

ARCHAEOLOGICAL RESEARCH ON ANEITYUM, SOUTHERN VANUATU, 1978-1979:
A SUMMARY

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This paper summarizes the results of archaeological research carried out on Aneityum Island, the southernmost inhabited island of the Republic of Vanuatu (formerly the Franco-British Condominium of the New Hebrides). Fieldwork in 1978 and 1979 was carried out under the auspices of and funded by the Department of Prehistory, Australian National University. This work formed part of a larger study of agricultural intensification in Oceania, focusing on irrigation systems for the growing of *Colocasia esculenta* or taro (Spriggs 1981a). Other aspects of the research are reported elsewhere (Spriggs 1980; 1981b; 1982a; 1982b; in press-a; in press-b; nd-a; nd-b; in prep.).

Aneityum (20° 14' S, 169° 46' E) is volcanic in origin, consisting of two deeply-dissected volcanoes of Pleistocene age. It is 160 km² in area and its highest peak is just over 850 m above sea level. The population is Melanesian, speaking a language of the Oceanic branch of Austronesian.

Archaeological research began in 1963-4 (Shutler and Shutler 1966) when 20 sites were recorded and it was noted that there were extensive areas of abandoned agricultural terraces on the island. Further archaeological research was carried out by Groube (1975) and McArthur (1974, 1978). The extent of terracing for both dry land and irrigated agriculture led Groube to describe the island as "the Easter Island of Melanesian agriculture," a claim I would not dispute. Groube's excavation in the Imkalau valley (ibid.) had also shown a 2000 year sequence of occupation and the possibility that long stratigraphic sequences could be obtained in the alluvial valley floors of the major valleys, relating to agricultural use of the island.

Aneityum was the first island in Melanesia to be successfully missionized and there exists a wealth of early historical accounts by the missionaries and by visitors to the island, starting in the 1830s, including early maps with coastal settlement locations marked on them. An island-wide census was taken in 1854 and population figures were also published for several named districts and divisions on the island at about the same time. These figures, together with other historical and archaeological data, provide valuable information, probably unique within Island Melanesia, for establishing a baseline geography of the island at European contact.¹

At contact the island was divided into seven major chiefdoms, each under a high chief (natimarid), and further subdivided into about 60 districts under sub-chiefs (natimi alupas). These districts

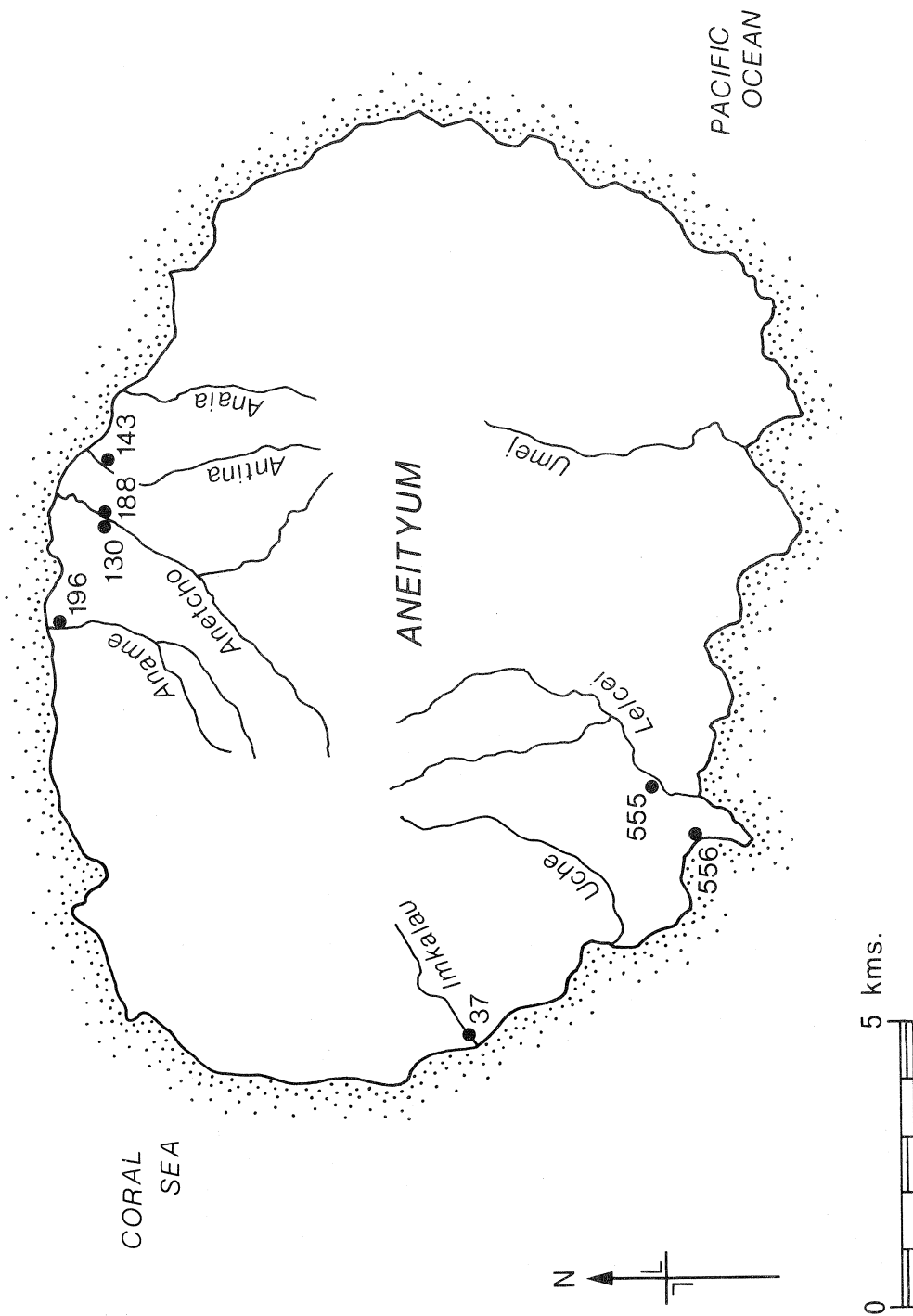


Figure 1. Map of Aneityum.

generally consist of valleys from shore to mountain-top, separated from the next by eroded ridges radiating from the central spine of the island. In the larger valleys, however, there were inland districts with no direct access to the sea. Relations between the chiefdoms involved either sporadic warfare and/or competitive feasts or food exchanges between them. The agricultural economy which supported this "fighting with food" was based in part on the irrigation of taro, two main methods being practiced. The first was planting in swamplands either on rectangular island beds or hillside terraces directly below springs. The second method was furrow irrigation, with gardens at the end of canals some of which were over 4 km long and crossed major watersheds. Dry land taro and other crops were also grown in swiddens, sometimes involving planting on stone-faced terraces.

An archaeological reconnaissance of the whole island, and a detailed settlement pattern study of four of the seven chiefdoms (Anau-unse, Ijipdav, Anetcho and Anau-unjai) were undertaken to examine the archaeological manifestations of this late prehistoric/early historic pattern. Over 800 sites were recorded, many of them associated with agricultural practices. The site survey allowed a detailed assessment of economy, demography and social structure at contact, complementing the historical information (Spriggs 1981a: Chapters 3 and 4).

To give time depth to this picture, archaeological excavations were carried out on the alluvial plains where the largest irrigation systems were located at European contact. Valleys which were investigated in some detail include the Lelcei, Imkalau, Aname, Anetcho and Antina valleys (Fig. 1).

The most striking result of these excavations was the demonstration of extensive landscape change during the period of human occupation, resulting from a complex interplay of humanly-induced and natural factors. Most important of these were the use of fire in clearing erosion-prone hillsides for agricultural and other purposes and the effects of high run-off associated with hurricanes and other periods of exceptional rainfall. The resultant erosion led to the deposition of extensive alluvial plains at the mouths and along the valleys of many of the streams on the island.

The rivers cutting through these plains reveal in their bank-sections traces of past agricultural systems in the form of stone walls and plot boundaries and stone-lined drains, up to 2 m beneath the present ground surface. Deep soil-profiles are often revealed in the river banks and former topsoil layers can be traced extending along the river sections sometimes for hundreds of metres--up to four such horizons can often be distinguished, each buried by alluvial material deposited in flash floods associated with major storms in the past. In some places, up to 300 m from the current coastline,

Holocene coral reef platforms are revealed in the river bed at or very close to present sea-levels. The landscape of Aneityum has thus not been a passive and stable arena in which the processes of agricultural intensification have taken place.

The dating of the Aneityum sequence summarized below is based on uncalibrated radiocarbon ages, dated by the ANU Radiocarbon Dating Laboratory. Site numbers are prefaced by AT, identifying them as sites recorded in the Aneityum archaeological survey.

HUMAN ARRIVAL AND INITIAL SEDIMENTATION

The sequence from the Anawau Swamp (AT556) is discussed in detail elsewhere (Hope and Spriggs, this volume). It shows that from the beginning of human occupation of the island at about 2900 B.P., vegetation and landscape changes were caused by clearance activities in what was initially a totally forested environment.

With the post-Pleistocene rise in sea-level to about its present level by 5500-5000 B.P., stream downcutting would have been halted and the valley floors would have begun to silt up naturally, leading to marshy valley bottoms with the streams meandering through them subject to frequent changes of course in response to heavy rainfall. A natural succession on the valley bottoms over time, caused by siltation of the valleys and some attendant progradation of the coastline, would be from marsh to meadow and eventually to forest (cf. Petersen for the Waipio and Waimanu valleys in Hawaii (1972:40)). When people arrived on the island, many of the valley floors may have been too swampy to be cultivated easily, as well as being prone to flooding. In addition, the coastlines at the valley mouths may have been in some cases a kilometre or more inland of their present locations. The early inhabitants may have concentrated agricultural activities on the hillsides near the coast in order to utilize both marine and terrestrial resources with the minimum of effort.

It seems plausible that some areas of swamp were used for growing taro, with small canal-fed irrigation systems in upstream valley floor areas. Many of the largest areas of swamp, however, which lie on the coastal flatlands against the hillsides or immediately adjacent to the beach, have developed above Holocene reef deposits and may have only come into existence in the last few hundred years as coastal progradation was accelerated. Previous to this, many of them would have only been small seepages at the base of coastal cliffs or small springs on the beach.

At Imkalau (AT37) there is evidence of initial sedimentation on the valley floor during the period 2180-1880 B.P. and then a break in alluvial deposition. In the Lelcei valley (AT555), valley infilling was underway by about 1570 B.P.

On the north coast, where much more massive erosion has occurred, the evidence for human interference with the landscape is generally more deeply buried and basal dates from river sections at best only relate to the last 1000 years or so. At Aname (AT196) there is evidence for substantial valley infilling and progradation of the shoreline from about 600 B.P. and 2.5-4.0 m of alluvium has been deposited over large areas of the Aname floodplain since that time. In the Anetcho valley such infilling had already begun to occur by 1000 B.P. In the Antina valley the datable sequences do not go back so far, but the major phases of valley infilling there have certainly occurred within the same time scale. At Aname (AT196) there is evidence for burning in the catchment by about 1600 B.P. but no evidence for accumulation of alluvium on the valley floor at that time.

THE MOVE ON TO THE VALLEY FLATS

Erosion caused by the combined effects of man and the elements was not totally deleterious in effect. It is true that it stripped the hillsides near the coast of much of their soil and vegetation and rendered them useless for gardening, but these hillside soils would have been of low fertility and needed extensive terracing to fit them for any sustained form of gardening. On the other hand, the alluvial soils created in the valley bottoms and coastal plains are the most fertile on the island. They are deep and well-drained and, unlike some of the extremely narrow valleys elsewhere on the island, sunlight hours at the wide valley mouths and on the coastal plains are optimal for crop growth, with a cropping time shorter than further up the valleys. Similar processes of alluviation also occurred in all the other smaller valleys of the island.

The first direct evidence for the use of the valley mouths and plains for agriculture and habitation, as opposed to the indirect evidence which their sediments contain for burning activities in the catchment, comes from within the last 1000 years. On the Lelcei floodplain (AT555) an earth oven was revealed in the river bank dating to 540 B.P., and slightly downstream, stone walls associated with agriculture have been found in the same horizon. At Imkulau (AT37), a settlement on the valley bottom with probable agricultural associations was occupied at about 1000-700 B.P., and dryland gardening was certainly underway by about 500 B.P. In the north there is no evidence of use of the Aname valley floor until after about 300 B.P. (AT196), whereas in the Anetcho valley an earth oven dates occupation at AT188 to about 1000 B.P. This occurred during rapid accumulation of alluvium on the valley floor and structural evidence associated with agriculture does not appear until some metres higher in the section. No direct dates have been obtained from the garden soils associated with the parallel storm drains found both on the Anetcho (AT130) and Antina (AT143) rivers, but a date in the order of 1000 B.P. seems likely on stratigraphic grounds. Fluvial deposits covering these storm drains could have been laid down much later.

AGRICULTURAL INTENSIFICATION ON THE VALLEY FLOORS

With the exception of the Aname floodplain, in all cases where clear evidence is available, the initial use of the valley floors appears to have been for habitation and dryland gardening. At Anetcho and Antina the initial labor investment in storm drains to prevent flooding and perhaps lower the water table in general may have been considerable. The process however was generally one of 'extensification', the use of the previously swampy and flood-prone valley flats for the first time as gardens. This may have been forced by over-exploitation of hillside swiddens near the coast. As alluvium accumulated, the valley floors would have become raised further above the base water-table and flooding would have been less frequent.

On the Aname floodplain, where massive alluviation has occurred since 5-600 B.P., the initial form of gardening for which we have evidence is irrigation. There is evidence to suggest that the irrigation system can only have been constructed after 3-400 B.P. The AT196 system occurs at the end of the longest canal on the island, so this particular inter-district canal may be no more than a few hundred years old. The floodplains of the Anetcho and Antina rivers also present surface remains of large-scale irrigation systems, often again at the end of long inter-district canals. The evidence of the river sections, assumed to reflect deposition patterns over wide areas of the valley floors, would suggest that the large-scale systems represent a late intensification of agricultural production, within the last few hundred years. Being surface features such systems are hard to date, but the very fact that they are surface features would suggest a comparatively recent date. The ultimate extension of irrigation on to the flattest areas of the plains, involving earth embankments/aqueducts, may have only occurred just before European contact.

THE IMPLICATIONS FOR SOCIAL STRUCTURE

Between the Aname and the Anaia rivers on the north coast of Aneityum, floodplain irrigation systems cover some 69 hectares fed by 11 canals. Four of these (AT177, AT183, AT396, AT134), feeding approximately 58 hectares, cross district boundaries and form the archaeological manifestations of supra-district political units, the chiefdoms known to have been in existence on the island at contact. It seems possible that such polities are as recent as the irrigation systems themselves. The competitive feasting at the base of the social system was inevitably 'inflationary', demanding larger and larger surpluses at the command of the chief in order to 'support his dignity' (as one of the missionaries put it) among his peers and rivals, and to propitiate the unseen multitude of spirits.

The growth of chiefly power and the expansion of irrigation went hand in hand. As a chief's prestige grew he would become more able to command labor to expand the conditions of agricultural

production by the building of new canals and the extension of irrigation systems on to the flatter areas of the coastal plains. It was not the need to have a chief as 'manager' of irrigation systems which led to their expansion and the expansion of his power (contra Wittfogel 1957). On the contrary, it was the chief's power to appropriate surplus production for feasts in order to maintain his prestige which required the expansion of irrigation systems. An expansion in one district or chiefdom would necessitate expansion in the others to match food presentations, taro for taro, up to the limits of the productive capacity of the island.

It is thus not surprising that, on Aneityum, the core of every chiefdom was a large permanent river or series of rivers. It is hard to imagine that the social system at contact, based as it was on the sustained production of large agricultural surpluses, could have existed on anything like the same scale even 500 years previously. Human interference with natural environmental processes had led, not to ecological disaster, but to a greatly expanded potential for agricultural intensification and social stratification.

CONCLUSIONS AND COMPARISONS

Agricultural use of low-lying coastal plains on Aneityum may only have become possible in the last thousand years as valley infilling took place and the valley floors were progressively raised above flood levels and the base water table. In nearly all observed cases the first use of the valley floors is for dry land agriculture, and the intensification of valley floor agriculture by the construction of large irrigation systems has only occurred within the latest period of prehistory, over the last 400 years. In addition, until recently many taro swamps found in low-lying areas just behind the shore may have been merely freshwater springs on the beach.

One consequence of these erosional and depositional processes is that it will be extremely difficult to find early occupation sites on the island, as they may be buried under many metres of alluvium, perhaps hundreds of metres behind the present coast. Coastal rock-shelters on the island are generally wave-cut features relating to current sea-level, and sediment build-up in those examined has only occurred within the last thousand years (Shutler and Shutler 1966). The lack of early pottery-bearing (Lapita?) sites might be explained simply by the fact that nowhere on the island are levels that old exposed. There are obvious implications here for the paucity of Lapita sites on high volcanic islands in the region, the so-called "Spriggs hypothesis" (Roger Green's term!).

An examination of comparative archaeological literature from elsewhere in Oceania shows that similar humanly-accelerated valley infilling and relatively late agricultural use of lower valley floors and coastal plains have occurred to varying extent on most

if not all high volcanic islands in the region.² The stratified political systems of Hawaii and elsewhere in the Pacific, to the extent that they are based on exploitation of the rich alluvial land of valley bottom and coastal plain, can only have come into existence within the last few hundred years at most, during the time that these environments have existed in a form manageable for agriculture. Prior to this a different economy and different social relations must have existed (the other element of the "Spriggs hypothesis"). Any archaeological study of settlement pattern and agricultural exploitation which does not take account of these factors will provide a misleading picture of Oceanic prehistory.

FOOTNOTES

1. Although sighted by Captain Cook in 1774, it is only from 1830 onward that we have any recorded landings on the island by Europeans. A permanent Christian mission was established in 1848 and the 1854 census gave a population of 3800. With the ravages of introduced diseases it later declined to below 200 persons, but is now rapidly increasing, having reached 464 as recorded in the 1980 census. Historical evidence for the occurrence of two epidemics prior to missionization, and the archaeological settlement pattern study, indicate an 1830 population of about 4600 to 5800 people, suggesting that previously published estimates of pre-contact population varying between 9000 and 20,000 are highly exaggerated (Spriggs 1981a: Chapter 4).

2. Evidence of this comes from New Caledonia (Avias 1950), Lakeba in Eastern Fiji (Hughes et al, 1979), Futuna in the Horne and Wallis Islands (Kirch 1975, 1981), and several of the Hawaiian Islands (Allen-Wheeler 1981; Pat Beggerly, pers. comm.; Kirch 1982; Kirch and Kelly 1975; Peterson 1972; Tuggle and Tuggle 1980). Detailed discussion of several of these cases is given in Spriggs (1981a: Chapter 6).

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