

I. CURRENT RESEARCH IN PACIFIC ISLANDS ARCHÆOLOGY

A. Report on Australia and Melanesia

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AUSTRALIA

The background of Australian archæology has been fully discussed by McCarthy (1948, 1958; McCarthy, Brammel and Noone 1946), Birdsell (1959), and Mulvaney (1961). In this paper a summary of current work and opinions is given.

Excavations and Prehistoric Cultures

The few isolated sites that have been dug in the various states of Australia have proved to be important index sites to the industries and cultures that are being found elsewhere on that continent.

Three periods are definitely established in an eastern group. The uniface pebble implements, including the Sumatralith, together with hammerstones and *horsehoof* cores are considered by Tindale and Maegraith (1931) and Cooper (1943) as characteristic of the Kartan culture on Kangaroo island and at Fulham in South Australia where it has been found on ancient land surfaces. The Kartan culture is assigned tentatively (Tindale 1957a) as being from 10,000 to 11,000 years old in the late Pleistocene period. The present author has recovered five Kartan pebble implements, with a few *horsehoof* and hammerstones, from the middle of the Capertian culture deposits in eastern New South Wales, which indicate that the Kartan is either not the earliest of Australian cultures or that it formed part of a knapped industry as a basic Australian culture. The claim of Tindale (1957a) that the Kartan occurs all over Australia has been contested by the present author (1958) who believes that it is limited in distribution to the coast and table-lands of eastern Australia, and does not belong to the inland group of cultures.

Between 1958 and 1961 the excavation of five rock-shelter sites by the author and party in the Capertee river valley, 150 miles west of Sydney, produced an industry of large primary flakes fashioned into scrapers, knives, dentated saws and burins, with a few choppers, unspecialized cores, five uniface pebble implements and hammerstones. The cores and flakes are mainly made of grey chert which is patinated and stained to a buff to orange colour. The form and retouch of the scrapers, a number of which are nosed and concave types, resemble that of Tasmanian implements, but the dentated saws are unknown in Tasmania. They are, however, with burins, found throughout the surface camp sites of central and western New South Wales. The Capertian culture appears to be a basic one for this region; the Kartan pebble implements intruded into it from the east coast. An important point is that the Capertian sites indicate that the Tasmanians left Australia prior to the Bondaian period of elegant small implements, and before the appearance of the ground edge axe.

EXPLANATIONS TO PLATE I

The lithic cultures of Australia, showing the specialized types of implements characteristic of each one:

Kimberleyan: *Leilira* blade (left), four uniface and biface points (middle), two scrapers made from long blades (right).

Oenpelliyan: Hafted *elouera* (top), *leilira* blade (left), *elouera*, two biface points, and flake fabricator (top row), pigment, scraper and *muduk* bone point (bottom row).

Milingimbian: Scraper, and ground-edge axe (top), *Yodda* tanged implement and *riambi* oyster pick (bottom).

Eloueran: Flake fabricator and scraper (top), two *elouera* (bottom), and ground-edge axe (right).

Bondaian: Group of *Bondi* points, microliths and flake fabricator (left), burin, gum-hafted adze flake, and ground-edge axe (right).

Capertian: Saw-edged pointed flake, scrapers and uniface-pebble chopper.

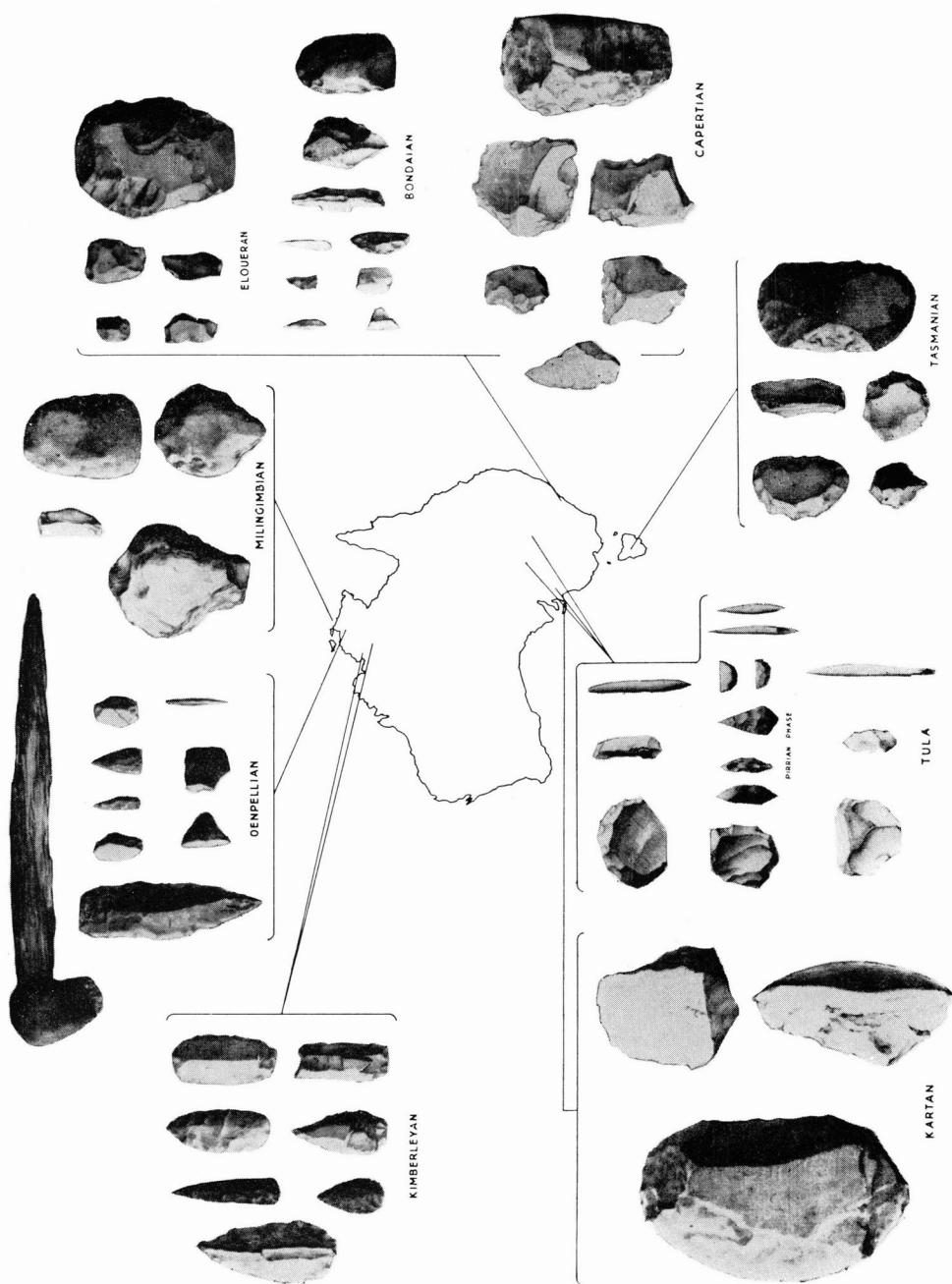
Tasmanian: Various scrapers and blade.

Tula: Late phase; unused *tula* and slug, with bone point (top), Middle or Pirrian phase; unused *tula* with *tula* and *Burren* slugs, *pirri* uniface point, microlithic segmental bone points. Early phase: unused *tula* and slug, with bone point.

These are not the original implements from the type sites but a series selected to illustrate the range of specialized types in the Tula culture.

Kartan: *Sumatra*-type and lateral uniface pebble implements, with horsehoof core.

D. Rae, *del.*



The Bondaiān culture has been excavated in two stratified sites, in the one at Capertee lying on top of the Capertian, and in the other at Lapstone Creek (McCarthy 1948) lying below the Eloueran culture. The Bondaiān consists of trimmed blocks, a few *elouera*, burins, flake fabricators, scrapers of many kinds, a wide range of geometrical microliths, and the *Bondi* point in large numbers; it marks the beginning of gum hafting of knapped implements and the appearance of the ground edge in eastern New South Wales.

The Eloueran culture is the latest one in this region, and is dominated by ground-edge axes and knives, associated with the *elouera*, burin, scrapers and knives, flake fabricators, and trimmed blocks and choppers.

The inland group of cultures, on the other hand, is now subject to much controversy about the validity of the original sub-division at the type sites.

A culture called the Tartangan (Hale and Tindale 1930) was excavated in an open site on the lower Murray river in South Australia, with a mid-point C-14 dating of 6030 ± 120 B.P. years extended by 8700 B.P. (Tindale 1957b) at the Cape Martin site. According to Tindale it is represented at many other sites in south and central Australia, and western New South Wales; he believes that the Tartangan was carried by the Tasmanian Negritos.

The Tartangan is followed in time by the Pirrian, with its uniface *pirri* points (4260 B.P. mid point), the Mudukian (3000–4000 years B.P.), and the Murundian which survived until white occupation. These are the lower Murray cultures defined by Hale and Tindale (1930), throughout which the hafted *tula* adze and its worn out slugs form a cohesive and index tool, associated with scrapers, bone awls and bone *muduk* points in various layers. The only extinct animal represented was the Thylacine. The sub-fossil cockle has since been re-classified (McMichael and Hiscock 1958) as the living species. At Fromm's Landing in this area Mulvaney (1960a) excavated a similar range of material, with the important addition of geometrical microliths in the Pirrian period, and a maximum dating of 4870 B.P. for the Pirrian (4870–3750 B.P.). Data from this site indicate that there has been no change in the climate of this area during the past 5,000 years although Hale and Tindale (1930) concluded that there had been a progressive modification in environmental conditions in direction of the semi-arid conditions of today. At both sites it was apparent that there had been a steady deterioration in the working of stone from the Pirrian to the late Murundian period. Stone implements (but not bone ones) similar in range to the Pirrian material have been excavated in rock shelters at Mootwingee and Cobar in western New South Wales by the author. At the Tombs, Chesterton Range, south-western Queensland, Mulvaney (1961) excavated Pirrian points and geometrical microliths associated with *horsehoof* cores. This is the only site yet excavated in this vast north-eastern region of the continent.

In Victoria, Mulvaney (1960b) excavated a rock-shelter deposit at Glen Aire which yielded a poorly developed flake industry in which there were only 8 utilized pieces among 2,275 untrimmed or waste flakes, associated with uncommonly high numbers of hammerstones (58) and bone points (66). He regards the site as representative of the late degenerate industries of south-eastern Australia, the C-14 date for it being 370 ± 45 B.P. His examination of the Glenelg river valley in

south-western Victoria proved fruitless in a quest for stratified sites, which are extremely rare to date in Victoria as a whole.

At Grafton on the north coast of New South Wales, Miss McBryde and party from the New England University, have obtained from several rock shelters bone awls, microlithic scrapers, *Bondi*-type points, scrapers and choppers. The provenance of the industry is not yet established and field work is still proceeding. The cave walls bear abraded grooves and one U within U figure, which form an archaic phase of rock engraving in Australia.

In the Northern Territory, Davidson (1935) excavated Kimberleyan type culture implements, comprising *leilira* blades, uniface *pirri* and biface points, *tula* adze flakes and scrapers in rock shelters on the Daly river. Macintosh (1951) obtained similar material at Tandandjal in south-western Arnhem Land, where there is intergradation of *pirri* and *leilira* points and blades, and where the utilization of *leilira* type blades for a variety of scrapers forms a unique variation of the Kimberleyan culture.

The excavation of rock shelters at Oenpelli (McCarthy and Setzler 1960) in western Arnhem Land provided evidence of the mixed nature of northern industries. These sites yielded *elouera* with use-polished working edge, flake fabricators, and bone *muduk*, all characteristic of the eastern New South Wales Bondaian and Eloueran complex, together with the uniface *pirri* and biface points, and *leilira* blades, of the Kimberleyan culture, with the edge-ground axe appearing on the surface, and no *tula* adze flakes. An important discovery was an *elouera* hafted as a single *kodja*, an implement known mainly in south and western Western Australia (Davidson and McCarthy 1957; Tindale 1951; Massola 1960). A Pirrian culture site was recorded at Yirrkalla, and an edge-ground axe culture, the Milingimbian, in a shell midden at Milingimbi, both in northern Arnhem Land (McCarthy and Setzler 1960).

On the Fitzmaurice river in the south-eastern Kimberleys, Stanner has excavated from painted rock shelters typical Kimberleyan and other implements. Dr Gallus has investigated a deposit in one of the deep limestone caverns in the Nullabor plains, South Australia.

The association of extinct marsupials with aboriginal prehistoric cultures is not yet clearly defined. As these extinct forms extend back into the Tertiary they are no longer accepted as time markers for the Pleistocene (Birdsell 1959). The association of the dingo with extinct animals of late Pleistocene age at Lake Colongulac and other localities (Gill 1951), and of one species at Lake Menindee with stone implements (Tindale 1955), indicate that further field work will throw some interesting light on this phase of aboriginal prehistory—as yet no site has been found where the Aborigines amassed the discarded bones of these animals, as with the Moas in New Zealand and of extinct animals in many European sites.

The above is the sum total of excavation work that has been done in Australia.

Superimpositions in Rock Art

The rock shelters excavated at Devon Downs and Fromm's Landing on the Lower Murray river contain archaic style rock engravings (Hale and Tindale 1930, Mulvaney 1960a). Those excavated at Mootwingee contain both paintings

and engravings. Those excavated elsewhere—Daly river (Davidson 1935), Oenpelli and Port Bradshaw (McCarthy 1960), Fitzmaurice river (Stanner 1960), eastern New South Wales (McCarthy 1949) and at Cobar, western New South Wales—all contain rich series of paintings which belong to definite phases of cave art and time periods varying in different parts of the continent, but they cannot as yet be related one to another nor with implement cultures. There is a wide variety of styles, techniques and motifs among these paintings and engravings, the involved problem of differential diffusion of art, religious ideas and implements needs detailed field study of superimpositions to clarify it.

The study of superimpositions in Australian rock art is now yielding results that will have a direct bearing on both the prehistory and the development of the religion of the Aborigines. This approach has established the existence of *i.* pre-Macassan and Macassan phases of cave painting on Groote and Chasm islands, with changes from simple to more elaborate styles and variety of subjects (McCarthy 1960); *ii.* an early outline-silhouette, Mimi stick figure, and X-ray phases in that order in western Arnhem Land (McCarthy 1960); stencil and outline, red and white, black and white, and two to four colour phases in eastern New South Wales (McCarthy 1960, 1961). Among the rock engravings Hale and Tindale (1930; Tindale 1957) detected three phases of early abraded grooves, intermediate outline, and later linear phases, dating the earliest series at between 3,000 and 3,500 years.

At Wamerana and Gallery Hill, on the upper Yule river in north-western Australia, Worms (1954) distinguished a younger stratum of outlines and linear designs and an older stratum of highly imaginative anthropomorphs inspired by the Djanba-Guragnara (or Gunabibi) cult mythology. The author (1960) distinguished an early outline, intermediate Linear Design, and a late Pecked Intaglio (with several sub-phases) phases of engraving which have been confirmed at Depuch Island, Port Hedland, in north-western Australia, Mootwingee and Sturt's Meadows in western New South Wales, and the Flinders Ranges in South Australia, recognizing that the outlines were preceded elsewhere by the abraded grooves. The sequence is thus confirmed in widespread localities, and it now remains to establish the antiquity of each phase, and the localities from which it spread in Australia.

Indonesian Pottery

The antiquity of the Indonesian, principally Macassan, visits to Arnhem Land is unknown, but these voyagers have left along the shores of this region extensive deposits of potsherds associated with trepang boiling stations amid groves of tamarind trees. These sites (Age-Oglu in Setzler and McCarthy 1960), contain red sherds of Philippine ware whose dating is difficult to establish and may lie anywhere between A.D. 960 (or even back to A.D. 206) and the 20th century; grey stoneware sherds of south-eastern Asiatic type probably made in South China between A.D. 1368 and 1912; Ming blue and white sherds of 15th and 16th centuries. A thorough archaeological examination, with C-14 datings, of these sites is urgently required to ascertain the antiquity of the Indonesian visits to Arnhem Land because of the considerable influence they have had on local aboriginal cultures in art, music, ritual and religion, mythology, social customs and material culture.

Datable Material and C-14 Dates

An immense potential of material exists in Australia for C-14 dating. Samples are obtainable from rock-shelter floors, ash mounds, mussel-shell middens and fire-places scattered throughout the interior, coastal shell middens both in the open and in rock shelters, and in graves and burial grounds all over the continent. Many of the significant excavations—Lapstone Creek in 1936, Daly river in 1930, Arnhem Land in 1948—in which archæological horizons were established were done prior to the advent of the C-14 technique, and dates are needed from these horizons for correlation with other sites. The check section at the Lapstone Creek site, unfortunately, was completely dug out by private collectors, and its two cultures will have to be dated from other sites. C-14 dates so far obtained are as follows from sites of undoubted human occupation:

8700 ± 120 B.P.	Cape Martin, S. Australia (Tindale, 1957b)	
6570 ± 100 B.P.	Lake Menindee, N.S.W. (Tindale, 1955)	
6030 ± 120 B.P.	Tartanga, S.A. (Tindale 1957b)	Type site, adze stones present
4850 ± 100 B.P.	Fromm's Landing, S.A. (Mulvaney 1960a)	Layer 10, containing <i>pirri</i> points and geometrical microliths.
4250 ± 70 B.P.	Devon Downs, layer IX, (Tindale 1957a)	Mid-point of Pirrian culture.
4055 ± 85 B.P.	Fromm's Landing, S.A. (Mulvaney 1960a)	Layer 9, containing the earliest adze stone in the site.
3881 ± 85 B.P.	Fromm's Landing, S.A. (Mulvaney 1960a)	Layer 8, containing latest geometric microliths in site.
3756 ± 85 B.P.	Fromm's Landing, S.A. (Mulvaney 1960a)	Layer 6, containing latest <i>pirri</i> point and bone <i>muduks</i> .
3240 ± 80 B.P.	Fromm's Landing, S.A. (Mulvaney 1960a)	Layer 4, containing crude artifacts, bone awls and <i>muduks</i> .
2080 ± 100 B.P.	South Arm, Tasmania	Charcoal from shell midden.
1777 ± 175 B.P.	Goose Lagoon, Port Fairy, Victoria (Gill 1955)	Aboriginal midden, cultural affinities not established.
538 ± 200 B.P.	Warrnambool, Victoria, (Gill 1955)	Aboriginal midden, with rich bone industry including <i>muduks</i> , but cultural affinities uncertain.
370 ± 45 B.P.	Glen Aire, Cape Otway, Victoria, (Mulvaney 1961)	Rock shelter deposit containing rich bone industry, poor stone industry, edge ground axe.

Gill has obtained a series of C-14 dates as follows: 18000 ± 500 B.P., 15000 ± 1500 , 8500 ± 250 , 3100 ± 1600 B.P. (Gill 1955), for ash deposits in the Keilor Terrace in Victoria, at and below the alleged site of the human cranium, and at Braybrook some miles downstream. No stone implements have been found *in situ* in this terrace at Keilor. Similarly, he has obtained a date of 13725 ± 350 B.P., from lacustrine deposits containing bones of extinct giant marsupials at Lake Colongulac in Victoria, and a grinding stone at Pejark Marsh has been correlated with this bone deposit. An incised bone, over which considerable controversy has centred concerning the origin of the cuts, has been shown by fluorine testing to be contemporary with the bone deposit. Mulvaney (1961) considers the materials as yet to be too tenuous for absolute certainty on these claims of antiquity.

C-14 dates from the various sites being excavated at present will enable archæologists in Australia to correlate recognized cultures, and to establish a table of the development or introduction of some of the specialized types of implements in various parts of the continent.

Preliminary Historical Reconstructions

The relatively small number of stratified sites that have been excavated in widely scattered localities in Australia fortunately provide reasonable data upon which to erect a tentative reconstruction of the prehistory of Australia. The situation has been confused by the insistence of Tindale (1957a, 1960) that *i.* the Tartangan-Pirrian-Mudukian-Murundian sequence of cultures forms the basic archæological horizons for the whole of Australia, notwithstanding, as the author has pointed out (1958) that they differ markedly in their range of implements from the Capertian, Bondaian and Eloueran cultures of eastern New South Wales; and *ii.* that each one was carried by groups of migrant people separated in time although the presence of adze stones from the Tartangan to the Murundian indicates a unity of culture, enriched by introduced implements, that survived for almost 7,000 years, on the lower Murray river. These, and many other claims made by Tindale (1957a, 1960), have been contested (McCarthy 1958; Mulvaney 1960b, 1961). The situation Australian archæology faces needs serious discussion by a Standing Committee on classification, typology and nomenclature to eradicate these differences of opinion.

Our evidence from south-eastern Australia suggests that man in Australia first employed an industry of the Capertian type, consisting of large primary flakes and blades used in the hand, among which dentated saws are prominent and burins were in use. During this period the Kartan uniface pebble implements came into use. This primary knapped culture was widespread in the interior of the continent, west of the Great Dividing Range, but it has not been excavated east of the latter barrier. The Kartan implements appear to be confined to eastern Australia. The Kartan-Capertian culture was followed in eastern New South Wales by the Bondaian culture, a period of elegant and skilful stone working, the implements generally being smaller than that of the preceding period. The Bondaian was followed by the Eloueran period, which continued until white occupation and during which the ground edge and the *elouera* came into greater use. As the choppers, blocks, scrapers, knives and burins are the same as in the Bondaian it is uncertain whether

the *Bondi* point, geometric microliths and the ground-edge technique can be credited to diffusion into this area during the Bondaian period, because the contrast between the implements of the Capertian and Bondaian periods is abrupt enough for there to have been a change in the people occupying the area. Future work will have to solve this problem.

The occurrence of *elouera*, flake fabricators and *muduk* at Oenpelli (McCarthy and Setzler 1960), and of *elouera* in eastern Queensland, flake fabricators and geometric microliths in south-western Australia (Butler 1958) indicates that the eastern sequence of cultures might extend in a coastal-hinterland band around the east, north and west of Australia. But much more surface collecting and excavation will have to be done to test this hypothesis.

The other group of cultures is an inland series which comprises the basic sequence in which the *tula* adze, worn down to a butt or median (Burren) slug was used over a period of some 6,000 to 7,000 years and right up to the present time: I propose to call this sequence the Tula culture, retaining Pirrian phase for its middle period. The lower Murray excavations established the antiquity of this complex. Excavations at other inland sites including Mootwingee, Cobar and south-western Queensland, and surface collecting, have demonstrated its occurrence throughout a vast region of the interior of New South Wales, Queensland, South Australia, Northern Territory and Western Australia—it is not recorded from Cape York. As in the eastern coastal-hinterland complex, the geometric microliths and the uniface *pirri* point (in place of the *Bondi* point) diffused into this sequence, but to date the ground-edge axe has not been excavated as part of it.

Main Problems Needing Discussion

The advent of the University of New England, the Australian National University, and the Western Australian Museum into Australian archæology has extended and will extend considerably the scope of field work, research on typology and distributions, and theoretical studies in Australia, and for this reason several of the basic problems needing clarification might be discussed here. The scope of the work to be done in such a vast country is immense, costly and time consuming; and only by thorough reconnaissance will it be possible to plan future work effectively. It will no doubt surprise delegates attending this congress to learn that excavations have been done in one locality only in each of the three States of Victoria, Western Australia and Queensland, none in Central Australia, and several on the lower Murray river valley in South Australia; while the rich harvest of sites to be investigated in New South Wales has barely been touched in the digging of half a dozen rock-shelter floors and the test trenching of a number of others. About a dozen sites have been excavated in Arnhem Land. Intense surface collecting has been carried out in coastal and western New South Wales (but not in the central strip), in south and central Australia and Victoria; and until similar collections are available from the remainder of the continent it will not be possible to plot accurately the distributions of any types of implements. Inadequate data are thus available for comparative theoretical and diffusionist studies. Northern Australia where man first trod the soil

of Australia, eastern Australia where diffusion from Melanesia played its greatest role, and similar vital areas await the spade of the archæologist.

The naming of specialized stone, bone and shell implements, and establishment of the specific characters of each type (McCarthy 1948) has facilitated greatly a universal recognition of these tools and simplified reference to them in archæological studies (Allchin 1957; Mulvaney 1961). Providing future writers do not confuse the situation by giving names to implements that do not merit them, the system will prove of inestimable value in the future, when minor problems of classification have been clarified by field work and typological studies. One of these problems at the present time is the relationships and varieties of uniface points of the *pirri* type and *leilira* blades which, because of the inter-gradation between them need re-classification on a continent-wide basis. Campbell (1960) identified two South Australian varieties of the *pirri*, but has not taken into consideration the equally fine *pirri* from the Kimberleys, Northern Territory and Arnhem Land in his claim that this point originated in South Australia.

An important aspect of nomenclature that is now emerging is whether the Australian terminology should be restricted to Australia, and Polynesian terminology to Polynesia, or whether both systems should be co-ordinated into one (as they are largely complementary) system of nomenclature for use in Oceania and south-east Asia also. Van Heekeren (1957) has used the Australian term *pirri* for Indonesian points, the Indonesian and south-east Asian name *Sumatra*-type has been adopted in Australia (Tindale 1937; McCarthy 1940), and Tindale (1960) has suggested that his term *Kartan* should be adopted in place of the old established *Hoabinhien* in Indonesia and south-east Asia. His claim must lapse because the ground-edge axe belongs to *Hoabinhien II*, the *Bacsonien* phase, and not to *Hoabinhien I*, the uniface-pebble phase. Further difficulties of this kind will doubtless arise in the future, particularly in regard to projectile points, *horsehoof* cores, axes and knapped adzes among other implements, and the *Yodda*-type tanged axe in Australia and New Guinea. It appears to me that a uniform single system of nomenclature throughout south-east Asia, Oceania and Australia is most desirable because implements of similar kinds occur throughout the whole region; they are all inherently and basically derived from south-east Asia; and writers in a great variety of languages would have available to them a common terminology. Let me point out that no classification exists for Melanesian axes and adzes, although it is a basic need for archæological work in these islands. As specific characters have not been established for implements outside Australia and Polynesia, there is a feeling of uncertainty about the relationships and similarities of implements. No doubt many knotty problems would have to be solved before general agreement could be reached but the attempt would be well worth while. The typology of trimmed core and knapped implements offers a challenge in this respect, but I feel quite certain that if a generally recognized and established terminology could be used by all excavators and typologists in this vast region, the techniques of descriptive work would be greatly improved. Again, the axes and adzes belong to the basic types of round, quadrangular, lenticular, and hogback, for which Duff (1959) has used the terms rectangular, triangular (with apex upwards or downwards), and circular. His eight

basic types might form the basis of such a classification the possibilities of which should be explored.

Another current problem of nomenclature is that of designating the layers and cultural assemblages revealed in excavations in the now pioneering stage of development of archaeology in Australia, and as more excavations are done in the future it will become more acute. In the past each level has been numbered and the cultural assemblages or industries named. It is not always clear in descriptions of sites whether the number refers to an actual depositional layer or merely to a level, and this leads to confusion in comparative studies. The Tartangan-Devon Downs sequence of four names (Hale and Tindale 1930) has been questioned (McCarthy 1958; Mulvaney 1960*b*, 1961) as a result of later work. Mulvaney has suggested that Tartangan be abandoned in lacking typological clarity, that Mudukian be eliminated, and Murundian restricted to local usage, as a result of his Fromm's Landing excavation. The solution of the problem rests upon the accuracy with which implement assemblages may be identified and compared. This becomes involved where assemblages were in use for thousands of years, and have had added to them important specialized types, as in both the lower Murray and eastern complexes. The question that must be answered is whether such a sequence should be given one cultural name, and each phase within it named in turn to signify its importance; or whether each phase should be identified by the depositional layer numbers? Or is it preferable to name each definite cultural assemblage provided agreement can be reached in deciding these distinctions? This again appears to be a problem for a Standing Committee, but the views of this Congress on the best methods to follow would be helpful.

Many other aspects of archaeology in Australia can only be mentioned here. Research is required upon stratified and surface sites to ascertain the routes of migration of man within Australia; the development of stone and bone implement techniques; climatic changes during man's occupation of the continent; and the extent of local and regional modifications and adaptations of techniques and forms. There is vital need to secure skeletal remains of early Aboriginal man to compare with his living descendants. My visit to Indonesia in 1937-38 (1940) established links between the archaeology of this region and Australia; but another survey of the data and material now available in south-east Asia, Indonesia, and particularly from the Niah cave in Sarawak, is now warranted. Studies of the Quaternary and Pleistocene coastal terraces and of ancient lake shores are necessary by the geologist and archaeologist in areas like the north coast of New South Wales and elsewhere where strand-line studies offer a rewarding result. Of vital importance is the recording of all information about artifacts, techniques, rock art and stone arrangements from the living people.

The final problem facing Australian archaeologists is that of conservation. No special legislation exists in any State (except the Northern Territory) for the protection of prehistoric and aboriginal relics, and of sites worth digging. Vandals may disfigure rock engravings and paintings, even remove them, dig out occupational deposits and keep the specimens without making any records of the work. There are no penalties for such vandalism, and no rangers with powers to protect these sites. And yet scientific papers on rock engravings are selling out to bushwalkers

and other groups among whom are many who disfigure the work of the Aborigines. The problem is being tackled by the National Trust of Australia in the various States, and the Academy of Sciences is conducting an inquiry into National Parks throughout the continent, and it is to be hoped that their efforts will meet with some success.

MELANESIA

Excluding Fiji, New Caledonia and New Hebrides

No archæologists are employed in New Guinea or Melanesia, and throughout the whole of the islands the science is in its infancy. In summarizing the literature on the subject, abstractors have all emphasized the meagre interest shown and active work carried out in this region (Shutler 1957; Emory 1958). The number of papers published each year forms a scanty list indeed. It is only in Fiji, New Caledonia and New Hebrides that any constructive field work has been done. But the need for additional data to provide a corpus of historical fact and for theoretical and comparative studies, is now strongly recognized in all Pan-Pacific countries. The key position of Melanesia, and of New Guinea in particular, between Australia and Polynesia in the southern seas, and Micronesia, Indonesia and south-east Asia in the north, stresses the importance of gaining more knowledge of its archæology, in which the scope of the work to be done is comparatively wide.

A considerable literature is in existence about the innumerable finds of prehistoric stone mortars, pestles and figurines; but no generally accepted explanation of their origin and function has been made; nor have they yet been found in a stratified deposit to enable their antiquity to be fixed with certainty. Prehistoric axes and adzes, clubheads, pottery, incised shells, and other artifacts have also been reported, some of them turned up by the gold dredges; and the problem of their association with the mortars and other objects is a pertinent one to be solved. The pecking and polishing techniques used for shaping these stone implements, and the pottery, are Neolithic traits, but the Aitape skull bones (Fenner 1941) indicate that much earlier cultures existed in New Guinea. Seligmann and Joyce (1907) described obsidian and other stone implements, engraved shells, and pottery from north-eastern Papuan deposits; and Thurnwald (1934) at Buin found human bones with potsherds, stone blades and other implements.

Little is known about the making and use of knapped implements, of which there appears to be an obsidian industry in New Guinea and the Admiralty islands. Few studies (Vial 1940; Blackwood 1950; Adam 1953) have been made of the quarrying, manufacturing techniques, haftings and uses of adzes, chisels and axes in a region as the living Neolithic culture, where first-hand observations of vital importance may be recorded of great significance to archæologists interested in the Neolithic period which is prehistoric in many parts of the world. The history of pottery making, and of the modelling and coiling techniques, is another outstanding aspect of Melanesian archæology. Attention has been drawn by several writers to the superior workmanship of prehistoric potsherds on Dauko Island, in the Ramu valley and Collingwood Bay, and to sepulchral pottery on Murua, Kiriwina and Vakuta Islands in south-eastern Papua, and the great range

of shapes all of which form an indication of the interesting study yet to be done in this field. MacLachlan (1938) mapped 70 village localities where pottery is made in New Guinea, Bismarck Archipelago and the Solomons; but few descriptive accounts are available from any of these centres. Melanesian pottery is a project that could be undertaken by one university or museum, both by excavation of abandoned pottery sites and study of the modern pottery industries. A major collection of this pottery should be established in Australia or New Guinea.

Bone and shell implements, too, in use by living Melanesians can supply important functional data to archæologists all over the world, as they are commonly found in excavations everywhere. But no attempt is being made to record this information from Melanesia as a whole.

Rock shelters excavated at Yuku (Baiyer valley, Western Highlands) and Koiwa (Chuave, Eastern Highlands) revealed 'pebble-choppers' similar to widespread south-east Asian and Australian chopping tools, and flaked or flaked and ground-waisted axe-adzes or hand-axes possibly attributed to the Hoabinhien tradition of south-east Asia. Pebble choppers were present throughout 15 feet of stratified deposit at Kiowa, persisting into layers which also contained fragments of 'modern' polished axes. Waisted axes excavated from the lowest stratum at Yuku were unground; some in intermediate layers were ground; none was found in upper layers. It is possible that the ground-waisted axes represent a local development of the flaked axe. Crude flake tools (scrapers and knives) were found at all levels at both Yuku and Kiowa. Flakes with use-polished edges also occurred. These excavations, done by Susan E. Bulmer, are the first of rock shelters in New Guinea.

Reisenfeld's (1950) great work on the megalithic structures of Melanesia underlines the need for archæologists to establish the provenance in the cultural history of this key region.

Cave paintings have been found at Sogeri, near Port Moresby (Williams 1931) and also near the coast in the Macluer Gulf and other localities in Netherlands, New Guinea, while rock engravings are reported from Sogeri (Williams 1931), Normanby Island, Fiji, New Caledonia and other localities. The rock art embodies an interesting range of techniques, styles and motifs involving links with Australian and Indonesian art, and is a field of study not yet fully explored in Melanesia.

Detailed and thorough regional reconnaissances will have to be carried out to ascertain areas worth archæological investigation, particularly of pottery and old village sites, rock shelters and limestone caves and adze making centres, to advance our knowledge of the problem outlined above. The discovery (Fenner 1941) of a partial Australoid skull in late Pleistocene deposits near Aitape indicates the important part New Guinea may play in the study of the migration of man into Australia and Oceania.

So little do we know of the archæology of these islands that we cannot attempt a discussion of the subject itself, but must concentrate at this belated stage on the programme of pioneering work to be carried out. It is obvious that the handful of archæologists in Australia, engaged with many urgent and vital problems in both field and typological studies, cannot undertake extended work in Melanesia. However, the Australian National University's appointment of an archæologist to its staff, and the promising results of Mrs S. Bulmer's excavations in the Baier

valley central New Guinea, marks the beginning of a new phase of Melanesian archaeology, which requires archaeologists financed by foundations willing to pioneer their science in this interesting region.

I have discussed above the need for a standard classification of the adzes, axes, chisels and other implements. Precise data is needed to absolve the many problems associated with the relationship of artifacts and racial waves or migrations, links with neighbouring ethnic regions, climatic changes and similar matters.

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