NOTICE OF ORDINARY MEETING

The seventh general meeting of the Society for 1977 will be held in the Museum Education Building, North Terrace, Adelaide at

8.00pm Monday 26 September, 1977

AGENDA

1. Apologies.

2. Confirmation of minutes of general meeting held Monday 22 August, 1977. A copy of these minutes is attached.

3. New members. Newly elected members to the Society will be announced.

4. Papers & Journals. Papers and journals received from other Societies and Organizations will be tabled at the meeting.

5. Films. A series of films depicting the art and culture of Japan will be screened at this meeting. They are entitled:

(1) 'Potters of Japan' (Colour)
(2) 'Festivals of Japan' showing religious festivals
(3) 'Nature's Patterns' showing Artists' relationships to Nature.

6. October meeting. The October meeting will be held in the Napier 5 Theatre, Adelaide University on Monday 17 October, 1977 in lieu of the normal date when a special New Guinea film will be shown dealing with the Cultural Revival of the Gogodala.

Vern Tolcher, Honorary Secretary/Treasurer, 213 Greenhill Road, EASTWOOD, S.A. 5063
SEMINAR WEEKEND JUNE 1977

The following are 2 papers presented at the seminar Weekend in June, 1977. They are:

1. 'Stone Tool Traditions in Australia' by V. Campbell
2. 'Palynology' Abstract of talk by D. Satterthwait

Other papers will be published in subsequent Journals.

STONE TOOL TRADITIONS IN AUSTRALIA

by V. Campbell June 1977

Preface

I am hoping to briefly outline the basic data necessary for understanding the use of stone artefacts in archaeological reconstruction and to briefly outline our present knowledge of the stone-working traditions in Australia.

I then hope you will all be interested to see and feel the assemblages I discuss and to talk about individual elements that interest you with the various people who are helping me in the second part of the workshop this afternoon.

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In 1806 Rasmus Nyergup, a Scandanavian professor said,

'Everything that has come down to us is wrapped in thick fog, it belongs to a space of time we cannot measure (Daniel, 1964:92)

The frustration true of Scandanavia in the nineteenth century has been all too true of Australian prehistory until recently. Slowly the fog is rising as the sun of scientific research shines more strongly. Hopefully at some time in the future our prehistory will be as well understood as that of Scandanavia. You will have gathered from the two speakers earlier today we still have many questions unanswered about the arrival of man in Australia, about his environment and his way of life.

One of the standard ways of learning about prehistoric peoples, whose society is undocumented by written records of any form is by the analysis of the artefacts they leave behind. In Australia the most enduring artefacts are the stone tools. The methods of analysis of these collections are as various as the workers: from a simple sorting into 'types' to sophisticated analysis of such aspects as length, breadth ratios, angle of cutting edges, numbers of striking platforms on cores. An interesting development in recent years that is providing valuable information on the function of tools is the use of examination of edge-wear on artefacts under low magnification. Whatever the methods the aim is always the same; to find out more about the former inhabitants of the region in which the artefacts are found.
There are good reasons for the emphasis archaeologists place on stone tools. The most obvious one is the enduring nature of stone, which will survive long after bone and other organic matter have been lost or reduced to traces in the soil. Less obvious, but as significant, is the fact that a piece of worked stone, to the trained eye is incontestible evidence of the presence of man. When all else has perished a simple struck flake and a piece of charcoal may tell the archaeologist that 30,000 years ago a human being was present. Such information is of real significance in Australia.

The second value of stone tools is that their form is not fortuitous but the result of intelligent and skilled behaviour: strike two pieces of rock together and quite often nothing will happen. When I tried, somewhat ingeniously, to hit granite pebble against granite pebble all that was produced was a very small flake, and a rather large blood blister! Any implement, I assure you, is the result of certain skilled actions and reflects a distinctive mode of behaviour. That mode of behaviour is the solution to some problem and these solutions occur in patterns. The pattern may be characteristic of a large region, or may be unique to a small area and reflect a particular response to particular circumstances or resources.

At any one time a group of people will produce not one, but several characteristic patterns by which they can be recognised. Thus a series of sites, or collections will have many of these patterns present. There may be slight variants. At some sites some characteristics may be absent, and again an unusual item may be included, but the overall nature of the collections will have many common elements. These will be regarded as belonging to the same tradition. Only when considerable differences occur and several new patterns appear do archaeologists being to speak of a different tradition being present, and speak of 'change'.

The changes from one set of patterns to another may be sudden and spectacular. Immediately forces of invasion and replacement are called forth as an explanation for the cultural change. More usually change comes slowly; invention and borrowing of ideas result in modifications of established traditions. New demands arising from environmental, population or social pressures, or changes in ways of thinking demand artefacts of different design. New styles may be invented. The functions may stay the same or a new use may be devised. For the prehistorian, these changes elucidate society, showing the way it functions as a unit, its economic basis, its relationship with other areas.

Before stone implements can contribute to building up this kind of prehistory they must be ranged sequentially and typologically. The sequences and assemblages are established only through the stratigraphic excavation of sites. The typological studies establish some of the patterns of behaviour already discussed. To be able to reorganise the patterns in the artefacts which are recovered, it helps if we can see the stone as the stoneage craftsman saw it and to understand how he modified it.

He begins with a pebble from a creek-bed, a nodule of flint or a fragment of quartzite and then strikes the margin with a hammerstone of convenient size and hardness. The result is shown in this diagram (figure 1) taken as are many of the illustrations that follow from an article of Campbell and Edwards (Campbell & Edwards, 1966:173). The flake is struck from the margin of the core which is called the striking platform. The force of the blow displaces a flake.
This is readily recognised by the bulb of percussion, a swelling below the point of impact.

The simplest artefact is produced by merely knocking a few flakes from one side of a pebble to provide a sharp working margin. A few flakes may be removed or the whole surface may be trimmed.

The flake when it is dislodged generally develops a sharp cutting margin and this can be used unmodified. Similarly the core will also have sharp margins that can immediately be put to work. Generally cores are used for chopping; bark from a tree, a branch or even fern rhizomes for dinner.

If a better finished implement is required considerable care may be taken knapping fine flakes from the working margin. Depending on the angle of impact the new margin may remain acute angled and suitable for cutting or become more abrupt and chisel-like. The general function of retouching is to produce an even working margin. Such basic retouching may be followed by pressure flaking. Using a soft instrument such as a piece of bone, pressure is applied to the margin of the implement, forcing long shallow flakes from the surface. Such finishing is characteristic of many piirri-points or the famous Kimberley points. Although retouch is usually applied to the working margin of a tool it may also be used to provide a roughened surface to enable hafting with resin into a handle to facilitate use of the smaller tools, such as the microliths.

A further extension of the knapper's skill is the careful preparation of a core to enable long, thin blades to be struck. The blade tools industries of Europe come late and are characteristic of the peak of the Paleolithic cultures there. Many European writers assume that the superb cherts and flints were essential to this work but the Australian Knapper has proven that the less amenable quartzite can be controlled to produce similar implements.

This brief outline, I hope, has been sufficient to introduce the basic terms to the uninitiated and to indicate the variety that can be introduced into stone working and also the skills necessary to produce an artefact.

Yet much of the real skill comes from the choice of material in the first place. Generally the finer grained rocks, such as the jaspers, cherts and flint are more homogeneous, have better fracturing characteristics and are more easily controlled. The Australian Aborigines were prepared to go considerable distances for this kind of material and developed quite large quarries covering some acres when good sources were located. The hard, fine-grained volcanic stone prized for axes is more, and demonstrates even more vividly the Aboriginal willingness to organize good raw materials. The contact metamorphic greywacke from the Moore Creek are quarry near Tamworth in Northern New South Wales was traded as far as Wilcannia on the Darling River (McBryde 1974:157). A series of greenstone quarries in Western Victoria, the most famous of which is the huge Mount William site, provided most of the edge-ground axes for western Victoria and penetrated south-eastern South Australia (McBryde, 1976:170).

This is a second means of establishing developments and trends; do the materials used remain constant or has a new resource been tapped, an older one abandoned?
I would now like to look at the Australian stone-working traditions and demonstrate how they contribute to our understanding of Australian prehistory.

The large core and flake tradition:

The earliest indications of stone-working in Australia form an important part of the evidence of man's presence on the continent. This comes from the Keilor terraces in Victoria and from Devil's Lair in Western Australia. Their location in the south of the continent and on opposite sides indicate the wide distribution of man in Australia by 30,000 years ago. Apart from indicating the early arrival of Man to Australia we now have a generalised picture of the stone tool kit of these early Australians which has now become widely known as the 'Australian large core and flake tradition'. (Mulvaney, 1975:174). (See figure 2). It consists of the distinctive 'horse-hoof' core. This massive, domed artefact, with its flat base is steeply step-flaked along its working margin. Scrapers made on thick flakes, steeply retouched along the working margins and often notched and nosed form a second element in this tradition. The third artefact commonly associated with this assemblage is made on a much flatter angled cutting edge. This small set of tools constitute the broad features of the first stone-working tradition: a chopper, a scraper/adze and a cutting tool. Hammerstones can be added, and in some regions flaked pebbles also occur. The 'Kartan' culture developed on Kangaroo Island and south coastal South Australia possesses trimmed pebbles, and rarely a crudely made notched axe.

Other regional differences also occur. On the eastern coast of New South Wales the 'horsehoof' core is absent, but the unifacially trimmed pebbles are a common element in the collection. Despite these differences the overall picture is of an homogeneous culture, characterised by large flake and core tools.

These tools all appear to be extractive, that is, used to work wood, to flense skins, to cut fibres and meat. Their presence suggests the use of a far wider variety of materials than have survived in the archaeological data so far recovered. An indication of the great range of materials used comes from the bone points dated to some 20,000 years ago (19,250 = 900 B.P.) from Devil's Lair in Western Australia and a bone bi-point from Lake Mungo dated to earlier than 22,000 years ago (Mulvaney, 1975:151).

Evidence of this kind from artefacts alone does allow the rudimentary reconstruction of Australian prehistory. It provides a cultural and historical skeleton to which flesh might later be added, as new evidence becomes available. The earliest human arrivals in Australia for whom we have physical evidence come from Lake Mungo in Western New South Wales. The skeletal material from this site indicates a people similar physically to the present aboriginal population.

They were well equipped with simple but effective stone implements supplemented by wooden and bone ones. Using these tools they fashioned skins as a protection against the icy Pleistocene winds, they hunted, collected mussels. Some insight into the culture of these early people comes from the 26,000 year old Mungo cremation sites, with their careful secondary internment.
Small Tool Tradition:

There was once an assumption of homogeneity in Aboriginal culture which was shattered when Tindale dug Devon Downs on the River Murray in 1928, and proved that stone-working techniques had developed and changed. Tindale's original sequences have now been revised in the light of later evidence but his demonstration of change has been validated. After an extended period of many millennium the early phase was followed by a highly innovative one which is apparent to us in the introduction of new techniques of stone-working and in the proliferation of new tool types. The use of finely retouched margins and of pressure flaking for really well-finished tools becomes a feature of this phase (see figure 3). Well finished adzes, much smaller than the earlier ones are common. Microlithic forms and pirri points are the most distinctive addition to the assemblage. The overall size of the tools is reduced and many forms appear to need to be hafted before they can be used efficiently. The grinding of a sharp cutting edge also became common over most of Australia during this phase. A few years ago this new innovative phase appeared to have taken place suddenly about 5,000 to 6,000 years ago, possibly coinciding with the introduction of the dingo. The picture is no longer so simple. Edge ground axes have been found in the Northern Territory older than 20,000 years. The technique of grinding the edge of an artefact to form an even and sharp working edge traditionally characterised the 'Neolithic' cultures. Its discovery in this context is the oldest in the world.

From Devil's Lair in Western Australia and from Lake Mungo in Western New South Wales come the very early bone points that have been mentioned already. The presence of flakes still bearing gum hafting stains in contexts indicating an age in excess of 20,000 years (Mulvaney, 1975: 159) indicates the very early use of composite tools. It is now known that grinding of natural seeds began 15,000 years ago along the Darling River and that the boomerang dates to at least 9,000 years ago (Mulvaney, 1975: 212).

It is obvious that in place of the simple line drawing of a few years ago we now have a complex picture emerging as one after another technological developments and new implement types appeared and dispersed across the continent. Sometimes the dispersal appears to have been incomplete. For example backed blades, which appear to be a southern innovation failed to move into the northern third of the continent. Pirri points have not been recorded along the eastern and western seaboard. The techniques of blade production, pressure flaking and edge-grinding all dispersed widely and were added to the older stone working traditions. We can speak of it being modified but it was not replaced. The new stock was grafted onto old roots. 'Horseshoef' cores continued to be used throughout the period and Tindale (Tindale, 1957:12-15) drew attention to the production at Yuendumu of knives similar to the obliquely angled implements of the early assemblages. Along the New South Wales north coast surface pebble tools span a period from earliest evidence of occupation to the sixteenth century A.D.

What kind of reconstruction of prehistory, of human responses can we make, based on the information outlined briefly above? Certainly there is ample evidence of conservatism and continuity over a period of 30,000 years. The early appearance of many techniques, sometimes the earliest in the world, attest to communities that are innovative and responsive to new ideas and to change. I would hope that something more can be added.
Golson (Golson, 1971: 196-238) has made a strong case for the argument that the earliest immigrants to Australia needed to make few modifications on their arrival. He argues that the majority of food plants in northern and central Australia belong to genera already common to the areas north of Australia. Nevertheless it seems to be a fair assumption that the further south the immigrants moved the more they had to modify their technology and to adapt their economy to changing conditions. The increasing cold in the higher latitudes is an obvious condition that would demand new responses. But, the environment was not a static one. By 15,000 years ago the coastlines were shrinking rapidly.

Large inland freshwater lakes like those of the Willandra system of western New South Wales, were drying up and their rich fish and molluscan resources disappearing. The population of water fowl must have declined and even land fauna must have become scarcer with the increasing aridity. In South Australia the central lakes to the west of Lake Torrens probably experienced similar dessication whilst the Cooper Creek area must similarly have become more hostile. These changes were very gradual in terms of human generations, but must have placed populations in considerable distress. The large land animals disappeared; the areas most suitable for human occupation were shrinking or drying out. I do not wish to suggest that in a few years the Garden of Eden became a desert, but I do want to indicate that over a few thousand years the climate became drier, probably less reliable and that the most favourable areas for occupation actually shrank by many thousands of square miles.

This transition from moist to arid conditions, though considerable, was gradual, and required of the human populations a series of subtle adjustments in their way of life, population size, density, and distribution, and their technology. For example, the introduction of seed-grinding was probably a response to the growing aridity and shrinking resources. With increasing aridity it is probably that grasslands expanded at the expense of shrub-lands.

The sporadic and extended changes in technology that have been mentioned earlier in this paper appear to reflect man's response to environmental change as much as the introduction of new ideas from overseas. Certainly the restriction of the distribution of backed blades to the south of the continent argues for its invention within Australia. Remnants of gum hafting on these implements argues strongly for their use as a projectile barb. If this is so its occurrence might reflect an increased use of spears in hunting, perhaps in turn reflecting adjustment to more open country. The high proportion of microlithic implements in later stone tool assemblages reflects the increasing variety of forms and techniques employed suggesting experimentation. Hunting and gathering techniques may have diversified in an attempt to utilize a wider spectrum of the environment. Conversely, the tools may reflect increasingly specialized equipment designed to increase the efficiency of man's use of the environment. On the present evidence the changes archaeologists have noted, in the assemblages appear to be a response to climatic change, although it should not be forgotten that cultural factors also may play their part. The arrival of new traditions from outside Australia may play an important part yet to be traced. The arrival of the dingo in the later phases of the period certainly indicates the arrival of new groups from the north.

Late Stone Working Tradition:

From about 700 to 1,200 A.D. another marked trend is discerned in the stone
tool assemblages from all over Australia. This trend appears to continue until the arrival of Europeans. There is a marked decrease in the quantity of worked stone found in sites. Not only are stone tools rarer than in other periods, but the variety is also more confined; microliths and pirri points disappear altogether. The percentage of retouched material drops markedly in later sites. In the Murray River sites quartz flakes virtually unretouched predominate. The continued production of well-made edge ground axes indicates that some workmanship retained a high standard, however. Because of the paucity of material there is a limit to what can be said about the stone-working traditions in its latest phase. We can say that the trend away from stone was wide-spread.

In explaining the latest change we have two factors working to aid us. The first is an archaeological one: as we come closer in time to the present period a wider range of sites and materials can be expected to survive. So far the archaeological record indicates that there was a marked increase in the use of bone. Some bone points were used as spear barbs and it is quite possible that bone replaced pirri points and some backed blades as projectile points.

The second source of information for the latest phases are the ethnographic accounts of European observers. Ethnographic accounts are a useful aid in elucidating aspects of prehistoric culture, but must be used with caution. Whilst the nineteenth or early twentieth century observer may provide more details of dress, appearance, manner of hunting and living than an archaeological site, he may not notice detail important to the archaeologist and may misunderstand what he has seen. His (or her) evidence must be regarded as relating specifically to a time and place and to push the evidence too far is traversity of scientific method. Having made such cautionary remarks it is possible to go on to say that the ethnographic accounts indicate the diversity of Aboriginal possessions and significantly, demonstrate what a small part was played by stone in their tool kit.

In describing the weapons and implements of the Arunta, Spencer and Gillen (Spencer & Gillen; 1927, 521-543) mention four types of spear, only one of which uses stone, and that a large untrimmed flake. Quartzite flakes very similar to those used as spear heads are described hafted as fighting picks, or mounted in resin grips as knives. The woomera, or spear thrower has a flake, usually carefully retouched into the classic tula adze, but not necessarily so. The main woodworking took the adze, with its stout, curving handle, has an adze-flake mounted with gum. Edge-ground axes are the only other stone implement listed. These would appear as three distinct artefacts in the archaeological record, yet they represent nine implements in constant use by the Central Australian Aborigine. Added to the non-lithic objects are boomerangs and a variety of netted articles. Only the mill and hammerstones attest to the women's role in the economy. Again the ethnographic records indicate the importance of worman and add digging sticks and coolamans to their equipment.

The example I have given is from an arid region where life was comparatively spartan when compared with more generous ecological zones. In coastal and riverine areas a profusion of nets, baskets, and even fur cloaks swell the list of material possession. Added to which were methods of damming creeks and inlets, and poisoning pools to provide large hauls of fish food without producing any permanent archaeological evidence at all. For purposes of
reconstructing prehistoric life, we do not know how far into the past it is valid to apply the observations of early Europeans who encountered Aborigines. Their evidence does indicate the limitations of the archaeological record and demonstrates that the apparent paucity of stone in the last 1,000 years of Aboriginal occupation was compensated for by a profusion of other materials. The last phase of the stone industries of Australia has been described, it has not been explained. At present there seems no satisfactory explanation for the change. Its solution lies in the future.

Australia's prehistory is still an uncertain one although the myths of 'an unchanging people in an unchanging land' has long since been silenced. We know that the land was penetrated at least 30,000 years ago by people bearing a simple, but functional tool-kit, consisting of fairly large tools; choppers, scrapers and knives. From about 20,000 years ago additions were made to that kit that demonstrated adaptive willingness, or the arrival of new groups. Such modifications continued throughout the period of deteriorating climatic conditions and may represent a response to environmental stress. A period of tremendous diversification and innovation occurred around 6,000 years ago and may indicate the arrival of new people, bringing the dingo with them. This period lasted 4,000 to 5,000 years and was followed by the abandonment of many of the new stone tool types in favour of much simpler ones, supplemented by a variety of bone, wooden and fibre implements.

If I can return to my original metaphor I can conclude that the mists of antiquity are slowly dispersing and the features of our prehistory are emerging but the fog still obscures and distorts many of the details. Only the rising sun of continuing research can finally dispel the uncertainty.

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Figure 3 Australian small tool tradition: typical examples

(from Lambert.)
Figure 2. Australian core tool and scraper tradition: a-d Lake Mungo, e & f Kenniff Cave, g & h Kartan (from Terrett).
FEATURES OF THE INNER FACE OF A FLAKE

After Campbell and Edwards

Figure 1.