COLLINGWOOD BAY AND THE TROBRIAND ISLANDS
IN RECENT PREHISTORY:

settlement and interaction in coastal and island Papua

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This work is a thesis submitted for the
degree of Doctor of Philosophy in the
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I Introduction

After describing the location of the Binandere briefly to discuss the way in which they classify their physical surroundings as an integral part of the value system. This is followed by a story which bring out an important aspect of the Binandere values. In the second part of the paper I reflect upon some of these values in the changing situation among the Binandere and my own role in it.

II Location.

III a) Classification.

 IV Belief System and Values.

 V) Personal Reflection

 VI Conclusion.
This thesis is the product of the author's research. The help of specialists in various disciplines has been sought and is acknowledged. Except for these instances the thesis is my own original work.

Brian J. Egloff.
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CHAPTER I

An Introduction

In November 1967, the field work which supports this study was initiated. At that time the prehistory of the world's second largest island was relatively unknown. Published studies dealing with the prehistory of New Guinea were limited. A pot-pourri of reports touched upon the subject and made pronouncements regarding the antiquity of the island's cultures. However, most of these efforts were not based in archaeological field work. Prior to 1967, only a few archaeological projects of any consequence had been attempted. These investigations were limited to the picturesque and attractive Highlands of the Territory of New Guinea. The Territory of Papua and West Irian were all but ignored by archaeologists.

The broad picture which was emerging from the research in the Highlands outlined man's activities for the last 10,000 or more years. The excavation of rock shelters in the Western and Eastern Highlands by S. Bulmer (1964a; 1964b; and 1966) and J.P. White (1965a; 1965b; and 1967b) produced evidence of an early tradition characterised by flaked stone tools and a subsistence interpreted as being based upon hunting and gathering. Pig enters the archaeological record at approximately 3,000 B.C. (Bulmer, S. 1966; and White 1967b:270). The pig is not native to New Guinea and its presence in the archaeological deposits has been used as an indicator of the emergence of horticulture in the Highlands. Excavations at the Manton Site near Mt Hagen gave the first positive evidence of an early and sophisticated agricultural system. Wooden tools preserved in the peat soil were dated at $2,300 \pm 120$ B.P. (Golson et al. 1967; Lampert 1967). This date resulted in a re-conceptualisation of the neolithic revolution in New Guinea (Brookfield and White 1968).

The adjacent Melanesian islands were yielding their long hidden past under the onslaught of the archaeologist's spade. J. Specht had investigated the Lapita ceramics of Watom Island on the northern tip of New Britain. The
sherds were demonstrated to be part of a larger ceramic horizon which encompassed most of the archaeologically known areas of island Melanesia by a 500 B.C. date (Specht 1968). Research in the New Hebrides by J. Garanger (1966) and C. Smart's (pers. comm.) excavations in New Caledonia were giving rise to regional sequences and indicating areal patterns. Specht's more recent work in the northern Solomon Islands was in progress and yielding yet another sequence of regional importance (Specht 1969).

While the Highland projects and work in island Melanesia were moving ahead, the coastal regions of New Guinea remained unfathomed. Reports of rock paintings and stone monuments were enticing reminders that this area had a provocative past (cf. Riesenfeld 1950). Leask's (1942-43) report of a coastal shell midden in the Central District of Papua is the first description of faunal remains from a prehistoric site in New Guinea. Pottery and flint implements were found associated with wallaby bones and sea shells. Miller (1950), operating in the same wartime situation as Leask, found a shell midden with ceramics at Cape Kassoe on Humbolt Bay, in what is now West Irian. Other brief reports describing archaeological finds in West Irian were published by Galis and Kamma (1958), Solheim (1958), Bruyn (1959) and Röder (1959). The last of these is the only report of any length describing an archaeological excavation.

In 1964, J.P. White (1965a) conducted an archaeological survey which ranged over the coastal areas of Papua and New Guinea. He reported sites at Kairuku, Port Moresby and Marshall Lagoon on the south coast. Surface scatters of shell and pottery were also found on the north-eastern coast at Tufi, Wanigela and in the lower Markham River Valley. None of these deposits was investigated in detail.

Certainly, the middens at Wanigela were extensive enough to warrant intensive research. In the Wanigela area, at the head of Collingwood Bay, an unparalleled complex of middens had been reported as early as 1905 (Monckton 1905:31-34). The ceramics from these deposits were obviously the products of highly skilled potters. The early reports, dating just after the turn of the century,
described large mounds containing not only ceramics, but shell, animal bone, human burials, elaborately carved marine shells and polished stone tools.

Furthermore, linguistic research in south-eastern Papua indicated that this region was peopled by a sequence of migrations (Capell 1943; 1962). The interplay between the earlier non-Austronesian speaking peoples and the later arrivals, non-Austronesian speaking population, resulted in the present intermingling of linguistic groups. The successive waves of migration and the meeting of cultures which left its mark on the languages of south-eastern Papua must be documented in the archaeological deposits. Within the Wanigela area both Austronesian and non-Austronesian languages are spoken. How long has this situation existed? At what time or times in the past were the Melanesian speakers of Papua separated from their linguistic relatives in island Melanesia? What technological and economic innovations did the Austronesians bring to south-eastern Papua? The questions to be asked are manifold and the answers lie beyond the reach of any single investigator. However, an initial attempt was necessary. The Wanigela middens appeared to be the best possible starting point on the coast of Papua.

Interest in the prehistory of Wanigela dates to the early years of the twentieth century when reports by missionaries and government officials described a complex of large mounds at the villages of Rainu and Oreresan. The mounds were discovered as the Anglican Mission in the village of Wanigela was being moved to a new location. The village was abandoned after the mission station was moved and Wanigela now refers to an area rather than a specific village.

The following account is rendered by A.K. Chignell who was a missionary at Rainu shortly after the mounds were found and to some extent destroyed. He probably received his information from P.J. Money, a lay missionary, who was present when the mission was shifted.

While the ground was being levelled, a series of mounds, ten or twelve feet high and from fifty to one hundred feet in length were cleared away, and used for
filling the swamps. Within these mounds, which must have been kitchen middens of an earlier and much larger settlement, were found quantities of broken pottery and engraved bones and shell (Chignell 1911: 19-20).

Dr. Rudolf Pöch became interested in the finds at Rainu when he saw some of the sherds at the Cape Nelson Patrol Station. In December 1905, he went with G.O. Manning, the Resident Magistrate, to Rainu and conducted an excavation.

First, we visited the site in the village of Rainu where, in the previous year the first excavations had been carried out. Here we found a mound about 1.5 metres high and approximately 5 metres wide. This, I was told had formerly been about 200 metres long. It was now practically dug away, but, in the part that remained, a cross-section through its sandy structure could be seen, and this was rich in broken potsherds.

For my own excavations, I chose a hitherto untouched mound on the edge of the village, lying to the north of the mission station. This mound was similar in height and width to the one already excavated, but of lesser length. I had it dug through in transverse section, and the excavated material was packed into bags in layers. At a depth of approximately one metre beneath the surface, I came upon four human skeletons which to judge from their position and completeness, had been buried there. No artifacts had been buried with these persons, but I did find a piece of shell which had apparently served as a personal ornament.

In spite of the find of skeletons I do not regard the mound as a burial mound or "tumulus", but simply as a rubbish-heap in which dead persons were sometimes buried (Pöch 1907b:68).

G.O. Manning, Resident Magistrate of the North-Eastern District briefly described his day of pottery digging with Dr. Pöch.

In a mound near the northern village three complete skeletons were found. These were all on the
same level, about 4 feet above that of the present village (Manning 1905).

Through one channel or another artifacts from these mounds found their way into the British Museum, the Museum für Völkerkunde (Vienna) and the Australian Museum (Sydney). The more interesting specimens were illustrated in publications and aroused considerable speculation. The incised marine shells exhibit an elaborate artistry using flamboyant curvilinear motifs in which scroll forms dominate the pattern (Joyce 1912:545-46, pls LXVI and LXVII; Monckton 1905:31-34; Pöch 1907b:67-71; Seligmann and Joyce 1907:325-41, pls VIII-XIII). These designs are similar in many respects to the basic elements of contemporary Massim art.

The term Massim received its current meaning when A.C. Haddon (1894:184) applied it to the coastal population from Mullen's Harbour to Bartle Bay, and to all of the islands off eastern Papua (map 1). Prior to this the term Massim had gradually come to include the D'Entrecasteaux Islands and the Louisiade Archipelago (Hamy 1889:5-21). Seligmann (1909:fig 3) further extended the Massim to include the southern half of Collingwood Bay. This admission was based upon the false information that all but one tribe on Collingwood Bay spoke a Melanesian language (Seligmann 1910:267).

Haddon's (1894) survey of the decorative art of British New Guinea brought to light the highly sophisticated art form which marks this region. This style is best developed in island Massim and does not reach a comparable degree of elaboration in the Collingwood Bay area. The people of Wanigela and their immediate neighbours are not known for their artistic talents, except in the fields of facial tattooing and tapa cloth decoration. The women excel in their handsome tattooed scroll work which is often combined with the croix à enveloppe or linear motifs (Barton 1918:pl XV). The striking facial tattoos contrast vividly with the designs on their tapa cloth. Occasionally, a bark cloth is decorated with designs reminiscent of Massim motifs. On the whole, tapa is embellished with complex angular patterns which are joined by simple curvilinear elements.
The Massim art style reaches its apogee on the Trobriand Islands. At some time in the past the Trobriand Islands are known to have been linked through trade with the Collingwood Bay region. Ceramics from burial caves on the Trobriand Islands were recognised by L. Austen (1939-40:40-46) as having close affinities with the prehistoric pottery from Collingwood Bay. Austen illustrates eight vessels found in the caves of Vakuta and Kiriwina Islands. One of these vessels is similar to Amphlett Island pots which were traded to the Trobriand Islands during historic times (Lauer n.d.:235). The remaining vessels are of the prehistoric Collingwood Bay style. A petrographic analysis of sherds found on some Trobriand Island sites indicates that many of them were made with a clay that came from the mainland (Key 1968). No historic record exists of a trade pattern which included both the Collingwood Bay area and the Trobriand Islands. Ceramic vessels currently in use on the Trobriand Islands are derived primarily from the Amphlett Islands.

At approximately the same time as I began to plan my research in Papua, P.K. Lauer commenced his study of the ceramic traditions in the D'Entrecasteaux Islands (Lauer n.d.). The D'Entrecasteaux Islands lie at a point midway between the Trobriand Islands and Collingwood Bay (map 1). Obsidian found in the Wanigela mounds is known to have come from a source in the D'Entrecasteaux Islands (Key 1969). This gives support to the concept of a large prehistoric interaction sphere which encompassed Collingwood Bay, the Trobriand Islands and the D'Entrecasteaux Islands. The necessity of co-ordinating my research with Lauer's project is readily apparent. The obvious linking point was the Trobriand Islands. Surface collections made on these islands in 1967 by J. Golson and C. Key, contain a mixture of sherds derived from sources on Collingwood Bay and the D'Entrecasteaux Islands (Key 1968).

The reports describing the mounds at Wanigela indicated that the area was ripe for further investigation, particularly when it was proven that the prehistoric cultures of Collingwood Bay entered into a complex pattern of interaction with the D'Entrecasteaux Islands and the Trobriand
Islands. Any excavation in the Wanigela area would then have wider implications in terms of being directly applicable to the prehistory of the Northern Massim. Aside from the delineation of culture history, other avenues of enquiry were open. Archaeology in Papua offers many opportunities which are denied prehistorians working in the more technologically advanced regions of the world. Many of these crucial fields of interest are disappearing as the Papuan way of life changes to meet the demands of the Twentieth Century. Seldom is the archaeologist able to excavate the remains of activities which are paralleled by a culture living in exactly the same location.

Chignell (1911:19-20) and Pöch (1907b:68) consider the mounds at Rainu to be kitchen middens or refuse dumps. Although the middens were not described in detail, the presence of faunal remains was implied. Further excavations would then produce material relevant to a reconstruction of the prehistoric environment and its utilisation through time. This could be compared with the pattern of exploitation practised by the local villagers and analogies drawn between the prehistoric and modern patterns.

Although Wanigela was ignored by anthropologists, except for the short visit of R. Pöch in 1905, a few government officials and missionaries collected an amazing amount of material from this area. Sir W. MacGregor acquired specimens from Collingwood Bay during the 1890s as part of his programme of exploration and pacification. Most of the material is stored in the Queensland Museum (Brisbane). The largest and best documented collection was made by P.J. Money, a lay missionary stationed at Wanigela, just after the turn of the century. To the distress of his bishop, Money spent a good deal of time not only collecting items of material culture, but also photographing scenes of village life. His photographic albums are held by the South Australian Museum (Adelaide) and a few pictures have been published (Chignell 1911, 1913). The Money collection, in the Australian Museum (Sydney), includes pottery, ornaments, clothing and tools. Many specimens are identified by native name and their function described in detail. R. Pöch's collection (Museum für Völkerkund – Vienna)
includes moving pictures and sound recordings which were made during his trip to New Guinea in 1904-1906. Both Pöch and Money collected material from the middens at Rainu (Pöch 1907a; 1907b). This became included in the collections obtained by the various museums.

These collections contain items of bone and stone which are similar in many respects to the material found in the prehistoric middens. This rich source of information, which could be used to link the past with the present, encouraged me to stress an ethnographic approach in the study of Collingwood Bay prehistory.

Further information bearing on the early contact situation is present in the Commonwealth Archives, Canberra. This consists of patrol reports made by the officers of the Cape Nelson Patrol Post during the period from 1901 to the present. Numerous sketch maps record the settlement pattern and a complete census of the area was made in 1928.

Wanigela is one of the major ceramic producing centres in eastern Papua (Tuckson 1966). Key (1968) describes certain aspects of the technology; however, the major areas of economics, ethno-taxonomy and individual variation within the industry remained to be studied. The information from such a study would no doubt assist in the interpretation of the prehistoric ceramics. This approach resulted in the acquisition of so much data that only the information directly relevant to the prehistoric situation is presented. The remainder will be published in full at a later date.
CHAPTER II

Wanigela-Cape Vogel Region and the Trobriand Islands

Two distinct geographical areas in eastern Papua were investigated in the course of the field programme. Primary consideration was given to the Wanigela-Cape Vogel region of eastern Papua (map 1). This region is separated from the second area, the Trobriand Islands, by 230 km of sea, reefs and scattered islands. The cultural picture of the Trobriand Islands is described in detail by B. Malinowski (1921; 1922; 1929; 1934; 1935) and only the more salient aspects are presented within this chapter. The culture of Wanigela has never been described, but F.E. Williams (1930) gives an accurate account of the Orokaiva to the northwest. C.G. Seligmann (1910) describes in detail the cultures to the south of Collingwood Bay. The archaeological survey and excavations in the Wanigela-Cape Vogel area were limited in most instances to the coastal regions. The following description of the entire region is designed to place the specific area of research, Wanigela, within its proper setting.

The Wanigela-Cape Vogel Region

Geography The Wanigela-Cape Vogel region as defined by Haantjens, Fitzpatrick, Taylor and Saunders (1964) covers 1,850 square miles between lat. 9° 00' and 9° 50' S and 148° 50' and 150° 05' E in the Northern District and Milne Bay District of Papua (map 2). This includes those lands which adjoin Collingwood Bay and its northern and southern capes. This area is bordered on the south and west by the massive northern slopes of the Owen Stanley Mountains. The metamorphic rocks of this range have been weathered into reddish silty clay soils which are covered with a Lithocarpus sp. - Cryptocarya sp. forest (all forest identifications are from Saunders and Taylor 1964:map). The large central region, extending from the thoroughly dissected uplands of Cape Vogel to the Cape Nelson volcanic mountains, is composed of piedmont
terraces and lower lying flood plains. Upon this terrain grows a variety of secondary forests which include: Terminalia canaliculata - Bischofia javanica, Casuarina sp. and Pometa pinnata. The lower lying coastal parts support extensive mangrove forests. Cape Nelson, at the north, is formed by the coalescence of two volcanic mountains. Mt Trafalgar has long been extinct and its thoroughly dissected slopes are covered with an Anisoptera kosterensi­ana - Alstonia scholaris - Rhus taitensis forest. The westernmost of the two volcanic mountains, Mt Victory, is reported to have erupted c. 1880 (Fisher 1957:54-55). An Octomeles sumatrana - Albizia falcata forest is found on its steeply eroded slopes.

Extensive areas of grassland dotted with fire-resistant trees are found on the slopes of Cape Vogel and to a limited extent on the eastern coast of Cape Nelson (map 3). Smaller patches are found on the fluviatile plain of the central area where they begin two to three kilometres inland from the coastal swamps and extend in scattered patches for a short distance to the west.

Climate The climate is marked by a seasonal increase in rainfall which begins in November and lasts until April, as well as a concomittant decrease in the prevailing south-eastern winds. Annually, 70 to 130 inches of rain can be expected along the coast with increased rainfall closer to the mountains (Fitzpatrick 1964:46). The temperature has an annual average of 75.5° F. Temperatures below 70° F. are rare, but they frequently exceed 90° F. between October and April (Fitzpatrick 1964:50).

Population The population of this region, exclusive of the tip of Cape Nelson, is less than ten persons per square mile and is concentrated along the coast. The tip of Cape Nelson has a population density of ten to fifty persons per square mile (Notes on the Territory of Papua and New Guinea 1968:fig 12). The bulk of the population is engaged in subsistence agriculture while a few individuals are employed by the missions, government administration or work on plantations. Taro (Colocasia
Map 3. Grasslands and Land Systems of the Wanigela-Cape Vogel Region after Haantjens and Taylor 1964
esculenta) is the principal crop of the indigenous agri-culturalist except on Cape Vogel where plantains are an important crop.

Along the coast of Collingwood Bay, at a point just south of Mt Victory, a cluster of small settlements is located near the largest mission station and airfield in the Wanigela-Cape Vogel region (map 4). This area derives its name from the mission which was established just prior to 1900 in the now abandoned village of Wanigela, at the mouth of the Anina River. This general area was the focal point of my archaeological research. Lying at the junction of the central fluviatile plain and the volcanic outwash slopes of Mt Victory, the fertile gently sloping terrain is littered with numerous prehistoric sherd concentrations. Today, most of the population inhabits the low beach ridge bordering the bay. Only a few recently established villages are inland from the sea. Taro is and has been the primary cultigen, with sago from the coastal swamps augmenting it during the slack seasons. The volcanic soils are well drained by rivers and streams which feed into extensive swamps. Apart from the swamps, the vegetation is mainly grassland of *Saccharum spontaneum* - *Imperata cylindrica* - *Ophiuros exaltatus* and regrowth or secondary forest of *Anisoptera kostermansiana* - *Pometia pinnata* (Haantjens and Taylor 1964:36).

### Ceramic Industry

Ceramic vessels continue to play an important role in the lives of the Wanigela people. Although this role is undoubtedly diminishing, the manufacture, distribution and consumption of these vessels remains an ever present aspect of village life. The processes employed in the village industry are described by C. Key (1968). The only vessel form currently being produced in large numbers is a spherical round bottomed pot which is primarily used for water storage or cooking (pl 1a). An increased dependency upon European pots has had its greatest impact not in supplanting the indigenous industry but rather in restricting the variety of forms which are produced. The *ramo* (plate), *simum* (water jug) and *sewaf* (water dipper) are traditional forms...
Map 4. The Wanigela Area (with overlay)
which have been replaced by European vessels (pl 1).

Wanigela is the only major pottery producing centre in
the Wanigela-Cape Vogel region (Tuckson 1966:12). As
such, its ceramics are widely sought after and are the basic
commodity which Wanigela contributes to the local trade
system. The vessels are in demand because of their thin
walls which permit rapid cooking of the food while using a
minimum amount of firewood. At Boga Boga on the tip of
Cape Vogel (map 2) a ware is manufactured which is quite
similar in form and decoration to that made at Wanigela;
however, the vessel's walls are thicker and the local
potters admit that their product is inferior to that of
Wanigela. The nearest coastal ceramic centres are a con­
siderable distance to the north-west on Dyke Ackland Bay
(Williams 1930:76-77) or as far south as East Cape (map 1).
These industries have not been described in detail. On
the D'Entrecasteaux Islands, a number of villages make
pottery. These have been investigated by P.K. Lauer (n.d.).
His study is the only comprehensive description of pottery
manufacture in eastern Papua.

The factor which limits the dispersal and influence of
Wanigela pottery is not the competition encountered from
other ceramic centres, but rather the problems involved in
transportation and distribution of the wares. Ceramics
manufactured in Rainu are distributed over very short dis­
tances by carriers and over longer distances by canoes or
European-managed coastal boats. The last of these is mar­
ginal in terms of the number of vessels handled but it does
account for a greater dispersal.

Discovery

In 1874, J. Moresby explored and charted the
south-eastern coast of New Guinea. This
was one of the last inhabited coasts of the world to be
explored by Europeans. The maze of reefs and islands be­
longing to the D'Entrecasteaux and Louisiade Archipelago
had proved to be an impenetrable barrier in June 1793 when
Antoine Joseph Bruni Raymond d'Entrecasteaux attempted to
chart this area (Rossel 1808). Moresby's later explora­
tions delimited the position of the D'Entrecasteaux Islands
and determined that they were not part of the mainland as
d'Entrecasteaux believed them to be (Moresby 1876:222-223). In May 1874, Moresby spent two days in a good anchorage at the head of Collingwood Bay cutting wood for the Basilisk (Moresby 1876:269). While cutting wood extensive areas of trampled grass and the droppings of a large herbivore were discovered. Moresby states that this is evidence of the rhinosceros inhabiting New Guinea. Little was observed and recorded by Moresby concerning the inhabitants of Collingwood Bay, except that they were 'a dark, dirty-looking people, wholly destitute of clothing with somewhat hostile ambitions' (Moresby 1876:270). Moresby left Collingwood Bay on May 5th and charted the unknown coast to the north.

This area of the coast and the D'Entrecasteaux Islands were declared hostile by the Administration in 1885-86 and a warning was issued against entry into the region. In the 1890s Sir W. MacGregor, the first Administrator of British New Guinea, further explored and extended government control over this coastal region. In the process of pacification he collected valuable ethnographic specimens which are now housed in Australian museums. It was not until the arrival of the missionaries at Wanigela in 1898 and the establishment of a patrol post at Tufi in 1901 that European control of Collingwood Bay became permanent. After the missions became firmly established and many aspects of traditional village life were altered, the area fell into a peaceful slumber. To some extent it was awakened during the Second World War when Wanigela became a base for the Allied attack on Japanese-held Buna. Although the region underwent few physical changes during the war, many of the inhabitants became impressed with the material wealth of modern civilisation.

Traditional and Historic Settlement Information used to reconstruct the traditional and historic settlement of the Wanigela area is derived from four sources: living residents of Wanigela; mission reports; annual reports of the Administration; and Patrol Reports from the Cape Nelson (Tufi) Station. Difficulties arise when trying to delineate the initiation or
abandonment of some villages. The basic problem is that villages continued to be occupied by remnants of the population for a few years after the majority of the inhabitants had shifted elsewhere. Figure 1 diagrams the pattern of settlement for the years between 1900 and 1969 (see also map 4). Before the arrival of the missionaries and the enforcement of *Pax Britannia* the people of Wanigela had found themselves forced by hostile neighbours into defensive positions.

The pre-European inhabitants of Wanigela were divided into three groups. To this day they have retained their individuality. The languages used by two of the groups, the Ubir and Oyan, are Melanesian dialects belonging to the Austronesian language family. The third group, the Onjob, use a non-Austronesian language (Capell 1969:126-27). Informants from the three groups agree upon the following account of 'their' known history, though their oral traditions are not extensive and there is no genealogical depth beyond the second generation.

The Ubir arrived in the Wanigela area after leaving a settlement on Cape Vogel. This village was situated somewhere on the slopes of the northern coast of the cape. The Ubir travelled inland along the coast and upon finding an uninhabited area, founded the village of Wanigela. The village was located on a small island in the swamp at the mouth of the Anina River. Houses were built upon piles and a stockade protected the settlement. The Ubir were then joined by the Oyan who claim to have come from a location approximately four kilometres to the north.

These two Melanesian speaking groups lived in the stockaded village while being raided and generally oppressed by their neighbours to the west and south. The non-Austronesian Onjob speakers came down from the slopes of Mt Victory and settled the villages of Aiafi, Murin and Aieram. These villages were adjacent to each other and well fortified. They lived in some degree of harmony with the Oyan and Ubir while serving the useful function of warning the Wanigela villages of impending raids by the inland Doriri (Monckton 1900).

When the area came under permanent European control, the people of Wanigela, either voluntarily or under govern-
Figure 1. The traditional and historic settlement pattern in the Wanigela area

*The census figures for 1927-28 from the Cape Nelson Reports, Journals and Correspondence, Commonwealth Record Series G 91
ment pressure, moved from the swamp into a healthier location. Plate 2 (after Newton 1914: facing 204) is a picture of Wanigela village (c. 1905) some time after the majority of the population had moved to the present villages of Rainu or Oreresan. The stockade is not pictured. Perhaps it had fallen into a state of disrepair and been removed. There is an interesting raised area, which could well be a midden, in the right hand section of the picture. The entire village area has subsequently settled and in 1969 most of it was continuously underwater.

An Anglican Mission was established at this site in 1898. By 1904, the mission had moved from Wanigela village to a new location approximately one kilometre to the north. The Ubir settled Rainu to the north of the station and the Oyan founded Oreresan to the south (map 4). In 1950, the mission moved to a new location inland and near the airstrip. The satellite village Sarad came into being at this time. Although there has been a shift inland from the coastal strip, the majority of the population is centred around the airstrip-road or on the beach. This is significantly different from the prehistoric settlement pattern where sites are found over much of the inland alluvial plain. Needless to say, the road and airstrip are Twentieth Century settlement determinants. At the beginning of this century the settlement of the Wanigela area was entirely defensive.

Surface collections were derived from the former Onjob villages of Aieram (Col. 22), Aiafi (Col. 23) and Murin (Col. 24). Two sites, Kakika (Col. 28) and Ruwage (Col. 29), are described by informants as having been temporary Ubir hamlets (maps 2 and 4). The sherds from the Koreaf village midden (Col. 25) are the only specimens from a modern village included in the ceramic analysis. All of these collections contain ceramics similar to the contemporary Wanigela ware.

Prehistoric Settlement Pattern

Any attempt at reconstructing the prehistoric settlement pattern of the Wanigela area is handicapped considerably by the terrain and vegetation. The grasslands
and thick bush are difficult to travel through unless they are traversed by a footpath. On the other hand agricultural plots, which are scattered over a considerable area of the alluvial plain, afford excellent conditions for collecting. Travel along the beach is difficult at low tide and impossible at high tide without a canoe. Movement by canoe along the coast is often interrupted by rough seas.

The 32 sites located in the Wanigela-Cape Vogel region are mostly near the Wanigela airstrip or northward along the coast (maps 2 and 4). Although I attempted a reconnaissance of the south coast of Collingwood Bay, the results were negligible. By actually living in Rainu I was able to visit many gardens and enlist the villagers' assistance in locating sites. The apparent concentration of prehistoric sites in the immediate vicinity of Wanigela is a reflection of my increased activity in this area.

Maps 2 and 4 indicate the precise location of all protohistoric and prehistoric sites. These sites are usually no more than a concentration of broken sherds upon the surface of the ground. A few of the coastal beach sites were marked by shell fish remains as well as ceramics. Chipped or ground stone artifacts were rarely encountered. The sites are grouped into six geographical categories: coastal, coastal-swamp, inland plain, mountain slope, island and miscellaneous.

Coastal Sites: This group includes all sites located on or near the slightly raised berm of the beach. These are sites Col. 1, 2, 7, 8, 18, 20, 28, 29 and 30. Col. 1 is the mound complex at Rainu and Oresesan which was excavated and is discussed in detail later in this study. Aside from Col. 1, only one other coastal site is associated with a midden containing shell fish remains. This site, Col. 8 at the village of Gigori, is a small remnant of a once larger site which had been extensively eroded by sea action. Site Col. 20, near the village of Marasa, is located on a high hill close to the sea. Its location would have afforded the inhabitants easy access to the sea.
Coastal Swamp Sites: Three sites were located in the mangrove swamps which lie immediately inland from the beach berm or directly adjacent to the sea. These are sites Col. 3, 26 and 27. Col. 3 is the site of the original village of Wanigela. The surface collection indicates that this site had an earlier occupation during prehistoric times. Sites Col. 26 and 27 are deep in the swamp approximately 0.5 km inland from the sea. These two small mounds lie in close proximity to each other. Only a small area is more than 20 cm above high tide. The presence of shell and bone refuse mark these middens as being similar to the mounds excavated at Rainu and Oreresan villages (Col. 1).

Inland Plain Sites: These sites lie on the rolling alluvial plain and are located in dense bush-grassland or in garden plots. They are sites Col. 4, 5, 6, 11, 13, 14, 15, 16, 17 and 21. Their location upon the plain does not appear to be dependent upon ready access to fresh water and in a few instances the sites are located in the centre of extensive grasslands. Although large quantities of sherds were found on the surface, limited test excavations on the more promising sites failed to reveal any depth to the deposit. Sherds were never found more than 10 to 15 cm below the surface of the ground.

Mountain Slope Sites: Approximately 14 km northwest of the villages of Rainu and Oreresan is the location of a now abandoned rest house. This was once used by government patrols when travelling from Wanigela to the Musa River region. The prehistoric sites, Col. 9 and Col. 10, are in the same location on a high rocky ridge above the Kwin River. Sherds are easily found over a wide area of the densely forested ridge.

Island Sites: Col. 19, on the small island of Nanu, 18 km northeast of the Wanigela airstrip, is the only prehistoric site located on an island. Prehistoric sherds are scattered over its rocky surface.
Miscellaneous Sites: Prehistoric and modern sherds were found in the Murin River bed. Site Col. 31 is the collection from the river bed near the present village of Naukwate and Col. 32 is derived from the river near the abandoned village of Murin. The material was probably eroded out of an original deposit which was never located. Site Col. 12 is a garden plot on a recently deposited bank of the river.

The sherds recovered from these sites are discussed in Chapter V. Only the collections from those sites which yielded more than 25 rim sherds are included in the analysis.

The Trobriand Islands

Geography The Trobriand Islands lie between latitudes 8° 00' and 9° 00' S and longitudes 150° 30' E. The actual physiography of these coral islands has never been described in detail. The group is composed of one large island (Kiriwina), three smaller islands (Kaileuna, Kitava and Vakuta) and approximately one dozen islands of minimal size (map 5). Kiriwina is 44 km long and 16 km wide. The southern tip of the island is separated from Vakuta Island by a narrow passage. The flattish topography of Kiriwina is dominated by a large coral ridge which runs along the northern and western edge of the island and reaches a maximum height of 55 m. Much of the low lying western sector of the island is swampland. Kitava is the highest island of the group. It rises sharply out of the sea to a height of over 142 m. Except for a few of the smaller and uninhabited islands, most of the arable land appears to have been cultivated at least once. The terrain which is not currently being cultivated is in a phase of bush regrowth or grassland. Strips of land which are too rugged or swampy for cultivation support forests. Mangrove forests grow in the swamps and tropical hardwoods are dotted along the higher coral ridges. Throughout the islands, small caves occur in the coral bedrock. These caves figure prominently in the oral traditions regarding the origins of the islanders. Many of
Map 5. The Trobriand Islands
the caves contain human burials which are accompanied by ceramic vessels (Austen 1939-40; Ollier and Holdsworth 1968b; 1969).

Climate The climate of the Trobriand Islands is not unlike that described for the Wanigela-Cape Vogel region, except for a slightly higher rainfall. Annually, 150 inches of rain can be expected. This is distributed fairly evenly throughout the year with a slight increase during the months of January, February and March (Notes on the Territory of Papua and New Guinea 1968:figs 7 and 8).

Population The Trobriand Islands have a population density of over fifty persons per square mile (Notes on the Territory of Papua and New Guinea 1968:fig 12). Subsistence agriculture is based upon the cultivation of yams. This primary food source is supplemented with a considerable quantity of fish (Malinowski 1922).

The people of the Trobriand Islands vary in physical appearance. Some individuals have aquiline profiles with light skin and straight hair while others have negroid faces and frizzy hair (Malinowski 1922:51-52). These physical types appear to be scattered throughout the islands. The islanders exploit the sea to a greater extent than do the coastal mainlanders of the Wanigela-Cape Vogel region. They also participate in an extensive trading network called the kula. The kula has been described by Fortune (1932), Malinowski (1922) and Seligmann (1910) as one of the factors which serves to integrate the islands of the Northern and Southern Massim. The Trobriand Islanders derive most of their pottery from trading partners in the Amphlett Islands (Lauer 1970). It must be remembered that the Wanigela area is not known to have ever been associated with the kula.

The Trobriand social system varies from that found in the Collingwood Bay region, particularly in the high status ascribed to women and the institution of chieftainship. Kiriwinian is the lingua franca of the region. It is a Melanesian language and in that respect related to the Ubir and Oyan languages of Wanigela. Capell (1969:127-129)
classifies Kiriwinian as an object-dominated language while Ubir and Oyan are designated as event-dominated. The object-dominated languages are restricted in Papua to the Northern and Eastern Massim.

**Discovery**

The Trobriand Islands were charted by d'Entrecasteaux in 1793 when he sailed around their eastern fringes while looking for a passage through the reefs which would enable him to sail westward towards the mainland (Beautemps-Beaupré 1808:No 28). Early in the nineteenth century the islands became provisioning stops for whaling ships (Hunter 1839). The last years of the nineteenth century saw the islands pacified and an administrative post was established at Lousia, Kiriwina Island. During the Second World War, airstrips on Kiriwina Island were developed and allied military personnel garrisoned the island.

**Traditional and Historic Settlement**

Considerable effort and time were expended trying to reconstruct the historic settlement pattern of Kiriwina Island. Apparently, most of the villages have occupied their current locations for as long as living memory or traditional sources can remember. Only a few recently abandoned sites were located. These were the result of intervillage conflicts at the turn of the century which involved the burning of villages (Seligmann 1910: 664-665). The villages included on the maps of MacGregor (1898), Seligman (1910:fig 46) and Malinowski (1922: map IV) are the same as those which exist today, with a very few exceptions.

**Prehistoric Settlement Pattern**

The oral traditions of the Islanders describe in detail the places where their ancestors emerged from the earth (Malinowski 1922:304-305). Needless to say, this legend is of limited use when attempting a reconstruction of the peopling of the Trobriand Island.

In 1968 and 1969, I spent a total of two months on the Trobriand Islands. During this period I investigated
prehistoric sites on the islands of Kiriwina, Vakuta and Kitava. P.K. Lauer (1970; n.d.) conducted a short reconnaissance of Vakuta, Kiriwina, Kaileuna and Kuyava Islands while taking part in a trading expedition from the Amphlett Islands to the Trobriand Islands. We had hopes of integrating our surface collections; however, Lauer's material was delayed in transit and has been presented in a separate study (Lauer n.d.). Map 5 locates the sites which we visited. Here I am concerned primarily with those sites which I recorded (Tro.1 - 28). These are divided into three categories: sites yielding surface collections, caves and stone arrangements.

Surface collections were derived from many localities and consisted primarily of sherds. Occasionally ground stone adze fragments or obsidian flakes were found with the sherds. Most of the sites are probably abandoned villages and as such they are found in much the same localities as the present villages. In fact, many of the prehistoric sites are adjacent to villages which are currently inhabited. Lauer (n.d.:221) records two sites (Tro. 20 and Tro. 35) on Vakuta Island which the local villagers remember as having been inhabited at some time in the past (Map 5). Although my notes distinctly state that these were not known to have been villages, there is a distinct possibility that my informants were not as well 'informed' on the subject as I believed them to be. This certainly is true for the abandoned village of Kwadagila (Tro. 21) which is featured on maps compiled by McGregor (1898), Seligman (1910:fig 46) and Malinowski (1922: map IV). My local informants do not remember Kwadagila as having been occupied. Near Labai, Lauer (n.d.:221) collected ceramics from three historic sites (Tro. 34, 36 and 49). I obtained a large sample of sherds from a fourth historic site in this locale. The inhabitants of Labai remember it as the abandoned village of Obwenuga (Tro. 28) and vaguely state that the former residents moved to the Amphlett Islands.

Small caves are found in many places on the Trobriand Islands (Ollier and Holdsworth 1968b; 1969). Some of these caves are listed as archaeological sites since they contain pottery, human bones and large sea shells (map 5).
In a cave near Labai (Obuwaga, Tro. 27), two large vessels of the prehistoric Wanigela style were found (Egloff n.d.). One pot was filled with human skeletal material and the other was empty. The custom of placing human bones in caves or rock fissures is common throughout much of the Massim. It certainly was practised at sometime in the past on Goodenough Island and Goodenough Bay where I have observed sites of this nature. Lauer (n.d.:233) records cliff burials on the Amphlett Islands and Lyons (1922) documents them on Woodlark Island. Seligmann (1910:228) describes the process used to convert the body of a Woodlark Islander into a compact bundle capable of being stored in a shallow cliff cavity.

One site which has been labelled as a cave is a small rock shelter on the northern coast of Kiriwina (Tro. 8). It has the appearance of an 'over-night' resting place. A few sherds, charcoal and burned shell were found under the sheltering rock.

Large stone arrangements are recorded on Kiriwina, Vakuta and Kitava Islands (Austen 1939-40; Ollier and Holdsworth 1968a). Prehistoric sherds were found near many of these arrangements (map 5). Only two sites, Tro. 1 and Tro. 2, provided samples which were large enough to be included in the analysis. Givakenu, Tro. 1, is the largest and best preserved stone group recorded on the Trobriand Islands. This monument is constructed of at least twenty rectangular slabs of calcareous beachstone arranged in a rectangular pattern. The slabs have broken and fallen into the interior or lie along the perimeter of the arrangement. The largest broken slab has 54 cm of its base standing and two metres of the upper portion lies adjacent to the base. The slab is 1.5 m wide and 20-25 cm thick. Stone of this type can be found along the north shore of Kiriwina Island. The large flat slabs would require substantial trimming and carrying before reaching the site and being erected.

Approximately 317 m northeast of this group is the larger complex of four stone groups (Tro. 2) which is described by Austen (1939-40:33). Sherds were collected from the bush adjacent to the stone arrangements. The relationship, if any, between the makers of the stone groups and the
users of the pottery is unknown.

Those surface collections from the Trobriand Islands which included more than 25 rim sherds have been analysed according to the same criteria employed in the analysis of the Wanigela ceramics. The procedure employed in the analysis and the results are presented later.
CHAPTER III

The Mound Complex at Oreresan and Rainu Villages

The location of the Anglican Mission station in Waningela village proved to be a rather unhealthy spot. The swamps were close on all sides and 'blackwater fever' was weakening the missionaries. In 1902-4 the mission shifted one kilometre north and established a new church and school. The discovery of large mounds was fortunate for the mission since this new location was also swampy. The mounds were truncated and buildings erected upon them. Mounds E and F suffered this fate (map 6). Mound F was probably the location of the excavation which Pöch (1907b: 68) describes as being in an untouched mound north of the village. Somewhere along the sea front between Mounds E and F a third mound existed (Money 1905). This feature could have been destroyed by sea action or quarried and used to raise the ground level of Rainu. The upper portions of Mound E were spread to the west and Mounds D and F were quarried and placed upon the adjacent village areas. Thus, four of the recorded mounds were either partially or completely destroyed by the establishment of the mission station. This was closely followed by the founding of its satellite villages, Rainu and Oreresan, which resulted in further destruction to the mounds.

Mound A is the largest existing mound. Its configuration probably has not been greatly altered even though it has been used as a cemetery for at least 60 years. The crest of the mound is more than two metres above sea level and its base is more than 85 m long. Any attempt at excavating Mound A presented many problems. These difficulties involved locating an undisturbed area and obtaining permission to dig upon sacred land.

Mound B was reported by the villagers to be undisturbed. This mound then became the focus of my attention and permission to excavate it was readily given by the Oreresan village councillor. Mound C, which had been a heathen burial place, was scheduled for less extensive excavation.
Map 6. Contour Map of the Mound Complex at Oreresan-Rainu Villages
It took a period of involved negotiations before it was possible to obtain permission to excavate this midden. Oreresan villagers stated that the digging should stop if burials were encountered. Mound D is just south of Oreresan and in the centre of the modern rubbish dump. The northern portion of the mound is said to have been used as fill during the early 1900s, leaving the southern sector undisturbed.

The soil in the mounds is a course to fine sand which is stained by humic-rich water. The mounds are in fact midden deposits, the exact nature of which will be described in detail later. It is sufficient at this point to say that the deposits are extremely rich in cultural debris. The midden has an acidity of approximately six to seven, which resulted in relatively good organic preservation. The mounds rest upon river mouth sediments and are gradually becoming drowned. The basal 30 to 40 cm of Mounds B and C are regularly inundated with every high tide. A comparison of the 1903 survey of the Rainu mission station (Richmond 1906) and a modern map indicates that more than 30 m of beach has been washed away by sea action. In 1950, the inhabitable area had become so reduced that the mission moved inland.

Excavation Mounds B, C and D were excavated in the same basic pattern. The sector was cleared of grass, brush and coconut debris. Following the clearing, one by two metre rectangles were surveyed with their long axis running east to west. These units were arranged to form a trench which could be, and in the case of Mound B, was expanded to cover a larger area. The grid co-ordinates are based upon a datum lying to the west of Mound B (map 6). The reference co-ordinates used to describe a unit are its south-western and south-eastern corners. All units extend one metre to the north. For example, the unit of Mound B (fig 2) which provided the ceramics for analysis is unit 33R66 to 33R68. This unit lies 33 to 34 m north of the datum and between 66 and 68 m to the right (or east).

The soil was excavated with trowels, transported in buckets or shovels and dry sifted or washed through 0.5 cm mesh screen. Material was washed through the screens
Figure 2. The cross-section and plans of Mounds B and D
following heavy rains and while working with the flooded basal deposits. All cultural debris and non-molluscan faunal remains were retained for study. Shell was collected from designated units, while all stone and pumice was recorded by weight and number. Charcoal was recovered from specific localised burned areas or by the painstaking removal of scattered lumps throughout the unit. Features and burials were serially numbered and given specific attention.

Vertical and horizontal control was maintained by the use of a surveyor's level and a tape measure. All elevations are given in reference to what is assumed to be the normal high tide. However, the tide regularly rises 30 to 40 cm above this point. The elevation of 0.0 cm fairly well coincides with the base of the cultural deposits in Mounds B and C. The excavation of each mound commenced using 10 cm levels except where natural strata were visible. As the stratigraphy was defined, all previously excavated levels were redesignated. The excavation of Mounds B and C took place in October, November and December 1968. The excavation at Mound B covered 22 m² and was considerably larger than that of C or D. The excavations at C and D were designed to recover specimens and information regarding the stratigraphy of the mounds. The larger surface area excavated at B was an attempt to locate dwelling or other areal patterns within the midden. Mound D was excavated during a 'dry' period in January 1969 which proved to be too wet, and sterile subsoil was not reached because of high water.

**Mound B**

The elongated southern side of Mound B drops sharply into the Sasap River while the remaining slopes, when covered with grass, blend into the surrounding terrain (figs 2 and 3). Approximately 722 m² of its surface is above the 60 cm contour line. At this height the mound is over 40 m long and 20 m wide. Only a small area at the crest is above 1.4 m. **Excavation** (pl 3) The programme commenced with the excavation of unit 34R70 to 34R72.
Figure 3. The cross-section and plan of Mound B
Following the excavation of this unit, the trench was extended as far as the R66 line and excavated to subsoil. This laid bare the 34 line profile, which was used as a control when excavating the units to the south. The six units south of the 34 line had each zone stripped from all the units before the next zone was excavated. It was hoped that this would facilitate the definition of structural patterns if they were encountered. With the excavation of these units to subsoil, a trench from 32R66 to 32R62 was excavated. This was dug in order to extend the cross-sectional profile of the mound. It could have been done more profitably by extending the trench along the 35 line to get a continuous profile, but a coconut tree prevented the extension.

Stratigraphy (fig 3)

Zone I. The surface zones were a markedly darker colour and Zone I of this mound ranged from a very dark brown (Munsell 10YR2/2) to a black (Munsell 10YR2/1). Sherds were small and shells highly fragmented. The zone was easily recognised and presented few if any problems in its excavation. Occasionally, an intrusion from the surface was defined but they were seldom encountered and appeared to be randomly distributed.

Zone IIA, IIAB, IIB and IIC. Lying at the top of Zone IIA was a shallow deposit of shell, similar to a deposit below the zone (Zone IIAB). These concentrations of molluscan remains were thickest in the central area of the excavation and diminished rapidly towards its edges. Zone IIA was marked by a moderate amount of shell in a very dark grayish brown (Munsell 10YR3/2) soil. The dark grayish brown (Munsell 10YR4/2) soil of Zone IIAB lightened towards its base where it blended into Zone IIB. The distinction between Zones IIB and IIC rests upon an increase of burned areas at the junction of the two zones. Feature 4, an extensive burned area, covered a large part of the western portion of the excavation. The soil and texture of Zones IIB and IIC were identical and in some instances a strict separation was not possible. A few small intrusions penetrated from Zone I into Zones IIA and IIAB. These were easily located and
isolated.

Zone III. The transition from Zone IIC to Zone III was characterised by a sharp increase in shells, particularly Fasciolariidae and Neritidae, at the base of Zone IIC. Zone III had considerably fewer molluscan remains per unit than any other zone in Mound B. This zone was significant in that it appears from the profiles to be a purposeful mounding. It tapered rather steeply at its extremities and was composed of loose soft fill which was not as consolidated as the soil found in the other zones of Mound B. Also, it can be seen that the burned areas found in, or directly on top of Zone III were limited to one small patch at the far northwestern corner of the excavation (fig 3). The soil was a dark reddish brown (Munsell 5YR3/3) with a dark yellowish brown (Munsell 10YR4/4) mottling.

Zones IVA and IVB. The surface of Zone IVA was marked by an increase of molluscan remains and a firm texture. The very dark grayish brown (Munsell 10YR3/2) soil of Zones IVA and IVB was frequently flooded at high tide. The distinction between these two zones was arbitrary.

Subsoil. The subsoil of Mound B, like that of C, was a very dark grayish brown (Munsell 10YR3/2) sand and permanently saturated with water. Only a few intrusions penetrated into this soil from Zone IVB.

Features

Extensive burned areas were present throughout Mound B, exclusive of Zone I, IIA and III where they were all but absent. A feature number was assigned when charcoal, burned plant remains and cultural debris were associated with these areas and needed specific referencing.

Features 1 and 3. These burned regions were located in the south-easterly corner of the excavation (fig 3). Feature 1 was situated on the surface of Zone IIC and Feature 3 upon Zone IVA. These two features were the remains of intensive fires and had sherds, charcoal, burned shell or bone, and grey ash associated with them.

Feature 2. Similar to Features 1 and 3, Feature 2
had a region where the fire appeared to be centred. This lay just slightly above the subsoil at the very base of the midden. It was in this area, not more than half a metre in diameter that the ash, charcoal and depth of discolouration was greatest. Outward from this extended a lenticular bed of crumbled charcoal, large sherds and discoloured soil.

Feature 4. This was a charcoal-rich area on the surface of Zone IIC, located in the western portion of the excavation. The extent in area and thickness of the feature indicated that the fire was of a considerable magnitude.

Burials and rock hearths similar to those found in Mound C were not located in Mound B. Only a few pits or other intrusive features were encountered. Seldom were more than two or three pits found in any single zone. These intrusions diminished in number towards the base of the midden deposits.

Radiocarbon dates

<table>
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<tr>
<th>Zone</th>
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<th>Sample Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIA</td>
<td>1240 ±  145 B.P.</td>
<td>ANU-371A</td>
</tr>
<tr>
<td></td>
<td>810 ±  100 B.P.</td>
<td>ANU-371B</td>
</tr>
</tbody>
</table>

This sample consisted of charred material from the interior of a small shattered ceramic vessel found at 31.6R66.8 in the base of Zone IIA. The sample came from 30 cm below the surface of the mound. The material was mineralised and an analysis by J. MacLeod, Research School of Chemistry, ANU, indicated that there were no volatile or partially volatile fats or other substances present in the sample. The sample was divided in half and two age determinations were made.

Feature 4, 560 ± 80 B.P. (ANU-419)

The extensive burned area between Zones IIB and IIC, representing Feature 4 was thick with charcoal. Only the material gathered from unit 32R62 to 32R64 was submitted for dating. This burned area was 56 to 63 cm below the surface of the mound and would be expected to date between ANU-371 and ANU-369.

Feature 3, 770 ± 90 B.P. (ANU-369A)

670 ± 235 B.P. (ANU-369B)

Feature 3 was on the surface of Zone IVB at a depth of 80 cm
below the mound's surface. The sample was composed of wood charcoal from an extensively burned area which in some places was 10 cm thick. This was presumed to be the remains of a hearth.

Feature 2, 1040 ± 90 B.P. (ANU-370) The burned area designated as Feature 2 was between three and four centimetres thick and rested upon a grey ash deposit which was almost six centimetres in depth. The sample came from within seven centimetres of the base of the midden in Zone IVB, primarily from the northern face of the excavation. This feature had a definite hearth-like appearance and dates the very early stages of the midden.

MOUND C
This small ovoid mound is immediately south of the southern tip of Mound A (map 6). The mound becomes differentiated from the surrounding terrain at an elevation of about 60 cm above sea level. At this height it is approximately 29 m long, not including the northern extension toward Mound A, and 17 m wide. The total area above the 60 cm contour line is 528.55 m$^2$. The western side of the midden, borders on thick bush and is relatively steep while the remaining slopes form a gradual approach. During the early years of this century it was used as a heathen burial place while Mound A was reserved for Christians.

Excavation (pl 4)

The positioning of the excavation was determined to some extent by the coconut trees which occupy the crest of the mound. An east to west trench on the southern slope of the midden, consisting of four one by two metre units, was initiated by excavating 75R15 to 75R17 (fig 4). When the excavation of this unit was complete, Zone I was removed from the remaining three units. Three burial pits were recorded and the burials excavated. Then each zone was removed in turn from the entire length of the trench, using the 75R15 to 76R15 profile as a guide. Problems arose in the excavation of unit 75R9 to 75R11. The western portion of the unit below Zone II and above Zone IVB was disturbed. This disturbance resembled a large pit or perhaps a ditch.
Figure 4. The cross-section and plans of Mound C
Stratigraphy

Zone I. This was a shell-free zone of very dark brown (Munsell 10YR2/2) sandy humus, quite distinctive from the reddish brown sand of Zone II. It extended from the surface to a depth of 18 to 34 cm. This zone was successfully removed along the entire length of the trench with no intrusions from the surface being evident.

Zone II. This unit was relatively free of shell and distinct from the adjacent zones. The dark reddish gray (Munsell 5YR4/2) soil stopped abruptly on a line with the surface of Feature 1. Three burial pits intruded into this zone from an undetermined point in Zone I. The thickness of the zone tapered from 20 cm in the middle of the trench (76R13) to 7 cm at the east (76R17), while remaining fairly constant to the west.

Zone IIIA. Shell fragments began to appear in this zone of dark yellowish brown (Munsell 10YR4/4) soil. From approximately 76R15 to 76R13 the base of the zone rested upon a hard packed charcoal-stained surface. Scattered charcoal was present throughout the zone. West from 75R10 to 76R10 the soil texture changed from a firm sandy soil to a softer material which appeared to be disturbed.

Zone IIIB. The charcoal-stained hard surface of Zone IIIB served to separate it from Zone IIIA. The texture and soil colour of these two zones were the same. The disturbed soil at the western extent of the trench continued from Zone IIIA.

Zone IVA. The soil in this zone was less compact and a lighter colour (dark brown, Munsell 10YR4/3) than that of Zone IIA and IIB. Shells increased markedly toward the base of the unit. This zone as well as all lower zones were regularly inundated by high tides and the flooding river.

Zone IVB. The surface of this zone was marked by scattered charcoal and a slight lightening of soil colouration. The quantity of shells increased slightly.

Zones IVC and IVD. The zones were indistinguishable from Zone IVB in their colour
and soil composition. The distribution of shells decreased in these zones which were separated primarily on the basis of patches of darkened soil caused by burning. Seldom did these discolourations have a depth of more than 1 or 2 cm.

Subsoil. The sterile subsoil is a very dark grayish brown (Munsell 10YR3/2) sand. Like the subsoil at Mound B, but to a lesser degree, it was saturated with water at all times. No intrusions into the shell-free subsoil were recognised.

Features

Feature 1. This distinctive and marked feature consisted of a concentration of sherds, stones, charcoal, and burned bone and shell between Zones II and IIIA (pl 4). It extended for a distance of 2 m along the northern profile and 1.2 m along the southern profile. At a minimum of 40 cm below the surface of the mound, it appeared to be free from later intrusions. Burial 3 did intrude into the feature. The stones were scattered the entire width of the trench and for 1.2 m of its length. The thickest concentration of debris was at the northern wall.

It is possible to consider Feature 1 as the remains of a hearth. The rocks, which were probably derived from stream beds one to two kilometres inland, have certainly been used for some activity which was associated with fire. The basin, which is part of Feature 1, would appear to be too shallow to have been used as an earth oven. It is conceivable that the oven consisted of a shallow pit with a large earth covering.

Feature 2. Five small rocks in the far north-western corner of the trench at 75.8R9.3 were recovered. No charcoal or evidence of burning was associated with these stones. The feature was 10 cm above the subsoil. These rocks were identical in shape and size to those found with Features 1 and 3.

Feature 3. This feature rested upon the subsoil at the base of Mound C (pl 4). A cluster of rocks, centred at 75.6R14.6 in a patch of charcoal, constituted the feature. This was unlike Feature 1, in that the rocks were closely grouped and not scattered. The
heavy concentration of sherds in Feature 1 was not evident in Feature 3.

These hearths indicate a consistent pattern of usage for the mound through time; however, the exact definition of this pattern requires a complete excavation of the mound. The stones found in the features are significant in terms of current village practice. Rocks have to be carried from at least two to three kilometres inland where they are found in stream beds. Seldom are rocks left lying around unused if they are of a size suitable for use in a hearth. During the course of the excavation many of the unwanted stones were eagerly gathered by the villagers and used in their fireplaces or in canoe anchors. Feature 3, a rock hearth, is the remains of a purposeful activity and perhaps indicates that the burned areas at other levels in the mound resulted from similar activities even though there are no stones associated with them. This supports a hypothesis that some form of activity occurred on the mounds other than the random dumping and burning of rubbish.

Radiocarbon dates

Feature 1, 880±60 B.P. (ANU-361)
Wood charcoal from this feature (43 to 58 cm below the surface of the mound) was dated. This is the uppermost date obtained from the mound.

Zone IVA, 810 ± 95 B.P. (ANU-362)
This sample came from scattered wood charcoal in unit 75R13 to 75R15 at a depth of 70 cm below the surface of the midden. Zone IVA was 22 to 15 cm thick at this point and approximately 20 cm above the sample from Zone IVD, and an equal distance below Feature 1.

Zone IVD, 920 ± 85 B.P. (ANU-363)
Charcoal for this sample came from unit 75R11 to 75R13, at the very base of the mound. This was at least 115 cm below the surface of the midden. The charcoal was probably scattered from Feature 3 (a sample collected from this feature was too small to be dated) which lay at the same level directly east of the unit from which the sample was collected. This dates the basal deposits of Mound C and correlates closely with ANU-370 which dates the bottom
zone (IVB) of Mound B.

Burials

The three burials found in the excavation all rested in pits which had their origins somewhere in Zone I. The pits were not definable until they entered Zone II. The pits stopped at the base of Zone II or went a few centimetres deeper into the surface of Zone IIIA. They were diffuse basin shaped intrusions and in each instance extended outside the excavation trench. The burials had definitely undergone some form of post-mortem disturbance, probably due to pigs scattering the bones and shattering the crania. The human remains were friable, while wallaby and pig bones found in the mound were firm and solid. At the time of European contact the natives of the area buried their dead in large shallow pits which were often covered by a small shelter (Williams 1930: pl XXVIIIa). Complete pots with small holes in their bases were often placed near the graves (Chignell 1911: facing p 342).

Other intrusions

Few intrusions were isolated except for a small pit in the south-eastern corner of the excavation.

**MOUND D**

Mound D is elongated in an east-west direction and parallels what appears to be an old bed of the Sasap River (map 6). The 60 cm contour line encloses an area of 342.25 m² with a small part of the midden lying above the 1.20 m interval (fig 2). At 60 cm elevation it has a maximum length of 35 m and breadth of 10 m.

Excavation

The excavation of Mound D was started by digging unit 12R224 to 12R226 as deep as possible. Sterile subsoil was not reached even though the excavation penetrated to a depth comparable to that reached in Mounds B and C. Marked stratigraphy was not present and when the excavation was extended by excavating unit 12R222 to 12R224 it seem advisable to subdivide Zone II and the lower portion of Zone III (fig 2). The excavation was prematurely terminated when the rainy season commenced. The recovery of large quantities of cultural debris, which had typified the excavations
in Mounds B and C, was not an aspect of Mound D. Quite a few sherds were recovered but very few faunal remains were found. Extensive burned areas, intrusions, burials and other features of interest were absent in the small and incomplete excavation.

Stratigraphy

Zones IA and IB. The humic-stained sandy soil of these zones was a very dark brown (Munsell 10YR2/2) in colour. Zone IA was differentiated from IB by a marked decrease in shells and an increase in the size of sherds.

Zones IIA and IIB. The soil of this zone was lighter (dark brown, Munsell 10YR3/3) and had a loose texture similar to Zone III of Mound B.

Zones IIIA, IIIB and IIIC. Small burned areas and an increased quantity of shell typified Zone III. The soil texture and colour (very dark grayish brown, Munsell 10YR3/2) were homogeneous throughout the zone and the division was arbitrary rather than natural.

Radiocarbon dates

Three samples derived from scattered charcoal found in unit 12R222 to 12R224 were submitted for dating. None of this material is associated with features.

Zone IIA, 600 ± 100 B.P. (ANU-416)

This date comes from the uppermost reliable sample, 34 to 53 cm below the surface of the mound.

Zone IIIA, 650 ± 120 B.P. (ANU-418)

The sample is from 73 to 94 cm below the surface of the mound and dates the assumed medial period of the mound's accretion.

Zone IIIC, 510 ± 120 B.P. (ANU-417)

Found at 1.06 to 1.34 m below the surface, this sample dates the lowest zone excavated. This date, unlike the lowest dates from Mounds B and C, does not date the basal deposits since subsoil was not reached and an unknown quantity of cultural material lies below it.
SUMMARY

Though similar in many respects, each mound proved to have distinctive features. Large quantities of ceramic debris, shell fish remains and animal bones were found throughout Mounds B and C. Food refuse was not common in Mound D. Mounds B and C have horizontal zones at their bases upon which cultural refuse and sand accumulated. Zone III of Mound B definitely has the appearance of being added to increase the height of the midden. Zonation is readily visible throughout Mounds B and C, and almost absent from Mound D. Mound B is marked by the presence of large burned areas which, when found in Mound C, are accompanied by what have been interpreted as hearth stones. Structural evidence in the form of post hole patterns is absent from all three mounds.

The current drowned status of the lower zones of the mounds indicates that the immediate area has become lowered in relation to the water table. It is possible that the mounds were initiated upon already existing middens when the water level began to rise. In the absence of structural evidence it can be proposed that the mounds were activity areas associated with adjacent structures. Unfortunately, the area next to the mounds was too swampy to permit excavations. The mounds certainly are not simply shell fish middens since they have a quantity of cultural debris within them and a large volume of sand as a matrix. This sand could have been deliberately introduced from the location of a previous settlement. If this is true, then there is the possibility that some of the material within the mounds is of secondary deposition.

Twelve radiocarbon dates from Mounds B, C and D, range between A.D. 420 to A.D. 1680 when two standard deviations are considered (Polach and Golson 1966:15-21). Because of the short time span delineated and the overlapping of the radiocarbon dates within this interval, the determinations are not particularly acute indicators of specific inter-mound relationships. Chronologically the evidence from Mound B is ambiguous and the analysis of the various types of excavated material will in a large part involve the
question of to what extent the formation of Mound B is or is not contemporary with that of Mound C.

Mound D furnished three overlapping dates. These determinations indicate a very rapid and late development of this portion of the midden, perhaps during a period slightly later than or coeval with the formation of Feature 4, Mound B.
CHAPTER IV

The Midden Analysis

The deposits are marked by large quantities of sherds, molluscan remains and mammal bones. The bones are extremely well preserved and quite large in size. The large size of the sherds and bones recovered from the midden suggests that this material was not subjected to intensive scuffage. This could indicate that activity on the midden was limited; however, the presence of stone hearths in Mound C would be indicative of a purposeful activity.

A close scrutiny of the main constituents of the midden deposits in Mounds B and C indicates that although the middens are basically similar, they vary in certain salient aspects.

Figure 5 charts the contents of each zone of Mounds B and C in terms of kilograms per cubic metre of deposit. These are estimates based upon data from a series of differing units which are designated in Appendix I. Units selected for sampling were located as far as possible across the entire extent of the excavations. Certain units were not included in the analysis if their stratigraphy was confused. These units and the units designated in Appendix I were internally consistent and no undue intra-zone discrepancies were detected. The selected units were then bulked according to zones.

Mound D is not included in the midden analysis. This is due to the incompleteness of the excavation and the paucity of faunal material found.

The Main Artifactual Constituents

In this section of the midden analysis the main artifactual constituents are discussed in general terms. The categories of artifacts which contribute significantly to the midden are: ceramics, obsidian, unworked pumice and stone, and worked pumice.

The Ceramics Figure 5 indicates that there is a difference in quantity between the middens of the two mounds. Mound C has an average of
Figure 5. The main components of Mounds B and C according to their weight/m³.
72.05 kg of sherds per cubic metre in each zone, while Mound B has 51.85 kg in the same volume of deposit. The sherd density is fairly consistent throughout the middens, except for a marked increase in Zone IIB and Zone I of Mound B. Zone IIA of Mound C is exceptionally rich in ceramics due to its close proximity to the thick layer of sherds and burned material designated as Feature 1.

The Obsidian Small flakes of obsidian were frequently encountered throughout the deposits. This material is most likely derived from sources on Fergusson Island, 160 km to the east (Key 1969: 49). Mound B has a marked paucity of obsidian in the basal zones, IVA and IVB, and a uniform distribution in the upper zones. Mound C presents a scattered picture which is similar to Mound B only in the decreased quantity of obsidian in the basal zone.

The Unworked Pumice and Stone The alluvial deposits upon which the mounds lie are normally devoid of rocks and pumice. Pumice is reported to be washed onto the beaches during heavy seas. Rocks are obtained from stream beds two to three kilometres inland from the coast. Unworked pumice from Mound C shows an irregular pattern of distribution in the midden. This is probably due to the exceptionally small quantity present in the midden and the fact that one or two large rocks could account for the entire stone content of any zone. Mound C has an average of 11.04 kg per cubic metre in each zone. This is double that found in Mound B and can be explained by the occurrence of two burned areas with associated rocks, and one cluster of rocks which was not associated with a burned area. No localised rock concentrations were excavated in Mound B.

The Pumice Artifacts Pumice was used primarily as abrasers of one form or another. The distribution of worked pumice within Mounds B and C does not present a regular picture. Mound C shows a diminishing frequency towards the upper zones with a peculiar absence in Zone II and a near absence in Zone IVA. The zones with the highest density of worked pumice are basal in both mounds.
The Nature of the Faunal Remains

The faunal material can be divided into vertebrate and molluscan remains. These show a markedly different distribution in the two mounds (fig 6). The basal zones of Mounds B and C are to some extent similar in the small quantity of vertebrate remains which they contain. However, the average density of bone in Mound C is half that of Mound B. This is in opposition to the molluscan remains where Mound C has a density double that of Mound B. Both mounds have an identical weight of shell per cubic metre of deposit in the basal zones. The main component of these coastal middens is not molluscan remains but rather a combination of bone, shell and ceramics, of which shells are no more of a salient feature than ceramic debris.

The Molluscan Remains

The shell analysis was carried out in the field and because of its uniqueness it deserves some explanation. Shell was collected from designated one metre square units (Appendix I). The material was then sorted into forty-one named varieties by certain villagers who demonstrated a facility for the work. The people of Rainu know these shells and over half of them are currently part of their diet or being used as tools. After a few preliminary tests it was apparent that these categories were firm, mutually exclusive and nearly as explicit as a zoological classification. Data were recorded on the informed or observed environment of each variety, as well as on its dietary or utilitarian function (Appendix II). This procedure has its advantages and its drawbacks. The primary advantage is that large samples can be handled. This in turn is offset by the reluctance of the workers to categorise highly fragmented pieces. A further advantage is to be had when transportation of specimens is difficult and it may be desirable to abandon large shell samples in the field. Type samples of the ethnographic varieties were submitted to G. Buick, University of TPNG; E. Coleman Glover, Canberra; and W. Ponder, The Australian Museum. These authorities supplied identifying and distributional information. Further distributional data were obtained
Figure 6. The mollusca of Mounds B and C according to their ethnographic and zoological environments: including unidentified material.

Graphs of the distribution of midden shells by the environmental zones described for them on the one hand by informants, or on the other by zoologists, illustrate that the riverine and mangrove forest-tidal mud categories are fairly similar in both taxonomies (fig 6). Where the two classification systems vary is in the varieties ascribed to marine environment. The zoological system places more species in the reef category. This means that the categories of deep sea and subtidal-sandy are diminished and that of sea weeds is completely omitted in the zoological taxonomy. Riverine species show a gradual decline through time in Mound B with a concomitant increase in tidal species. This could reflect a change in the immediate local environment. It would be expected that as the alluvial deposits in the area of the mound compacted and the terrain was gradually submerged that rivers which were previously saline-free would become subjected to marine encroachment. Thus, the streams which once supported riverine varieties would now contain tidal species. However, Mound C does not reflect this change but acts in opposition to Mound B and has a constantly increasing quantity of river species. The zoological classification shows a marked decrease of the marine species in Mound C through time.

Figure 7 calculates the occurrence of shell in the middens as a percentage of total identifiable shell and sets the information out in terms of the ethnographically and zoologically derived categories. The description of molluscan remains in Mound B by this method does not differ to any great extent from that calculated on the basis of the entire sample, identifiable plus unidentifiable. However, the picture from Mound C is somewhat different. The riverine species show a marked and continuing increase. The decrease in marine species registered in the zoological category in both figures is now visible in the ethnographic category in figure 7. There is thus an opposition in the molluscan remains in the two mounds, where the riverine species in Mound B follow the same pattern as the
Figure 7. The mollusca of Mounds B and C according to their ethnographic and zoological environments: excluding unidentified material.
marine species in Mound C. One explanation that could be offered is that the high frequency of unidentifiable material in Mound C biased the sample. This would hold true if shells from one particular environment proved to be more easily degraded than shells from other environments. The other explanation is one which emphasises the fact that Mound B is 65 m closer to the river than Mound C. It could be argued that because of this close physical proximity Mound B is more sensitive to any change in the ecology of the river. This is conceivable and cannot be discounted, but the question can always be asked as to just where was the Sasap River during the period of mound formation. An examination of the terrain indicates that the river has changed its course many times in the recent past.

The Vertebrate Remains

The collection of bone consists of material which was fractured for food use. Considerable assistance and guidance was given by J. Hope, ANU, in the identification of these fragmented mammal remains. Mound C provided such a small collection that the occurrence of particular species is best represented as present or absent. This is true for all but two species in Mound B. Sus scrofa (pig) and Macropus agilis (Agile Wallaby) represent over 80% and 10% of the identifiable vertebrate remains from Mound B (fig 9).

Appendix III lists the distribution of all vertebrate remains from Mounds B and C. Certain areas of the faunal spectrum would appear at first glance to be under represented but they actually reflect a fairly close approximation of the fauna available in the area. Early descriptions of the hunting practices of the Wanigela people describe large communal hunts using nets and spears to dispatch large numbers of pigs and wallabies. This is the same type of hunt which is common in contemporary Wanigela, except that some shotguns are used and nets have been completely discarded. Fire is frequently used to drive the animals. The results are the same in that pigs and wallabies are the dominant species taken. Occasionally bandicoots are flushed from the burning grass. This is the pattern reflected in the excavated remains where pigs predominate and
wallabies are the second most popular species, followed by bandicoots.

Small mammal, bird and fish remains are rare in the archaeological deposits. Leader of the 1953 Archbold Expedition, L.J. Brass, comments that the coastal area of Collingwood Bay is particularly limited in mammal species. The Archbold Expedition found far more species on the mountain slopes inland from Collingwood Bay than they did on the coastal lowlands (Brass 1956). They also noticed that the people of Collingwood Bay did not gain very much of their subsistence from the sea. A paucity of small mammal remains would be expected in this environment and little evidence of fishing would occur if the culture did not fully exploit marine resources. The further factor of differential preservation had probably destroyed many small bones. A few coprolites, possibly of dog, from Mound B contain many small fishbones. C.F.W. Higham (1968) discusses dogs as a factor affecting an archaeological sample in such a manner that large bones are broken and small bones consumed, thus giving a biased picture.

The presence of shell net weights in the deposits indicates that there was fishing and in so far as the weights are identical to those used ethnographically, we might assume that the prehistoric exploitation was similar to that practised today. Up to 100 or more shells of Anadara sp. are used to weight a large net. The distribution of these weights is shown in figure 8.

The absence of cassowary and crocodile bones from the deposits is interesting. Some natives in areas adjacent to Collingwood Bay eat crocodiles (P.K. Lauer, pers. comm.). Cassowary bones are used in contemporary Wanigela to make lime spatulae. Both these animals figure strongly in local oral traditions. Bats are common in the area (van Deusen 1958) and frequently eaten, but were not found in the excavations. Their larger bones are used as needles and awls by the Wanigela villagers. Some wallaby manibles from the excavations and the distal portions of certain humeri appear to be polished. These specimens could have been retained as 'trophies' and achieved a degree of polishing through handling. Mandibles, humeri and foot bones
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<td>IVA</td>
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<table>
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Figure 8. The distribution of shell net weights

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<th>IIAB</th>
<th>IIB</th>
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<th>III</th>
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<td>.50</td>
<td>.51</td>
<td>.59</td>
<td>.60</td>
<td>.58</td>
<td>.62</td>
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<td></td>
<td></td>
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<td></td>
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<td>% of Identified Bone</td>
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<td>6</td>
<td>6</td>
<td>7</td>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>

| Macropus agilis | | | | | | | |
| % of Total Bone | .06 | .05 | .08 | .07 | .11 | .12 | .08 | .11 |
| % of Identified Bone | .14 | .09 | .13 | .11 | .16 | .16 | .12 | .16 |
| Minimum Numbers | 1  | 1   | 3   | 5   | 2   | 10  | 8   | 2   |

| Total Bone in Grams | 2320 | 3385 | 2094 | 6525 | 4480 | 8945 | 7803 | 2622 |
| Total Identified Bone in Grams | 957  | 1998 | 1248 | 4460 | 3241 | 6326 | 5650 | 1816 |

Figure 9. The distribution of Sus scrofa and Macropus agilis remains from Mound B, by weight and minimum numbers
are the most frequently encountered wallaby remains.

Dog is represented in all zones of the two mounds, except IIC of Mound B and I and IVD of Mound C. Generally a few fragments of the skeleton were all that was found, but Zone IVA of Mound B produced 13 pieces. Today, the dog is a valuable hunting aid as well as serving as a household guard. Bored canine teeth were found in the excavations. In Rainu they ornament the traditional Ubir headband.

If we turn specifically to Mound B, we see (fig 9) that pig bone shows a slight increase in Zone IVA if regarded as a percent of the total sample of the zones. When the minimum numbers are considered a different picture emerges. There is a significant difference between IVA and IVB, where IVB has considerably fewer pigs and wallabies.

Zone IVB was also distinctive in its variation from the normal distribution in regard to the portions of pig skeleton recovered (fig 10). Pig bones were divided into cranial, pectoral, pelvic, vertebral and distal. The distribution of these categories in the various zones of Mound B is shown in figure 10 and compared with a modern domesticated Australian pig from the reference collections at the Department of Prehistory, ANU. No comparative material from Papua was available, so strict comparisons are not possible. The cranial bones of the domesticated pig account for 21% of the skeletal weight. For all levels of Mound B except for Zone IVB cranial parts account for over 50% of the excavated pig bone. The bases of the skulls show signs of having been smashed to facilitate the extraction of the brains. Distal and vertebral bones are under-represented, which may reflect butchering practices or differential preservation. The axis and atlas are frequently encountered, perhaps because of their close and secure attachment to the skull.

Figure 11 indicates that many pigs were butchered before their third molars had erupted. The consumption of pigs before they reached their maximum size would appear to parallel a situation described by L. Pospisil (1963:204-5) amongst the Kapauku of the Wissel Lakes, West Irian. These
### Table 1: Percentage of Each Major Category of Sus scrofa Remains from Mound B, by Weight

<table>
<thead>
<tr>
<th>ZONE</th>
<th>I</th>
<th>II A</th>
<th>IIAB</th>
<th>II B</th>
<th>III</th>
<th>IVA</th>
<th>IV B</th>
<th>MODERN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cranial</td>
<td>.54</td>
<td>.50</td>
<td>.59</td>
<td>.55</td>
<td>.51</td>
<td>.53</td>
<td>.63</td>
<td>.33</td>
</tr>
<tr>
<td>Pectoral</td>
<td>.18</td>
<td>.25</td>
<td>.16</td>
<td>.18</td>
<td>.16</td>
<td>.24</td>
<td>.15</td>
<td>.26</td>
</tr>
<tr>
<td>Pelvic</td>
<td>.12</td>
<td>.16</td>
<td>.19</td>
<td>.17</td>
<td>.18</td>
<td>.16</td>
<td>.19</td>
<td>.28</td>
</tr>
<tr>
<td>Vertebral</td>
<td>.03</td>
<td>.02</td>
<td>.02</td>
<td>.06</td>
<td>.10</td>
<td>.03</td>
<td>.02</td>
<td>.10</td>
</tr>
<tr>
<td>Distal</td>
<td>.13</td>
<td>.07</td>
<td>.04</td>
<td>.05</td>
<td>.05</td>
<td>.04</td>
<td>.02</td>
<td>.03</td>
</tr>
</tbody>
</table>

Figure 10. The percentage of each major category of Sus scrofa remains from Mound B, by weight.

### Table 2: Number of Individuals and Age Estimates of Sus scrofa from Mound B, Using Dentition of Mandible

<table>
<thead>
<tr>
<th>Zone</th>
<th>I</th>
<th>II A</th>
<th>IIAB</th>
<th>II B</th>
<th>III</th>
<th>IVA</th>
<th>IV B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molar 1, not erupted less than 4 months</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Molar 1, erupted 4 to 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Molar 2, erupted 8 to 12 months</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Molar 3, erupted 18 to 20 months</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Molar 3, worn greater than 20 months</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 11. Number of individuals and age estimates of Sus scrofa from Mound B, using dentition of mandible. The average periods of teeth eruption are after Sisson & Grossman 1961:488.
people slaughter their pigs when they weigh between 80 and 120 kg. This is presented as the most economical stage in that up to this size the animal can obtain most of its food requirements by foraging. To raise the pig above this weight requires purposeful feeding by the villagers. A few pig bones show butchering cuts, but these are not frequent enough to indicate specific methods of butchering.

The upper jaws of 16 Wallabia agilis specimens recovered from Mound B were measured and their molar index (M.I.) determined by Dr. Hope. The age estimation criteria established by Kirkpatrick (1964) for a Queensland population were then applied to the specimens (also see Kirkpatrick and Johnson 1969). The following results were obtained:

<table>
<thead>
<tr>
<th>Number of individuals</th>
<th>M.I.</th>
<th>Age (years-months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1.7 - 1.9</td>
<td>1.5 - 1.8</td>
</tr>
<tr>
<td>5</td>
<td>2.2 - 2.5</td>
<td>2.3 - 2.8</td>
</tr>
<tr>
<td>3</td>
<td>2.6 - 2.9</td>
<td>2.9 - 4.1</td>
</tr>
<tr>
<td>4</td>
<td>3.1 - 3.2</td>
<td>4.7 - 5.1</td>
</tr>
<tr>
<td>1</td>
<td>3.9</td>
<td>8.9</td>
</tr>
</tbody>
</table>

These figures are to be regarded as rough estimates which lose some degree of reliability when a specimen has an age greater than four years. The comparability of the Queensland Wallabia agilis with the Papuan is unknown.

**Summary**

The major subsistence activity of the ethnographic population at Wanigela is horticulture and while there is no direct evidence for this in the excavations, we may confidently assume its presence. The pattern of environmental exploitation portrayed by the surviving faunal remains falls well within that recorded for the area at the turn of the century.

Two models can be described to explain the nature of the faunal data. The first is labelled 'sociological' and considers Mounds B and C as being coeval. The second, a 'temporal' model, regards the bulk of Mound B to be later in time than Mound C.
The sociological model put forward, is one in which the two middens are envisaged as the products of distinct social groups with varying patterns of environmental exploitation. The group contributing their rubbish to Mound B deposited greater quantities of pig and wallaby bones than the group at Mound C which discarded a larger bulk of shell fish. The shell fish remains from Mound C indicate an increasing importance of riverine species which was matched by a concomitant decrease in Mound B. Tidal varieties in the two mounds also act in opposition. This could be interpreted as a complementary exploitation of the environment, where the utilisation of specific zones shifted between the social groups through time.

It is possible to account for the faunal distribution by constructing a temporal model which states that the bulk of Mound B is later in time than Mound C. This presents a more or less even curve in the distribution of riverine species where they reach increasing importance through time in Mound C and decrease in importance in Mound B (fig 6 and 7). Mangrove varieties then present a distribution which reaches a position of dominance in the upper zones of Mound B. The marine species decrease through time. However, this model does present some problems in that the top zones of Mound C have a larger proportion of riverine and a smaller proportion of mangrove species than is found in the basal zones of Mound B. Thus, there is not a precise fit between the upper zones of Mound C and the lower zones of B.

Both the sociological and temporal models will be investigated and discussed further with respect to the ceramic analysis.
CHAPTER V
The Description and Analysis of Ceramics

The excavations and surface collections in the Wanigela-Cape Vogel region and the Trobriand Islands produced more than five tons of ceramics. The sherds belong to at least two major ceramic traditions. One of these was centred in the Wanigela-Cape Vogel region and the other had its locus in the northern D'Entrecasteaux Islands. On the whole these traditions were characterised by a relatively well made pottery which was free from flaws. The clay used in the vessels was naturally suitable and tempers were not needed. Whatever process was used in the manufacturing left few if any visible traces. The sherds do not exhibit any paddle or anvil marks, nor do they break along obvious planes of weakness, as is seen in some coil built wares.

Prehistoric sherds from Collingwood Bay possess a suite of traits which differentiate them from the D'Entrecasteaux material. Collingwood Bay vessel forms include; jars, globular pots, open to restricted hemispherical bowls, complex composite forms and pedestal bowls. Flat bottomed vessels are not a part of this ceramic complex. The size range is extreme. Some vessels are no bigger than a cup and others are large enough to hold 20 to 30 kg of food. The average size would lie at approximately 30 to 40 cm in width and perhaps 20 to 30 cm in height, depending on whether it is a bowl or pot form. Surfaces are normally smoothed or burnished.

Rim form assumes a wide variety of shapes. The simplest rim is nothing more than a continuation of the vessel's wall and terminates at the lip without any modification. Elaboration of the lip and rim area in some instances is amazingly complex and a variety of forms is present. Decoration on these areas is often complex, although many rims are plain. Channeling (grooving), punctation, and shell stamping are the commonest decorative elements and are often combined into rather simple curvilinear or rectilinear decorative motifs.

Appendages take the form of single tab handles or large lugs which are affixed to the lip or shoulder area.
Large lugs are occasionally found in pairs, extending from the lip to the shoulder. A large sherd from Zone IVA of Mound C indicates that at least 12 double lugs were attached to a single vessel (pl 9e).

A pedestaled bowl with a high cylindrical stand was found on a Collingwood Bay surface site (pl 7a). Rectangular cutouts embellish the stand and triangular cutouts pierce the labial flange.

On the Trobriand Islands, many surface collections contain Collingwood Bay and D'Entrecasteaux ceramics. The majority of the D'Entrecasteaux sherds are from relatively simple spherical to hemispherical vessels with restricted or open mouths. Lauer (n.d.:pls 61 and 62) describes in detail the complete range of forms found in the ceramic tradition. The variation he presents lies primarily in the treatment of the lip area and involves simple thickening or no modification at all. Shoulders lie relatively high on the vessel and abrupt composite or flat bottomed forms are absent. Relatively simple decoration combining grooving, punctation and shell impression is found on the prehistoric sherds.

The overall impression of the Collingwood Bay and D'Entrecasteaux ceramic traditions is one of a sophisticated and vital craft, that produced ceramics on a par with other Neolithic societies of the world.

The problem at hand is the ordering and presentation of the mass of information pertinent to the understanding of these prehistoric ceramics. The researcher embarks upon an analysis and classification when faced with the definition of a system, in this case prehistoric ceramics, which has too many properties and values to permit an economical description. This certainly is the case with the ceramics accumulated for this study. Theoretical and practical aspects of the ceramic analysis and classification are divided into four stages, each of which has a number of steps.

Stage 1. The guidelines, units of analysis, and procedures to be used in the analysis are explicitly stated.
Stage 2. This stage is concerned with the distribution of the various attributes through the site.

Stage 3. The attributes were clustered into larger groups through proximity analysis.

Stage 4. The composition of the ceramic groups and some general features of their distribution are detailed. The significance of the analysis is discussed in Chapter VI.

Stage 1 of the analysis

The theoretical and practical aspects of the ceramic analysis and classification are outlined for all steps employed in this initial stage of the analysis. They are similar to those diagrammed by Sokal and Sneath (1963:1).

Step A. A definition of the guidelines determining the nature of the ceramic study.

Step B. An explicit statement of the objectives of the analysis and classification.

Step C. The selection of the sample to be studied.

Step D. A definition of the attributes to be used in answering the questions formulated in Step B. These attributes must be explicit and free from value judgements in order to conform with the principles laid down in Step A.

Step A. The choice of procedures to be employed in this study is controlled by three concepts. The first of these is based in the premise that the scheme should be as independent as possible of value judgements and 'experienced' intuition (Clarke 1970:26). The second prerequisite of any analysis is a set of clearly defined units and objectives with a broad enough base to exploit fully the information content of the data. Over both of these principles a third concept operates. This clearly states that the problem at hand is the analysis and classification of a specific body of archaeological material in as concise a manner as possible. At no time
is the procedure to be regarded as an exercise in which the archaeological facts become submerged and lost in the classification process.

**Step B.** The immediate objectives of the analysis and classification are best expressed as a series of questions.

1). What are the basic traits (attributes) of the ceramic complex and which of them carry the most information?

2). Can these attributes be used to determine if the archaeological deposits are disturbed to such an extent that a meaningful interpretation of the ceramics derived from them is vitiated?

3). Can the attributes be clustered into groups, perhaps defining types?

4). What are the significant features of the ceramic groups?

**Step C.** Sherds were selected for coding from those units which had arrived intact from the field at the commencement of the analysis. This is not a random sample but rather a sample of necessity due to the brutal fact that many specimens spent over half a year in transit from field to laboratory. Rim sherds were utilised as they have a higher information content than do body sherds. Many of the rim sherds were large enough to estimate vessel form and define the mode of decoration.

Sherds were only included in the analysis if the lip area was present and there was a reasonable chance of determining the correct orientation of the rim. 3,284 rim sherds from Mounds B, C and D were derived from specific units listed in Appendix I. 2,926 rim sherds were coded from 30 surface collections. Sites represented by fewer than 25 sherds were excluded from the analysis and collections of more than 250 sherds were reduced to that number by a random selection of specimens.

**Step D.** The attributes are listed and defined in the ceramic code included in Appendix IV (fig 22). Attributes were chosen on the basis of distinctive qualities and their ability to describe the ceramics. They are grouped into fourteen classes, each of which includes one or more quantitative or qualitative attributes (Clarke 1968:}
Only three attribute classes are quantitative (i.e. Class III, Percent of rim present; Class IV, Orifice radius; and Class V, Maximum body radius). Class VI, Rebating, refers to the small groove which lies just below the lip on the interior of many vessels. This appears as if it was made by trailing the thumb, with considerable pressure, around the inside circumference of the rim.

Within each class only one attribute may occur. This procedure, when applied to the decorative elements, often resulted in the combining of two or more already defined attributes into a third. Thus, punctation is a separate attribute and so is channeling. These were combined into a third decorative attribute, punctation and channeling.

Only one attribute class (Class III) is used which is not common to other ceramic studies. In so far as only rim sherds were being studied, it seemed possible that a better system could be applied in counting specimens than the weight or number of individual specimens present. Fortunately C.D. Smart and I.C. Glover, fellow students at ANU, were involved in developing a technique for measuring the percentage of the vessel's rim and using this as a counting device. The method is a development of the traditional system of measuring rim diameter by a graded series of concentric circles. By adding radii at intervals of 5% of the total circumference it is then possible to measure the fraction of the vessel's rim represented by the sherd (fig 12). This fraction, which will be referred to as the 'percentage factor', has two prime uses. Firstly, it is possible not only to state how many sherds there are of a given variety, but to indicate the minimum number of vessels of a given type represented by the sherds of that type. This is accomplished by the simple procedure of adding the percentage factors of the individual sherds. Secondly, it states the size of each individual sherd. In the following stage of the analysis, the use of the 'percentage factor' is discussed in greater detail.

Stage 2 of the analysis

The distribution of the attributes with respect to number and size of sherds is investigated in this stage.
Figure 12. The device used to measure the orifice radius of a ceramic sherd and to calculate its 'percentage factor'.
In order to do this as efficiently as possible a computer was employed to count and factor the data. This was necessary because of the large number of attributes defined by Stage 1. The data concerning each sherd was punched on a single card. This identified, located and described the individual specimen according to the code presented in Appendix IV.

J. Palmer of the CSIRO Division of Computing research wrote a 'Programme for Tabulating Archaeological Data'. This is a straightforward tabulating programme. However, the magnitudes involved presented difficulties which could only be overcome by a well planned programme.

The distribution of rim sherds according to size is a significant aspect of this programme, which generated tables of attribute distribution for all excavated units and surface sites. The tables pertaining to the excavations are presented in graphical form (Appendix IV, fig 23). The attribute classes concerned with decorative elements and surface finish are plotted using three distinct techniques.

1. The entire population of rim sherds from the specified archaeological units is employed.
2. The entire population is weighted by the 'percentage factor' as outlined in Appendix IV.
3. All sherds which constitute less than 5% of the vessel's orifice are omitted and the remainder are weighted by the 'percentage factor'.

Initially, the mounds at the villages of Oreresan and Rainu were not accepted as being completely undisturbed. The integrity of an archaeological deposit can and should be questioned. Too many investigators assume that their source of data is valid. The logic behind such an assumption is often very weak. In many instances, suppositions based upon an analysis of artifacts from the deposit are the sole test of legitimacy. If these suppositions present a neat picture, then the deposits are assumed to be valid. Needless to say, this argument is circular.

Both primary and secondary deposition could have been
operating during the formation of the Wanigela middens. It therefore seemed necessary to determine if secondary displacement was a significant factor in redistributing the midden's content. If the middens were partially disturbed or formed in part by secondarily deposited debris, then the cultural material within the mounds should vary with regard to size and distribution. Sherds which have been disturbed or displaced would perhaps be smaller in size than those of primary deposition. Areas of increased cultural activity and zones which had been exposed for a long period of time would also be expected to contain small sherds. This oversimplifies the problem, but does present a testable hypothesis.

The distribution tables in Appendix IV (fig 23) remain fairly constant in their overall pattern regardless of which of the three techniques is used. By regarding the graphs belonging to Class VII (Lip decoration) it can be seen that the triangles (below the line for Technique 3 and above the line for Technique 2) fall fairly close to the end of the bar which indicates the percentage by sherd count (Technique 1). Technique 3, which discounts all sherds representing less than 5% of the rim and factors the remaining sherds, often reduces the sample to such an extent that minority attributes disappear. Technique 2, where the rim sherds were weighted by the 'percentage factor', by and large only affects the small samples, particularly those from specific features.

Whether or not this can be accepted as proof of the deposits' validity is a question which will be discussed later in the light of the complete ceramic analysis. Nevertheless, on a preliminary basis it supports an hypothesis that the material within the mounds has not been subjected to a large amount of redeposition. This of course is contingent on the assumption that sherd size is reduced during the process of secondary displacement.

Certain aspects of the graphs in Appendix IV (fig 23) should be noted. These pertain to the emergence of a definite distinction between Mounds B and C. This is clearly exhibited in the attribute classes concerned with vessel decoration. In this respect the data are quite
rewarding; however, only a few attributes vary significantly with regard to their distribution within the mounds. The following is a summary of the salient features of the attribute classes.

Classes I and II: Surface finish

Surface finish refers to the treatment of the entire exterior or interior surface of the vessel. Mound D has the highest frequency of eroded sherds. These constitute the 'not observable' category. Of the remaining five attributes, red slipped sherds have the most significant distribution. This minority attribute is almost entirely confined to Mound C. On the whole, burnished sherds are more common in Mound C and decrease in frequency in the upper zones, where they are replaced by sherds with a smoothed surface finish. This tendency is not paralleled in Mounds B and D.

Class III: Percent of rim present

Within Mounds B and C the uppermost zone contains the highest ratio of small (0% to 5%) sherds. In Mound B the high ratio in Zone I (73% of 0% to 5%) is approximated only by the sherds found associated with the features (Fea. 4 = 70%, Fea. 1 = 50% and Fea. 3 = 47%). The other zones have between 31% and 44% of their sherds falling into the 0% to 5% group. This is not the case in Mound C where the features have low values in respect to small sherds (Fea. 1 = 37% and Fea. 3 = 46%). The features of Mound C also have high values in the 10% to 15% group. The lower zones of Mounds B, C and D have a high proportion of sherds which represent more than 5% of the rim.

Class VI: Rebating

Approximately 40% of the sherds from all the zones of Mound C have a shallow groove on their interior surface just below the lip. Rebating is slightly less popular in Mound B and is only found on about 30% of the sherds from Mound D. The presence of rebating remains fairly consistent through time for each midden.

Class VII: Rim form

The one hundred and fifteen attribute models (hereafter referred to by their attribute number and the prefix Rf) of this class present a rather diffuse picture. A few of
these attributes are significantly distributed; but, the number of these attributes is nowhere as high as would be hoped. The more popular forms of the everted rim (Rf 6 and Rf 7) are prevalent in Mounds B and D. To a lesser degree this is also true for Rf 9 and Rf 10. These forms are similar in their gently out-curving shape which is common to globular vessels. The forms representing a straight necked jar form (Rf 22, Rf 23, Rf 24, Rf 26, Rf 27 and Rf 31) are more common in Mound C. The open bowl form, typified by Rf 60 and Rf 61, is commonest in Mounds B and D. Mound C would appear to have more of the restricted forms like Rf 38, Rf 39, Rf 42 and Rf 53.

Class VIII: Lip decoration

The lip area of each particular rim form is indicated in Appendix IV (fig 23). The criteria used to define the lip area is not specific in its relation to vessel form. Rather, the lip is defined as the area of the vessel's orifice which best separates the inner rim from the outer rim area. Punctation (Ld 2) and broken line incision (Ld 3) are common in Mounds B and D, while Mound C has significantly fewer sherds decorated with these attributes. Shell stamping or impressing (Ld 5 and Ld 16 - edge of shell; and Ld 15 - side of shell) occurs primarily in Mound C. Channeled or grooved lips (Ld 8) are absent from Mound D as are notched (Ld 13) lips. Plain lips (Ld 1) dominate the collection and account for more than 50% of the sherds in some zones. On the whole there are more plain lips from Mound C than from Mounds B or D.

Classes IX and X: Rim decoration

The classes of outer and inner rim decoration reflect the same tendencies as those seen in the attribute class of lip decoration. Shell stamping (Rd 5, Rd 18, Rd 21 and Rd 23) is found predominately in Mound C. Rd 33, punctation, found in small quantities in Mounds B and D, is absent from Mound C. Notching and channeling are conspicuous by their near absence from Mound D, particularly in the class of outer rim decoration. Plain rims (Ld 1) are a dominant feature and account for more than 80% to 90% of the excavated ceramics.
Class XI: Body decoration placement

This class has eight divisions which are concerned with the particular area of the vessel which is decorated and to what degree of certainty a sherd can be said to come from an undecorated vessel.

Lower body decoration normally occupies that portion of the body below the vessel's equator. Usually, this area is separated from the upper body by a line of design elements. This might consist of punctation, grooving or shell stamping. The graphs indicate that a large quantity of sherds are 'apparently' undecorated. Mound D has a higher frequency of decorated sherds than does Mound B or C. In part this is a function of the relationship between vessel form and the placement of body decoration. The globular vessels (Rf 6 and Rf 7), when decorated, tend to have the motif high on the vessel's body, whereas the straight sided jar forms (Rf 31, Rf 32, Rf 33, Rf 34 and Rf 35) usually have the motif situated 4 to 6 cms below the rim.

Class XII: Body decoration

Channeling, possibly with a seed pod or univalve shell, is the primary decorative technique found on the excavated sherds. Univalve shells are used by the contemporary Rainu potters to make grooves and Lauer's (n.d.: pl 33) Amphlellt Islanders use a seed pod for grooving and burnishing. Sherds from the mound excavations have relatively simple combinations of decorative elements compared with the complex motifs found in the surface collection. The graphs demonstrate the popularity of parallel grooving (cf. Bd 11, Bd 12, Bd 13, Bd 16, etc.) as an element of body decoration on the ceramics from all the excavated middens. However, it is apparent that this same attribute when combined with punctation, as in Bd 21 and Bd 22, is limited to Mounds B and D. The conjoined half circle design (Bd 25 and Bd 27) is restricted to the upper zones of Mound C. The arc (Bd 30) is commonest in the lower zones of Mounds C and D. Both of these designs are made by grooving.

Class XIII: Shoulder decoration

Punctation (Sd 10) is again found at Mounds B and D.
however, shell impressing (Sd 9) is also found in Mound B to a greater degree than was encountered in the other decorative classes. Broken line incision (Sd 18) is absent from Mound C. Approximately 10% to 15% of the sherds are from vessels without shoulders, i.e. shallow bowls, and fall into the 'not applicable' group (Sd 1). On more than 50% of the sherds from the excavation the shoulder area is absent (Sd 2, 'not observable'). 10% to 30% of the sherds from the excavated zones have plain shoulders.

Class XIV: Appendages

A few sherds from Mounds C and B have tab or lug handles. This attribute is all but absent from Mound D.

Summary of Stage 2

A high proportion of the mound ceramics are plain. The dominant decorative attributes found upon the lip area are punctation, broken line incision and shell stamping or impression. Punctation and broken line incision are found predominately in Mounds B and D, while shell stamping dominates Mound C. This distribution, which is almost mutually exclusive, also occurs with the attribute classes of rim decoration, body decoration and to a lesser extent shoulder decoration. The graphs demonstrate the popularity of parallel grooving as an element of body decoration on the midden ceramics. However, it is clear that the same design when combined with punctation is found only in Mounds B and D. Thus, it can be illustrated that the ceramics from Mounds B and D manifest a different complex of decorative elements than those found upon the sherds from Mound C. This dichotomy is also seen in vessel form. Everted rim forms belonging to globular vessels are prevalent in Mounds B and D, with straight necked jar forms occurring in Mound C. This is not a mutually exclusive distribution but one of relative proportions.

Although there are differences between the mounds, they are also similar in many respects. The majority of the ceramics belong to the same major tradition. The distinction between Mounds B and C does not operate with respect to their basal zones. Zone IVB of Mound B shares many attributes with Zone IVD of Mound C.
Whether the distinctions between Mounds B and C are the product of temporal or social factors is not readily apparent. The radiocarbon dates, as mentioned earlier, are not clear on the exact relationship between Mounds B and C. The value of the attribute analysis in establishing chronological markers or delineating trends is restricted. The multiplicity of attributes confuses the overall picture. The subsequent stage of the analysis reduces the number of units in order that the relationship between the various zones of the excavation and the surface collections can be investigated.

Stage 2 of the analysis produced a complex mass of data which described the distribution of the attributes within the excavations. The large number of attributes handled in the analysis did not facilitate an economical or clear comparison of the excavated units with the surface sites. For this reason it was deemed necessary to ignore the surface collections at the attribute level of the analysis and emphasise the excavated ceramics. The distribution of the attributes was plotted by the computer. The bulk of the tables negated their complete presentation within this study.

Stage 3 of the analysis

The next logical step would then be one which reduced the number of rim form units by forming groups which were internally homogeneous with respect to the other attribute classes. This meant designing a system which would place relatively similar rim forms into a specific group if they shared a significant number of attributes with the other members of that group. The procedure used to accomplish this is outlined below.

**Step A.** The entire sample of 6,210 rim sherds was regarded as a single unit. Matrixes were constructed using the 115 rim forms defined in the analysis, grouped in terms of the five major subunits of Class VII, Rim form (fig 22).
1) direct rims belonging to restricted spherical vessels
2) everted or thickened rims belonging to various jar forms
3) rims belonging to restricted composite vessels
4) rims belonging to unrestricted vessels
5) rims belonging to composite vessels having a shoulder to lip height greater than 3.5 cm.

The matrixes were of the two-way correlation type and plotted each rim form in terms of four specific attributes: exterior surface finish, rebating, lip decoration and body decoration. These attribute classes were considered as having a high information content. Classes such as; rim decoration, shoulder decoration and appendages, had too many sherds in the plain, 'not observable' or 'not applicable' categories to be of much utility in defining groups. Twenty matrixes were produced. Their size vitiated presentation within this study and they remain in the archives of the Department of Prehistory, ANU.

Step B. The matrixes resulting from Step A were subjected to a proximity analysis in order to determine which rim forms could be clustered together on the basis of shared attributes. The technique employed is known as the Brainerd (1951) and Robinson (1951) method. This method is usually employed to order archaeological deposits; however, the agreement coefficient can be used to define relationships which exist between groups of artifacts. If we can use the agreement coefficient to state that Zone X is related to Zone Y on the basis of a numerical index of the degree to which the two zones have similar proportions of ceramic types; then the same method could be used to state that rim form X is related to rim form Y on the basis of their sharing similar ratios of specific attributes.

The agreement coefficient in this instance was calculated by taking all possible pairs of rim forms within each of the 5 subunits and subtracting the differences between the percentages of the attributes from 200. The maximum agreement between each pair is 200 and complete disagreement scores as 0. It was then possible to plot the agreement between rim forms as a series of links (Renfrew and Sterud 1969). When rim forms proved to be closely linked, they were considered a cluster. The use of four separate and independently derived matrixes multiplied the work but
served as a valuable cross-check. Rim forms which were related by the agreement coefficient in terms of lip decoration were only placed in the same cluster if they also had a high agreement with respect to exterior surface finish, rebating and body decoration.

Step C. The previous step defined clusters, each of which contained one or more rim forms, which often needed further refinement. Since these clusters were formed by a coefficient of agreement based upon the magnitude of similarity, certain distinctive and significant minority attributes lost their power of discrimination. In other words, rim forms would belong to the same cluster if they had a similar distribution of attributes; however, within this cluster there might be a group of rim forms having a distinctive attribute which was not possessed by the other members of the cluster. Thus, a cluster might include ten rim forms, five of which shared the minority attribute notching as an element of lip decoration and five which did not. This cluster could then be split into two groups: those possessing the distinctive attribute as one group and the remaining rim forms as a second group.

Only one distributional criterion was employed when searching for groups. Rim forms commonly occurring in Mound D were seldom grouped with those rim forms which were not present in the Mound D deposits. The radiocarbon dates indicate that the ceramics from Mound D were deposited c. 600 B.P. With this rather tight temporal control, it seemed best to regard the ceramics commonly found in Mound D as a discrete unit which should be kept uncontaminated by material not found in this context.

Step D. The resulting clusters were termed ceramic groups and labelled alphabetically (fig 13). Ceramic Group Z is composed of rim forms which did not fit into any particular cluster. For the most part the unassigned rim forms represented a very few sherds and amounted to 12% of the 6,210 sherds analysed.

Not all of the groups can be considered as being equally tight knit units. Ceramic Groups G, J, O and perhaps L are weak internally, in so far as their individual members frequently possess disproportionate numbers of
Figure 13. The ceramic groups
specific attributes.

**Stage 4 of the analysis**

The groups are described (figs 14-18) and their distribution in the excavations and surface collections plotted. Figure 19 is concerned with the excavated sherds as proportions by sherd count, while figure 20 presents the proportions using the 'percentage factor'. It is quite clear that the general trend in the distribution of the ceramic groups remains the same regardless of which method is used. However, the 'percentage factor' method, which factors all sherds representing 0% to 5% of the vessels rim by 2.5, 5% to 10% by 7.5, 10% to 15% by 12.5, etc., noticeably alters the proportions of some ceramic groups. This is particularly true with respect to Group W sherds in Mound B. Ceramic Group W was considerably inflated, indicating that large sherds of this variety were present in the upper zones of Mound B.

The material from the surface collections is graphed in figure 21. The data from the 'percentage factor' count is presented rather than that from the sherd count. The seriation is the same regardless of which method is employed. The ordering of the surface collections is considered in a subsequent chapter and the graphs are presented at this point only to illustrate the distribution of the ceramic groups, not the seriation of the surface sites.

**The Ceramic Groups**

An outline of each of the 25 ceramic groups is presented which summarizes the salient aspects of their composition, form, decoration and distribution. Each ceramic group in figures 19, 20 and 21 is represented by an idealised vessel form. In certain cases the step from rim form to vessel form is not at all secure. The procedure used was one which selected the dominant rim form of the group and a reconstruction of the typical vessel was based upon this form. A few of the ceramic groups include rim forms which obviously belong to different vessel styles. This certainly is the case with Group J. In that instance Rim form 16 was selected because large sherds were present in the
### Ceramic Group

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**tn** = Total sherd sample  
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**σ** = Expected value of sample variance of O.R.  
**O.R.** = Orifice radius external surface

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**Exterior Surface Finish**

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**3** = Grainy Texture  
**4** = Rough Texture  
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**Ceramic Group**

**Presence of Rebatings**

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see Appendix IV (fig 22) for attribute code

Figure 14. Ceramic groups:

- sample size and mean orifice radius

Figure 15. Ceramic groups:

- exterior surface finish

Figure 16. Ceramic groups:

- presence of rebating
| Ceramic Group | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| A            | .95 | .01 |    |    |    |    |    | .04 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| B            | .59 | .03 | .02 | .08 | .09 | .02 | .01 |    | .02 | .02 | .15 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| C            | .45 | .12 | .09 | .07 | .08 | .02 | .01 |    | .05 | .01 | .10 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| D            | .25 | .31 | .26 | .04 | .03 | .05 | .00 | .01 | .01 | .01 | .01 | .01 | .01 | .02 |    |    |    |    |    |    |    |    |    |    |    |    |
| E            | .56 | .07 | .09 | .05 | .10 | .01 |    | .01 | .01 | .01 | .05 | .03 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| EE           | .32 | .23 | .25 | .01 | .04 | .00 | .08 | .01 | .01 | .01 | .03 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |
| F            | .53 | .24 | .11 | .03 | .00 | .02 | .03 | .01 | .01 | .01 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| G            | .50 | .12 | .07 | .08 | .01 | .01 | .01 | .05 | .06 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| H            | .53 | .08 | .05 | .04 | .04 | .02 | .05 | .03 | .01 | .02 | .04 | .05 | .01 | .01 | .01 | .01 |    |    |    |    |    |    |    |    |    |
| I            | .69 | .08 | .01 | .01 | .05 | .04 | .01 | .05 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| J            | .83 | .01 | .01 | .01 | .02 |    | .01 | .08 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| K            | .78 | .05 | .01 | .01 | .01 | .01 |    | .13 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| L            | .91 | .01 | .01 | .01 | .02 | .02 | .02 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| M            | .80 | .01 | .03 | .03 | .10 |    |    | .03 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| N            | .91 | .03 | .01 | .04 |    |    |    | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| O            | .91 | .05 | .02 |    |    |    |    | .02 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| P            | .83 | .02 | .03 | .01 |    |    |    | .03 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Q            | .90 | .02 | .01 | .01 | .01 | .01 | .01 |    | .01 |    |    | .01 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |
| R            | .73 | .05 | .02 | .04 | .02 | .03 | .02 | .01 |    | .02 |    | .04 |    | .02 | .01 |    |    |    |    |    |    |    |    |    |    |
| S            | .80 | .03 | .03 | .03 | .08 | .08 | .03 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| T            | .72 | .06 | .01 | .01 | .06 | .07 | .07 |    | .06 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| U            | .88 | .01 | .01 | .01 | .04 | .01 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| V            | .89 | .03 | .01 | .00 | .05 | .01 | .01 | .01 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| W            | .80 | .06 | .15 | .01 | .09 | .04 | .03 | .02 |    | .06 |    |    |    |    |    |    |    |    |    |    |    |    |    |
| X            | .55 | .11 | .04 | .02 | .02 | .09 | .04 | .03 | .02 |    | .06 |    |    |    |    |    |    |    |    |    |    |    |    |    |

0 = present

see Appendix IV (fig 22) for attribute code

Figure 17. Ceramic groups: decorative elements on lip area
| Ceramic Group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| A            | .02 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| B            | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 |
| C            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| D            | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 | .06 |
| E            | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 |
| EE           | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 | .07 |
| F            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| G            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| H            | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 |
| I            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| J            | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 |
| K            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| L            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| M            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| N            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| O            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| P            | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 | .08 |
| Q            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| R            | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 |
| S            | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 | .03 |
| T            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| U            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| V            | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 | .01 |
| W            | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 |
| X            | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 | .02 |

0 = present

see Appendix IV (fig 22) for attribute code

Figure 18. Ceramic groups: decorative elements on body area  Part 1 of 2
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*<sup>45</sup> - sherds too small to determine if vessel is decorated on the body
*<sup>46</sup> - sherds large enough to determine that body decoration is positively absent  see Appendix IV (fig 22) for attribute code
0 = present

Figure 18. Ceramic groups: decorative elements on body area Part 2 of 2
Figure 10. The distribution of ceramic groups in Mounds B, C, and D, using the 'cluster count'.
DISTRIBUTION

Excavations: Only a few, probably intrusive, sherds were found in Mounds B, C and D (figs 19-20).

Surface collections: This group is found on sites in the Collingwood Bay area and on the Trobriand Islands (fig 21). The basic pot form is similar in both regions; however, the decorative elements found on the vessels are distinctive. On the Trobriand Islands, shallow channeled motifs (Bd 41, 42 and 43) are common. The Collingwood Bay sherds are decorated with applied ridges (Bd 8). These two subgroups are mutually exclusive and indicate that modern (c. 1890-1960) Wanigela ceramics were not acquired by the Trobriand Islanders, which fits in with the historical and ethnographic evidence of pottery trade to the Trobriands (Lauer 1970). Ceramics belonging to the D'Entrecasteaux subgroup have been produced in the Amphlett Islands and traded to the Trobriand Islands (Lauer n.d.). Inclusions of talc in a number of the sherds indicates that the clay used to make these pots probably comes from the D'Entrecasteaux Islands (C. Key, pers.comm.).

DISCUSSION

A roughly spherical vessel with a simple restricted rim is produced in Wanigela and was made on the Amphlett Islands. In general form they are similar; however, the Amphlett vessel usually has a more abrupt shoulder and where the Wanigela pot is nearly spheroid in profile the Amphlett pot tends to be ellipsoid. The Wanigela wares are decorated with raised shell impressed ridges and the Amphlett vessels have shallow grooves and stippled motifs (Lauer n.d.:pls 39-47).

CERAMIC GROUP B

Rim forms: 31 and 32; 223 rim sherds (figs 13-14)

FORM AND DECORATION

Shape: The generalised vessel form of this group is that of a relatively straight necked jar with a slightly everted and thickened rim.
Rebating: More than 72% of the sherds in this group exhibit rebating (fig 16).

Exterior surface finish: Approximately 50% of this group have a smooth finish while slightly over 20% are burnished (fig 15).

Lip decoration: The technique used most commonly is shell impressing (Ld5 and Ld15= 24%), although a fairly wide range of decorative elements is present. Over 50% of the lips are plain (fig 17).

Body decoration: Simple channeling (Bd 11 and Bd 12) is the commonest decorative device and accounts for 11% of the sherds. The body region is definitely plain on 73% of the rim sherds (fig 18).

DISTRIBUTION

Excavations: This group has its strongest representation in the basal half of Mound C. It also constitutes over 10% of the sherds in the basal zone of Mound B. Mound D is devoid of this ceramic group (figs 19-20).

Surface collections: The group is present in the surface collections from sites whose ceramic constituents closely resemble those found in the basal sectors at Mounds B and C (fig 21). These sites are Col. 10, 13, 14, 18, 20 and 21. Tro. 1 has the strongest representation (8%) in the Tro-briand Islands. This site is characterised by a high frequency of ceramic Groups P and Q.

DISCUSSION

(See Group C; discussion)

CERAMIC GROUP C

Rim form: 33; 214 rim sherds (fig 13-14)

FORM AND DECORATION

(pl 5c-d)

Shape: This is the same basic vessel form as that characterising Group B, that is a jar with a relatively straight neck and slightly everted rim.

Rebating: Rebating is present on only 40% of the sherds
as opposed to the 73% found in Group B (fig 16).

**Exterior surface finish:** Smooth sherds account for 64% of this group and burnishing for another 28% (fig 15).

**Lip decoration:** Punctation or short line incision (Ld 2, Ld 3 and Ld 4) decorates 28% of the lips (fig 17). Shell impressing (Ld 5 and Ld 15) is found on 18% of the lips.

**Body decoration:** This group is similar to Group B in that 73% of the sherds are plain and 7% are decorated with simple channeling (Bd 12) (fig 18).

**DISTRIBUTION**

**Excavation:** Group C constitutes 35% of the sherds in the basal zone of Mound B and is limited to the lower zones at Mound C. It has a restricted appearance in Mound D (figs 19-20).

**Surface collections:** Surface collections in the Collingwood Bay region, containing sherds of this group, are the same as those listed as having ceramics of Group B (fig 21).

**DISCUSSION**

This straight necked jar form resembles Group B in general form and in having a distribution which is strongest in the basal sectors of Mounds B and C. In Zone IVB of Mound B, ceramic Group C accounts for 35% of the pottery and in Feature 3 of Mound C for 15% of the sherds. However, a fair number occur in the upper zones of Mound B. These zones produced the aberrant radiocarbon dates (ANU-371A and ANU-371B) and their status will be discussed later in the summary of the ceramic analysis.

Group B differs slightly from C in the shape of the rim. Group B, with shell impressing (Ld 5 and Ld 15), is more common in Mound C, while Group C with punctation (Ld 2, Ld 3 and Ld 4) is somewhat better represented in Mound B. Both Groups B and C are predominately plain (72%) in respect to body decoration with simple channeled motifs occurring on some sherds. This decoration usually lies some distance below the rim on the vessel's body rather than adjacent to the rim as is found in Group D.
CERAMIC GROUP D

Rim forms: 6 and 7; 929 rim sherds (figs 13-14)

FORM AND DECORATION
(pl 5e)

Shape: A markedly everted rim on a globular vessel characterises this ceramic group.

Rebating: This attribute is present on 16% of the sherds (fig 16)

Exterior surface finish: 66% of the sherds are smooth on the exterior and 14% are burnished (fig 15).

Lip decoration: Punctation (Ld 2) decorates 31% of the lips and short line incision (Ld 3) is found on 26% of the sherds (fig 17). Only 25% of the lips are plain.

Body decoration: Punctation (Bd 3 = 7%) and channeling (Bd 11 and Bd 12 = 12%) are the commonest decorative techniques. Plain sherds account for 33% of this group (fig 18).

DISTRIBUTION

Excavations: Ceramic Group D is well represented in Mounds B and D (figs 19-20). It is strongest in the upper zones of Mound B and throughout Mound D.

Surface collections: This group is best represented in the Collingwood Bay collections (fig 21). Group D represents 35% to 48% of the ceramics found at sites Col. 3, Col. 19, Col. 26, and Col. 27. Tro. 25 has a significant quantity (25%) of this group in its collection; only two other sites have greater than 5% (Tro. 7 and Tro. 24).

DISCUSSION

Ceramic Group D has a distribution which acts in opposition to that of Groups B and C. The globular vessel with a gradually everted rim appears to be a middle to late mound manifestation with only small quantities occurring in the basal zones of Mound C and Zone IVB of Mound B. Group D is found in significant quantities on sites Col. 26 and Col. 27. These sites are situated deep within a mangrove swamp 0.5 km south of Rainu. Although Group D is best
represented on these more or less isolated sites, it is also common on other sites in the Collingwood Bay region.

CERAMIC GRUP E

**Rim form:** 8; 72 rim sherds (figs 13-14)

**FORM AND DECORATION**

**Shape:** This group falls midway in form between the jars with a relatively straight neck (Groups B and C) and the globular vessels with a slightly constricted neck and expanded body (Group D).

**Rebating:** More than 47% of the sherds are rebated (fig 16).

**Exterior surface finish:** 62% of the sherds have a smooth surface finish, 30% are burnished and almost 5% manifest the intensive burnishing which has been labelled polishing (fig 15).

**Lip decoration:** Linear incision (Ld 3) is present on 9% of the sherds, shell impressing (Ld 5 and Ld 15) on 15%, punctation (Ld 2) on 7% and oblique incision (Ld 4) on 5%. The lip area is plain on 56% of the sherds (fig 17).

**Body decoration:** The majority (73%) are plain, and horizontal channeling (Bd 11 = 7%) or complex channeling (Bd 1 = 5% and Bd 18 = 2%) are the only forms of body decoration which occur on more than 2% of the sherds (fig 18).

**DISTRIBUTION**

**Excavations:** Group E has its strongest representation in the lower halves of Mound B and C (figs 19-20). It is restricted in Mound D to a few sherds in Zone IA.

**Surface collections:** This group is not found on the Trobriand Islands (fig 21). The 4% recorded for site Col. 11 is its strongest representation in the Collingwood Bay surface collections.

**DISCUSSION**

Group E, as a relatively straight necked jar form, is similar to Group B and Group C. As a minority group it never amounts to more than 10% of any zone in the mounds or more than 4% of any surface collection. In the
excavations, it is best represented in Mound C with a lower frequency of occurrence in Mound B. It is present only in Zone IA of Mound D.

CERAMIC GROUP EE

Rim form: 9; 311 rim sherds (figs 13-14)

FORM AND DECORATION
( pls 5f and 6a)

Shape: A gradually everted rim on a globular vessel.
Rebating: This attribute is present on only 15% of the sherds (fig 16).
Exterior surface finish: In this group 70% of the sherds are smooth and 12% are burnished (fig 15).
Lip decoration: Group EE has 25% of the lips decorated with linear incision (Ld 3), 23% with punctation, while 32% are plain (fig 17). To some degree this resembles the lip decoration of Group D.
Body decoration: 41% are without decoration. Punctation (Bd 3 = 7%) and simple channeled motifs (Bd 11 = 7% and Bd 12 = 3%) are the most popular decorative techniques (fig 18).

DISTRIBUTION

Excavation: Mound D is marked by a substantial number of Group EE sherds (figs 19-20). The lower zones of Mounds B and C also have Group EE ceramics.
Surface collections: In the Collingwood Bay region and on the Trobriand Islands, Group EE is commonly found on the sites which also contain Group D ceramics (fig 21).

DISCUSSION

It is readily apparent that Group EE and Group D are related in many respects. On ceramics on both groups rebating is not common (15% to 16%), most of the exteriors are smoothed (66% to 70%) and only 25% - 32% have plain lips or undecorated bodies. In the surface collections the groups tend to occur on the same sites. However, the distribution of Group EE within the excavations presents
some problems. In Mounds B and C it is best represented in the basal zones. In Mound D it constitutes over 35% of Zone IIIA.

CERAMIC GROUP F

Rim forms: 11, 12 and 13; 489 rim sherds (figs 13-14)

FORM AND DECORATION

(pl 6b)

Shape: A thickened everted rim on an almost straight necked jar is the general form characterising this group.

Rebating: 12% of the sherds are rebated (fig 16).

Exterior surface finish: The majority are smooth (77%) and only 6% are burnished (fig 15).

Lip decoration: Punctation (Ld 2 = 24%) is the dominant technique and short line incision (Ld 3 = 11%) is second in importance (fig 17). 53% of the lips are plain.

Body decoration: Group F is distinctive in its high frequency (22%) of punctation (Bd 3). Another 11% are channeled and punctated (Bd 22). 17% are decorated with complex channeled motifs (Bd 37 and Bd 38) which are often combined with raised ridges (fig 18).

DISTRIBUTION

Excavations: This group is best represented in the basal halves of Mounds B and C (figs 19-20). Although 17% of this group are decorated with complex motifs (Bd 37 and 38), not one of these was derived from the mound deposits.

Surface collections: Group F is well represented in the surface collections where it often accounts for more than 20% of the ceramics (fig 21).

DISCUSSION

Within the mound deposits, Group F is best represented in Mound C. As such it is limited to less than 15% of the ceramics found in any single zone. In the surface collections from the Trobriand Islands and Collingwood Bay it frequently accounts for 20% to 30% of the ceramics.
CERAMIC GROUP G

Rim forms: 22 and 23; 508 rim sherds (figs 13-14)

FORM AND DECORATION
(pl 6c)

Shape: The straight neck found on this ceramic group is similar to that of Groups B and C; however, the body of the vessel is slightly globular in appearance. This means that Group G falls midway in form between the straight necked jar of Groups B and C and the globular pots of Group D.

Rebating: 44% of the sherds are rebated (fig 16).

Exterior surface finish: Within this group 73% are smooth and 21% are burnished (fig 15).

Lip decoration: The common decorative elements are present in the following proportions: punctation (Ld 2), 12%; incision (Ld 3 and Ld 4), 15%; and shell impressing (Ld 5 and Ld 15), 13%. 50% of the lips are plain (fig 17).

Body decoration: The most common decorative elements are channeling (Bd 11, Bd 12 and Bd 13 = 13%) and punctation (Bd 3 = 2%). 61% of the rim sherds have plain bodies (fig 18).

DISTRIBUTION

Excavations: This group is found in Mounds B, C and D (figs 19-20). Its most significant occurrence is in Mound D. There it is strongest in the basal zones and gradually diminishes towards the surface of the mound.

Surface collections: Although ceramics of this group were found in 20 of the 30 surface collections, on only four sites (Col. 10, Col. 19, Col. 26 and Col. 27) did it constitute more than 10% of the ceramics. All these sites are marked by the presence of ceramic Groups D, EE and Q. Two of these, Group D and Group EE, are forms with gradually everted rims (fig 21).

DISCUSSION

It appears as if Group G falls midway between the straight necked jar forms (Groups B, C and I) and the globular styles with gradually everted rims (Groups D and EE).
The two rim forms (Rf 22 and Rf 23) which comprise this ceramic group do not form a tight cluster with respect to their decorative attributes. This is the weakest unit formed by the grouping procedures and should be regarded as such.

CERAMIC GROUP H

Rim forms: 26, 27, 28; 238 rim forms (figs 13-14)

FORM AND DECORATION

Shape: The heavy thickening of the lip area and the general vessel form are similar to those described for Group F.

Rebating: 61% of the rims are rebated (fig 16).

Exterior surface finish: 78% of the sherds in this group are smooth and 14% are burnished (fig 15).

Lip decoration: The attributes commonly used on Group H vessels are similar to those found on Group G: punctation (Ld 2), 8%; incision (Ld 3 and Ld 4), 9%; and shell impressing (Ld 5 and Ld 15), 9%. Linear incision (Ld 7 = 4%) is present and 53% of the lips are plain (fig 17).

Body decoration: Punctation (Bd 3 = 5%) and simple channeling (Bd 11 and Bd 12 = 8%) appear along with a significant quantity of more complex motifs (Bd 37 and Bd 38 = 8%). With respect to the Bd 37 and Bd 38, this group resembles Group F (fig 18).

DISTRIBUTION

Excavations: The only significant occurrence of Group H is in the upper zones of Mound C. No other ceramic group is distributed in this fashion (figs 19-20).

Surface collections: Sites where Group H sherds are present also tend to have a significant quantity of Group F ceramics (fig 21).

DISCUSSION

Group H resembles Group F in its reinforced lip area, vessel form and in the high proportion of elaborate channeled motifs which decorate the body area. The two
groups appear in the same surface collections; however, Group F is strongest in the lower half of Mound C with Group H replacing it in the upper zones of the same mound.

CERAMIC GROUP I

Rim forms: 34 and 35; 65 rim sherds (figs 13-14)

FORM AND DECORATION

(pl 6d)
Shape: A straight necked jar with a thickened lip distinguishes this group.
Rebating: 81% are rebated. This is the highest proportion found in the ceramic groups (fig 16).
Exterior surface finish: 58% of the sherds are smooth and 30% are burnished (fig 15).
Lip decoration: Plain lips are common (69%), with punctuation (Ld 2 = 8%) and oblique incision (Ld 4 = 7%) being the most important decorative techniques. Shell impressing (Ld 5 = 5%) and finger nail impressing (Ld 6 = 4%) are also encountered (fig 17).
Body decoration: Group I has a high proportion of plain bodies (77%) and a limited variety of decoration (fig 18). Channeled arcs (Bd 30 = 7%), channeled oblique lines (Bd 12 = 2%) and channeled - punctate motifs (Bd 22 = 2%) are the only elements occurring on at least 2% of the bodies.

DISTRIBUTION

Excavation: The only significant occurrence of Group I is in the basal zones of Mound C (figs 19-20).
Surface collections: Group I seldom accounts for more than 5% of any collection and does not appear to be commonly found with any particular suite of ceramics (fig 21).

DISCUSSION

This is a straight necked jar form which is best represented in the basal zones of Mound C. To this extent it conforms with the general trend established for the other straight necked jar forms found in the excavation.
CERAMIC GROUP J

Rim forms: 14, 15, 16, 17, 18, 19, 20; 168 rim sherds (figs 13-14)

FORM AND DECORATION

Shape: This group is characterised by a relatively flat lip on a variety of jar forms.

Rebating: Less than 10% of the rims are rebated (fig 16).

Exterior surface finish: Group J has the highest group frequency of smoothed sherds (80%) (fig 15).

Lip decoration: 82% of the lips are plain. Notching (Ld 13 = 8%) is the most commonly applied decorative technique (fig 17).

Body decoration: Two decorative techniques mark this group as unusual (fig 18). Bd 34 (a criss-crossed incised pattern) and Bd 35 (a series of shell-edge impressions) are found on 11% of the sherds. 53% of the ceramics are plain.

DISTRIBUTION

Excavations: This group is found scattered throughout Mounds B and C, but never accounts for more than 5% of the ceramics in any zone (figs 19-20).

Surface collections: In the material from Col. 11, Group J represents 54% of the ceramics (fig 21). At this same site Groups S and Q are present (13% and 12%) as is Group G (5%). Other ceramics appear in quantities accounting for less than 4% of the sherds found at these sites.

DISCUSSION

Group J is definitely unique in form and decoration. Most of the sherds found in Mounds B and C were small and battered. As such, small quantities are found throughout Mound C and a lesser amount comes from Mound B.

The form depicted as typical of this group is a straight necked jar form. Of the seven rim forms (Rf 14-20) included in this group, this was the single vessel shape which could be positively reconstructed. It is readily apparent that a variety of vessel forms are included in
the group. Some of these have constricted necks and expanded bodies. Although it contains a number of vessel styles, Group J is internally homogeneous with respect to rebating, surface finish and vessel decoration. A flat lip area is found predominantly on sherds of this group.

CERAMIC GROUP K

Rim forms: 38, 39, 40 and 41; 253 rim sherds (figs 13-14)

FORM AND DECORATION

(pl 6f)

Shape: Shallow bowl forms with restricted rims are typical of this group.
Rebating: This attribute is present on 25% of the rim sherds (fig 16).
Exterior surface finish: 54% of the sherds are smooth and 34% are burnished (fig 15).
Lip decoration: 78% are plain and 13% are decorated with a single channel or groove (Ld 8). Punctuation (Ld 2), the next commonest element, is found on 5% of the lips (fig 17).
Body decoration: 23% of the sherds are decorated with horizontal channels (Bd 11) and 7% with a complex motif consisting of channeling and raised ridges (Bd 38). 38% of the ceramics are plain (fig 18).

DISTRIBUTION

Excavations: Group K is best represented in the lower zones of Mound C. It appears in small quantities throughout Mounds B and D (figs 19-20).
Surface collections: This group is present in the majority of the collections. It does not regularly appear with any particular suite of ceramic groups (fig 21).

DISCUSSION

Group K is strongly represented in the middle and lower zones of Mound C. The form is common throughout the surface collections and excavations, indicating that this rather simple bowl form with a restricted orifice was pro-
duced over a considerable span of time.

CERAMIC GROUP L

Rim forms: 44, 45, 46, 47, 48 and 49; 98 rim sherds (figs 13-14)

FORM AND DECORATION
(pl 6g)

Shape: An irregular thickening of the rim area, on either the exterior and/or the interior, is common on this shallow to deep bowl form.

Rebating: Rebating is found on 49% of the rims (fig 16).

Exterior surface finish: 41% of this group have a smooth finish and 46% are burnished (fig 15).

Lip decoration: 91% of the lips are plain (fig 17).

Incised (Ld 7 = 3%) or channeled (Ld 8 = 2%) grooves are the only relatively common decorative techniques found on the lips of this group.

Body decoration: Horizontal channeling (Bd 11 = 13%) and oblique channeling (Bd 12 = 3%) are the commonest forms of decoration in a group where 46% of the sherds are without body decoration (fig 18).

DISTRIBUTION

Excavations: This group is present in virtually all of the zones of Mounds B and C. It is found in only one zone of Mound D (figs 19-20).

Surface collections: Group L has its strongest representation in the collection from Col. 20 (11%). Ceramic Group B (18%) is the most common ceramic group found on this same site (fig 21).

DISCUSSION

This ceramic group is virtually absent from Mound D and is best represented in Mounds B and C. As such it could be considered to be an early to middle mound phenomenon.
Rim forms: 42, 52 and 53; 130 rim sherds (figs 13-14)

FORM AND DECORATION

Shape: The group is composed of restricted bowls with composite profiles. Shoulders are pronounced and often have a slight flange. Shallow bowls can be easily reconstructed and there are indications that deeper bowls also belong to this group.

Rebating: 27% of the sherds are rebated (fig 16).

Exterior surface finish: 33% of the sherds are smooth and 52% are burnished (fig 15). Polishing is present on 11% of the ceramics.

Lip decoration: A single channel (Ld 8 = 10%) is the commonest decoration; however, this area of the vessel is left plain on 80% of the sherds (fig 17).

Body decoration: The body of the vessel is decorated with horizontal channels (Bd 11 = 29%), punctated (Bd 3 = 3%) or left plain (38%). 22% of the sherds were broken at or near the shoulder and only a small portion of the vessel's body remained attached to the rim. These sherds were placed in the category 'not observable', since it was impossible to discern not only the mode of decoration, but if indeed they were decorated (fig 18).

DISTRIBUTION

Excavations: Group M is found in every zone of Mound C and scattered throughout Mounds B and D (figs 19-20). In this respect it is comparable with Group K, also a restricted bowl form.

Surface collections: At sites Col. 11 and Col. 20, Group M has its highest frequency of occurrence (approximately 6%) in the surface collections (fig 21). Group K is also found at these sites. However, in a number of surface collections (sites Col. 6, Col. 14, Col. 28, Tro. 7 and Tro. 21) where Group K is relatively common, Group M is absent.

DISCUSSION
The paucity of Group M sherds in Mound D indicates that
its period of greatest use lies before this midden's accretion. The surface collections from sites Col. 11 and Col. 12 confirm this by the constant association of Group M with ceramics which are best represented in Mound C or the lower zones of Mound B (Groups B, C, E, F, K, M, R and S). However, since this group never amounts to as much as 10% of any single excavation zone or surface collection, its placement in time and its relationship to other ceramic groups must be regarded as tentative.

CERAMIC GROUP N

Rim forms: 50 and 51; 73 rim sherds (figs 13-14)

FORM AND DECORATION
(pl 8a)

Shape: The typical vessel is a hemispherical bowl with a sharp break at the shoulder. The shoulder area is thickened and the rim consists of a short inward projection of the body wall.

Rebating: None (fig 16).

Exterior surface finish: 81% of the sherds are smooth and 4% are burnished (fig 15).

Lip decoration: 91% of the lips are plain (fig 17). A small fraction are incised (Ld 7 = 4%) or punctated (Ld 2 = 3%).

Body decoration: 66% of the vessels appear to be without body decoration. A shallow channeling of angular (Bd 41 = 14%) or curvilinear (Bd 43 = 13%) motifs is common (fig 18).

DISTRIBUTION

Excavations: None.

Surface collections: This group is limited to the Trobriand Islands where it is present in sizeable quantities (fig 21).

DISCUSSION

(See Group O; discussion).
CERAMIC GROUP O

Rim form: 43; 67 rim sherds (figs 13-14)

FORM AND DECORATION
(pl 8b)

Shape: A hemispherical bowl comprises this group. The shoulder presents a definite break in the profile which is less abrupt than that found upon Group N vessels.

Rebating: None.

Exterior surface finish: Burnishing and polishing are not found on sherds of this group. Virtually all of the vessels have smooth exteriors (88%), except for 1% which are slipped with a red iron oxide compound. 11% of the sherds have their exterior eroded to such an extent that the nature of the surface finish is undefinable (fig 15).

Lip decoration: Only four techniques were used to decorate the lips: punctation (Ld 2 = 5%); incision (Ld 4 = 2%); a single channel (Ld 8 = 2%); and notching (Ld 13 = 2%). The remaining 91% are plain (fig 17).

Body decoration: The use of shallow channels to decorate the body area is common (Bd 40, Bd 41, Bd 42 and Bd 43 = 22%). 60% of this group have plain bodies (fig 18).

DISTRIBUTION

Excavations: None.

Surface collections: Group O is limited entirely to the Trobriand Islands and is commonly found upon historic sites (fig 21).

DISCUSSION

Groups N and O are products of the northern D'Entrecasteaux Islands and are frequently found on sites ranging from prehistoric to modern. Lauer (n.d.) describes the manufacture of vessels having this same general form and rim profile. The ceramic producing community of Buduna, in the northern sector of Goodenough Island, regularly produces vessels having the same form and rim profile as Group N. Lauer also describes the production of ceramic vessels at Gumawana in the Amphlett Islands. There the
women make a large cooking pot, the nokuno, which has the same rounded shoulder as is characteristic of Group O. This in turn is similar to the kaokao which was produced and traded to the Trobriand Islands during the early historic period (Lauer n.d.; Malinowski 1922, 284-86). Shallow channeled decorative motifs (Bd 41 and Bd 43) are only found on sherds belonging to Group O, Group N and that portion of Group A which was manufactured in the D'Entrecasteaux Islands.

CERAMIC GROUP P

**Rim forms:** 68, 71, 72, 73, 74 and 75; 138 rim sherds (figs 13-14)

**FORM AND DECORATION**

(pl 7a, b and d)

**Shape:** This group consists of shallow bowls with thickened or flanged lips. Only one vessel of this category has been reconstructed. This is a shallow dish on a pedestal. The lip flange is pierced by triangles and the pedestal has rectangular cutouts.

**Rebating:** Only 5% of Group P is rebated (fig 16).

**Exterior surface finish:** 75% of the sherds are smooth with only 5% being burnished.

**Lip decoration:** The thickened or flanged lip area is pierced or impressed with triangles (Ld 24) on 9% of the rim sherds (fig 17). 83% of the sherds have plain lips.

**Body decoration:** Bd 11, Bd 22 and Bd 23 are the only decorative elements applied to the body area and their combined proportion is 2%. 98% of the sherds are plain or fall into the 'not observable' category (fig 18).

**DISTRIBUTION**

**Excavations:** This group is found in every zone of Mound C (figs 19-20). It never amounts to more than 5% of the ceramics in any of the zones of Mounds B, C or D.

**Surface collections:** In three surface collections Group P amounts to approximately 45% of the sherds (Col. 12, Col. 31-32 and Tro. 2) (fig 21).
DISCUSSION

It is not possible at this time to associate all of the rim forms included in this group with pedestaled dishes; however, the only reconstructable vessel belonging to Group P is pedestaled.

Ceramics with pedestals are morphologically unique in the south-west Pacific. This vessel form is found in South-East Asia (Chang 1968: pl IIIb) but has not been recorded in Melanesia. Its striking resemblance to pedestaled wares described by Solheim (1961) as belonging to the Sa-huynh ceramic complex is remarkable. Further speculation upon this fact and the placement of Group P in the ceramic sequence is reserved for later.

Two distinctive sherds were found on sites where Group P ceramics were in the majority. They belong to a composite bowl form with a restricted rim. The shoulder is delineated by a flange which is decorated with impressed triangles. The field above the flange is embellished with a well executed impressed rectilinear design made with the edge of a shell (pl 7c).

CERAMIC GROUP Q

Rim forms: 60, 61, 62, 63, 64 and 65; 628 rim sherds (figs 13-14)

FORM AND DECORATION
(pl 8c - f)

Shape: This group includes a diverse collection of six basic rim forms. The commonest form is a shallow bowl with a direct rim; however, some of the bowls are relatively deep and have a composite profile.

Rebating: Rebating is present on 29% of the sherds (fig 16).

Exterior surface finish: The exterior of the vessel is frequently burnished (24%) or polished (6%). 57% of the sherds have a smooth surface finish (fig 15).

Lip decoration: 90% of the rim sherds have undecorated lips and a wide spectrum of decorative elements is found on the remaining 10% (fig 17).
Body decoration: Channeling (Bd 11 and Bd 12 = 16%), punctation (Bd 3 = 8%) and complex combinations of channeling and raised ridges (Bd 38 = 5%) are the commonest of a variety of decorative elements found upon the ceramics of Group Q. 46% of the rim sherds are without body decoration (fig 18).

DISTRIBUTION

Excavations: Group Q is prevalent in Mound B and present to a lesser degree in Mounds C and D. An enigmatic bi-modal distribution is a feature of Mound D (figs 19-20). Surface collections: This group is present on all but one of the surface sites which provided material for this analysis (fig 21).

DISCUSSION

The wide range of decorative elements described for the body area, and of rim forms represented, suggests that the group is too diverse to have explicit meaning. This supposition is supported by its distribution throughout the excavations and surface collections. It would appear as if Group Q should be interpreted only in very general terms. The simple bowl form comprising this group has its greatest popularity in Mound B. The open bowl form, specifically Rim form 61, is one of the shapes currently being manufactured in the Wanigela area.

CERAMIC GROUP R

Rim forms: 78, 79, 80 and 81; 171 rim sherds (figs 13-14)

FORM AND DISTRIBUTION

(p1 8g)

Shape: The typical form of this group is that of a shallow hemispherical bowl with a labial flange.

Rebating: 44% of the rims are rebated (fig 16).

Exterior surface finish: 52% of the sherds in this group are smooth, 21% are burnished and a small minority (3%) are polished (fig 15).

Lip decoration: 73% of the lips are undecorated, 5% are
punctated (Ld 2), 9% are incised (Ld 3, Ld 4 and Ld 7) and 5% are shell impressed (Ld 5 and Ld 15) (fig 17).

Body decoration: 72% of the sherds are undecorated (fig 18). The commonest form of decoration is a series of horizontal channels (Bd 11 = 8%).

**DISTRIBUTION**

Excavations: This group has its highest frequency of occurrence in the medial zones of Mound C (figs 19-20).

Surface collections: Ceramics of this group are found on many sites in the Collingwood Bay region and on the Trobriand Islands (fig 21).

**DISCUSSION**

This group clusters in the medial zones of Mound C and has a subdued presence in Mound D.

**CERAMIC GROUP S**

**Rim forms:** 84, 85, 86 and 87; 42 rim sherds (figs 13-14)

**FORM AND DECORATION**

(pl 8h)

Shape: This is a composite vessel form which is distinguished by the presence of a concave profile between the shoulder and rim.

Rebating: Rebating is present on 30% of the sherds (fig 16).

Exterior surface finish: 62% of the sherds are smooth, 13% are burnished and 6% are polished (figs 15).

Lip decoration: Only four decorative elements are found upon the lip area of this group: notching (Ld 13 = 8%); punctation (Ld 2 = 3%); ridges (Ld 9 = 3%); and incision accompanied by a channel (Ld 20 = 3%). The remaining 80% are plain (fig 17).

Body decoration: 74% of the bodies are plain (fig 18). A restricted range of decoration appears on the body area. The most significant of these is a motif consisting of criss-crossed incisions (Bd 34).
DISTRIBUTION

Excavations: This group constitutes no more than 2% of the ceramics from any single zone (figs 19-20). As such it is found primarily in Mound C.

Surface collections: Group S accounts for 13% of the ceramics from Col. 16. 53% of the sherds from this same site belong to Group J (fig 21).

DISCUSSION

Criss-crossed incisions (Bd 34) are found on sherds belonging to Groups S and J. This sharing of a relatively rare decorative attribute could speak for some form of a relationship.

CERAMIC GROUP T

Rim forms: 76 and 77; 105 rim sherds (figs 13-14)

FORM AND DECORATION

Shape: The bowls belonging to this group have a composite profile and a slightly flanged lip.

Rebating: Rebating is present on 41% of the rim sherds (fig 16).

Exterior surface finish: This group has a high frequency of burnished sherds (59%) and a correspondingly low percentage of smooth sherds (36%) (fig 15).

Lip decoration: 72% of this group have plain lips, 6% are punctated (Ld 2), 13% have an incised or channeled line (Ld 7 and Ld 8) and 6% are notched (Ld 13) (fig 17).

Body decoration: The commonest form of decoration is channeling (Bd 11 = 9%), in a group where 80% of the sherds are plain (fig 18).

DISTRIBUTION

Excavations: Group T is best represented in the upper deposits of Mound C (figs 19-20). It is scattered in small quantities throughout Mound B and entirely absent from Mound D.

Surface collections: Sherds of this group are seldom found in the surface collections and when present never
constitute more than 3% of the sherds from any given site (fig 21).

DISCUSSION

Of all the contexts in which this group is found, only in the upper zones of Mound C does it amount to more than 5% of the ceramics.

CERAMIC GROUP U

Rim form:  66; 118 rim sherds (figs 13-14)

FORM AND DECORATION

Shape:  The single basic form which this group includes is that of a hemispherical bowl with a lip which is markedly thickened on the exterior.

Rebating:  Rebating is present on 45% of the rim sherds (fig 16).

Exterior surface finish:  10% of the sherds are polished, 36% are burnished and 46% are smooth (fig 15).

Lip decoration:  The majority of the lips in this group are undecorated (88%), with applied dots (Ld 11 = 3%) and channeling (Ld 8 and Ld 18 = 6%) being the commonest form of decoration (fig 17).

Body decoration:  Bd 39, a motif consisting of wavy shell edge impressions, is found on over 4% of the sherds. Many of the sherds of Group U are plain (59%). Incision (Bd 4 = 11%) or channeling (Bd 10 and Bd 11 = 12%) are often encountered (fig 18).

DISTRIBUTION

Excavations:  This group has its strongest distribution in the middle to upper zones of Mound B (figs 19-20). Only a few sherds were recovered from Mounds C and D.

Surface collections:  Group U is found in small amounts on many of the Collingwood Bay sites and on a few of the Trobriand Island sites (fig 21). It never accounts for more than 5% of the ceramics in any collection.
DISCUSSION

Group U is best represented in the middle to upper zones of Mound B; however, it is present in only one zone of Mound D. Since the upper zones of Mound B and most of Mound D have a similar content of ceramic groups, the contrary distributional pattern of this group is striking.

CERAMIC GROUP V

Rim forms: 82; 209 rim sherds (figs 13-14)

FORM AND DECORATION
(pls 8i and 9a)

Shape: This group is composed of hemispherical bowls with a small exterior flange or ridge just below the lip. Often, there is a very slight shoulder no more than one or two centimetres below the lip.

Rebating: 50% of the rim sherds are rebated (fig 16).

Exterior surface finish: The exterior of the vessels are well finished and polishing is common (20%). A fine burnishing was applied to 37% of the sherds and 34% are smooth (fig 15).

Lip decoration: 89% of the lips are undecorated (fig 17). Punctation (Ld 2 = 3%) and a small ridge (Ld 9 = 5%) are the main elements used.

Body decoration: 70% of the vessels have plain bodies (fig 18). Punctation (Bd 3 = 7%) is relatively common and various channeled motifs are also present (Bd 11 = 4%, Bd 21 = 4% and Bd 29 = 3%). 2% of the sherds have a wide channel just below the lip area (Bd 10).

DISTRIBUTION

Excavations: Group V sherds were recovered from the upper zones of Mounds B and C and particularly from Mound D (figs 19-20).

Surface collections: Group V ceramics were not found on the Trobriand Islands (fig 21). In Collingwood Bay this group is found on five sites (Col. 3, 10, 19, 26 and 27). These sites are dominated by Group D and Group EE ceramics.
DISCUSSION

The data from the excavations places Group V towards the terminal end of the mound sequence.

CERAMIC GROUP W

Rim forms: 96, 102 and 105; 58 rim sherds (figs 13-14)

FORM AND DECORATION

(pl 9b)

Shape: This group is a distinctive series of large composite bowls with vertical walls and pronounced shoulders.

Rebating: Rebating is found on 76% of the vessels (fig 16).

Exterior surface finish: The exteriors of the vessels are well formed and finished (fig 15). Polishing (22%) and burnishing (39%) are extensive. 37% of the ceramics are smooth.

Lip decoration: Only two forms of lip decoration are found on Group W ceramics: punctation (Ld 2 = 6%) and channeling (Ld 8 = 15%). The remaining 80% are plain (fig 17).

Body decoration: 12% of the vessels have plain bodies (fig 18). Horizontal channeling is the dominant decorative element (26%).

DISTRIBUTION

Excavations: Group W is strongly represented only in upper zones of Mound B (figs 19-20).

Surface collections: The distribution of Group W is almost identical to that already described for Group V (fig 21).

DISCUSSION

Like Group U, its strong presence in upper Mound B and weak occurrence in Mound D contrasts with the normal ceramic relationship of these deposits.

CERAMIC GROUP X

Rim forms: 98 and 100; 55 rim sherds (figs 13-14)
FORM AND DECORATION
(pl 9c-d)

Shape: The large and robust bowls of this group have marked shoulders, heavily reinforced rims and a large orifice radii (average is 18.025 cms). Four to six handles are found on some of the vessels. The handles consist of large and roughly triangular shaped lugs which when joined at the apex form a strap. This strap usually extends from lip to shoulder. Not every vessel has appendages constructed in this fashion. Some of the handles are not paired triangles, but single triangles and in this form resemble lugs.

Rebating: Rebating is present on 58% of the rim sherds (fig 16).

Exterior surface finish: 53% of the sherds are smooth, 21% are burnished and 13% are polished (fig 15).

Lip decoration: 55% of the lips are plain, 11% are punctated and 10% are channeled (fig 17). A variety of other decorative elements is found on the lips.

Body decoration: Only 11% are plain and the commonest decorative elements are: punctation (Bd 3 = 7%); simple channeling (Bd 11 and Bd 12 = 34%); wide channeling (Bd 9 and Bd 10 = 17%); and complex channeled motifs (Bd 14, Bd 17, Bd 18, Bd 19, Bd 30, Bd 37 and Bd 38 = 29%) (fig 18).

DISTRIBUTION

Excavations: Group X is found scattered throughout Mounds B, C and D (figs 19-20).

Surface collections: When present in the surface collections, Group X sherds are always a decided minority (fig 21).

DISCUSSION

The attributes present on Group X vessels indicate that they are closely associated with most of the ceramics recovered from Mounds B, C and D. However, their exact placement within the mound tradition is difficult. Group X is similar to Group W in having the form of a composite walled hemispherical bowl. In the excavations, both
groups are strongest in Mound B.

CERAMIC GROUP Z

**Rim forms:** All rim forms which have not previously been assigned to a specific ceramic group are placed in this category. (694 rim sherds or 11% of the ceramics analysed)

**SUMMARY**

The ceramic analysis began with the definition of a series of guidelines and the selection of the sherds to be studied. To some extent both of these actions were predetermined. The goal of the analysis had to be an empirical detailed ordering of the material. This was necessitated by the fact that no prehistoric ceramic material from Papua has ever been described in detail. Thus, no previous study could be used to order the ceramics and thereby circumvent the tedious procedure of constructing a classification. The sample of sherds was derived from the only shipment of specimens which had managed to reach the laboratory within six months of my leaving the field.

After the attributes were defined and their distribution charted, the 115 rim forms were clustered by a proximity index. The procedure used involved combining rim forms into ceramic groups on the basis of their sharing common attributes in like proportions. The attributes used were rebating, exterior surface finish, lip decoration and body decoration. This entire process was no mean task and even with the aid of the computer it required two months.

Eighty-nine percent of the sherds were placed into 25 ceramic groups. The remaining small sherds and unique forms were assigned to Group Z. The 26 ceramic groups that are defined and described, when viewed as a whole, synthesise the range of variation found within the sherd sample. Most of the ceramic groups have a mean orifice radius of from 13 to 15 cm (fig 14) with the largest being 19.10 cm for Group P and the smallest being 12.33 cm (Group G). Burnishing is frequent and often intensive on some bowl forms (Groups K, L, T, U, V and W); however, a smooth exterior surface finish is more common within the entire
sample (fig 15). Rebating is extremely specific and almost absent from some groups (Group A = 1% and Group P 5%) while dominating others (Group I = 81% and Group W = 76%). Groups containing the jar forms can be represented as a continuum ranging from globular pots (Group D) to the relatively straight sided jars (Group B). The open and restricted bowl forms are placed into groups which are characterised by the shoulder profile and the degree of modification found upon the lip area.

The globular and jar forms (Groups B to J) frequently have decorated lips while a high proportion of the bowl forms are plain. Body decoration varies from group to group with channeling and punctuation being the most popular elements. Motifs are restricted to fairly simple curvilinear and rectilinear patterns.

Certain ceramic groups have been designated as marginal or unrelated to the basic Collingwood Bay ceramic tradition. Groups N and O are restricted spherical vessels belonging to the D'Entrecasteaux tradition. This tradition appears to be related to the modern Wanigela industry through the spherical vessel form (Group A), which is common to both. The second peripheral cluster of groups (J, P and S) has been tentatively associated with the pedestaled bowl (Group P) by virtue of shared decorative attributes, a common occurrence on specific surface sites and a distribution in the excavations which is limited primarily to a scattered appearance in Mound C.
CHAPTER VI
Implications of the Ceramic Analysis

From the data set out in Chapter V, two major divisions can be isolated with regard to the distribution of the ceramic groups. Groups which are frequently found in the excavations and surface collections belong to the first division. The second division includes groups that are present in the surface collections and weakly represented or absent from the excavations: Groups N and O, which are D'Entrecasteaux wares and restricted to the Trobriand Islands; Group A, with the D'Entrecasteaux subgroup being limited to the Trobriand Islands, and the Wanigela subgroup, representing the recent pottery industry and as such confined to the mainland; and Groups like J, P and F which are found in quantity on some surface sites and account for only a small proportion of the sherds from the excavations.

The Excavated Mounds

The ceramic groups belonging to the first of these divisions can be discussed with regard to their distribution in the stratified excavations. The distribution of the ceramic groups is presented in graphical form (figs 19 and 20) and the following interpretation of these groups could be advanced.

Mound C
There is a continuous and consistent trend through the deposits of Mound C, whereby an initial preference for straight necked pots, (especially Groups B and C, and less so in respect to Group I), as against globular vessels with gently everted rims (Groups D, EE and H), is reversed. The shift has its greatest impact upon the straight necked groups with abrupt and short rim eversion (Groups B and C). Group EE acts contrary to this major trend and actually declines in popularity. Group G, an intermediate jar form that is neither globular nor straight sided, is found throughout the mound. However, Groups E and F, which can also be classified as intermediate, are strongest in the middle to basal zones. Therefore, the intermediate vessel style represented by these three groups is less common in the upper levels.
The full range of bowl forms is present in Mound C, although none of them dominates the deposit. Restricted bowls in the form of Groups K and M are found throughout the mound while the open bowl forms, when present in significant numbers, cluster towards the middle (Group R) or towards the top (Groups T, V and perhaps Q). Figure 23 (Class XIV) indicates that the small quantity of large lug handles present in Mound C decreases through time and that tab handles appear as a minority throughout the deposit.

Mound B

The lower zone of Mound B (IVB) is more closely linked with Mound C deposits than it is with the rest of Mound B. The following considerations link Zone IVB convincingly with the whole of Mound C and particularly with the lower zones. The greater popularity of straight sided jars as against globular pots is evident. This is especially noticeable with respect to Group D, a globular pot which is found in significant numbers throughout Mound B and is all but absent from Zone IVB. Open and restricted bowl forms are present, but not to the degree which is evidenced throughout the other zones of the mound. Furthermore, the zones above IVB, to and including IIC, represent an intensification of the trends developing in Mound C. Upwards through Mound B the globular pot replaces not only the straight sided forms (Groups B, C and I) but also the intermediate forms (Groups E, F and G). Only Group G continues to be of some importance and this is considerably diminished. Of the globular forms, it is Group D which is dominant.

The full range of bowls is present; and, as distinct from Mound C, open bowls are better represented than restricted forms. Group Q is the most significant open bowl and is followed in importance by Groups V and W. Tab and lug handles are rarely encountered (fig 23, Class XIV).

Mound D

The trends established in Mounds B and C are amplified in Mound D (fig 20). Straight sided jars (Groups B, C and I) are all but absent and only Group G of the intermediate forms is present. Group G exhibits a marked decline in the upper zones from relatively high values at the base. Globular vessels are common.
(Groups D and EE) within the restricted range of ceramic groups found in Mound D. Of the bowl forms, Groups Q and V are the only significant groups. Other bowl forms are of little importance and appendages are virtually absent (fig 23, Class XIV).

Zones I, IIA, IIAB and IIB of Mound B

The uppermost zones of Mound B (I, IIA, IIAB and IIB) act contrary to the trends established by the basal and medial zones. This is apparent in the sudden increase of Groups C and G at the expense of the globular vessels of Group D. Also, this is less evident with ceramic Group B and perhaps the case with some of the bowl forms (Groups K, L, M and V).

The distribution of the ceramics would indicate that earlier material had been redeposited in this late context. Not all of the material in these zones needs to be regarded as redeposited, only enough to offset the established trends. The distribution of the attributes and ceramic groups within the upper zones of Mound B was not noticeably changed when sherd size was taken into consideration (figs 19, 20 and 23). The inability of the newly developed 'percentage factor' technique to recognise this redeposition could have been based in a faulty operating hypothesis, which stated that sherd size was reduced during redeposition. Although this is probably true, it need not be the major factor in size reduction. Intensive activity on the surface of a deposit would probably reduce sherd size more rapidly than the act of transporting trash from one location to another. Zone I of Mound B has a considerably reduced sherd size since it has lain open for a long period of time without the protective cover of a superimposed zone. Thus, post-depositional disturbances, perhaps gardening, have reduced the sherds to a uniform small size. The 'percentage factor' may not have been acute in defining redeposition due to the fact that many of the rim sherds probably reached a 'minimum' size early in their depositional history. As a descriptive device the 'percentage factor' undoubtedly has its utility. The ability to describe in a fairly precise fashion the size of the sherds being analysed and estimate the minimum number of vessels
of that type in the sample is a significant advance over the traditional method of counting the number of rim sherds.

If we rank the radiocarbon dates derived from the excavations in terms of their central value, we see that they can be fitted harmoniously with the pattern elucidated in the preceding discussion of the distribution of the ceramic groups. The following diagram outlines the proposed order of the excavated zones.

Following the proposed scheme, Mound C would then represent an early occupation which continued uninterrupted through the history of the mound. Mound B is more complex in that the occupation does not appear to have been continuous and the upper zones (I, IIA, and IIB) consist in part of...
redeposited material. Thus, the mound can be divided into three units. The basal unit, Zone IVB, is considered as being contemporary with Mound C and clearly distinct in content from the adjacent Zone IVA. The second unit includes Zone IVA and those zones and features which lie above it, but below Zone IIB. This unit represents a later occupation, probably subsequent to that of Mound C. Suspected redeposited material has contaminated the third and uppermost unit of Mound B. All of the zones above Zone IIC would fall into this category. Early radiocarbon dates (ANU-371A and ANU-371B) were determined for charcoal removed from a large fragmented sherd recovered from Zone IIA.

Mound D would then be the youngest deposit and conformable with the late zones of Mound B.

This synchronisation of the distributional data from the ceramic groups and the radiocarbon dates would then support the later occupation of Mound B, in part coeval with Mound D, and the earlier position of Mound C. However, serious objections can be raised against this reconstruction. Two age determinations of the same sample (ANU-371A and ANU-371B) overlap only at two standard deviations. Following the practice recommended by Polach and Golson (1966:15-23), which stresses the necessity of operating with respect to two standard deviations, we see that all of the dates from Mounds C and D overlap. This means that in terms of the recommended interpretation of radiocarbon dates, the proposed earlier deposit (Mound C) is in fact indistinguishable from the latter (Mound D).

The proposed relationship between Mounds B and C states that Zone IVA of Mound B is distinct and later in formation than the basal zone (IVB). This would then require a period of abandonment following the formation of Zone IVB and a later period of development which was initiated in Zone IVA at a time following the termination of Mound C. Presumably, if the period of abandonment was of any duration, a break in the stratigraphy would have been apparent. However, there was no visible break in the stratigraphy and the zonation was entirely arbitrary. In both zones the sherd size is large (fig 23, Class III) and
this would argue against any extensive abandonment of Zone IVB. A stabilisation of the surface of Zone IVB, while a nearby mound was a centre of activity, would have resulted in the exposure of the surface to conditions adverse to the preservation of large sherds. Thus, sherds should have been reduced to a size comparable with the ceramics found in Zone I of Mound B. However, this was not the case since the sherds found in Zones IVA and IVB were relatively large and well preserved.

With a closer inspection of the ceramic distribution, further arguments can be offered against the proposed chronological ordering of the mounds. Certain ceramic groups reappear or are clustered in embarrassing contexts when Mound C is compared directly with Mound B. Group C disappears in the upper zones of Mound C, to re-enter the sequence in Mound B. Group H is a firm block in the upper zones of Mound C and all but absent from Mound B. Group EE is present initially in Mound C, disappears in the upper zones, and obtains its highest degree of popularity in Mound B.

Similar confusing distributions can be seen regarding Mounds B and D. Group W is all but absent from Mound D but present in the upper units of Mound B. In Mound D, the total absence of Group T and near absence of Groups B, U, J, L and E, after their persistent presence in Mound B, speaks for some degree of differentiation between these mounds.

Some of these differences may be due, where a minority ware is concerned, to sampling hazards which would be particularly acute when considering the small number of sherds from Mound D. The structure of the ceramic groups could be affecting the comparisons, since some groups are not as tightly knit as others. However, it is doubtful if any minor reconstruction of the ceramic groups would alter the significant trends.

The chronological factor may not be the only agency operating upon the differentiation and distribution of the ceramic groups. Earlier, two models were described with regard to the faunal remains from Mounds B and C. The first of these proposed an ordering which placed Mound B
later in time than Mound D and was referred to as the 'temporal' model. In apparent opposition to this model a second was constructed, the 'sociological'. The operation of this factor is most obvious in the sphere of vessel decoration. This has been detailed in the discussion of the ceramic attributes. Shell stamping was shown to be commonest in Mound C as opposed to punctation and linear incision which assumed a contrary distribution and clustered in Mound B. Although this dichotomy existed between the deposits as a whole, the linking of the basal zones of Mounds B and C continued to be evidenced.

An apparent contradiction to this dichotomy is presented by the distribution of ceramic Group D, a globular vessel form. Punctation and incision are the most characteristic forms of lip decoration found in this group and shell stamping is a minority element (fig 17). Yet, this group is found in all but one zone of Mound C (fig 20). The major elements of lip decoration were charted for this group to see whether the sherds were similarly or differently decorated when found in one or the other mound. At the same time Group G, which is better represented in Mound C than Group D and has a higher proportion of shell stamping, is looked into in the same way.

The data are set out below.

**CERAMIC GROUP D**

<table>
<thead>
<tr>
<th></th>
<th>Mound B</th>
<th>Mound C</th>
<th>All sherds of the group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ld 1 plain lips</td>
<td>.21</td>
<td>.54</td>
<td>.25</td>
</tr>
<tr>
<td>Ld 2 punctation</td>
<td>.27</td>
<td>.04</td>
<td>.31</td>
</tr>
<tr>
<td>Ld 3 broken line incision</td>
<td>.37</td>
<td>.05</td>
<td>.26</td>
</tr>
<tr>
<td>Ld 4 oblique incision</td>
<td>.05</td>
<td>.07</td>
<td>.04</td>
</tr>
<tr>
<td>Ld 5 shell stamping</td>
<td>.01</td>
<td>.15</td>
<td>.03</td>
</tr>
<tr>
<td>Ld 15 shell stamping</td>
<td>.00</td>
<td>.04</td>
<td>.01</td>
</tr>
</tbody>
</table>

**CERAMIC GROUP G**

<table>
<thead>
<tr>
<th></th>
<th>Mound B</th>
<th>Mound C</th>
<th>All sherds of the group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ld 1 plain lips</td>
<td>.34</td>
<td>.58</td>
<td>.50</td>
</tr>
<tr>
<td>Ld 2 punctation</td>
<td>.33</td>
<td>.01</td>
<td>.12</td>
</tr>
<tr>
<td>Ld 3 broken line incision</td>
<td>.13</td>
<td>.01</td>
<td>.07</td>
</tr>
<tr>
<td>Ld 4 oblique incision</td>
<td>.11</td>
<td>.08</td>
<td>.08</td>
</tr>
<tr>
<td>Ld 5 shell stamping</td>
<td>.03</td>
<td>.13</td>
<td>.08</td>
</tr>
<tr>
<td>Ld 15 shell stamping</td>
<td>.03</td>
<td>.10</td>
<td>.06</td>
</tr>
</tbody>
</table>

Note: the sum of the columns may not equal 100% since all lip decorations have not been included on this chart.
The entire collection of Group D sherds has 31% punctation (Ld 2) and 26% broken line incision (Ld 3) upon the lip area. In Mound B, the combined total is 57% as opposed to 9% in Mound C. On the other hand, 4% of Group D lips have shell stamped decorations (Ld 5 + Ld 15). Only 1% of the sherds in Mound B are decorated in such a fashion while these elements are found on 19% of the sherds from Mound C. Mound C has many more undecorated lips in Group D (54%) than has Mound B (21%).

This indicates that real differences exist between the ceramics of the two mounds, which is further supported by the distribution of the decorative elements of Group G. Overall, 19% of the lips are decorated with punctation (Ld 2) and broken line incision (Ld 3), and 14% with shell stamping (Ld 5 + Ld 15). Mound B has 46% of the former category and 6% of the latter; Mound C has 2% and 23% respectively.

A second table was prepared to investigate whether or not the consolidated totals masked an increasing trend over time which resulted in the replacement of shell stamping by punctation and incision. This would be required to support the temporal explanation of the differences between the two mounds. The table which follows, although derived from a small proportion of the total sherdage, fairly convincingly illustrates that this trend just does not exist. Puncta­tion on Groups D and G is actually strongest in the basal zones of Mound C and shell stamping does not diminish through time.

### CERAMIC GROUP D

<table>
<thead>
<tr>
<th>MOUND B</th>
<th>Ld 1</th>
<th>Ld 2</th>
<th>Ld 3</th>
<th>Ld 4</th>
<th>Ld 5</th>
<th>Ld 15</th>
<th>n</th>
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<tbody>
<tr>
<td>Zone I</td>
<td>.22</td>
<td>.22</td>
<td>.28</td>
<td>.09</td>
<td>.03</td>
<td>.03</td>
<td>32 sherds</td>
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<tr>
<td>Zone IIA</td>
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<td>.42</td>
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<td></td>
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<td>.26</td>
<td>.04</td>
<td>.02</td>
<td></td>
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<td>Zone IIC</td>
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<td></td>
<td>25</td>
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<tr>
<td>Zone III</td>
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<td>.32</td>
<td>.10</td>
<td></td>
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Note: The sum of the rows may not equal 100% since all lip decorations have not been included on this chart.

Thus, to some extent both the temporal and sociological models are supported by the ceramic analysis. The basic difference between the two models rests in the relationship of Mound B to Mound C. The sociological model would consider the greater part of their accretion to have been
coeval, while the temporal model stresses their separation in time. Neither model renders invalid the basic trends established in the ceramic analysis. These were defined in terms of globular vessels replacing straight sided jars, open bowls supplanting restricted bowls and a diminishing occurrence of appendages. These changes were initiated in Mound C and intensified in Mounds B and D.

The Surface Sites

The surface collections were ordered by applying the Brainerd (1951) and Robinson (1951) technique. Robinson's coefficient of agreement was arrived at by taking pairs of sites and adding the differences between the percentages of each ceramic group and subtracting the sum from 200. The agreement coefficients were arrayed in a matrix. Ordering of the matrixes was done by considering the most similar neighbours of each unit in turn and arranging them in a linear sequence (Renfrew and Sterud 1969). These procedures were applied first to the Collingwood Bay surface collections and secondly to the material from the Trobriand Islands. The matrixes have not been presented due to their large size. They remain in the archives of the Department of Prehistory, ANU.

Collingwood Bay region

Surface collections from the Collingwood Bay region, when treated as described above and seriated, fall into four units (fig 21). The ordering within the units was controlled by the correlation index and the actual sequence of the units was determined by considerations which emphasise the distribution of the ceramic groups belonging to the second major division. The second division, as discussed earlier, is composed of those ceramic groups which are found in the surface collections and weakly represented or absent in the excavations.

On the mainland, Group A consists of spherical pots of a type and with a decoration similar to wares presently being made in Wanigela. The group can then be used to define the modern end of the Collingwood Bay sequence (i.e. Col. 25) (fig 21).

Groups P (which includes at least some pedestal bowls)
and J, though poorly represented in the mounds, are nevertheless present and exhibit a pattern of diminishing occurrence through Mound C and into Mound B. The case can be made that the three collections, Col. 12, 16 and 31-32 (fig 21), having large amounts of these ceramics are early in the sequence.

The distribution of the ceramic groups, which were well represented in the mound excavations, established certain trends. The sequence derived from the mounds detailed an early popularity of straight sided jars giving way to globular pots and an early equality of open and restricted bowls shifting to a later preference for open bowls. These same trends are present in the sequence from Col. 20 at the base to Col. 3 at the top (fig 21).

**Trobriand Islands**

As distinct from the Collingwood Bay exercise, by applying Robinson's correlation index, an uninterrupted linear sequence emerged in the ordering of the collections (fig 21). The two historic sites (Tro. 21 and 28) by virtue of their having ceramics belonging to Groups N and O, part of the ethnographically known D'Entrecasteaux tradition, were placed at the modern end of the sequence. Tro. 1 and 2, the collections made near the large stone groups, then fell at the early end of the continuum. These collections contain a high proportion of Group P ceramics, thus confirming the placement of sites where this group is common at the early end of the Collingwood Bay sequence.

A further observation involves the apparent continuity that exists in the Trobriand Islands as opposed to the disjointed Collingwood Bay sequence. This continuity in the Trobriand Islands could be a factor of certain sites being occupied for a considerable duration of time and actually bridging what could be interpreted as discrete ceramic phases in the Collingwood Bay sequence.

**The Ceramic Phases**

The surface sites, when considered in the light of the ceramic sequence established by the excavations, can be discussed as representing four major phases.

**Early Ceramic Phase**

The earliest block of sites on the
mainland, Col. 12, 16 and 31-32, are difficult to handle with the high proportion of Group P ceramics on Col. 12 and 31-32 and the large quantities of Group J on Col. 16 (fig 21). Both of these ceramic groups are poorly represented in the other collections from the mainland and have a limited distribution in Mound C and a sporadic occurrence in Mound B. Group J is somewhat better represented in the mounds and surface collections. To some extent Groups P and J display an early and regular pattern of decreasing popularity through the mounds. This might suggest that they represent wares which were popular at sometime prior to the formation of the mounds and only their terminal stage is represented in the excavations. It is possible to consider Groups J and P as being some of the earliest known pottery from this region of Papua and to some degree apart from the later tradition which was dominant during the formation of the mounds. Group S was shown to be decorated with criss-crossed incisions (Bd 34) and in this respect related to Group J (fig 18). Since Group S is a minority ware, it is difficult to use distributional data to support this proposed relationship. Nevertheless, Group S is best represented on site Col. 16 where more than 50% of the ceramics belong to Group J.

On the Trobriand Islands, Groups J and S are poorly represented while Group P is present in significant numbers on the earlier sites. Group P is gradually replaced through time by the more common Collingwood Bay ceramics and D'Entrecasteaux wares. The latter dominate and completely supplant the mainland ceramics. Through all but the earliest stages of the Trobriand sequence, Groups N and O of the D'Entrecasteaux tradition are found on the same sites as Group P. Group P ceramics are also found in the immediate vicinity of the stone arrangements (Tro. 1 and 2).

The only sites in the Collingwood Bay region with significant proportions of Group P ceramics, Col. 12 and Col. 31-32, have been redeploited by the Murin River. Any precise statement concerning the nature of the collections is hazardous. The largest and most reliable collections containing Group P ceramics are from Mound C. The degree to which the pedestaled Group P wares are distinct from the
better represented mound ceramics is poorly understood. It could be argued that the Groups J and P, when found in the excavations, are redeposited from an earlier phase of occupation. Most of the sherds found in the excavations are small and only one fragmented pedestal was found in the mounds and it cannot be associated with a specific rim form or vessel style (pl 7d).

**Expansion Phase**

A block of ten sites on Collingwood Bay, Col. 20 through 28, and four sites on the Trobriand Islands, Tro. 22 through 26, follow the Early Ceramic Phase. Groups D, G and H are present, but Group F is the most popular pot form (fig 21). Except for Group D, which is a globular vessel with a gently everted rim, these groups belong to the intermediate style that lies midway in form between the globular and the straight necked jars. During this phase, D'Entrecasteaux wares, Groups N and O, assume an increasing importance in the collections. A variety of bowl forms is present on both the mainland and Trobriand sites, but the restricted form, Group K, and the open form, Group Q, are more prominent in both regions.

We are faced with a major problem when trying to relate these sites to the sequence established by the excavations. Group F is important in the collections, but in the excavations it is a minority and as such is strongest in the lower half of Mound C (fig 20). Two complex body decorations, Bd 37 and Bd 38 (fig 22), combining channeling, punctation and raised ridges, are found upon sherds belonging to Groups F, H, K and X (fig 18). These motifs are well represented on sites Col. 6, 8, 10, 11, 13, 15, 18, 21 and 28 on the mainland and sites Tro. 3, 7, 24, 25 and 26 on the Trobriand Islands. More than 16% of the recorded body decoration for each of these sites is Bd 37 and Bd 38.

The Collingwood Bay pottery found in the burial caves on the Trobriand Islands is in many instances decorated with flamboyant designs, some of which are variations of Bd 37 and Bd 38 (Austen 1939-40: 49-52; Egloff n.d.). Yet, not a single example of these decorative elements was found in the sample of sherds which was analysed from the excavations. The incidence of punctation and incision on the lip,
body and shoulder area can be considered to be indicative of a class of ceramics associated with Mounds B or D. On the other hand, shell stamping is regarded as an attribute which is particular to Mound C. All of the surface collections (except for Col. 13, 14 and Tro. 22) have very few sherds decorated with shell stamping. The collection from Col. 13 has the highest ratio of shell stamping to punctuation—broken line incision (1:2).

Again, we are faced with explaining the distribution of ceramic groups in terms of temporal or sociological factors. Either these ceramics with their relatively exclusive decorative features were manufactured by a different ceramic centre than that which produced the ceramics excavated in the middens, or they were made at a time earlier than that represented in the basal zones of Mound C. If they are earlier, this widespread distribution of sites belonging to a single related phase of prehistory speaks for an expansion of settlement in the Collingwood Bay region and a continuation of interaction between the mainland and the Trobriand Islands.

Placing these sites earlier in time than Mound C does not present any problems in the interpretation of the mainland sites; however, it means that a break must have occurred between Tro. 26 and Tro. 28 (fig 21). The latter is an historic site and completely devoid of mainland ceramics. Therefore, the break would be expected to have been on the order of at least 600 to 700 years (i.e. before 1000 A.D. to 1700-1800 A.D.), unless we propose the unlikely situation that site Tro. 28 was inhabited for 1000 or more years and bridges the phases. The trends established for the D'Entrecasteaux wares in the earlier sites continue unbroken from Tro. 22 to Tro. 21. The complete replacement in the sequence of the mainland wares, at a point between Tro. 26 and Tro. 28, indicates that some form of a significant change had taken place, but not necessarily a gap of a 1000 years.

The strongest single factor relating the mound sequence to the Expansion Phase is that within both the ceramics belonging to the Early Ceramic Phase diminish to insignificance and there is a gradual replacement of straight sided
jars by globular vessels (figs 20 and 21). It would then appear as if the early stages of mound development should tentatively be ascribed to the Expansion Phase thereby reducing the gap in the Trobriand sequence. The provisional nature of this statement rests with the awkward status of Group F and the difficulty in interpreting the significance of the differential distribution of Bd 37 and 38. 

**Refuge Phase**

A tight cluster of five sites (Col. 3, 10, 19, 26 and 27) is placed toward the later end of the mainland sequence and evidences the terminal stages of the prehistoric Collingwood Bay ceramics. Site Col. 10 is related to some degree to the earlier group of ten sites. Col. 3, Old Wanigela Village, appears to have had two entirely separate phases of occupation. One phase was c. 600 B.P. and coeval with the later stages of mound formation and the second shortly before the arrival of Europeans. In spite of these factors, the coefficient of agreement placed these five sites into such a close cluster that it was impossible to integrate them with the earlier group of ten sites.

Ceramics from these sites closely resemble those found in the later zones of Mound B and Mound D. Ceramic Groups D, G, Q, V and EE characterise these deposits and the surface sites. Group D, a globular pot, is the dominant form on all sites except Col. 10.

An interesting fact emerges when regarding the distribution of these sites, in that they are all located in marginal areas (maps 2 and 4). Col. 3, 26 and 27 are found in extensive swamps near the mouth of the Anina River, Col. 10 lies 14 km inland on the slopes of Mt Victory and Col. 19 is the only site situated on an island. Thus, the positioning of these sites and indeed that of the mounds at Rainu and Oreresan strongly suggests that these were refuge settlements. This phase is not represented on the Trobriand Islands, suggesting that the trade in ceramic vessels had ceased at an earlier date.

**Historic-Modern Phase**

Sites Col. 25 and Tro. 21 and 28 represent the post-mound period (fig 21). Continuity between the prehistoric and the modern Collingwood Bay ceramics is absent. Group A, a
spherical vessel, and the ubiquitous open bowl, Group Q, are the only ceramic forms present in the contemporary village dump at Koreaf (Col. 25).

On the Trobriand Islands, D'Entrecasteaux ceramics are the sole component of the historic sites except for a few sherds from Tubetube or Wari Islands. Groups N and O are present as are the D'Entrecasteaux forms of the simple restricted bowl (Group K) and the open bowl (Group Q).
CHAPTER VII

The Description and Analysis of Artifacts

In this chapter the classes of artifacts recovered from the excavations and notable examples from museum collections are discussed. They are divided into four groups: bone, shell, stone and ceramic. The ceramic section does not include vessel sherds which are the particular concern of Chapter V.

Throughout this chapter comparisons are made between excavated specimens and artifacts which have been used during recent times. The best published sources on the material culture of coastal eastern Papua are Seligmann (1910) and Williams (1930). In Orokaiva Society, Williams touches upon material culture. The Orokaiva are a cluster of non-Austronesian speaking groups living on or near the coast, 100 km to the north-west of Wanigela. They occupy an area between the 8th and 9th meridians, which is well outside of the Massim. Although Seligmann and Williams are primarily concerned with social customs, they remain the major contributors to the study of material culture in the general area. Both studies are concerned with peoples living more than 100 km distance from Wanigela. Seligmann occasionally mentions Collingwood Bay, but the closest group he discusses in detail lives near Bartle Bay at the head of Goodenough Bay. Many of the prehistoric and modern items of material culture collected or excavated at Wanigela have counterparts to the north with the Orokaiva and to the south and east in the Massim.

In contrast to the widespread distribution of certain traits, others appear to be localised and a few prehistoric items have no direct parallels in the living cultures. Whenever possible, I collected bone, stone and shell artifacts in Wanigela or sought them out in museum collections. All excavated and collected artifacts were examined and discussed by the Rainu villagers. The informants testimony was then checked by consulting the literature or museum collections.

The inhabitants of Rainu have only vague recollections pertaining to stone and bone tools. Occasionally, bone
needles are made in the village. Shell and bone ornaments are a part of every villager's personal kit. Information concerning the manufacture and use of shell ornaments as well as the specimens themselves were easily collected within the village.

**Bone Artifacts**

**Spatula-shaped bones**  
Spatula-shaped bones were found in Mounds B and C. Without implying any specific function I will refer to them as spatulae. These artifacts have three distinct handle forms; tubular, U-shaped and flat (pl llj-o). The tubular variety is made from the proximal portion of a wallaby's tibia. Two to five centimetres of the bone retain its tubular shape and the remainder is altered to a flat strip. This gives the spatula a convenient handle and blade, which are polished to a high lustre. The U-shaped handle is made by splitting the bone longitudinally and flattening only the blade portion. The flat variety is nothing more than a slightly concave to flat strip of bone with a rounded or tapered end. The blades are from 2 to 3 cm in width. The only complete specimen found in the excavation is 15 cm long, undecorated and of the flat variety (pl llj).

A few flat spatulae fragments are too wide to have been made from wallaby bones. Pig or cassowary bones were probably used as the raw material for these artifacts. All specimens which can be positively identified as spatulae are devoid of elaborate carving and only occasionally are they decorated with notches or grooves. Although the spatulae are usually highly polished, a few deep scratches remain from the early stages of manufacture. The rough shape of the artifact was probably made by cutting and scraping with obsidian flakes. Preliminary smoothing was done with pumice and the final lustre produced by rubbing with mildly abrasive plant leaves. Three of the flat spatulae have a small hole drilled into the handle. These are usually about two millimetres in diameter and exceptionally well made. The reconstruction of the manufacturing process combines informants' testimony with the actual archaeological data. The latter consists of numerous
pumice abraders and obsidian chips which were found throughout the deposits.

The following table considers all of the spatula-shaped bones and regards fragments as a single specimen if they do not articulate with any other pieces.

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<tr>
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The term spatula is used to describe the specimens' form rather than to imply a function. However, the Rainu villagers identify these bone artifacts as being used to carry lime from a gourd container to the mouth when chewing betel nut. If these are lime spatulae, then the much discussed custom of chewing betel nut is at least 1000 years old in this region of Papua. Speculation concerning the 'betel nut peoples' arose when it was noted that this custom did not extend into Polynesia, Fiji, New Caledonia or the New Hebrides (Riesenfeld 1947:203). Riesenfeld's (1947) notable effort towards synthesizing the information on betel nut chewing in Melanesia regards this custom as having Indonesian origins.

Awls and/or Pins Plate 11 (a-e) illustrates the complete range of artifacts which are included in this category. The majority of the specimens is made from the fibula of the wallaby. None of these is complete. The longest specimen is 14 cm long and 7 mm thick. One example retains the bulbous terminal portion of the bone. Small scratches remaining from the manufacturing process are common. The polished lustre seen on bone spatulae is only rarely found on this class of artifact.

Although my informants readily identified these as
oreg and used as awls, no specimens of this type were found in Rainu village nor were any located in the museum collections. The Australian Museum has a specimen (E37482) from Wanigela which is labelled oreg (pl 11f). This item is made from pig bone and is used as a pin to hold a feather head-piece in the hair. It is possible that some of the smaller broken 'awls' found in the excavation are part of such a pin. One specimen has a notched end and possibly functioned as a pin with the notches facilitating the attachment of feathers (pl 11e). Blackwood (1950:32) describes awls made from the fibulae of wallabies and small piercing tools shaped from the phalangeal bones of flying foxes. The people of the Upper Watut River use these bone tools as an aid in fibre lashing or plaiting (cf. Williams 1930:85).

The distribution of all awls and/or pins is listed below.

<table>
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<td>IVB</td>
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Three small pointed fish bones were recovered from the excavation (Zones IIA and IVA of Mound B and Zone IIIA of Mound C). Two of these bones retain their proximal end which has a natural foramen (pl 11g and h). It is unlikely that the hole served the same function as that in a needle since the head of the fish bone has not been thinned to permit its easy passage through the material being sewn. The largest specimen is 4.9 cm long and the smallest has a length of 2.5 cm.

Some of the items described as awls could well have been used as bone projectile points. However, the use of
bone points has not been recorded for this area during historic times.

**Bored dogs' teeth**

Ethnographically, canine teeth were used for personal ornamentation and entered into economic exchanges in many areas of Melanesia (Harding 1967:49-52). Dog's teeth are used to decorate the garam or head band which is worn on special occasions by the Ubir. Williams (1930:40, pls VI and XXVIb) documents a variety of ornaments worn by the Orokaiva. Dogs' teeth adorn necklaces, ear ornaments and headbands.

Six bored dogs' teeth were recovered from the excavation (pl llw). Five of these are canine teeth while the sixth is a first molar. The roots of the teeth are polished. A small hole approximately 2 mm in diameter is drilled through the root of each specimen. In Mound B, two teeth came from Zone IVA and single specimens were found in Zones IIC and IIAB of the same midden. Additional specimens were located in Zones IIIA and IVA of Mound C.

**Bone chisels**

Two examples of this tool were found in Mound C (Zones II and IVA). These specimens are made from the proximal portion of a pig's tibia. The complete example is 10.9 cm long (pl lli). The people of Rainu expressed no knowledge of this tool's function. Finsch (1888:pl V) illustrates a pig bone tool from Port Finsch on the Huon Peninsula which is identical to the archaeological specimens. This is listed as 'a short chisel-like instrument made of bone (chiefly from pigs), for breaking open betel nuts, etc' (Finsch 1888:26).

**Carved bones**

This heterogeneous category contains all of the remaining undescribed worked bone from the site. The specific functions of these items is not known. Perhaps the most enigmatic specimen is an almost complete bone tube from Zone IIIA of Mound C. The tube is 7.5 cm long and 1.2 cm wide, with two short projecting prongs at one end (pl lls). It is similar to specimen E15593 in the Australian Museum which came from the mounds at Rainu when they were destroyed early in this century. The surface bears numerous scratches and sharp incisions from the manufacturing process. Other pieces
of carved bone from the site represent too small of a portion of the artifact to determine the original shape. These items are illustrated along with the majority of miscellaneous carved bone from the site (pl 11p-v).

Shell Artifacts

Three distinctive shell artifacts are present in the archaeological material. Rainu villagers recognise these as having direct parallels in their material culture.

Shell Armlet The most common shell artifact is the armlet. Specimens from Zones III (4 fragments), IVA (1), and IVB (4) of Mound B appear to be made from Trochus niloticus (pl 12e and f). Specimens from Zones IIA (1 fragment) IIB (3), IIC (1), III (1) and IVA (3) of Mound B and Zone IVA (1) of Mound C are probably made from the Conus leopardus shell (pl 12h and i).

The Trochus armlets are rounder in cross-section and have an inside diameter of 6 to 8 cm. Conus specimens have approximately the same diameter but the width of the band is almost 1.5 cm, where it usually is less than 0.8 cm on the Trochus armlets.

Over most of the Massim the Conus leopardus shell is used in the manufacturing of armshells (Saville 1926:152-156). These are massive shell ornaments which often have a width of 5 to 6 cm. Large worked pieces of cone shell come from Zone IVB of Mound B and Feature 3, Mound C. Due to their fragmented condition, it is not certain that they are parts of armshells.

Shell discs The second type of shell artifact found in the excavation is in the form of a flat disc (pl 12g). These are identical to the pako and yaro-yaro of the Ubir. The pako is a large flat disc, approximately 15 cm in diameter, which is made from the Melo amphora shell. These continue to be produced by the men of Rainu and are worn by them and a few special women during dances. Two holes are drilled a short distance apart near the margin of the shell. Australian Museum specimen E13147, a Turbo setosus shell, is listed as being used to drill holes in shell discs. Through these holes a small fibre loop is attached to the shell. This loop is
held securely in the teeth during dances with the shell disc extending over the chin. Williams (1930:39 and pl XXXII) illustrates the use of this ornament among the Orokaiva who also refer to it as pako.

The yaroyaro is a smaller disc made from the Melo amphora or alternatively from the shell of a pearl oyster (Pteriidae). The latter can be recognised by its pearly lustre. Two holes are drilled in the disc and it is worn suspended as part of an elaborate shell necklace (Williams 1930:pl VI). An interesting variant of this is the yaro. This is a pearl shell crescent which is decorated with shells, beads and fruit seeds. The outer edge of the yaro is sharpened and used for opening betel nuts. Archaeologically it would be difficult to ascertain if a fragmented piece of pearl shell was part of a yaro or a portion of a yaroyaro.

Within the mounds one complete specimen measuring 9 cm long and 4 cm wide was found in Zone IIIB of Mound C (pl 12b). The villagers called this a yaroyaro even though it was not disc shaped. A partially complete disc from Zone IIC of Mound B was immediately recognised as a pako (pl 12g). Fragmented shell discs came from Zone III of Mound B and Zone II of Mound D (pl 12c and d). Smaller fragments came from Zones IIC (2 specimens) and IVB (1) of Mound B and Zone IVA (2) and Zone IVB (1) of Mound C.

Shell triangle

A small triangular piece of shell from Zone III of Mound B is the sole representative of the third shell artifact class. This is identical in form to the pieces of shell found on an Ubir headband (pl 12a and j). The boin is made from triangular pieces of shell from a large white cowrie together with bird feathers. The feathers and shell triangles are lashed to a fibre roll. Both the Orokaiva and Ubir forms of this ornament have holes drilled in the shells to facilitate their attachment to the fibre roll (Williams 1930: pl VIII). The archaeological specimen is made from the lip of a Strombus luhuanus shell and is not drilled for attachment.

Summary

The shell triangle, discs and armlets were the only shell artifacts found in the archaeological
deposits. A considerably wider range of shell ornaments is found within the ethnographic area. Chignell (1911: facing 216) pictures a 'death dance' costume which consists of among other things a wide variety of shell ornaments. The central figure is wearing the Ubir style boin headband.

The excavation failed to yield any carved cone shells comparable to those found when Mounds E and F were destroyed early in this century (Monckton 1922: facing 116; Seligmann and Joyce 1907:pl VIII). These shells are decorated with spirals, concentric circles and stylised human faces. One specimen is engraved with an extremely well executed and realistic bird motif (White and Disney 1970:344-345). Golson (n.d.) discusses the possible links which this art form might have with certain 'bronze age' influences in the prehistoric cultures of New Guinea.

The designs on the shells are considerably more sophisticated than any found on the pottery from the excavations. The complexity of scroll and bird motifs is equalled in the wood carving of the Trobriand Islands (Malinowski 1922: pl XXVI). This art style is not at all developed on Collingwood Bay, but is a dominant feature of Massim art (Haddon 1894). Finsch (1914:taf XX) illustrates a carved coconut shell cup from Normanby Island in the D'Entrecasteaux Islands, which is decorated in an equally elaborate fashion.

**Stone Artifacts**

**Ground stone tools** The excavations yielded numerous fragments of ground stone tools. A few of these specimens have their cutting edge preserved. A hafted adze collected by Sir W. MacGregor, about 1894 on Collingwood Bay, is similar in shape to the large blades from Mounds B and C (pl 13a; courtesy of the Australian Museum, E6443). The flattish cross-section of the blade is symmetrical and the cutting edge is not hollow ground. The blade is set between two tapered and grooved pieces of wood which are tightly lashed together with cordage. A plaited fibre ring securely binds the wooden blade holder to the adze handle. This arrangement allows the blade and its socket to be easily removed and adjusted for proper
angle. The blade is manufactured from a green laminated chlorite schist. This stone is readily worked since it naturally parts into sheets and has a hardness of 3 to 5 (Mohs scale); however, it also breaks or splinters easily. The Ubir obtained this material through trade with the tribes to the west. It is found inland from Collingwood Bay on the slopes of the Owen Stanley Mountains.

The largest specimen recovered from the excavations (Mound B, Zone IIA) is almost complete with only a portion of its poll missing (pl 13b). This blade is 10 cm long, 4.6 cm wide and 1.1 cm thick. A second specimen (Mound C, Zone IVD) of this same order is slightly wider and its cutting edge and poll are battered (pl 13c). The lateral edges of the first specimen are squared, while the second is lenticular in cross-section. Both of these relatively crude blades resemble the ethnographic specimen collected by McGregor.

A smaller tool (Mound B, Zone I) is only 1.3 cm wide, 0.7 cm thick and 3.9 cm long (pl 13d). This blade is lenticular in cross-section with a symmetrical chisel shaped edge. Fragments of large tools have been reworked into small blades (pl 13e and f). The smallest of these (pl 13e) is only 3 cm long.

A single specimen from Zone I of Mound B is made from a material resembling the Woodlark Island hornfels (pl 13g; cf. Seligmann 1910: pl LXIV). The fragment consists of the poll end of the tool. It is lenticular in cross-section with squared edges and has a high polish. The Woodlark Island adze blade was traded throughout the Massim during historic times (Seligmann 1910:15).

The following table divides these stone tools from Mounds B and C into three categories. The first refers to all specimens having a cutting edge. The second group includes all of the remaining fragments which appear to be the butt or poll of a stone implement. The remainder fall into a category which includes all worked and polished pieces of schist without an edge or poll. It is quite likely that these are fragments from adzes.
Polished stone disc  A piece of polished chlorite schist found in Zone IIA of Mound B is roughly circular in diameter (4.6 to 5.9 cm) and .75 cm thick (pl 14a). This stone has no known ethnographic parallels, nor were the Rainu villagers able to suggest any function.

Perforated stone club head  The only drilled stone artifact found in the excavations is from Zone IIIA of Mound C. The size of the hole (1.9 cm diameter) and the general shape of the fragment indicates that it is a club head. The specimen is 1.85 cm thick and is made from a grey steatite. Ethnographic specimens from the Wanigela area are usually made from a dense igneous or metamorphic rock.

The basic fighting weapons of the Wanigela people were the spear and stone club. The majority of Wanigela stone club heads in the museum collections are disc shaped with an outside diameter of approximately 11 cm (Williams 1930: pl LVIII). The archaeological specimen has only one finished edge preserved and this appears to be only slightly curved. Decorating this edge is a longitudinal groove and a series of cross notches. In plate 14b, I have taken the liberty of indicating that the complete shape of the artifact is probably that of a rounded-square, approximately 9.1 cm at its maximum width. Haddon (1900: pl 22, 2) illustrates a stone club from the Papuan Gulf with similar
decoration. The reconstructed shape would assign the specimen to his 'flat club with notched edges' category (Haddon 1900:250).

**Hammer and anvil stones**

All stones found in the excavation which exhibit scars from intensive battering are included in this group. Most of these were probably used for a variety of purposes. Blackwood (1950) describes the use of hammer stones in the manufacturing of adze blades and club heads.

Some of the hammer stones are combination tools. Grinding surfaces, hammering bruises and concave depressions are found on the stones. The villagers claim that small rocks with concave depressions served as anvils when crushing univalve shells to obtain the meat. The largest anvil stone comes from Feature 3 of Mound B. Only half of the artifact is present but this weighs 2.210 kilograms and measures 15 by 13 by 9 cms in its maximum dimensions. A second specimen comes from Zone IIA of the same midden. The stone is broken (15 x 7.5 x 7.2 cm) and has a single dish shaped pit on its surface with a surface depth of 1 cm (pl 14c). Small fist-sized anvils came from Zones I and IVB of Mound B and Zone I of Mound C. A pounding stone came from Zone II of Mound C and a grinding-pounding rock from Zone III of Mound B. These are rather non-descript artifacts which retain their river cobble appearance with only a slight modification through use.

Strathern (1970:314, 320 and pl XV) and White (1967a: pl 4-2) document stone anvils and hammer stones in the New Guinea Highlands where they are used for flaking stone tools and roughing-out adze blades. Williams (1928:145) in his study of the Orokaiva states that 'when one sees a stone embedded in the ground with a small worn hollow on the top, it is probably no more than a Tauga breaking stone'. The *tauga* is an edible nut.

**Grinding stones**

Within the north-eastern section of Zone IIB of Mound B two flat grinding stones were found. The largest is a slab of fine-grained basalt showing intensive grinding on both surfaces. The stone is 2.8 cm thick, 13.5 cm long and 9.2 cm wide (pl 14d). The second stone is an oblong river cobble measuring 11 by 5.6
by 2.5 cm (pl 14e). One surface is ground flat while
the other is unmodified. The grinding surfaces of the two
stones fit each other perfectly and they could well be a
set. They could also have been used separately in the
manufacturing of adze blades (Blackwood 1950) or shell orna-
ments. Lewis (1929:13-14) describes the process of making
shell grinding discs at Ponam in the Admirality Islands. A flat
grinding stone is used to rub the roughly chipped discs
smooth.

'Magical stones' Certain rocks found in the excavations
were identified as sorcery stones by
the Rainu villagers. Plate 14f illustrates a farum or
faruma which was collected in Wanigela prior to 1934 and
is now in the Australian Museum (E36425; cf. Seligmann
1910:pl XXVII). Fibre cordage encloses part of the farum.
The stone closely resembles in shape and material the speci-
mens found in the excavation (pl 14g). All of them are
smooth water-worn pieces of grey, green or red slate. A
few of the stones are bruised on the ends or sides and in
a couple of instances appear to have been scoured by grind-
ing. The specimens are from 9.5 to 5.5 cm long and range
in width from 4.5 to 2.2 cm. A total of nine stones of
this category were found in Zones IIA, IIAB, IIB, IIC (2
specimens), III, IVB of Mound B and Zones I and IVB of
Mound C.

Some of these stones could well have been used as sago
beaters. Malinowski (1915:599) describes sago beaters of
the Mailu people. These implements have a stone head
which is to some degree consistent in form with the 'farum'
from the excavations. Sago grows in the Wanigela area
and no doubt the prehistoric people exploited this food
source.

A second form of 'magical stone' found in the excava-
tion is shaped like a pencil pointed on both ends. The
size ranges between 5 to 6 cm in length and the width is
about 1 cm (pl 14h). Examples came from Zones III, IVA and
IVB (2 specimens) of Mound B. The stones do not appear
to be greatly modified from their natural shape. Rainu
villagers attribute to these sorcery stones the ability to
'draw blood'. It is possible that these artifacts were
used as files for working shell or bone.

A small stone sphere with a maximum diameter of less than 3.8 cm was found in Zone I of Mound B (pl 14i). The surface of the sphere is pitted and battered. This stone and an oblong rock from Zone IVA were identified as sorcery stones. The sphere shows obvious signs of intentional shaping. The oblong rock which is 4.1 cm long has a few pits on its generally smooth surface (pl 14j).

A well formed calcite crystal came from Zone II of Mound D (pl 14k). This was claimed by the villagers to have great magical powers. Seligmann (1910:284) documents the use of rock crystals for magical purposes among the Roro of the south coast.

Pumice abraders The gross distribution of pumice abraders has been presented in Chapter IV. The worked pieces of pumice vary in size from lumps weighing more than 600 grams to small abraders which are no larger than a man's thumb. A large block of pumice (16 by 13.5 by 11.5 cm) has a trough shaped groove on one surface (12.2 by 8.6 cm) which is worn to a depth of 1.3 cm. This was probably used to sharpen ground stone adze blades.

Other pieces of pumice exhibit narrow V shaped grooves which are 3 to 4 mm in depth (pl 15a). These were probably used in the manufacture of bone tools. Smoothed lumps of pumice are also common (pl 15b). Pumice and shark's skin were used in Wanigela at the turn of the century to shape wood, bone and shell.

Pumice rings Small pumice rings with an outside diameter of 3.5 to 6.0 cm and an inside diameter of approximately one cm were recovered from Zones I, IIA, IIB and III (2 specimens) of Mound B (pl 15c). The Rainu villagers were unable to offer any explanation for these artifacts other than 'they were made by small boys when playing'.

Chipped stone Obsidian chips were found throughout the mounds. The distribution of this material is presented in Chapter IV. Most of the obsidian is in the form of primary flakes measuring a few mm in thickness and having a maximum length of 4 to 5 cm (pl 15d). Only an occasional specimen exhibits purposeful flaking or
use wear. Cores, in the few instances when found, were exhausted and smaller than the larger flakes. Since this material had to be imported from Fergusson Island (Key 1969) in the D'Entrecasteaux Islands, it no doubt was of value and not lightly discarded.

Carved bone excavated in the mounds often has fine sharp cuts at the base of the notches where it was protected from subsequent polishing. These are similar to cuts that I was able to make on relatively fresh pig bones using obsidian flakes.

Before the arrival of the Europeans, according to my informants, the people of Wanigela traded with the Mukawa group living at the tip of Cape Vogel for this commodity. The Mukawa people acted as middlemen in the trade between the Ubir and the Fergusson Islanders. The normal exchange was one ceramic vessel for a fist sized lump of obsidian. Saville (1926:-facing 137) documents the use of obsidian flakes by the people of Mailu for head shaving and 'chiro­pody'. The flaking technique used by these inhabitants of the south coast amounted to holding the rough core in one hand and striking it with a hammer stone held in the other (Malinowski 1915:540-41).

The entire collection of obsidian from the excavations is currently being studied. It is planned that this will include microscopic studies of use wear, detailed analysis of secondary flaking and the search for further information regarding possible use. W. Ambrose (Prehistory Dept., ANU) is engaged in measuring the hydration rims on a sample of the obsidian flakes.

Two flakes of a reddish chert were found in Mound B (pl 15e and f). Specimen 'e' exhibits fine secondary flaking on the margins while on 'f' only one small area appears to have been modified. The material is ideally suited for flaking and it is puzzling why only two pieces of this chert were found. The villagers could not provide me with any clues as to the source of this stone.

Ceramic Artifacts

Excavated in 1968-69 Perforated ceramic discs were the only form of ceramic artifact,
other than vessel sherds, found in the excavation. It is possible that these were used as fly-wheel weights on pump drills similar to those described by Williams (1930:85-6) for the Orokaiva. The weights are approximately 5 to 6 cm in diameter with a central perforation ranging from 0.60 to 0.85 cm in diameter (pl 15g). All of the weights are made from undecorated sherds and single specimens were found throughout Mound B (Zones I, IIA, IIAB, III and IVA) and in Zone I of Mound C. The hole is neatly bored in most instances and roughly pecked in the specimen from Zone IVA. The bored holes are straight, conical or bi-conical. The specimen from Zone III has not been finished. A conical hole has been bored in each side and possibly the maker stopped when it became evident that the perforations were not in direct alignment.

A ceramic roll was found in Zone IIA of Mound B. The specimen is 4.1 cm long and 1.8 cm in diameter. One end has been broken while the other is finished with a concave depression (pl 15h).

**Collected in 1903-06**

P.J. Money sent a sizeable collection of sherds and artifacts from Wanigela to the Australian Museum, Sydney, in the early years of this century. Some of these were found when Mounds E and F were truncated in 1903 and others were collected in the Murin River. Included in the collection are some specimens that have the appearance of small-necked bottle spouts (pl 15k; cf. Seligmann and Joyce 1907:pl X). The spouts appear to be made by a coiling technique with applied raised ridges affixed around the neck. This form of ceramic artifact has not been recorded in an ethnographic context in Papua. Spherical water jugs with small double spouts are manufactured on the Admiralty Islands. These seem to be the closest possible parallels.

An anthropomorphic ceramic nose, which is somewhat like the applique figures adorning Aibom vessels (von Meinhard Schuster 1969: pl VI) is present in the Money collection and is catalogued as coming from the Murin River (pl 15l). The broken edges are worn smooth and there is evidence of a large perforation on each side of the nose. Traces of powdered hematite appear to be present on the
Perhaps the strangest specimen of the collection is that illustrated in plate 15m. The function of this large hand-moulded clay object is difficult to ascertain. Eleven finger-sized holes perforate the side of this ceramic oddity. By stretching the imagination it is possible to envisage this as a headrest such as those carved from wood which are used in the Wanigela area.

Surface collections made upon sites on the banks of the Murin River yielded two different types of ceramic artifact. Ceramic discs, similar to those found in the archaeological deposits but lacking a central perforation, were found at site Col. 12 (map 4). The four specimens from this site are all made from 'modern' sherds (pl 15i).

A ceramic artifact, which to some extent resembles a mushroom in shape, was found on site Col. 5. It is possible that this is a broken handle or knob from a vessel, but since it is the only example of its type, it is difficult to say just what it is (pl 15j).
CHAPTER VIII

Summary and Discussion

The introduction presents the salient features of New Guinea prehistory and indicates that my research is the first of its kind to be attempted in coastal and island eastern Papua. As such it is to be regarded as a preliminary effort towards reaching an understanding of the recent prehistoric settlement of, and the interaction between, Collingwood Bay and the Trobriand Islands. The research centred upon the Wanigela area, at the head of Collingwood Bay, where three mounds were excavated and collections obtained from 32 surface sites. The mounds proved to be large and substantial features. They contained quantities of ceramic debris, shell fish remains and animal bones. Pig and wallaby bones were the commonest vertebrate remains and, surprisingly in view of the closeness of the sea, few fish bones were found. Structural evidence in the form of post hole patterns was absent; however, burned areas and associated hearth stones were found in Mound C. The absence of house remains indicates that these mounds were probably activity areas that were in part formed by village refuse.

Bone, stone and shell artifacts excavated in Mounds B and C often have direct counterparts in the ethnographically known cultures of eastern Papua. This is particularly true of the ground stone adzes and shell ornaments. Worked pumice and numerous obsidian flakes were scattered throughout the deposits. The latter were obtained from sources on Fergusson Island (Key 1969).

The mounds have a restricted distribution which marks them to some extent as refuge settlements. The only place on Collingwood Bay where these mounds are recorded is in the Wanigela area and more specifically near the mouths of the Anina and Sasap Rivers. Two small mounds were found to the south of the Anina River (Col. 26 and 27), two are pictured by Newton at Old Wanigela (pl 2) and at least seven are known to have belonged to the complex at Oreresan and Rainu. Surface collections were obtained from 28 sites on the Trobriand Islands. Earlier reports had suggested the
existence of a prehistoric trade system which transported mainland wares to the Trobriands (Austen 1939-40; Key 1968) in addition to the modern kula network (Malinowski 1922). Although over two months were spent in the survey, no stratified sites were located. The Trobriand Islands were considered to be the best possible area to link Lauer's n.d.) study of the D'Entrecasteaux ceramic tradition and my research in the Collingwood Bay region.

Surface collections from Collingwood Bay and the Trobriand Islands were ordered with respect to the ceramic sequence which emerged from the excavations. The data from the excavations and surface collections suggested the operation of multiple factors. These factors were considered in detail and a four phase ceramic sequence proposed.

1. Early Ceramic Phase
2. Expansion Phase
3. Refuge Phase
4. Historic-Modern Phase

In further summarising the research and its implications, I will proceed from the specific problems raised by the excavations to the general considerations of a regional prehistory. This involves starting with the mound complex, moving outward from this reference point to include the surface collections from the Collingwood Bay area, then considering the material from the Trobriand Islands and finally the overall implications of the research.

The Excavated Mounds

By about 1000 years ago settlement had developed in the swamps at the head of Collingwood Bay. As the terrain was lowered by the compaction of the soil, the slightly raised midden areas became focal points of activity. Data from Mirrngadja in Australia's north-eastern Arnhem land documents the initial stages of midden formation in a swamp environment (R. Jones, pers. comm.). The Aborigines living in the Arafura swamp are attracted during the wet season to elevated areas. These places may lie only a few centimetres above the surrounding terrain, but they are dry for a longer period during the wet season than the lower lying areas. Gradually this specific area is elevated by the
accumulation of human refuse. The stratigraphy of Mound C appears to reflect this process.

But there was another factor responsible for the accretion of the excavated mounds. This was the deliberate addition of sandy soil. Sand could well have been brought in periodically to seal in midden refuse and refresh the surface of the mound. At times the evidence points towards there being a conscious effort to increase the height and usable area. This is particularly noticeable in the case of Zone III of Mound B and perhaps Zone IIIA of Mound D. If such sandy soil was obtained from an abandoned midden, it would provide the opportunity for the redeposition of earlier material in a later context.

At Wanigela, the belt of swamps which separates the interior plain from the sea is in fact a protective barrier. This presents an ideal situation in which to establish an initial colony if the inland areas host a hostile population. Access to the sea and swamp environments would be assured and the immediate inland regions could be exploited on a temporary basis. If the new settlers were able to expand inland and establish themselves on the alluvial plain, the coastal villages would probably continue to exploit the local environment. However, if pressure was mounted by inland groups, the coastal-swamp villages would then become refuge areas.

The collections from the surface sites have been interpreted as showing phases of ceramic development which occurred before 1000 B.P. and were poorly represented in the excavated mounds. Whether this Early Ceramic Phase was represented in the other mounds at the mouth of the Sasap River is not known. The early reports describing ceramics from the demolished mounds illustrate rim sherds decorated with triangular cutouts (Monckton 1922:facing page 118; Seligmann and Joyce 1907:pl XI). Some of these sherds are specifically referred to as being derived from the Murin River and the others are listed as coming from the mounds. A few sherds of this style (Group P) were found in the excavations, particularly Mound C. Either this material is redeposited in the excavated mounds or its presence marks the very terminal stages of the pottery
characteristic of the Early Ceramic Phase, a time when Group P had diminished to insignificance. This ware is well represented on the early Trobriand Island sites and possibly the Wanigela area may not have been a major centre during the Early Ceramic Phase. What is clear, is that sometime before or shortly after 1000 B.P. the Early Ceramic Phase merged with the Expansion Phase.

During the Expansion Phase, occupation of the inland plain was intensive and connections with the Trobriand Islands continued. This phase is represented in the earlier zones of the mound deposits. It is impossible to determine from the evidence at hand, if the mounds were inhabited first and then the population spread into the inland plain, or if the mounds evidenced their major accretion during a phase of general withdrawal. Certainly, by 500 B.P. they were being abandoned and the population associated with the Refuge Phase retrenched themselves in the peripheral areas of the region, on the slopes of Mt Victory and in the coastal swamps.

Soon after the mounds were abandoned a significant gap in the sequence exists until the arrival of the modern Wanigela peoples. They settled initially in the swamps at the mouth of the Anina River and slowly expanded their control of the immediate inland area. This was accomplished to some extent when the Onjob (non-Austronesian speakers) allied themselves with the Wanigela peoples (Austronesian speakers) and formed a weak barrier against the hostilities of the inland tribes.

Radiocarbon dates from the excavated mounds indicate a period of activity which spanned at least 500 years of prehistory (c. 1000 B.P. to 500 B.P.). However, the dates are not particularly acute indicators of specific inter-mound relationships. The distribution of the ceramic groups within Mounds B, C and D, suggested the following sequence that was in agreement with a ranking of the central values of the radiocarbon dates. The basal zones of Mounds B and C were assigned to the same early period, immediately followed by the remainder of Mound C. During this segment of the sequence a gradual shift from straight sided to globular jars and from restricted to open bowls was
apparent (fig 20). This trend continued through Mounds B and D. The uppermost zones of Mound B (Zones I, IIA, IIAB, IIB) contained material which was considered as having been redeposited from an earlier context. Mound D was regarded as being in part contemporary with, in part later than the middle zones of Mound B.

It was clear that more than the chronological principle was affecting the distribution of the ceramics. Mound B had a high proportion of punctation and broken line incision as a decorative element, while Mound C had more shell stamping. It was illustrated that two jar forms (Groups D and G) present in both mounds followed this same pattern with respect to their lip decoration. Furthermore, it was clear that punctation and broken line incision did not gradually replace shell stamping as would have been the case if the latter was considered to predate the former.

Longacre (1964:166) was faced with much the same situation in his study of black-on-white sherds from the Carter Ranch Site. He described a non-random distribution where 60% of the design elements are universal and the remaining 40% exhibit a distinctive pattern. The differential relative frequencies of design elements were interpreted as suggesting a delineation of various social aggregates within the site.

My own research (to be published elsewhere) in the contemporary ceramic producing centre of Rainu detailed such a situation. Lineages have the exclusive use of some design motifs. Members of a particular social group are the only individuals permitted to apply these decorative elements and to use the ceramics upon which the specific designs are placed. Given the situation where the members of each lineage live in a localised cluster within a larger settlement, they will tend to throw their rubbish into middens that are close to their residence. The differential distribution not only reflects a pattern of exclusive manufacture, but also, and perhaps more important, a restricted consumption. The decorative elements applied to a vessel not only identify the maker but in some instances restrict the use of the pot to members of a specific social group. Vessels are manufactured without these specific
motifs and they enter into trade and may be used by anyone who happens to own them.

The interlocking of local organisation and kinship in the contemporary societies of Melanesia is commented upon by Chang (1958:300). He cites a statement by Hogbin and Wedgewood (1952-54:241) that politically significant groups all have their roots in the land and rights to the land is determined by descent. Allen and Richardson (1971) comprehensively discuss the problems involved in reconstructing descent and residence patterns from archaeological data, particularly when the ethnographic situation is not clearly understood. Nevertheless, it is readily apparent that within the context of contemporary Wanigela two social groups, the Oyan and Ubir, have lived side by side for more than ninety years and maintained a residence pattern which is more or less exclusive. Secondly, various totemic groups own specific plots within the villages and permanent access to this land by non-members is severely restricted. This means that lineages tend to cluster into specific areas in the settlement.

It is significant that Chang points to Melanesia as one of the four major regions of the world where a study of contemporary 'Neolithic' (Chang's parentheses) communities emphasises the need for prehistorians to 'look at archaeological sites as local social groups instead of cultures or phases' (Chang 1958:324). He discusses the nature of the segmented 'Neolithic' village which is found in Melanesia (Chang 1958:306-7). In this type of a village, social groups live in close proximity to each other, yet remain distinct.

Heterogeneity within linguistic groups and major settlements has been documented by physical anthropologists working in New Guinea. A study of the population of 14 interrelated neighbouring villages in the Markham Valley documents intervillage genetic heterogeneity in a situation where the authors thought 'this might be expected to be minimal' (Giles, Wyber and Walsh 1970).

Similar sociological factors might equally be expected to influence the composition of middens in regard to food refuse. L. Pospisil, within the New Guinea context
(1963:13) explicitly states that in Kapauku society law and political structure are profoundly interrelated with the native economy. This is a well known and accepted premise which operates to some extent in all societies. Pospisil (1963), however, discusses in detail a situation in which sublineages control the exploitation of specific areas in terms of their agricultural, hunting and gathering practices. It is not too difficult to extend this analogy to include a situation which would produce midden deposits comparable to those excavated at Wanigela, if specific groups of the prehistoric population had exclusive or near exclusive access to specific facets of the environment.

The following observation refers to the Kubiri, a close linguistic relative of the Wanigela Ubir. The Kubiri live in a similar environment on the southern coast of Collingwood Bay.

Totemism is well-developed among the Kubiri. The crocodile is a totem and its intercession is sought by placing food in the rivers for it to eat. The more common customs of totemism are in full force. The crocodile clan has many subsidiary totems; these include two shell-fish, because their shells are like the scales of the crocodile, three fresh-water fish, because the crocodile feeds on them, a variety of taro, and a kind of banana which has the same name as the crocodile and which is used to feed it. Even subsidiary totems may not be eaten, and in some cases they may not be touched (Giblin 1910:744).

It is plain to see that an archaeologist excavating a rubbish heap belonging to these people would not find a mirror image of the local fauna.

Significant differences were observed in the faunal content of Mounds B and C. Throughout the deposits, except for the basal zones, mammal bones were common in Mound B and molluscan remains were best represented in Mound C. Within the molluscan category each mound displayed a different trend. In Mound C, the riverine species increased at the expense of the marine, and within Mound B the mangrove species gradually came to dominate the riverine species.
The differences between the mounds could be explained in terms of the sociological model or the tendencies regarded as supporting the temporal model. Both of these models could have been affected by a change in the local environment.

The temporal model would envisage a situation where mangrove and marine species were of equal importance. This equality, as seen in the basal zones of Mound C, changed to an increasing dependency upon riverine species at the expense of the marine species. Following the abandonment of Mound C, there is an abrupt decrease in riverine species through Mound B and an ever increasing dominance of mangrove species. The marked increase in mangrove species could be reflecting a change in the local environment. As the land lowered, the habitat of the riverine species would have become saline. Tidal species would then have replaced riverine species in the immediate area of the mounds.

Although the changes in molluscan species can be fitted into a temporal model, the preponderance of molluscan remains in Mound C, compared to Mound B, cannot be explained so readily. The same is true for the mammal remains, particularly pig, which are common in Mound B and not as frequent in Mound C. The differences in the components of Mounds B and C are consistent throughout the deposits, except for the basal zones. This marked differential distribution of faunal remains might be reflecting sociological factors which resulted in Mound B having a high mammal bone content and Mound C having more shell fish remains.

The archaeological data from the excavated mounds support a model which combines the spatial, functional and symbolic aspects, as well as chronological considerations, of the settlement pattern. The salient features of this model are:

1. The interlocking aspects of kinship organisation and local organisation.
2. The heterogeniety and social segmentation found within a neolithic social group.
3. The exclusive access to or consumption of faunal resources by specific social groups.

4. The restricted rights of social groups to use both certain design elements and the objects which bear these motifs.

A bold approach to the situation would carry the archaeological data further and describe the mounds as the rubbish heaps and activity areas associated with a typical segmented village. Chang (1958:306) describes this village as containing two or more lineages, each of which is localised in the community. Until further work is done on the mounds at Oreresan and Rainu villages this can only be regarded as a proposal.

**Surface Collections**

**Collingwood Bay**

The picture which emerges from the mound excavations is one of localised heterogeneity within a ceramic tradition which is homogeneous in many aspects. Vessel form, decoration and the placement of the decorative elements are relatively uniform when viewed as a tradition. The surface collections from the Collingwood Bay area fall within this general tradition. Five surface collections contained pottery identical with that found in Mound D and the middle zones of Mound B. The excavated deposits were dated at roughly 500 to 600 B.P. These five sites, which evidence the terminal stages of the prehistoric ceramic tradition, are situated in peripheral areas and as such are part of the Refuge Phase.

A large number of sites, although they fit well within the general tradition as defined from the mound excavations, remains distinctive. The distinctiveness rests in a high proportion of Group F pottery (a jar form) and/or flamboyant forms of vessel decoration (Bd 37 and Bd 38). The ceramics would appear to relate to another component of the larger tradition. This material has been interpreted as being coeval with the formation of Mound C and the early stages of Mound B, although a direct comparison of the surface sites and the excavations is difficult and open to question.
These sites fall in the middle ranges of the Collingwood Bay and Trobriand Island sequences (fig 21). Their wide distribution in the Collingwood Bay region and presence on the Trobriand Islands has been interpreted as an expansion of the settlement area and a continuation of interaction with the Trobriand Islands. As such it has been labelled the Expansion Phase. Needless to say, further research is needed before this period of prehistory can be precisely defined in terms of the complete settlement pattern as it existed through time in the Collingwood Bay region and on the Trobriand Islands.

The collections from three sites (Col. 12, 16, 31-32) in the Wanigela area are dominated by ceramics ascribed to the Early Ceramic Phase. Two of these sites are dominated by a ceramic group (Group P) that includes pedestaled wares. Although this material is well represented on the Trobriand Islands (sites Tro. 1, 2 and 22), it is not common in the excavated mounds nor widely found in the Collingwood Bay area. Its placement within the ceramic sequence established for the mounds is poorly understood. Although some decorative features are common to both, the early ceramics are quite distinctive from the later and more common ceramics.

The wares belonging to the Early Ceramic Phase experienced their greatest popularity at sometime prior to 1000 B.P. It is conceivable that the Early Ceramic Phase could have been initiated before or early in the first millennium A.D. By the first millennium B.C., the south coast of Papua was settled by pottery using peoples. This date was obtained from a site on Yule Island, Central District, by R.L. Vanderwal (pers. comm.).

Trobriand Islands

The surface collections from the Collingwood Bay sites display a series of major breaks between each phase of the sequence. This situation contrasts with the unbroken sequence obtained from the Trobriand Islands. Early ceramics, Group P, decrease gradually as the later Collingwood Bay ceramics become popular. During this process, D'Entrecasteaux wares steadily increase until they dominate the Historic-Modern Phase. By this time Collingwood Bay
ceramics have been entirely replaced. The replacement appears to have taken place at a time prior to the Refuge Phase (before c. 600 B.P.). In order to securely date this break in the interaction between Collingwood Bay and the Trobriand Islands, stratified sites on the islands must be excavated.

Collingwood Bay ceramics are found in interesting associations on the Trobriand Islands. Although it has been documented for only two sites, the finding of Early Ceramic Phase wares with the stone groups deserves some comment, particularly with respect to the burial caves. Two associations appear to be present. The first of these is the stone groups and Early Ceramic Phase pottery, and the second is Expansion Phase ceramics and the cave or niche burial complex.

Ceramic Group P, known to include some pedestaled forms, is found in large quantities on the sites (Tro. 1 and 2) adjacent to the stone arrangements. Contemporary Trobriand Islanders ascribe little importance to these massive monuments, nor do they consider their ancestors as having erected them. However, they do place considerable importance on the burial caves which are filled with the bones of their ancestors. These caves contain pottery belonging to the Expansion Phase, particularly globular vessels decorated with flamboyant motifs (Austen 1939-40; Egloff n.d.). Early Ceramic Phase pottery has not been recorded in the burial caves. The dichotomy would lend support to the idea that a change occurred on the Trobriand Islands which permitted the stone groups to fall into decay and the custom of cave burial with accompanying mortuary vessels to become popular. The evidence at hand does not permit much expansion of this topic; however, it should be noted that both customs were followed to some extent in other areas of the Massim (Egloff 1970; Lyons 1922; Reisenfeld 1950: map IV: Seligmann 1910:228; Tindale and Bartlet 1937).

Regional Considerations

Recently, L. Groube (Department of Prehistory, ANU) and myself investigated a burial complex on Nuamata Island, just north of Goodenough Island. More than 40 complete or fragmented vessels were found in small shelters or niches
on a boulder strewn hillside. Human bones were associated
with many of the vessels. The ceramics found at this site
can be divided into three major categories.

1. Prehistoric mainland ceramics (Expansion Phase)
   belonging to ceramic Groups F, W and X.

2. Prehistoric-Historic D'Entrecasteaux wares
   belonging to Groups A, N and O.

3. An enigmatic style which appears to be a proto­
totype of the modern Wanigela wares with
certain stylistic features of the D'Entrecasteaux
tradition. These vessels are roughly spherical
in form and as such resemble ceramic Group A.
They have a direct rim and the body decoration
consists of shallow channels arranged in angular
patterns (i.e. similar to Bd 41).

Early Ceramic Phase wares were not found on the site
nor were modern Wanigela wares. The Nuamata Island burial
complex to some extent confirms the data from the Trobriand
Island surface collections, in that both mainland and
D'Entrecasteaux wares are found together in a prehistoric
context. A comprehensive report of the Nuamata burial
complex is being prepared for publication.

All of the ceramics found on the Trobriand Islands
are trade wares derived from the mainland, the northern
D'Entrecasteaux Islands or from Tubetube and Wari Islands
in the Southern Massim. The last of these amount to a
very few vessels which probably arrived as part of the kula
trade (Lauer n.d.:223). Ethnographically, before the ad­
vent of European metal vessels, a brisk trade was carried
on between the Trobriand Islands and the Amphlett Islands.
The Amphlett Islanders were considered by Malinowski
(1922:282-3) to be 'the only purveyors to the Trobrianders'
of pottery. Apparently, suitable clay sources are not
available upon the coral based islands and hence an indigen­
ous ceramic industry has not developed in the Trobriands.

The trade which brought mainland ceramics to the is­
lands spans the Early Ceramic Phase and the Expansion
Phase of the Collingwood Bay sequence. During most of
this time D'Entrecasteaux ceramics were also being traded
to the Trobriand Islands. The antiquity of the inter­
action in these islands must be at least a thousand years and could well be on the order of two thousand.

During these same periods, mainland wares were traded to Goodenough Island. Lauer (n.d.: pl 55) recorded three sites on northern Goodenough Island which contained sizeable quantities of mainland sherds. A few sherds found in this same region by C.A. Key are identical in form to the prehistoric Collingwood Bay ceramics; however, they are made from D'Entrecasteaux clays (C.A. Key, pers. comm.). If under examination of a larger sample, this proves to be true for a sizeable quantity of sherds, the entire D'Entrecasteaux - Trobriand Island - Collingwood Bay trade pattern would need to be reconsidered. If the interaction between these areas spans at least 500 years, and not only items but the actual processes of ceramic technology were being exchanged, this would then speak for a relatively intensive exchange of not only material goods, but also of ideas and perhaps people.

To the north of Collingwood Bay, sherds collected by C.A. Key and D. Songer at the Eroro Anglican Mission on Dyke Ackland Bay (map 1) are definitely related to the prehistoric Wanigela tradition (pl 10a-d). The clay used to manufacture the Eroro vessels is basically the same as that used in the Wanigela vessels (C.A. Key, pers. comm.) and further research is needed to differentiate them. The Eroro sherds could have been made either on Collingwood Bay or Dyke Ackland Bay. Nevertheless, their presence indicates that the influence of a specific mainland ceramic tradition extended for at least 100 km northward along this coast of Papua.

To the south of Collingwood Bay, I found prehistoric sherds near the Boianai village cemetery. This community is situated at the head of Goodenough Bay, approximately 110 km south-east of Wanigela. Ceramics belonging to the Expansion Phase were found in the collections along with modern Boga Boga and East Cape wares. This village dump had obviously been used for a long period of time. Small stone arrangements and rock carvings are found in this village (Egloff 1970) and the former could be considered as part of the stone arrangement complex which is scattered throughout much of the Massim and reached its height of
elaboration on the Trobriand Islands.

Wider Implications of the Research

How could the widespread Collingwood Bay ceramic tradition vanish without leaving a significant residue of traits in the modern ceramic industries of the region? If these traits exist they are certainly obscure. The prehistoric D'Entrecasteaux ceramic tradition has continued into the present and it is possible that the modern Wanigela wares are an offshoot from this major tradition. The problem of the disappearance of the prehistoric Collingwood Bay tradition is matched by the equally knotty question of its initiation.

The ceramics which I have assigned to the Early Ceramic Phase are only tentatively related to the mound ceramics. Stylistically these wares are characterised by triangular impressions or cutouts on the labial flange (Group P); a gambreled shoulder on the bowl forms (Group S); elaborate pedestals decorated with cutouts (Group P); and an associated ceramic style which is decorated with shell stamping on the upper body and triangular impressions on the shoulder flange (pl 7c). Lauer found what could be considered a counterpart to Group P on the D'Entrecasteaux and Trobriand Islands. This ware has a wide labial flange which is often decorated with shell impressions. The vessel form appears to be that of a shallow bowl which is represented as having a gambreled shoulder (Lauer n.d.: pls 61 and 65, PR 17). A few of these sherds were found in my Trobriand Island collections (pl 10e and f). Unfortunately, all of these sherds were so battered that they could not be included in the ceramic analysis. Lauer's PR 17 and my 'premound' ceramics (Groups P, S and J) upon relatively weak stylistic evidence, can be considered the oldest ceramics from this area of Papua.

If, and certainly the 'if' must be stressed, these are the earliest ceramics, then how do they relate to prehistoric ceramics found in New Guinea and the adjacent Melanesian Islands? They certainly do not have the full range of features which would mark them as belonging to the Lapita tradition (Specht 1968:127-132). J. Allen, S. Bulmer and R. Vanderwal have allowed me to study their material from
the coastal areas of the Central District, Papua. A cursory examination did not reveal any close similarities between their ceramics and the Collingwood Bay tradition. Nor does the latter relate closely to Specht's Buka ceramics or to the Shutlers' description of Bougainville sherds (Shutler and Shutler 1964; Specht 1969). Garanger's (1970) ceramics from the New Hebrides do not present any close parallels to the Wanigela ceramics.

Pedestaled vessels have not been reported in any prehistoric ceramic assemblage from the south-west Pacific. The closest recorded examples lie in South-East Asia where this form is widespread (Chang 1966:pl IIIb; Solheim 1961: fig 2; 1964a: pls I and II; 1964b, pls 9, 14 and 37). The pedestal is not a form which is easily invented and there is every reason to propose that Collingwood Bay pedestaled wares are derived more or less directly from a South-East Asian prototype.

The widespread distribution of the Early Ceramic Phase, where it is well represented on the Trobriand Islands and to a lesser degree on the mainland, could indicate that it was initiated by a sea-faring people. The most likely candidates would be an Austronesian speaking, marine oriented, population which perhaps spread southwards along this coast of Papua. Golson (n.d.) discusses the reality of South-East Asian metal age influences in the South Pacific and points towards Collingwood Bay specifically. His attempt to draw together the evidence for this influence focuses in part on the curvilinear scroll which appears on Dong-son bronzes and as a dominant art motif in the Massim. The carved marine shells from the Wanigela mounds exhibit a high degree of sophistication in the rendering of this art motif (Seligmann and Joyce 1907:pl VII). Golson specifically points towards the bird motif found on a single shell (White, Disney and Yaldwyn 1970) as forming a link with the Dong-son ship-of-the-dead complex. A further note of interest pertinent to the Early Phase Ceramics is the fact that although pedestals have not been found on ceramics from the South Pacific, pedestaled stone mortars have been reported from New Guinea (Schmitz 1966:19) Golson (n.d.) would consider these artifacts as having probable or
problematical ties with the 'Bronze Age' of South-East Asia. It must be remembered that Golson's consideration of Collingwood Bay and the enigmatic 'Bronze Age' features of New Guinea prehistory was proposed prior to the discovery of pedestaled wares at Wanigela. Thus, perhaps, the case is strengthened, but extensive research remains to be done before the parallels can be explicitly demonstrated.

In the Collingwood Bay region, the Austronesian speaking population has a bare toe hold on the coast. An incredible amount of intermixing and dislocation of language groups has resulted in a linguistic situation which is unbelievably complex (Dutton n.d.). Austronesian and non-Austronesian languages are intermixed and confused; however, the restriction of Austronesian languages to the coastal areas is complete.

It is interesting to note the findings of physical anthropologists working in eastern Papua. The sporadic occurrence of the $R_z$ gene complex includes the Massim area of Papua (Booth and Saave 1970). Four regions have been recognised as possessing a significant frequency of this gene complex: the D'Entrecasteaux Islands and the adjacent coast including the Ubir of Collingwood Bay; the Marshall Lagoon-Hula area, 70 km south-east of Port Moresby; the Papuan-West Irian border area on the south coast of New Guinea; and Bougainville and New Ireland. Booth and Saave (1970:190) recognise this as a coastal-island phenomenon and suggest that it was introduced by a sea-faring peoples. The $R_z$ gene complex is present in Indonesia and in Australia. Its occurrence in the Papuan-West Irian border area could have resulted from some intermingling with the Australian Aborigines (Booth and Oraka 1968:153). This still leaves the apparent D'Entrecasteaux, Bougainville and Indonesian connection unexplained.

Howells (1970) summarises his anthropometric grouping of the Pacific peoples. One of the populations that he includes in his study was collected by Pöch at Cape Nelson, on Collingwood Bay. Howells places them within the $D_1$ branch (Micronesian) which includes populations from the north and south coast of New Guinea, Bougainville, Malaita in the Solomons, the Carolines and Ontong Java. He
stresses the 'constant intergrading between the Micronesian and certain Melanesian peoples' (Howells 1970:212). Micronesian D₁ is closely allied to the Melanesian C₂, while Micronesian D₂ is closer to the Polynesian groups. He then proposes three major populations for Oceania: Australian, Micro-Polynesian, and Melanesian. The Melanesian he regards as a 'much varied population ... which has had very considerable genetic effects on parts of Micronesia (west and centre) while also being affected to a lesser degree by a reverse contribution from Micronesia in parts of New Guinea and the Solomons' (Howells 1970:215).

In an attempt to relate the prehistory of Collingwood Bay and the Trobriand Islands to the train of events which populated Oceania, this study has suggested some possible correlations which when viewed in the light of linguistic, genetic and anthropometric studies leaves much room for speculation. It is obvious that until more prehistoric sites are excavated in coastal New Guinea, many questions of the past will continue to be asked and the answers proffered will remain questionable.
APPENDIX I

A list of the excavation units of Mounds B, C and D which provided material for the analysis

CERAMICS
Mound B - 33R66 to 33R68 and 32R66 to 32R68 - midden analysis
   33R66 to 33R38 - ceramic analysis
Mound C - 75R11 to 75R15 - midden analysis
   75R13 to 75R15 - ceramic analysis
Mound D - 12R222 to 12R224 - ceramic analysis

MOLLUSCA
Mound B - 32R64 to 32R65, 32R66 to 32R67 and 32R68 to 32R69
Mound C - 75R14 to 75R15

BONE, PUMICE AND STONE, OBSIDIAN, AND PUMICE ARTIFACTS
Mound B - all units excavated excluding 32R64 to 32R62
Mound C - all units excavated excluding 75R11 to 75R9

The location of these units is indicated on figures 2 to 4. The units selected for the midden and ceramic analysis were chosen because they proved to be free from intrusions and had a relatively well defined zonation. Material for the ceramic analysis came from units whose specimens arrived from the field after less than six months in transit.
The present day availability and utilisation of the excavated mollusca in the Wanigela area

The diet of the Wanigela people is augmented by small quantities of mollusca. Just how many shell fish are eaten is impossible for me to estimate. A variety of molluscan shells serve as scrapers or ceramic tools with certain species being used to make ornaments. The list which follows was prepared from data and specimens gathered in the field, with the later assistance of G. Buick, University of Papua and New Guinea, E. Coleman Glover, Canberra and W. Ponder, the Australian Museum. My own observations have been used to qualify their data, so I assume all responsibility for any errors that may have crept into the list. A study by T. Kira (1962) proved to be helpful and was often referred to. A paper by R.N.H. Bulmer (1969) outlines the procedures and problems involved in ethnozoology. It is apparent that this study falls short of the ideal. Not only was my work handicapped by a shortage of time but my minimal grasp of the language made any acute understanding of the folk-taxonomy impossible.

The Ubir nomenclatures are spelled in a manner consistent with the Ubir dictionary prepared by the staff of the Anglican Mission, Wanigela. For the use of this document I am indebted to Sister H. Roberts.

**KEY**

<table>
<thead>
<tr>
<th>ARCIDAE</th>
<th>Tidal mud flat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anadara sp.</td>
<td>&quot;gogor&quot;</td>
</tr>
<tr>
<td><em>sea-weeds</em></td>
<td>0.016</td>
</tr>
</tbody>
</table>

Usage: Item of diet and used for net weights

1. Family name
2. Zoological environment
3. Scientific name
4. Ubir name
5. Ethnographic environment
6,7. Figures represent the percentage of the species in the total analysed molluscan sample from Mound B or from Mound C
8. Current and historic usage by the Wanigela peoples
**ARCIDAE**   Tidal mud flat

*Anadara sp.*   "gogor"   _sea weeds_ .016 .022

Usage: Item of diet and used as net weights

**ARGONAUTIDAE**   Deep sea

*Nautilus pompilius*   "roke matan"   _deep sea_  ---  ---

Usage: Item of diet

**CARDIIDAE**   Subtidal, sandy

*Cardium sp.*   "kikirer"   _deep sea_ .002 .003

Usage: Item of diet and as a ceramic tool

*Cardium sp.*   "rioi"   _deep sea_ .005 .009

Usage: This species if not eaten.

**CERITHIIDAE**   Subtidal, sandy

*Cerithium nodulosus*   "sisi"   _mangroves_  ---  ---

Usage: Item of diet

**CERITHIIDAE**   Subtidal, sandy

*Cardium sp.*   "rioi"   _deep sea_ .005 .009

Usage: This species if not eaten.

**CONIDAE**   Subtidal, reefs

*Conus (lividus?)*   "tutut"   _shallow sea_ .023 .005

Usage: Item of diet and for decoration

**CORBICULIDAE**   Freshwater

*Batisia violacea*   "kwasaas"   _rivers_ .124 .043

Usage: Item of diet and as a ceramic tool

**CYPRAEIDAE**   Subtidal, reefs

*Cypraea arabica*   "fui"   _reef_ .003 .003

Usage: Used for decoration

**DONACIDAE**   Tidal, Sandy (beach)

*Donax cuneata*   "safe"   _sea shore_ .001  ---

Usage: Item of diet

**FASCIOLARIIDAE**   Subtidal, reefs?

*Latirus sp.*   "giman"   _reef_  --- .001

Usage: This species is not eaten

**GELOINIDAE**   Tidal mud flat

*Gelonina (coaxam?)*   "yoyok"   _mangroves_ .116 .025

Usage: Item of diet and manufactured into lime

**MACTRIDAE**   Tidal mud flat

*Lutraria sp.*   "kamatan"   _sea weeds_  ---  ---

Usage: Item of diet

**MITRIDAE**   Subtidal, reefs?

*Mitra eremitarum*   "badir"   _deep sea_  ---  ---

Usage: This species is not eaten
MURICIDAE  Deep sea
Chicoreus torrefactus  "aiwabasik"  deep_sea  .003  .005
Usage: This species is not eaten

NATICIDAE  Deep sea
Polinices sp.  "amur"  deep_sea  .004  .002
Usage: This species is not eaten, a ceramic tool

NERITIDAE  Tidal mud flat
Nerita sp.  "matasfot"  mangroves  .008  .004
Usage: Item of diet

NERITIDAE  Tidal mud flat
Nerita sp.  "yayab"  mangroves  .095  .063
Usage: Item of diet

OSTREAEIDAE  Tidal mud flat
Ostrea sp.  "kokaf"  mangroves  .010  .011
Usage: Item of diet

POTAMIDIDAE  Tidal mud flat
Cerithidea sp.  "sisirarau"  mangroves  .014  .034
Usage: Item of diet

Spondylidae  Subtidal, reefs?
Spondylus (ducalis?)  "kokaf"  reefs  .005  .019
Usage: Item of diet

Spondylus ducalis  "korafis"  deep_sea  ---  ---
Usage: This species is not eaten

STROMBIDAE  Subtidal, reefs?
Lambis lambis  "daudur"  deep_sea  .002  .010
Usage: This species is not eaten

STROMBIDAE  Subtidal, reefs?
Strombus canarium  "saurab"  shallow_sea  .058  .076
Usage: Item of diet

THIARIDAE  Freshwater
Melania (diadema?)  "daur"  deep_sea  ---  .001
Usage: This species is not eaten, trumpet

Stenomelania denisoniensis  "giman"  river  .077  .108
Usage: Item of diet
Tidal mud flat

Melania juncta "waifus" mangroves .158 .031
Usage: Item of diet and as a ceramic tool

TRIDACNIDEA Subtidal, reefs?

Hippopus hippopus "kome" reefs --- .009
Usage: Item of diet and for decoration

TROCHIDAE Subtidal, reefs?

Trochus genestrtatus "kokoar" swamp .004 .013
Usage: This species is not eaten

Trochus niloticus "jingo" deep sea --- .001
Usage: Item of diet and made into ornaments

TURBINIDAE Deep sea

Angaria atrata "kokorek" deep sea .002 .009
Usage: This species is not eaten

VENERIDAE Subtidal, sandy

Anomalodiscus squamosus "kire" deep sea .001 .003
Usage: Item of diet

Gafrarium tumidum "warewan" swamp --- .002
Usage: Item of diet

Periglypta puerpera "nakwer" mangroves .004 .002
Usage: Item of diet

Periglypta sp. "fanim" deep sea .001 ---
Usage: This species is not eaten

Pitar sp. "mgoruf" shallow sea .006 .002
Usage: Item of diet

Pitar sp. "yamum" mangroves --- ---
Usage: Item of diet

VOLUTIDAE Deep sea

Melo amphora "yaroyar" shallow sea --- ---
Usage: Item of diet and for decoration
APPENDIX III

The present day availability and utilisation of mammal, bird and reptile fauna in the Collingwood Bay region

The people of Wanigela derive most of their food from vegetable sources. Pigs, both domestic and wild, and to a lesser extent wallabies supplement the basic starch diet. The protein portion of the daily diet is almost negligible. Upon special occasions meat is consumed in greater than normal quantities. Although many communities are located along the shore of Collingwood Bay there appears to be a minimal exploitation of sea resources. The people possess canoes and fishing gear which gives a somewhat false impression that they regularly harvest sea resources. Evidence surviving in the prehistoric middens at Oreresan and Rainu villages bespeaks a dietary pattern similar to that found in contemporary Wanigela villages. Pig and wallaby bones predominate while fish bones are all but absent. Other small mammals are present only in minor quantities. Since the fish remains in the archaeological deposit are negligible and their exact contribution to the modern diet is in question, I shall not treat the utilisation of fish resources in detail.

The availability of mammals in the sector adjacent to the midden is relatively difficult to determine. The Archbold Expedition (Brass 1956) researched an area from the south-western coast of Collingwood Bay, inland to Mt Dayman. The number of mammal species increased progressively inland and at higher altitudes. At Baiawa, a coastal village in a situation similar to that occupied by Oreresan and Rainu villages, the Archbold Expedition found mammals hard to come by. Only Macropus agilis and Isoodon macrourus were recorded at this camp. This same paucity of mammals could well exist in the coastal sector of Wanigela. Inland on the grasslands and in the bush more species are found. A list of these animals follows. It is based upon the results of the Archbold Expedition (Brass 1956) and the experience of J. Hope, Prehistory Department, ANU, who helped considerably with the faunal material from the excavations. This list is not definitive or exhaus-
tive but is designed to present the range of animals that would be available by hunting no more than five to seven miles from the archaeological sites on the coast. It is recognised that this study is compromised by the lack of ethnographic data. My time and energy were directed primarily to the archaeological situation and secondarily towards the ethnographic aspects of ceramics, material culture, settlement patterns and molluscan utilisation.

Many factors can bias the archaeological picture of an environment. Differential preservation may eliminate certain ranges of the faunal spectrum. Dogs or pigs are known to consume the bones of small animals. The animals present in the archaeological deposit may not be representative of the total range of species available because the people just were not utilising all the available resources. Aside from preservation, there are many cultural conditions which strongly influence the range of animal remains discarded by any social group, such as nature of butchering techniques and food preparations. Age, sex, rank and group membership may further restrict the range of species to which any single person has access. These factors must all be held in consideration when at attempt is being made to reconstruct a living culture from dead refuse.

A Selected List of Animals in the Wanigela Area

MARSUPIALS

**Macropus agilis**: Sandy or Agile Wallaby.
This animal is well represented in the archaeological deposit as an item of diet and a material used for tools. Long bones were made into spatulae, awls and tubes. Today, large communal hunts are held in the grasslands to the west of Wanigela. The villagers kill wallabies, pigs and bandicoots during the hunt.

**Dorcopsis sp**: Scrub Wallaby.
This small wallaby was not found in the deposits nor did I see it in the area. The villagers spoke of a small wallaby which they sometimes hunted in the bush as opposed to the larger Agile Wallaby which was hunted in the grasslands.
Phalanger maculatus: Spotted Cuscus.
The spotted cuscus is found in limited numbers in the archaeological deposit. Apparently this animal is eaten by the villagers whenever it is captured. I did observe killed animals of this genus but I am not certain of the exact species.

Phalanger orientalis: Cuscus.
This species is not identified in the archaeological deposits.

Phalanger gymnotis: Cuscus.
This species is not identified in the archaeological deposits.

Dactylopsila trivirgata: Striped Possum.
This species is not identified in the archaeological deposits nor did I see it in the area.

Distoechurus pennatus: Feather-tailed Glider.
This species is not identified in the archaeological deposits nor was it seen in the area.

Petaurus breviceps: Sugar Glider.
This species is not identified in the archaeological deposit nor was it seen in the area.

Isoodon macrourus: Short-nosed Bandicoot.
The bandicoot present in the archaeological deposits is probably referable to this species and in fact one actually fell into the trenches and was captured. The animal is eaten by the villagers and frequently encountered along the bush tracks and on the grasslands.

Peroryctes raffrayanus: Bandicoot.
This large bandicoot was not observed nor was it found in the archaeological deposit.

RODENTS

The only rodent identified in the archaeological deposit is the rat Uromys sp. To the best of my knowledge rats are not eaten by the villagers but they may well have been so in the past. Following, is a list of the rodents known to be in the area.
Rattus (exulans?)
Rattus (vereundus?)
Melomys sp.
Pogonomys sp.
Uromys caudimaculatus
Hydromys chrysogaster

**BATS**

Chiroptera remains have not been identified in the archaeological deposit but there should be bones of these animals present since today they are eaten and used for tools (bone needles) by many villagers in this region. Although it is difficult to tell which species are present in the area the following list gives the range of possibilities.

Pteropus sp.
P. neohibernicus
Dobsonia molucoensis
Macroglossus sp.
Rousettus sp.
Kerivoula sp.
Emballonura sp.
Pipistrellus sp.
Miniopterus sp.
Philetor sp.
Hipposideros spp.

**REPTILES**

Snakes are frequently encountered along the bush tracks and the natives usually avoid them as much as possible. A few reptile vertebrae were found in the archaeological deposits but these cannot be identified as to genus. Certain snakes, known as 'sleeping' snakes, are regarded as totemic animals and are not harmed.

A large water lizard is found in the swamps adjacent to Rainu. It is hunted primarily for its skin which is used for drum heads. Crocodiles live in the swamps near the village and reports of their entering the villages during the night in search of pigs are frequent. The
crocodile is also a totemic being and is represented upon ceramic vessels and tapa cloth of individuals belonging to that clan. Crocodile bones were not found in the archaeological deposits.

Large sea turtles are hunted for their meat and shells. The shell is made into combs and net-making bobbins. The meat of the turtle is often used as bait in crocodile traps. One informant told me that only certain people in the village could eat the meat of 'some' turtles. I was told that this also applied to certain fish.

BIRDS

Brass (1956) does not describe the birds collected by his expedition since they were not of particular interest to its members. As a result I do not know what birds are in the area and I will only discuss those which I have actually observed.

Any bird with bright plumage is killed if possible. During traditional times the Wanigela people traded pots for feathers with the inland tribes. A number of birds are probably eaten but I saw only the hornbill and pigeon being hunted for this purpose. The villagers claim to hunt brush turkeys whose presence in the area is attested by the large nests seen in the bush. The cassowary is hunted for its feathers, meat and bones. My only encounter with a cassowary was when some neighbours brought me a tibia of this large bird which they were making into a spatula. Some of the fragmented bone spatulae found in the archaeological deposits could well be from this bird but no positively identifiable specimen was recovered.
APPENDIX IV

The ceramic attributes and their distribution

Fourteen classes of descriptive attributes were chosen for coding. The classes and the individual attributes were selected because of their ability to describe in a relatively precise manner the ceramics under study. Paste, an attribute class normally considered significant, was not included in this analysis. Earlier research indicated that the majority of the ceramics had their genesis in the clay sources which lie in the Wanigela area (Key 1968). D'Entrecasteaux sherds recovered from the Trobriand Islands were an exception to this rule, since their clays came from Goodenough Island or Fergusson Island. Tempers were not added to the clays and distinctions between the various pastes are best made with a polarising microscope. Since this method requires a thin section of the sherd it was applied to only a small sample (see Key 1968).

With the single exception of paste, all diagnostic features found on the rim sherds are included in the fourteen attribute classes. Only one attribute is present in each class. An example of this is the attribute class of body decoration (Class XII). Within this class there are forty-four attributes, some of which are combinations of elements which appear elsewhere in the class as single attributes. Since the data was being tabulated by a computer, the programming was simplified by making it necessary to consider only one entry in each class.

The first entries in the code (fig 22) are concerned with the identification of the specimen and its location within the excavations and surface collections. Fourteen relatively straightforward descriptive classes follow the initial identification. Most of the classes and attributes are assigned nomenclatures which are relatively standard (Deetz 1965; Shepard 1963); however, some of them require clarification.

Classes I and II refer to the finish of the vessel either in a plain state or after decoration. Attribute 6, red slipped, is a haematite rich red slip which when applied to the surface of the vessel produced a red chalky film
that was easily removed through time and probably more common than the analysis indicates. Evidence of painted designs is not present. A very few examples of pattern burnishing occur (pl 6a). When the burnishing reached a high lustre over the surface of the sherd it was termed polishing. Most of the ceramics were lightly burnished or smoothed.

Class III, percent of rim present, is measured on the device pictured in figure 12. This was calculated in units of 5% and used to factor the data. The 'percentage factor' is the mean of the units parameters, e.g. 0 to 5% = 2.5, 5% to 10% = 7.5, 10% to 15% = 12.5, 15% to 20% by 17.5 and so on to 100%.

Class IV and V, orifice radius and maximum body radius, were measured (fig 12) and the former was used to describe the ceramic groups. These measurements are not plotted in fig 23 (the distribution of the ceramic attributes in Mounds B, C and D). Maximum body radius could only be determined on a very few sherds and is of little descriptive use when applied to the entire collection.

Class VI, rebating, is one of the diagnostic features found on many of the prehistoric sherds from Collingwood Bay. This is a small groove or rebate which lies 2 to 3 cm below the lip on the interior of the vessel. The rebate was probably made by trailing the thumb, with considerable pressure, around the inside circumference of the rim.

Class VII, rim form, was determined by using model attribute forms rather than measurements. The latter method, although applicable in many instances, when applied during a preliminary analysis generated a series of perplexing classes. These proved to be obscure and difficult to relate to actual vessel styles.

To facilitate coding the 115 rim forms were divided into six major groups, five of which refer to the generalised vessel form believed to be associated with that rim shape. Shape classification of ceramic vessels and the assignment of nomenclatures is rather complex and Shepard's (1963:224-255) terminology has been modified to some degree for ease of communication. The six groups of rim
forms are described below with respect to Shepard's terminology.

1. Direct rims belonging to restricted spherical vessels: These can also be termed simple restricted spherical (or spheroid forms) (Shepard 1963: fig 23).

2. Everted or thickened rims belonging to various jar forms: Most rim forms in this group belong to Shepard's (1963:fig 22) 'independent restricted vessels with inflected contours'. Throughout the text members of this group are considered as being either jars or globular vessels. The former refers to the relatively straight necked varieties while the latter includes those vessels having a more pronounced expansion at the equator.

3. Rim forms belonging to restricted composite vessels: This group includes a diversified range of forms (generally referred to as open bowls) some of which, particularly Rim forms 56, 58 and 59, would more correctly belong in the 'vessel form unknown' group.

4. Rims belonging to various unrestricted forms: Throughout the text 'open bowl' is used to refer to this mixed array of forms. Rim forms 92, 93 and 94 would be better placed in the 'unknown' group. These three rim forms and those mentioned in the restricted bowl group are an extreme minority in the surface collections and excavations.

5. Rims belonging to composite vessels having a shoulder to lip height of greater than 3.5 cm: These are generally unrestricted vessels with composite contours (Shepard 1963: figs 22 and 23). Rim form 105 grades into Rf 64, a composite hemispherical bowl belonging to the fourth group of rim forms.

6. Rims belonging to vessels of unknown forms: Small rim sherds with less definite indications of vessel form were placed in this group.

Classes VIII to X describe the decorative elements found on the lip and rim areas. Lip refers to that point on or near the termination of the rim which best divides the inner vessel wall from the outer. The specific sectors of the vessel included in the definition of lip, inner
rim and outer rim areas are indicated in fig 22, Class VII. Decorative techniques found within this class are described as channeled (i.e. grooved), incised, punctated and stamped (i.e. impressed). Punctuation and incision were made with a sharp pointed tool and stamping with the edge or side of a shell (perhaps *cardium* sp.). Dished, describes an indentation made by pressing the thumb into the soft clay. Small applied rolls or dots of clay are relatively common and frequently combined with other elements. Ld 24 and Rd 19 are patterns of small triangles which take the form of cutouts which completely pierce the lip or rim area, shallow impression made with a triangular tool, or excisions carved with a sharp tool.

Classes XI and XII consider the placement and form of body decoration. Most of the techniques used are similar to those described for the lip and rim decoration. Bd 2, ribbon, is an applique strip which is only partially welded to the vessel's body. The wide channel attribute (Bd 9 and 10) is a groove approximately 1.0 to 1.5 cm wide and less than 5 mm deep which is found below the lip on some large bowl forms. Shallow channels (Bd 40 to 43) are narrower and not as deep as the deeper channels (Bd 11 to 33 and Bd 36 to 38) which are the more common form of body decoration.

Bd 44 was included in the analysis but was found on only two sherds, both of which were from (Tro. 21, Kwadagila) an historic site on the Trobriand Islands. These sherds probably belong to vessels made on Wari or Tubetube Islands in the Southern Massim and traded through the *kula* to the Trobriand Islands (Seligmann 1910:536; cf. Lauer n.d.: pl 50F and G).

Class XIII, shoulder decoration, includes the same range of elements found on the lip area with the addition of Sd 7, 'notched flange', which refers to a strip of clay (or flange) which is added to the shoulder area and modified by notching.

Class XIV, appendages at shoulder and rim, includes three attributes:

1. Tab handles: A small protrusion or flange (pls 6f and 8g) found primarily on the lips
of jar forms (Rf 23), open bowl forms (Rf 79 and 77) and restricted bowls (Rf 52 and 40). This is the most popular form of appendage, being present on one percent of the sherds. Over 97% of the sherds are without any form of appendage.

2. Small double lugs: These are the same form as the large lugs (pl 9e) but considerably smaller (2 to 3 cm long and protruding approximately 1 cm from the body). This attribute occurs on three sherds belonging to Rf 82 and single examples are found on six other forms.

3. Large lugs: This attribute occurs either alone or in pairs (pl 9e) which usually extend from the lip to shoulder. Large lugs are found on a few open bowls being commonest on Rf 90 and 88.

The fourteen attribute classes include almost all of the major and minor elements discerned on the 6,210 sherds being analysed. A few elements were included which only occurred on a very few sherds and others were omitted. The full range of variation found within the Collingwood Bay and D'Entrecasteaux ceramic traditions is not included within this study. It would have been impossible to analyse and describe the complete collection of five tons.
Identification

Sherd serial number
Sherd type
  1. Rim sherd (only this category applies)
  2. Shoulder sherd
  3. Body sherd

Location

Site number
Sub unit of site
Horizontal unit
Vertical unit

Description

Class I  Surface finish - exterior
  1. Not observable
  2. Rough
  3. Smoothed
  4. Burnished
  5. Polished
  6. Red slipped

Class II  Surface finish - interior
  1. to 6. Same as Surface finish - exterior

Class III  Percent of rim present coded in five percent units

Class IV  Orifice radius
  1. Not observable
  2. to 30. Centimetres radius

Class V  Maximum body radius
  1. Not observable
  2. to 30. Centimetres radius

Class VI  Rebating
  1. Absent
  2. Present

Figure 22. The attribute code (page 1)
Class VII Rim form
Direct rims belonging to restricted spherical vessels

Class VII Rim form
Everted or thickened rims belonging to various jar forms

RIM FORM KEY
; lip area > shoulder

interior of vessel to the right

Figure 22. The attribute code (page 2)
Class VII Rim form
Rims belonging to restricted composite vessels

Class VII Rim form
Rims belonging to various unrestricted vessels

Figure 22. The attribute code (page 3)
Class VII Rim form  Rims belonging to composite vessels having a shoulder to lip height of greater than 3.5 cm

Class VII Rim form  Rims belonging to vessels of unknown forms

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C - CHANNELED I - INCISED P - PUNCTATED S - STAMPED

Class VIII Lip Decoration

Figure 22. The attribute code (page 4)
Class IX Rim decoration - outer
Class X Rim decoration - inner

Class XI Body decoration placement
1. Not observable
2. Apparently absent on upper body
3. Absent on upper body
4. Absent on upper body
   Absent on lower body
5. Present on upper body
   Lower body unknown
6. Present on upper body
   Absent on lower body
7. Present on upper body
   Present on lower body
8. Absent on upper body
   Present on lower body

Figure 22. The attribute code (page 5)
### Class XII  Body decoration

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### Class XIII  Shoulder decoration

### Class XIV  Appendages at shoulder and rim

1. Tab handles
2. Small double lugs
3. Large lugs

Figure 22. The attribute code (page 6)
The Distribution of the Attributes

The attributes were coded with a single I.B.M. card representing each of the 6,210 sherds. I then presented my problem to the C.S.I.R.O. Division of Computing Research. J. Palmer devised a 'Programme for Tabulating Archaeological Data'. This programme was run on the Control Data 3600. The complete programme and a description of each phase is on file in the Department of Prehistory, ANU.

The programme generated four tables for each attribute class. This was done for every unit of the excavation and surface collection. These four tables are:

Table 1: The count of attributes present within each class.

Table 2: The percentage that each attribute represented of the total attribute counts of that class.

Table 3. The weighting of Table 2 by the 'percentage factor'. This means that rim sherds representing from 0 to 5% of the vessels orifice are weighted by 2.5, 5% to 10% by 7.5, 10% to 15% by 12.5, 15% to 20% by 17.5, etc.

Table 4. This table is calculated in the same fashion as Table 3 except that all sherds representing less than 5% of the vessels orifice are dropped.

The graphs included in this appendix combine Tables 2, 3 and 4 into one chart for each class of the decorative attributes. Tables 3 and 4 have not been plotted for Class VII (Rim form). Only Table 2 is presented for this class. Certain attribute classes, primarily those consisting of measurements, have been omitted entirely. The figures are only concerned with the excavated sherds.
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 1)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 2)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 3)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 5)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 7)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 8)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 9)
CLASS VIII LIP DECORATION

SCALE

C-CHAME(ELED  I-INCISED  P-PUNCTUATED  S-STAMPED

Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 10)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 11)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 12)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 13)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 15)
Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 16)
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Figure 23. The distribution of the ceramic attributes in Mounds B, C and D (page 17)
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Plate 1. Contemporary Wanigela ceramics: a, naukwat nobosu, a new vessel which will be used for cooking and water carrying; b, ramo, plate or bowl used for serving food, (note the crocodile motif); c, simum, water jug; d, sewaf, water dipper or container for small valuables.
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