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Waisted Blades in Australia?

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ABSTRACT. Waisted tools from two localities in Australia are compared with the better known, flaked waisted blades from New Guinea. In size, shape and type of edge modification, the two Australian samples differ both from each other and from New Guinea specimens. While waisting itself is seen as appearing in Australia through independent invention rather than as a shared concept, other aspects of the technology, which were universal, are seen as preconditions for waisting. These increased the probability of waisting's being invented in the region more than once.

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The earliest carbon dates of around 40,000 BP from Australia show that the initial human colonization of territories east of the Wallace Line took place in the Late Pleistocene. The sea level was then low enough to join New Guinea, Australia and Tasmania into one land mass, known as Greater Australia, but not low enough to bridge the water barrier separating Greater Australia from the Indonesian islands that form the nearest part of Southeast Asia. Crossing this sea barrier could only have followed the development of suitable watercraft, but other ideas or 'cultural baggage' entering Greater Australia with these early migrants from Southeast Asia cannot easily be recognized.

In addressing this question, Golson (1971) looked for a correspondence in archaeological traits as an indication of the transmission of technological ideas between Southeast Asia and Greater Australia. One trait seen as significant by Golson is the presence of waisting as a hafting aid on certain percussive cutting implements from both sides of the Wallace Line.

'Waisting' is the presence of a pair of opposed flaked notches, one on each long side of an implement. It is a trait most commonly known from New Guinea, where it appears on both edge-ground and flaked tools, known collectively as 'waisted blades'.

At the time of his investigation, Golson was unaware of the presence of waisting on Australian tools and based his comparisons with Southeast Asian tools on New Guinea specimens. However, waisting produced by opposed flaked notches has been recognized on tools from Kangaroo Island, South Australia (Lampert, 1981), and from the Mackay district of Queensland (McCarthy, 1949). In both Australian situations the tools appear as surface finds and are thus almost impossible to date accurately. However, from distributional evidence, the Kangaroo Island tools seem almost certain to be Pleistocene in age (Lampert, 1981).

In view of Golson's argument for waisting as a trait indicating early cultural relationships within New Guinea and beyond, it seems reasonable to examine the proposition that Australian waisted tools are similarly related. Having inspected a sample of 14 waisted tools from Kangaroo Island and more recently a sample of 80 from Mackay, I will compare these with each other and with a group from New Guinea in terms of shape, size and any evidence for function suggested by their working edges.

Characteristics of Tools

New Guinea waisted blades. In the most comprehensive survey of these tools yet carried out, Bulmer (1977) identifies three significant groups. These are: 11 tools from layers dating to around 26,000 BP at the Kosipe open site in the southern highlands; 19 tools from levels dating to a minimum of 12,000 BP at the Yuku site in the highlands; 106 tools from surface sites of unknown age in the Passismanua district of southern New Britain. In comparing these in terms of their shape and size, and type of edge, Bulmer finds some differences between the groups but also a great deal of similarity. Because of their likeness in these same characteristics to unwaisted axe blades, Bulmer argues that both waisted and unwaisted percussive cutting tools belong to the same functional continuum.

Of the three New Guinea groups of waisted blades, I chose those from Kosipe for comparison with the Australian samples, partly because Kosipe tools, being the largest, are the nearest in terms of size to the Australian tools, and partly because the raw metrical data is published (White *et al.*, 1970). All of the flaked waisted tools in the three groups consided by Bulmer have bevelled ends sharpened by either bifacial or unifacial flaking.

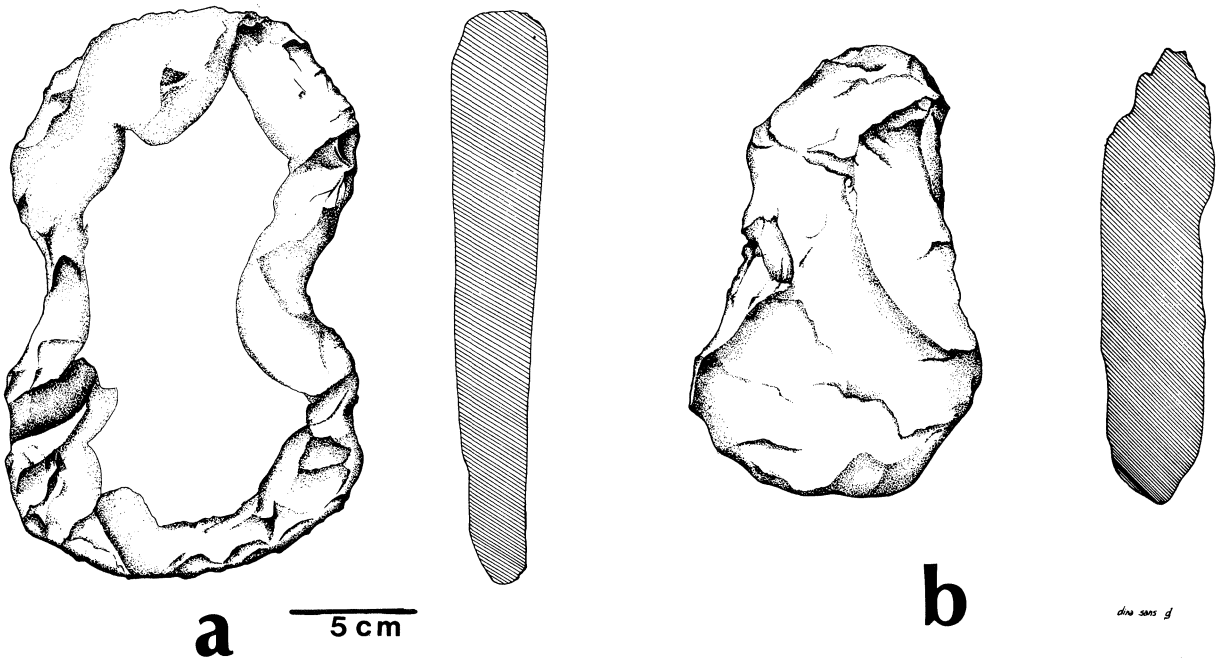


Fig. 1. Mackay waisted tools.

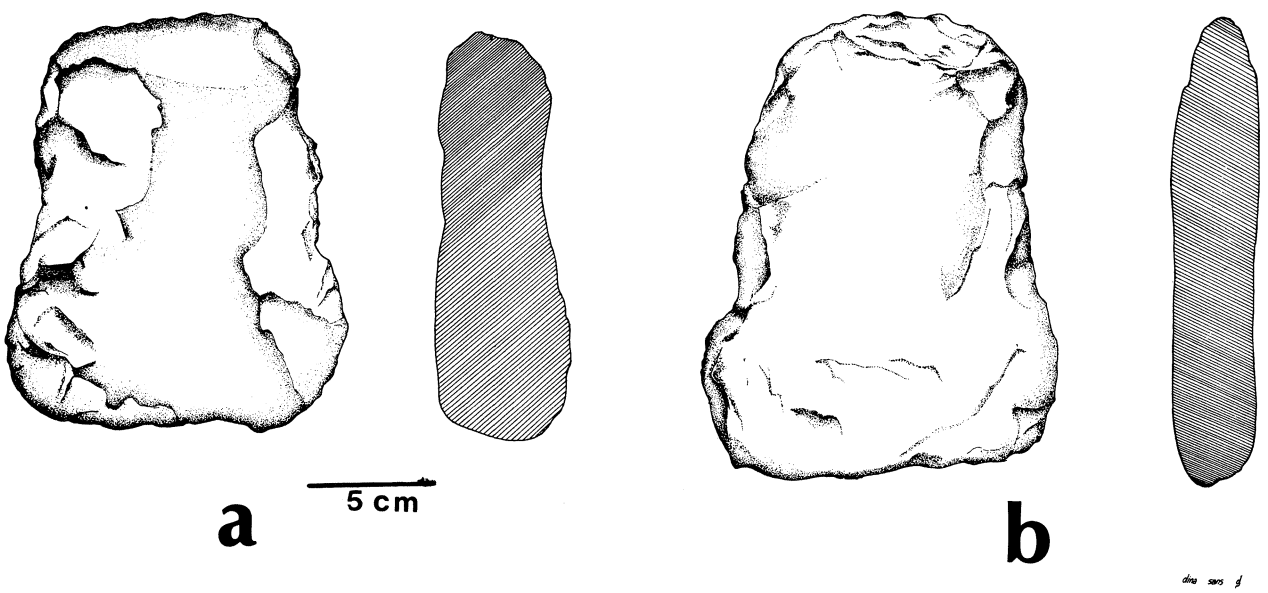
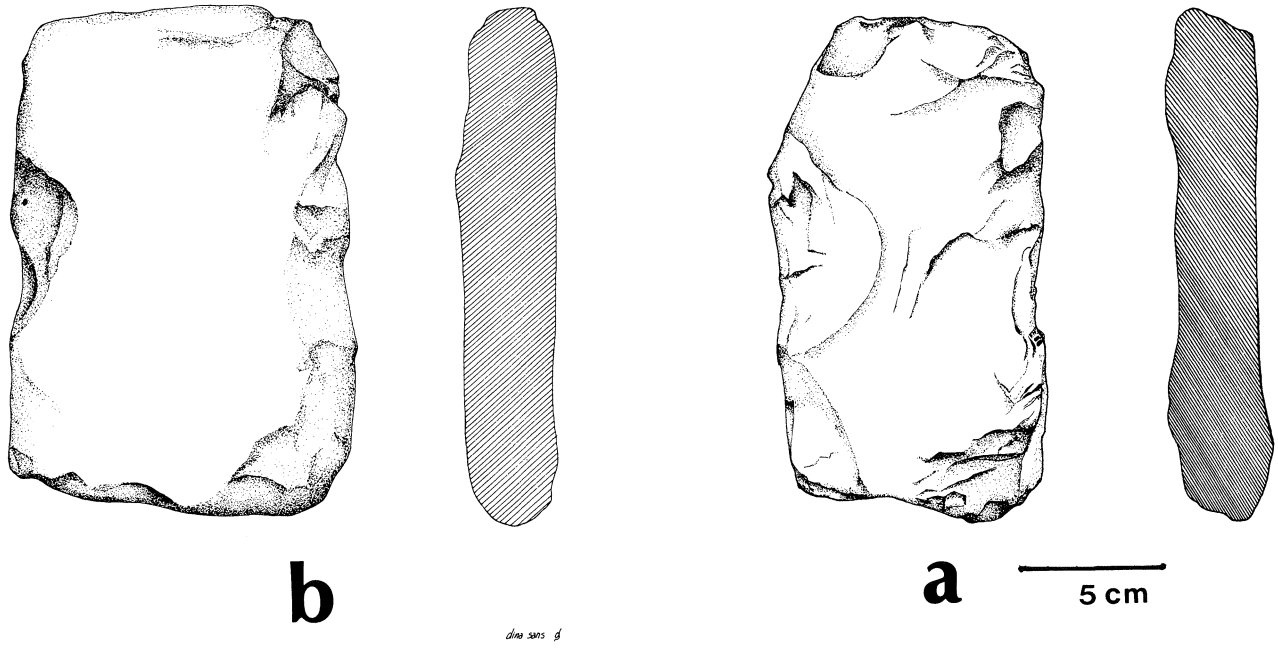


Fig. 2. Mackay waisted tools.



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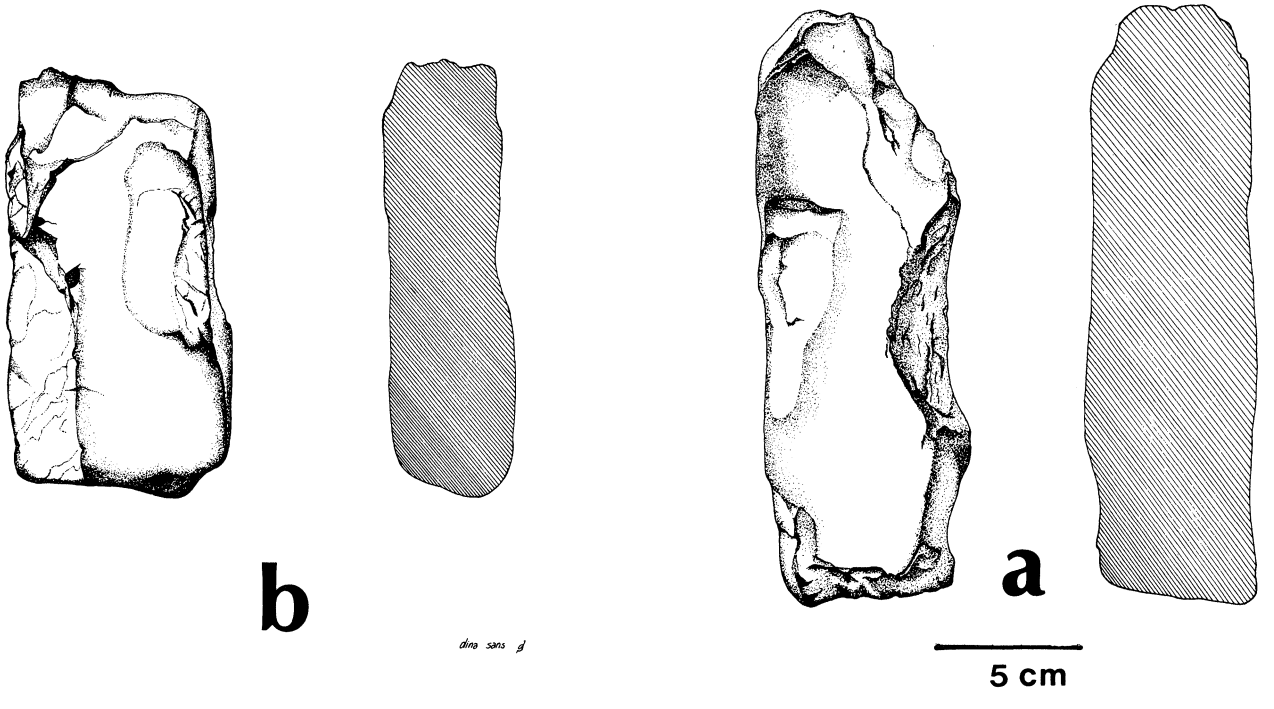
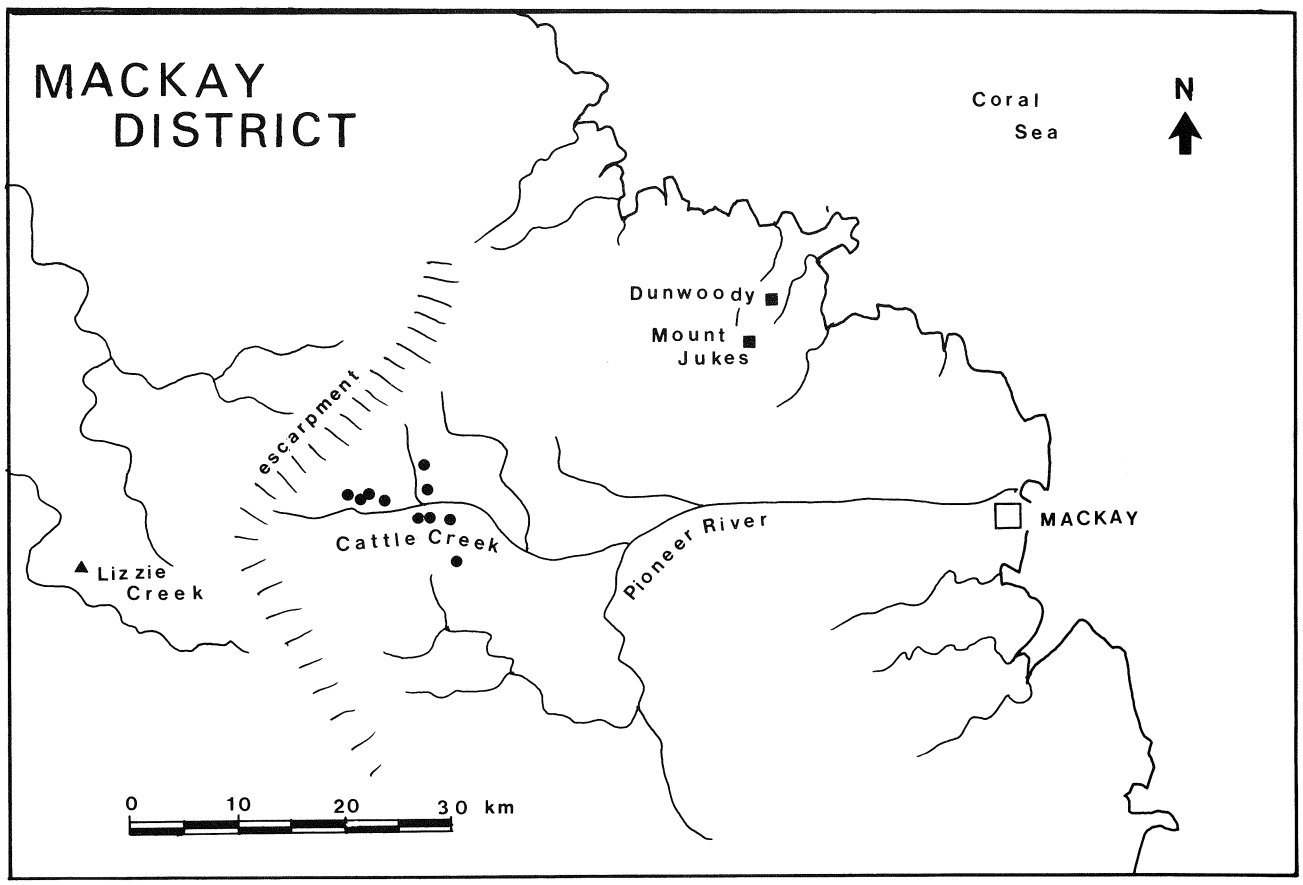


Fig. 4. Mackay waisted tools.



Map 1. Mackay district, Queensland, showing: sites at which waisted tools were found (squares); other sites examined which do not have waisted tools (circles and triangle).

Kangaroo Island. Twenty-four waisted tools have been found on surface sites on Kangaroo Island. Because most were found either near or on Kartan sites, and because they share the same massiveness and are made of the same rock types as Kartan tools, I have suggested (Lampert, 1981) that these waisted tools are part of the Kartan industry and are Pleistocene in age. They show a more varied range of edge modification than do the New Guinea tools, 70% of the functional ends of Kangaroo Island tools being bevelled by flaking, while the remaining 30% are either naturally rounded or squared off along a natural cleavage plane.

Mackay. I visited Mackay in October, 1981, to look more closely at a sample of waisted tools identified initially by McCarthy (1949), my interest being aroused because the few measurements published by McCarthy had suggested that these tools are similar in size and shape to those from Kangaroo Island (Lampert, 1981:191). Because of additional discoveries in recent years, I was able to examine a larger sample than that available to McCarthy. On a total sample of 80 of the Mackay waisted tools, held in two private collections, I recorded the same 10 measurements already taken on the Kosipe and Kangaroo Island specimens (White *et al.*, 1970; Lampert, 1981) and made several observations that would allow the functional ends of the tools to be described.

I looked also at the distribution of Mackay waisted tools as recorded by their discoverers, finding them to be clustered in quite discrete groups with isolated finds coming to light only rarely. Nearly all were found in the Mount Jukes–Seaforth area 30 km north of Mackay, while only one was located in Cattle Creek Valley, west of Mackay (Map 1). Mr J.H. Williams of Mackay found the Mt. Jukes tools in two major groups: 18 in one paddock on the southern lower slopes and 17 within one acre at Jordans Gap. The largest collection, comprising some 80 tools, was found by E. and N. Dunwoody on their cane farm near Seaforth, some 5 km from Mt. Jukes. All came from a narrow strip of land that is ecotonal between open forest and rain forest, and parallel to a creek about 100 m distant in which permanent water holes persist throughout the dry season. The Dunwoodys say that about half of their collection came from a cultivated area of only 150 × 120 m. I looked carefully over this area and found two small core tools but no other flaked stone. There was, however, naturally occurring stone of the same volcanic type as that of which the tools are made.

An examination of this large sample provides testimony to support McCarthy's view that the artefacts

were hafted by the aid of the two opposed notches, and used as heavy hammers or pounders. The evidence for this function is not only the massiveness of the tools (mean weight: 1.9 kg) but also the shape of their ends and the type of damage these have suffered during use (Figs 1–4). For most tools, blocks of volcanic stone with naturally squared-off ends had been chosen, giving the flat hammer-like striking surface present on 67% of ends. On nearly all of these flat ends, bruising is present around the margins, and flake scars extend away from them to invade the sides of the tool. These modifications must be the result of heavy percussion during use, and are reminiscent of a use wear pattern I have seen on some New Guinea sago pounders, except that gloss is absent. Sharp, bifacially flaked ends, which comprise a further 25% of the sample, could be a more developed form of this same pattern of use wear, the flake scars appearing too irregularly to be a deliberate method of sharpening an edge. Rounded ends, which make up the remaining 8% of the sample, have been formed by numerous small bruises and pits that suggest repeated blows, too light to dislodge flakes visible to the naked eye. Although McCarthy (1949) distinguishes between "hammers" and "blanks" among the Mt. Jukes specimens, I was unable to verify this distinction through my own observations.

In shape, the tools vary from those on which the opposed notches produce the hourglass waisting (e.g. Fig. 1a) typical of Kangaroo Island waisted tools (Lampert, 1981: 192-5); through blocks on which the notches, though still opposed and bifacial, are not deep enough to alter the rectangular outline of the tool (Figs 3a, b); to blocks on which the notches are similarly subdued, but which are elongate and have a squarish lateral cross section (Figs 4a, b).

Exactly what the Mackay tools were used for is currently unknown, but the site locations suggest that people who were based at open forest sites near fresh water used the tools in the exploitation of some product of the rainforest. Using Roth (1904) as his main authority, McCarthy (1949) suggests a number of uses for hammers, including loosening bark from trees, pounding hard nuts, knapping stone and making bark cloth. However, the hafted tools identified by Roth (1904: pls xviii, xix) as being so used show no close relationship to the Mackay waisted tools, particularly in the form of edge damage. I examined these same hammers, collected by Roth, in the Australian Museum (Accession nos E13652 to E13656). All are hafted and made on river pebbles of volcanic stone. The edge damage, which in form is consistent throughout the sample, is a finely pitted flattening at the end of a pebble, like that seen on many unhafted archaeological hammers from sites widespread in Australia (e.g. McCarthy, 1976: 67). Among the Mackay tools, this form of edge damage is most akin to the rounded pitted ends which make up only 8% of the sample. One Roth specimen (E13652) has a single large flake removed, presumably by use, from a face adjoining the working end; whereas multiple flake removal is the most common type of edge damage on the Mackay tools. I suspect therefore that the Mackay tools, because of this more pronounced form of edge damage, served for much heavier work than that described by Roth. Nor are the edges of the Mackay tools like those of the bevelled pounder, used possibly for the preparation of fern root as a food in south-eastern Queensland (Kamminga, 1981; Gillieson and Hall, 1982), which again were used for much lighter pounding than were the Mackay tools. A closer identification of function might emerge from further studies, both of the ethnographic evidence for rainforest economies and of the rainforest environment itself, and through experiments designed to replicate the type of edge damage.

Statistical Analysis

The relationships between the groups of waisted tools from Australia and New Guinea were investigated through manipulating the data already described.

Multivariate analyses and significance tests indicate no significant differences between two separate col-

Table 1. Mean ($\bar{x}$) and standard deviation (s) scores for groups of waisted tools.

N		18	60	14	11
$Length_1$:					
	$\bar{x}$	184.4	186.4	206.2	126.8
	s	20.5	24.8	28.7	34.4
$Length_2$:					
	$\bar{x}$	86.7	91.9	100.2	41.5
	s	13.6	16.4	17.2	21.1
$Length_3$:					
	$\bar{x}$	43.1	41.5	41.2	13.0
	s	11.4	10.7	6.9	4.7
$Length_4$:					
	$\bar{x}$	47.1	46.3	51.0	48.1
	s	17.6	11.6	9.3	32.9
$Breadth_1$:					
	$\bar{x}$	108.6	107.0	120.1	60.8
	s	19.1	14.4	19.0	24.0
$Breadth_2$:					
	$\bar{x}$	118.4	119.5	141.9	64.9
	s	25.1	17.2	24.4	24.8
$Breadth_3$:					
	$\bar{x}$	133.4	130.7	155.5	97.1
	s	18.5	16.1	17.4	31.9
$Height_1$:					
	$\bar{x}$	45.6	43.5	42.1	23.5
	s	14.9	9.2	7.6	9.2
$Height_2$:					
	$\bar{x}$	42.2	42.8	40.6	21.0
	s	11.4	9.1	7.4	7.1
$Height_3$:					
	$\bar{x}$	40.3	42.8	40.6	21.4
	s	14.3	10.6	9.1	7.9

Table 2a. Matrix of pairwise F ratios (Mahalanobis distances).

	Mt. Jukes	Kangaroo Island	Dunwoody
Kangaroo I.	2.62		
Dunwoody	1.00	2.66	
Kosipe	11.00	11.31	13.86

Table 2b. Matrix of differences significant (S) at the .001 level.

	Mt. Jukes	Kangaroo Island	Dunwoody
Kangaroo I.	S		
Dunwoody	—	S	
Kosipe	S	S	S

lections of Mackay waisted tools found only a few kilometres apart at Mt. Jukes and Dunwoody. However, the Mackay, Kangaroo Island and Kosipe tools all differ significantly from one another (Tables 2a, b). These localities are separated geograpically by long distances that must have crossed the territories of numerous groups of people, and in the intervening areas waisted tools are extremely rare. Even if the tools from the three isolated localities were contemporary, which is a doubtful proposition, it is hardly likely under such circumstances that the tools, though related, would be closely like each other. Therefore, I find the difference revealed by significance tests to be unremarkable, as Wright (1974) notes for other tools from widely spaced Australian sites.

More appropriate here are statistics that judge the amount of variation (Wright, 1974: 171), or compare archaeological distances, such as techniques that attempt to cluster sites and portray the results graphically for visual evaluation. Discriminant analysis of the waisted tools shows Kangaroo Island fairly close to the two Mackay sites and Kosipe at a considerably greater distance from either (Fig. 5). This grouping is suggested also by examining the functionally sensitive ends of the tools. Those from Mackay have a high percentage of flat ends, those from Kangaroo Island very few, and those from Kosipe none.

Looking a little more closely at the discriminant analysis plot (Fig. 5), the Mackay sites and Kangaroo Island are separated from Kosipe along the horizontal axis (Function 1), whereas along the vertical axis (Function 2) Kangaroo Island is the outlier. An inspection of the raw output tables shows that size, particularly length, is the main component of the first discriminant function, while the second is possibly a reflection of shape. Kosipe waisted tools are significantly smaller than those from the Australian sites. The uniqueness of Kangaroo Island tools is

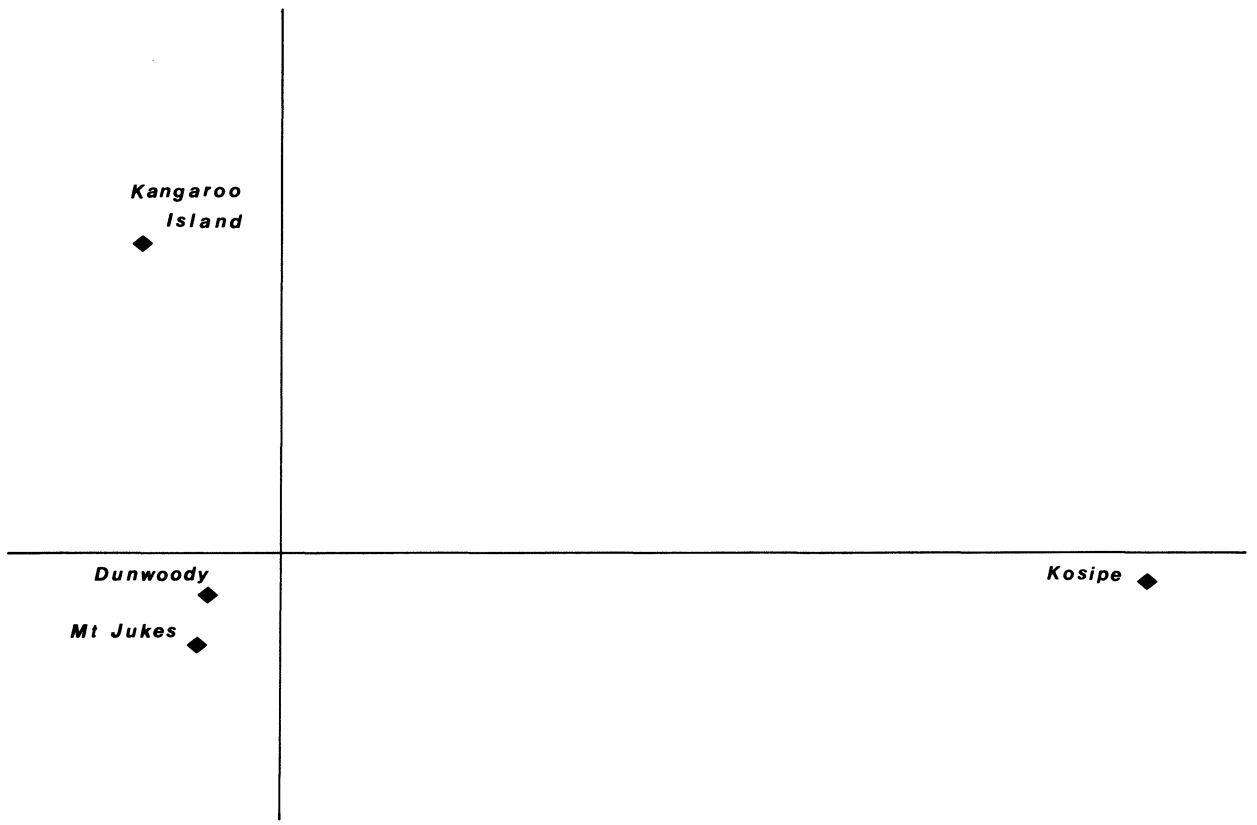


Fig. 5. Comparison of waisted tool groups through discriminant analysis.

possibly due to shape, though this is not readily apparent from an inspection of other data (e.g. Table 1).

Also relevant here is another group of New Guinea waisted tools found recently on raised coral terraces in the Huon District (Groube, pers. comm.). These too have sharp rather than flat ends, but in main dimensions appear to resemble more closely the Australian tools than they do those from Kosipe.

Discussion

Different in size, shape and probably function, these isolated groups of tools have only waisting as a common trait. Does the presence of waisting unite them culturally at a broader level of comparison, as Golson (1971) argues for waisted tools in New Guinea and Southeast Asia? In New Guinea, at least, waisting is fairly widespread, with localities of occurrence separated by areas which are not well known archaeologically. In Australia, however, definite suites of waisted tools have been found at only two localities some 2000 km apart, and the intervening areas are better known archaeologically. Therefore, while the New Guinea sites are possibly linked by a shared concept this could not reasonably be argued for Australia. It would mean accepting the view that, because of common origins, some cultural traits had spread over a vast area and then lain dormant, perhaps for several thousands of years. Later, these traits had emerged in widely separated localities. This proposition I find completely implausible.

An alternative hypothesis that seems more attractive is the independent invention of waisting as a hafting device to meet specific needs both on Kangaroo Island and in the Mackay district, these two groups of tools not being directly related either to each other or to New Guinea waisted blades. As an even more acceptable alternative, I propose a modified version of this hypothesis. Could it be that a broadly similar level of stone technology, which has been demonstrated for the Southeast Asian–Greater Australian region (Hayden, 1977), allows a high probability for the independent invention of fairly simple ideas like waisting as a hafting aid? While the idea of waisting itself might not be transmitted directly between isolated groups of people, the preconditions for waisting might be spread widely in the region. Indeed, for waisting there are preconditions more specific than the broadly similar level of stone technology mentioned above. The concept of attaching a heavy blade, used for hammering or cutting, transversely to a wooden handle is widespread. Of greater importance perhaps is the type of handle used in the region and the manner in which it is attached to the stone head. Throughout Aboriginal Australia in recent times, axes were hafted by "bending a strip of split vine or cane, bark or wood cut from a sapling or branch, round the axe head, and sealing the joint with gum cement . . . The handle is bound with twine at several points . . ." (McCarthy, 1976:47). A flexible handle of this kind wrapped around the reduced waist of a tool would produce a secure grip, as Bulmer (1977) has argued for the hafting of New Guinea waisted blades.

In conclusion, I do not see the Australian waisted tools and those from New Guinea as evidence for these areas' sharing a common idea of waisting. Rather, it is a universal method of hafting, using a flexible vine or split sapling wrapped transversely around a tool, that has increased the probability of waisting's being invented independently more than once.

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