surface remains indicated that there were discrete activity areas at the site.

This research, focusing on the archaeology of last 1000 years, is very preliminary in nature. The initial appearance and transformation of these ceremonial structures remains largely unknown and as yet there are no comparative excavations that have been carried out in the rest of Vanuatu. Much more detailed research into this period is required to understand this influential phase of social and cultural transformation which defined the ethnographic period and comprises the cultural heritage of much of the present populations of Northern Vanuatu.

**Malua Bay School Site (Mk-3-55)**

This site is located behind Malua Bay, some 12–14m above sea level on a remnant beach terrace (Fig. 3.29). The area was identified as an ideal area for a colonising settlement with its accessible all year round water source, large areas for gardening behind the beach, a sheltered bay and sandy beach which facilitates canoe access. The perennial river at the southern end of the beach has downcut through the uplifted coral terraces in a restricted area of the bay and left the site intact. This was not the case in other areas of likely early settlement such as Espeigle Bay and Tenmaru where the rivers appear to have meandered back and forth over large areas of the coastal fringe.

A total of 14m² was excavated to determine the extent and stratigraphy of the colonising site and collect a sample of the cultural material remains. The remains of the early site covered an area of some 50 by 30m (Fig. 3.29). Much later settlement appeared to cover a larger area although recovered cultural material was very sparse. Five layers were identified at the site, the depth and presence of which varied between test pits (Fig. 3.30). All test pits measured 1 by 1m except for TP 9 which was 2 by 2m. The extent of the early settlement site could be seen in the stratigraphy of TPs 3, 4, 7, 8, 9 and 10. Recovered materials from these test pits, which are presented in detail in other chapters, included concentrated sherds of calcareous-tempered plainware, shellfish, bone and occasional artefacts. One dentate-stamped Lapita sherd was also recovered from amongst this material. The stratigraphy of the excavated test pits was as follows:

Layer 1 (surface to 30cm bd) was a mixed black (10YR 2/1) topsoil representing more recent accumulation at the site. The area is now heavily gardened. Occasional basalt river cobbles, shellfish and more frequent, generally thick-walled ceramics were recovered from all but one of the excavated test pits. These remains would appear to represent a dispersed settlement, the remains of which have been greatly disturbed.
Layer 2 (from 30–50cm bd) consisted of a mixture of black (10YR 2/1) sandy sediment and a pale brown (10YR 6/3) tephra. It contained significantly less frequent cultural material. The tephra may be related to a particularly violent volcanic event emanating from the nearby island of Ambrym. A radiocarbon date of 1030±70 BP (ANU-10531) 1063–788 BP was recovered from the interface of this layer and the cultural layer below. The sparse cultural material recovered from Layer 2 seems more likely to relate to disturbances of either Layer 1 or 3.

Layer 3, where in evidence, was up to 50cm below the surface and comprised of a black (10YR 2/1) sandy sediment with concentrated coral gravel and frequent basalt cobbles plus cultural material which appeared to be largely cooking and frequent midden remains. The layer was very hard-packed and on average was some 25cm thick. The concentrated coral gravels look
very much as if they have been transported into the area to build up a clean dry surface on top of
the beach sand, a practice that is still seen at Malua Bay today. A charcoal sample was assayed from
this layer and returned a date of 1900±80 BP (ANU-10524) 2000–1627 BP. This date, which suggests
up to 700 years of initial occupation at the site appears somewhat inconsistent with the
archaeological remains (see discussion below) and seems more likely to relate to later activity at
the site.

Layer 4 represents the interface of the cultural and sterile and where present was located
some 70cm below the surface. It consisted of a dark brown (10YR 3/3), to very pale brown (10YR
8/3) compacted beach sand with a decreasing sediment content along with frequent pottery and
other midden remains. Shell and charcoal samples from TP 9 returned consistent dates of 2860±70
BP (ANU–10522) 2755–2361 BP and 2400±70 BP (ANU-10532) 2733–2213 BP respectively.

The recovered materials from Layers 3 and 4 included large quantities of thin plainware
sherds with calcareous temper. A single dentate stamped sherd was also recovered from TP 9, Layer 3. The pots appear to be globular with outcurving rims, and some sherds have fine notching
on the lip. The plainware is the same as that recovered from the basal layers of Navaprah and other
coastal cave sites. Other artifactual material included part of a Conus shell ring, an ear pendant and
a small argillite adze. Pig, sea turtle, bird, fruit bat, rat and fishbone were also recovered, along
with quantities of shellfish (some of which were said to be no longer available in the area).

Layer 5 was a distinctive uncompacted very pale brown (10YR 8/3) sterile beach sand which
could be identified across the whole site. Excavations at Malua Bay revealed the remains of an initial colonising settlement site some 12–14m above the present sea level. The recovered remains included a range of both introduced
and indigenous faunas, along with concentrated shellfish and pottery. The plainware pottery was
calcareously-tempered with only several vessel forms being represented. A single dentate-stamped
Lapita sherd was also recovered. The homogeneous nature of the ceramics from these lowest
cultural layers suggests the settlement was short-term, perhaps a maximum of several hundred
years or even less at c. 2700–2500 BP. It appears to post-date a period when dentate stamping was
more frequent. The stratigraphy of the site also suggests that the area may have been abandoned or
less intensively utilised for a period after its initial settlement. Much of Layer 2 was sterile and
appeared to consist of slopewash and/or tephra.

Fiowl (Mk-3-61)
This is an open area located some 100m north of Tenmiel village and some 150m from the beach,
where frequent pottery sherds were noted on the ground surface. Also in the area were a series of
mounds/ridges that had been formed by clearance of the area for gardening. The area is
approximately 12m above sea level. A 1 by 1m test pit was excavated on top of one of the ridge
features to a depth of 80cm (Fig. 3.31). The recovered pottery was somewhat weathered due to
post-depositional processes but the general pattern found throughout the excavations on
Malekula, that of thicker sherds in the upper layers and thin calcareous-tempered sherds in the
lowest layers, was confirmed at Fiowl. Four distinct layers were identified.

Layer 1 (8–25cm bd) comprised a very dark gray (10YR 3/1) topsoil with concentrated
angular coral pebbles which graded into the layer below. Occasional very degraded shellfish were
noted. Pottery (32 sherds) only was collected.

Layer 2 (25–45cm bd) was characterised by a hard-packed black (10YR 2/1) silty sediment with
less frequent worn coral pebbles. Midden material became increasingly sparse with depth. At the base
of this layer a distinctive lens of coral pebbles and sand was noted which may be the result of cyclone
activity. Recovered materials included pottery (11 sherds) and sparse worn shellfish remains.

Layer 3 (50–80cm bd) was the earliest cultural deposit, comprising a dark gray (10YR 4/1)
gravelly silt with increasing coral pebble content with depth. Again the only recovered materials
were somewhat worn pottery (17 sherds) and sparse worn shellfish. A distinctive break was noted at 80 cms bd where Layer 4, the former foreshore was encountered.

Layer 4 (below 80cm bd) was the former foreshore consisting of a yellowish brown (10YR 5/4) matrix of gravel, coral pebbles and branch coral. It was from this lowest level that two calcareous-tempered sherds were recovered.

The testing of one of the linear mound features at Fiowl confirmed that they appeared to have been formed largely from the clearance of the area for gardening and other activities. Midden remains were found throughout the stratigraphy of the test pit but were somewhat weathered indicating they had been subjected to various post-depositional processes. The recovered ceramic remains were largely plain but a general trend of increasing thickness over time could be observed. Thin calcareous-tempered sherds were recovered from the lowest layer of the site.

**Nuas (Mk-3-62)**

Nuas is the name given to an open site located directly inland from the present Nuas village on the coast. The site is some 100m above sea level and 75m from the coastal cliff which backs the present village situated some 50m from the sea. The site is on a flat area at the top of a slight slope. Pottery and shellfish concentrations were noted at the site and a low platform of coral cobbles indicated the remains of a former nasara. The site remains were very similar to those noted at Chachara (Mk-3–43) and the site was tested as a comparison with the inland site. A series of test pits (Fig. 3.32) were excavated in an area of the site where concentrations of pottery, shellfish and fire-cracked stone were present on the surface. Post-depositional processes have affected the condition of the recovered pottery and shellfish and also appear to have eliminated any bone remains. The stratigraphy was very shallow, a maximum depth of 40cm only, and only a single layer was distinguishable. A total of five square metres was excavated.

Layer 1(0–30cm bd) was the only layer identified at the site. It consisted of a black (10YR 2/1) topsoil with occasional limestone pebbles/cobbles and basalt cobbles. The buildup of the matrix appeared to be largely the result of slopewash interspersed with midden debris. Midden remains were sparse. The layer sat directly on top of the basal limestone rock. Its thickness ranged from 6–8cm in TP 7 to 20cm in TP 1, 30cm in TP 4 and 4a and to 30cm in TP 5. All test pits, except TP 7 which was completely sterile, returned worn shellfish and pottery remains.

The Nuas site appears to be a single short-term late settlement site associated with the adjacent nasara. The site revealed similar layout and ceramic remains to the inland site of
Chachara. A radiocarbon determination on a shell from the upper levels of the cultural layer (TP 4, 0–15cm bd) returned a date of 570±50 BP (ANU-10530) 298–0 BP. This is somewhat later than the date from Chachara and suggests that this site type and the associated ceramics have some time depth.

Discussion of Malekula Sites
The stratigraphy of the Malekulan cave sites was relatively consistent, generally representing intermittent occupation with ash lenses from cooking fires, fire-cracked basalt and or coral cobbles, shellfish, bone and relatively sparse artifactual material. Ceramics were consistently found at the base of the cultural stratigraphy in all the cave sites and less frequently throughout all layers. In a number of coastal cave sites calcareous-tempered sherds were recovered from layers associated with initial human occupation of the area. Three of the cave sites returned a high concentration of faunal material. This is attributed to them having periodically been owl roost caves. The excavated open sites included an initial settlement site dating to c. 2700–2500 BP at Malua Bay that was associated with calcareous-tempered plainware ceramics, and two much later sites (post 500 BP) namely Nuas and Chachara, that were associated with ceremonial activity areas and extensive collections of the later style ceramics. The excavated sites have revealed only the two extremities of the ceramic sequence on the island. The recovered ceramic remains are presented in detail in Chapter 7 along with further evidence which suggests that a central section of the sequence does exist but that it was largely absent from the excavations carried out in Northwest Malekula.

The earliest settlement on the Northwest appears to have been concentrated on the coast around sheltered bays and reliable water sources. It is not until some time later that permanent settlement shifts inland and to more marginal areas of the coast. There is also some indication across a number of the sites that after initial settlement there is a period of abandonment or less intensive occupation of the area. More intensive occupation occurs again from c.1000 BP or later. There was no evidence, in any of the excavated sites, of pre-Lapita settlement in this area of the island.
Summary

The stratigraphic and cultural sequences gleaned from the excavations on Erromango, Efate and Malekula have greatly expanded our knowledge of the early history of Vanuatu. Settlement pattern across the archipelago is becoming increasingly clear. It seems safe to conclude that the pattern of initial occupation in Vanuatu would fit a situation where Lapita colonists and their immediate successors were moving into an empty landscape and were thus able to set up settlements in the prime locations for habitation and canoe access which would have facilitated maximum utilisation of the marine and other faunal resources (e.g. Ponamla and Ifo on Erromango, Arapus, Mangaasi and Erueti on Efate, Malua Bay on Malekula and its small offshore islands and much of coastal Malo, Aore). This settlement pattern has been further confirmed on the small islands of northeast Malekula where four Lapita sites have been located (Bedford 2003). This phase of settlement was extremely fluid and at a number of sites initial occupation appeared to be relatively short-lived being followed by a period of abandonment or certainly less intensive occupation (e.g. Ponamla on Erromango, Malua Bay and coastal cave sites on Malekula). This may be due to a combination of factors one of which is that these sites were located on the more environmentally fragile leeward sides of the respective islands. There is certainly evidence that populations moved on to other areas of the same island or indeed to other islands. Other environmental factors may also have influenced the suitability of long-term settlement. The site of Arapus and Mangaasi display lengthy cultural sequences and certainly the tephra-rich soils found on the west coast of Efate would have been an attractive feature which would have facilitated intensive horticulture over a lengthy time period.

The archaeological record also suggests that it is only later, as populations grew and people spread out from these prime locations, that the interior areas, certainly of the larger islands became part of the settlement system (e.g. Erromango cave sites, and inland Malekula).

The more recent investigations have filled a number of archaeological blanks and enables a reassessment of earlier research and at the same time provides a platform from which to further address a number of the research questions detailed in the introduction. Already it has been established that pre-Lapita occupation of the archipelago seems very unlikely and a tentative settlement pattern has begun to emerge. Having outlined the excavated sites we move to the analysis and presentation of the recovered midden remains.