

## **The Edge-ground Stone Adze and Modern Counterparts in the Kimberley Region, Western Australia**

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### **Abstract**

Aborigines from the southern Kimberley, Western Australia have provided data on stone and shell adze blades found on surface artefact scatters. The methods of hafting these are described and illustrated with examples from Museum collections and the relationship between stone or shell bladed adzes and contemporary metal bladed adzes is discussed. The distribution of each type in the Kimberley Region is presented.

### **Introduction**

Adzes are one of the basic components of the Australian Aboriginal woodworking tool kit. They consist of a straight or slightly curved wooden haft and a blade, the cutting edge of which is perpendicular to, but in the same plane as the centre line of the haft. Evidence for the distribution of flaked adze blades through time and space in Australia has been summarized by White and O'Connell (1982: 131), who conclude that these tools originate in late Pleistocene times and were widely utilized, particularly in the drier interior of the continent. Recently, we have examined a series of adzes from the Kimberley Region of Western Australia which lies north-west of the continent's arid zone (Figure 1). Here the many kinds of wooden artefacts used prior to white settlement are still manufactured with various types of adzes. This paper describes in detail one type of edge-ground stone adze, although other adze forms are mentioned and illustrated.

### **Chisel, Adze or Knife?**

Adzes are usually held in both hands and used with short chopping blows made downwards and towards the body of the operator. These blows, relying on the momentum generated by the operator's arms and the weight of the tool for their effectiveness, pare thin shavings from the work. Chisels, another component of the Australian woodworking tool kit, are generally much lighter tools, and although they perform a similar function to adzes, they are driven through the work by a second tool. Both 'adze' and 'chisel' along with other names have been applied to the small edge-ground artefact which this paper describes (see McCarthy *et al.* 1946: 54 for references to earlier names): These names were based on the presumed function or occasionally the observed use of these implements.

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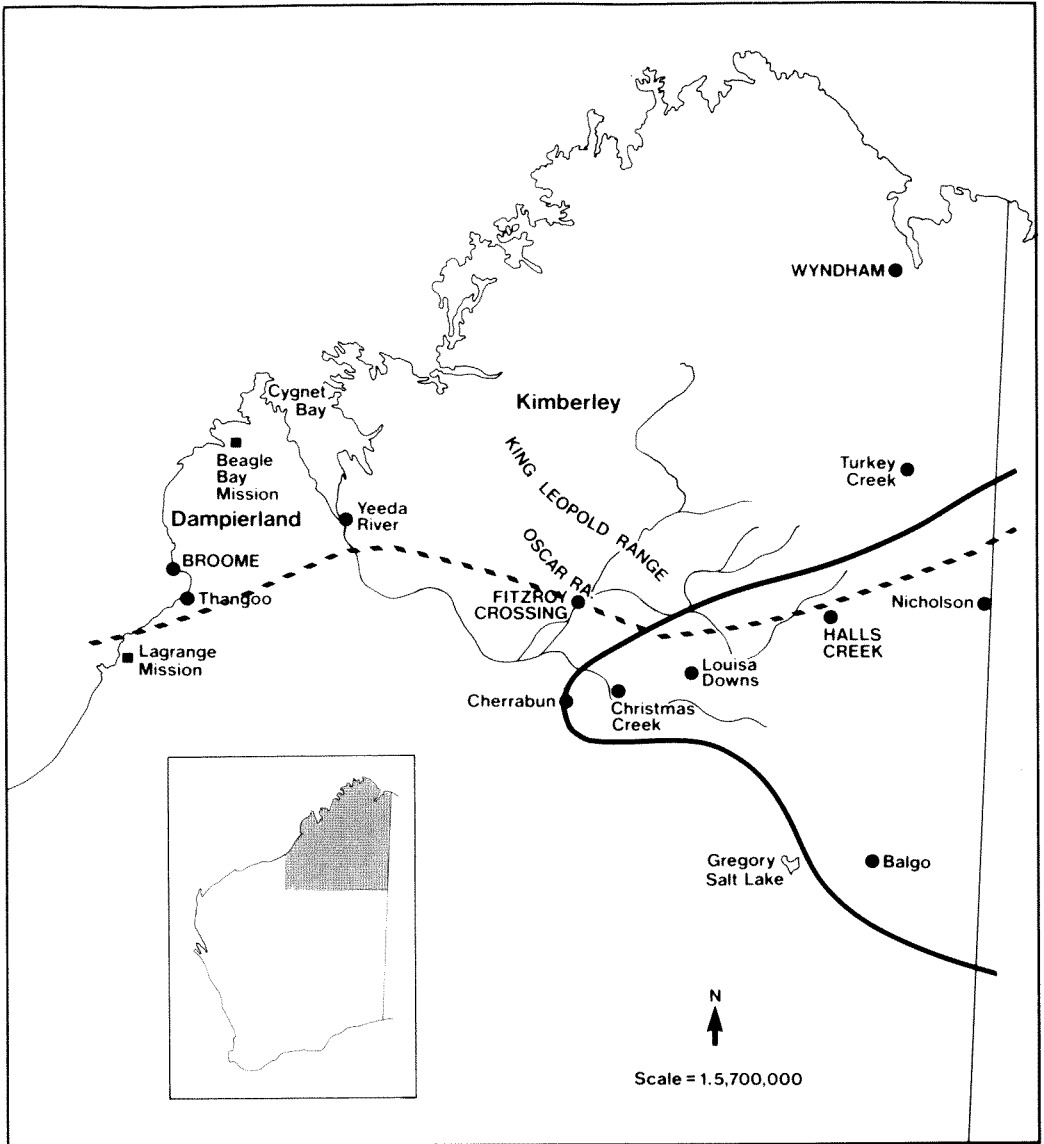
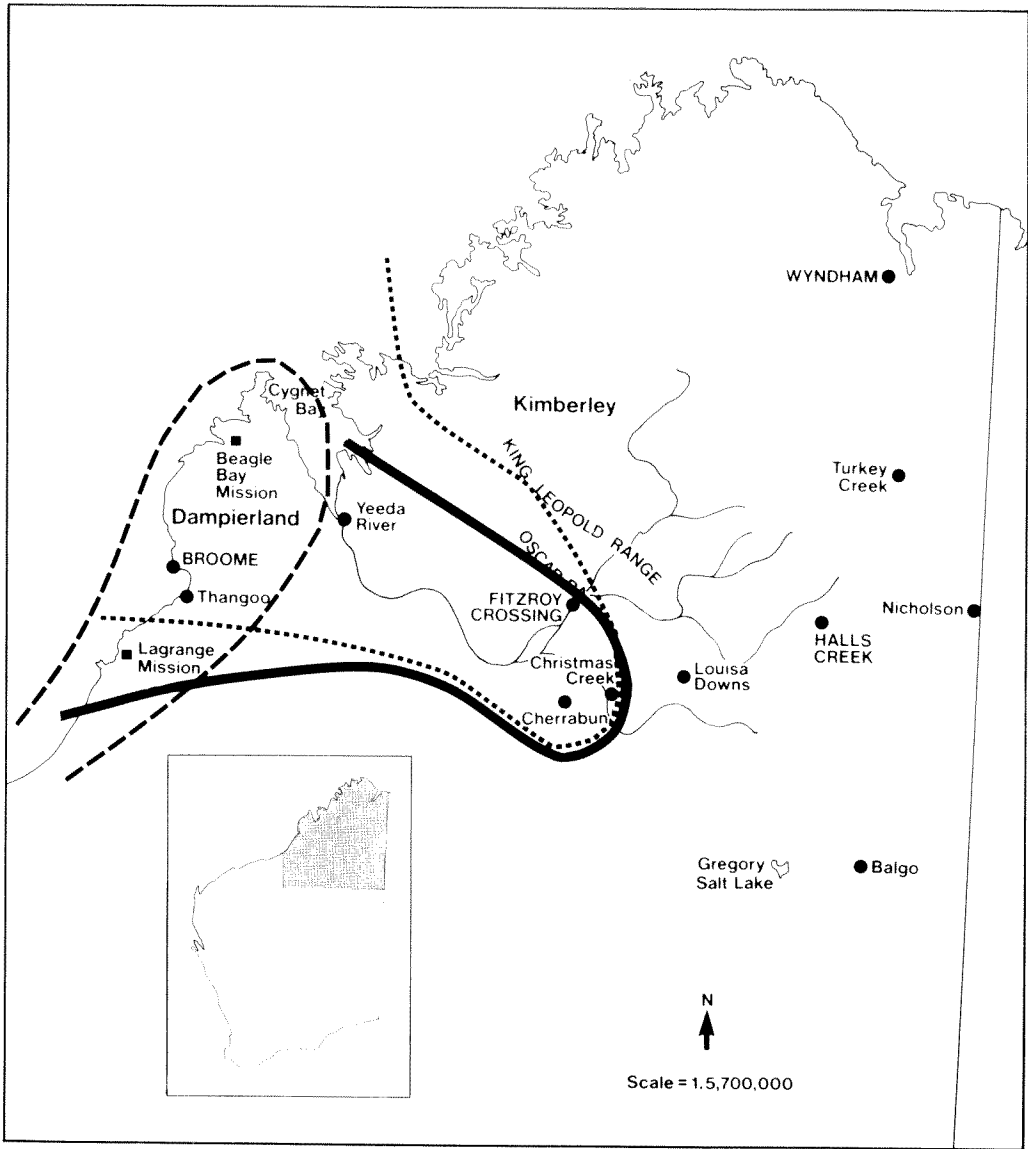


Figure 1 Map A

The metal adze with a tula type predecessor is found east of the solid lines however stone tula blades and slugs are more widely distributed, being found westward to the coast.

Metal adze with tula predecessor east of ———

Tula adze south of - - - - -



**Figure 1** Map B

Distribution of the metal *navi* blades follows closely that of the edge-ground stone blades, west of the dotted line.

Edge ground stone adze west of .....

Edge ground shell adze within - - - - -

Metal *navi* adze west of ———

According to older Nyikina, Walmatjeri and Kitja informants (Kimberley tribal groups still familiar with these artefacts) the common type of edge-ground flakes were hafted and used as adzes. We have thus chosen 'Edge-ground Stone Adze' as being the most descriptive and accurate term alluding to both the form and main function of the tool type which we describe in this paper. We do not deny its incidental use as knife, chisel, scraper or the like.

Nyikina terms for components of the edge-ground stone adze are:

handle or haft – *Kangka*, of *Beauhinia* wood (*Lysiphyllum cunninghamii*) (*Tjikal*)  
stone element – (a) *Tjirimi*

or

(b) *Tjintapal* – this term is used also for the ground shell adze

sinew – (a) *Tjiliwa* – leg sinews of kangaroo or emu

or

(b) *Nyilingka* – tail sinew of kangaroo

resin from spinifex

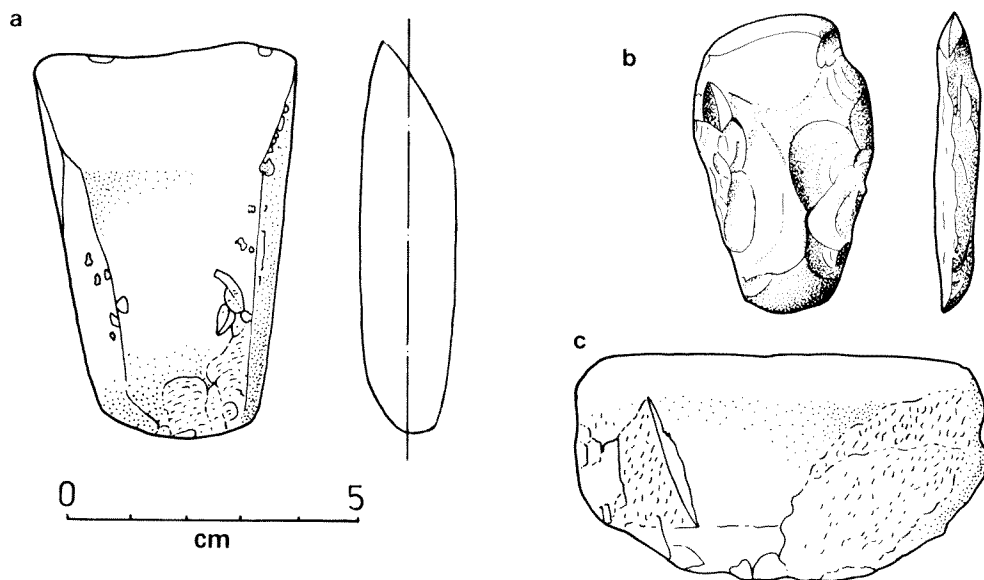
hummock grass

(*Triodia* sp.) – *Limirri*

### Edge-ground Stone Adzes

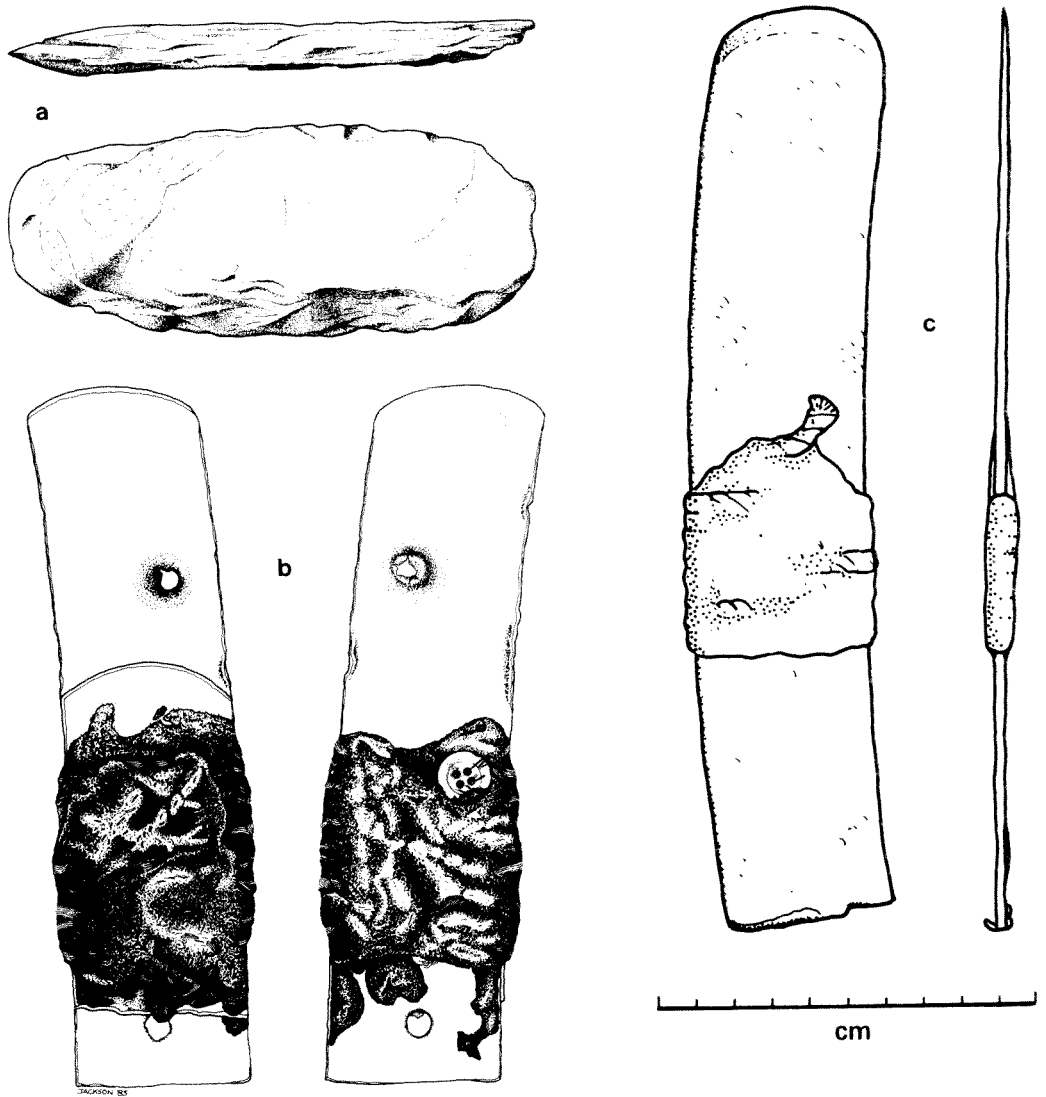
Large edge-ground artefacts similar in form to Pacific Island adze blades have been reported from various parts of Australia (Davidson 1938, McCarthy 1944 and 1976). Generally, adzes from the Pacific Region have asymmetrical blades, the working edge of which is perpendicular to, but offset from the central axis of the stone blade when viewed from the side (Figure 2a). Some of these tools are probably not indigenous and it is likely that the others are merely variants of edge-ground hatchet blades. There seems to be no evidence for assuming that these objects were hafted in any other manner than is usual for Australian hatchets (Dickson 1976: 259 and 1982). Unlike the edge-ground adzes of the Pacific Region, the diminutive Australian example has its cutting edge in line with the central axis of the artefact (Figure 2b). Also, our ethnographic investigation indicates that in the Kimberley it was used in a manner similar to that described for other types of adzes seen in the desert by observers like Spencer and Gillen (1904: 634ff) or Gould 1969: 79).

Several early writers commenting on the stone artefacts of south-eastern Australia, include edge-ground adzes and chisels in a wide 'knife' category along with *Bulga* knives or skin-scapers. They describe the latter as elongated artefacts with one long straight or slightly curving edge-ground margin (e.g. McCarthy *et al.* 1946: 55; McCarthy 1976: 53) (Figure 2c). This is in contrast to the typical edge-round adze where the grinding occurs on one of the narrower margins (Mitchell 1949: 86). Some examples of Kimberley edge-ground adzes have more than 50% of their edges modified (Figure 5b), but their highly curved working edge and small size distinguishes them from *Bulga* knives, many of which were probably equipped with a simple gum grip (McCarthy *et al.* Fig. 299) and not hafted in the way described later in this paper.



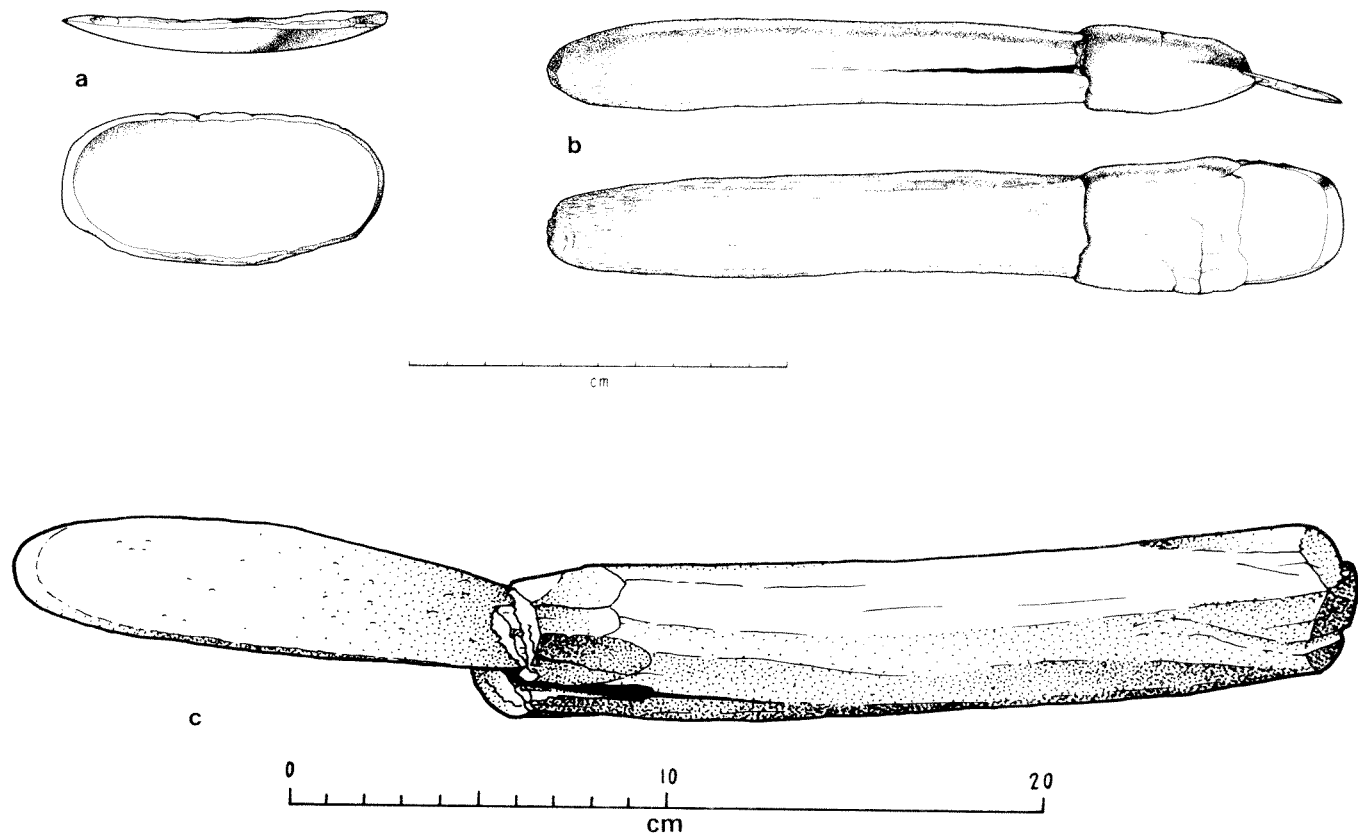
**Figure 2** (a) Two views of an edge-ground stone adze blade from the Pacific showing cutting edge offset from central axis of tool when viewed from the side. New Zealand. (WAM E.147).  
 (b) Two views of an Australian edge-ground stone adze blade, Christmas Creek Station. (WAM B5524/1).  
 (c) Skin-scaper, the ground edge on one of the long sides, and presumably used unhafted. New South Wales (re-drawn from Thorpe and McCarthy, Plate 9).

No Kimberley edge-ground adzes have been seen with battered or percussion marked edges opposite the blade, indicative of use as unhafted wedges or true driven chisels. Examples bearing evidence of this type of attrition have been collected from the Kurnell Peninsula (Dickson 1982: 78) and other areas of N.S.W. (White and O'Connell 1982: 128). Such artefacts are generally made on elongated pieces of raw material with one narrow end margin ground to produce the cutting edge. We suggest that the elongated edge-ground adze figured here (Figure 3a) was not driven through the work with blows from a hammer or maul, but was used with a two-handed grip in the manner described for adzes. In this instance we base our identification on both the lack of battering on the margin opposite to the blade and the opinion of Aboriginal informants. These men took particular note of the material from which the artefact is manufactured and the fairly acute working edge angle and suggested that the artefact was used to shape dishes and spearthrowers made from *marlay* (*Erythrina vespertilio*) a soft wood. This particular artefact, although uncommon in the Kimberley fits well within the size range of both edge-ground hatchet blades and edge-ground chisels, however the silicified schist from which the tool is made, while being strong enough to permit its use as an adze is not sufficiently robust to withstand hammer blows without shattering.



**Figure 3**

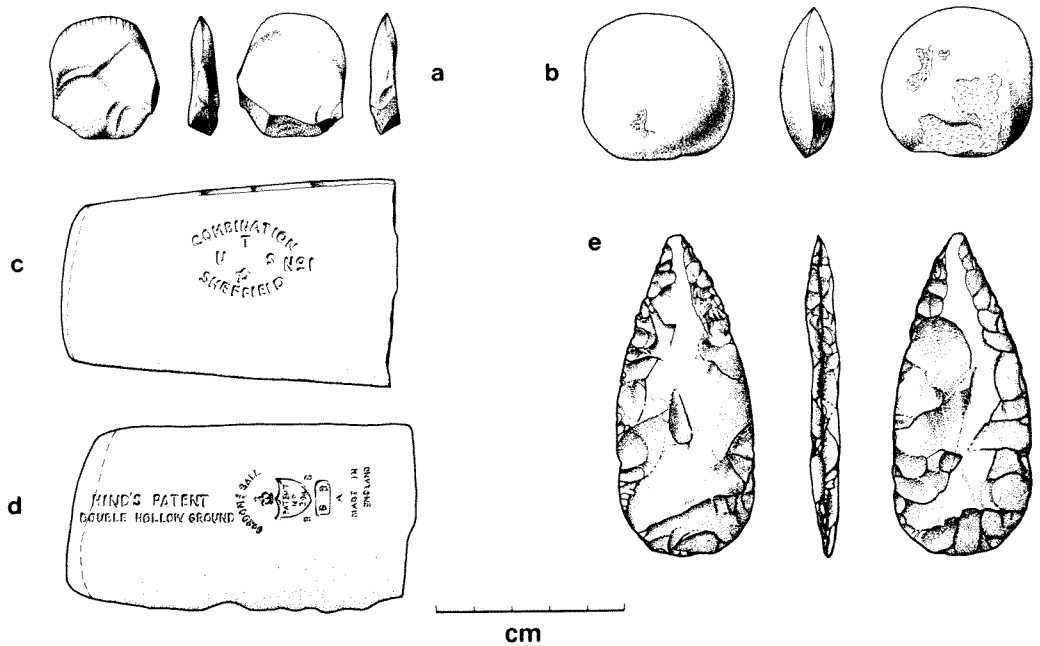
- (a) Two views of an edge-ground stone adze made from a slab of silicified schist and used unhafted. Palm Springs, Louisa Downs Stn. (U.W.A. Anthropology Museum Coll.)
- (b) Edge-ground metal adze used unhafted. Battered and folded edges on the end opposite to the sharpened blade indicate that this artefact has been used as a chisel. Ochred twine grip, Kimberley. (WAM A14233)
- (c) Edge-ground metal adze made from a section of hoop iron. Spinifex resin and twine grip includes a button. Battered end again indicates use as a chisel. Kimberley. (WAM A14232)



**Figure 4**

- (a) Edge-ground shell blade. Collected from a coastal soak north of Beagle Bay Mission in 1979. (WAM A23575)
- (b) Two views of a hafted shell artefact from Sunday Island †Cygnet Bay) collected 1932. Gum seal over string-bound hafting joint. (WAM 9956)
- (c) Metal bladed 'nayi' adze. Found with a cache of artefacts in the Oscar Ranges in 1980. (U.W.A. Anthropology Museum Coll.)

The Edge-ground Stone Adze and Modern Counterparts

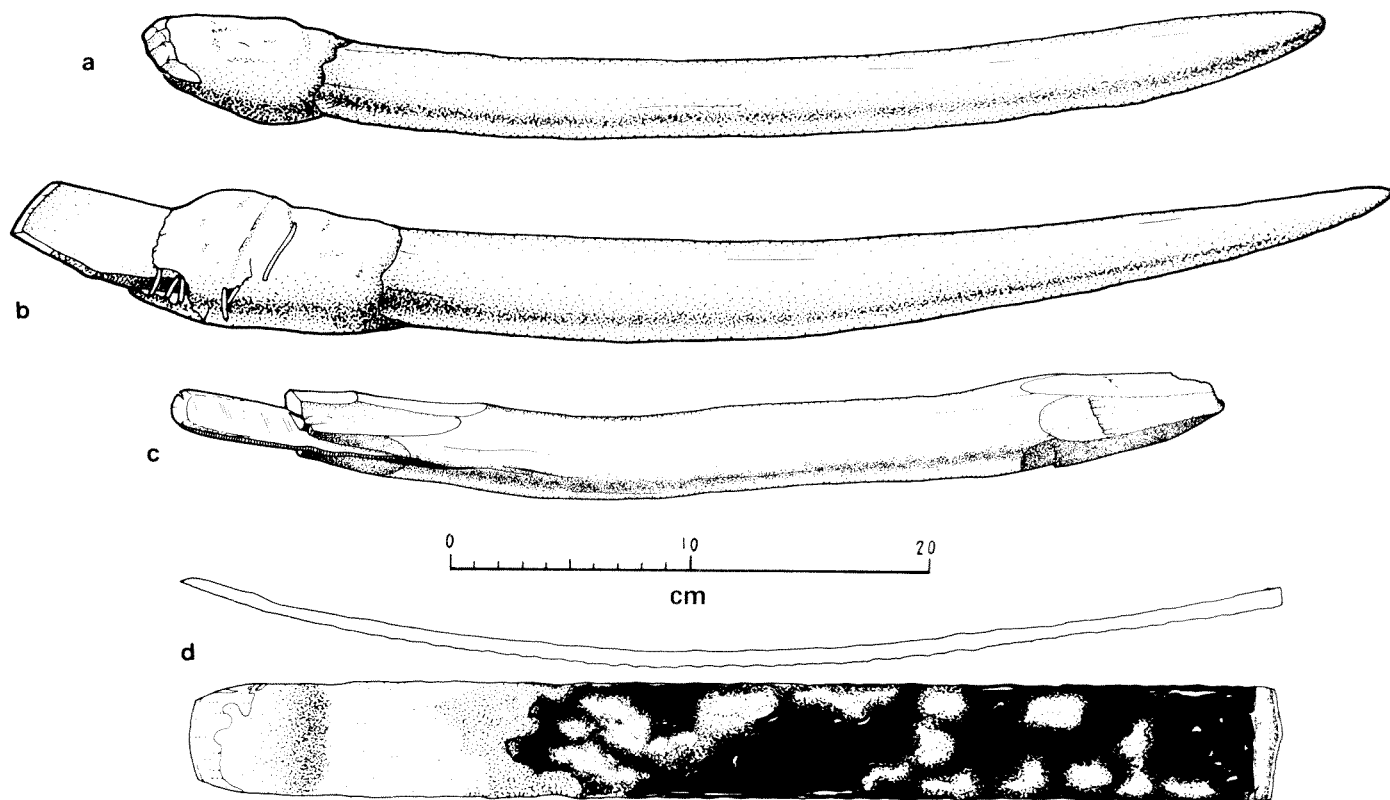


**Figure 5** (a & b) Edge-ground stone adze blades. Christmas Creek Station. (WAM B5524/3 & B5524/2).  
 (c) Metal adze blade made from section of hand-shear blade. Traded unhafted between two men 1/6/81 south of Balgo. (U.W.A. Anthropology Museum Coll.)  
 (d) Similar metal shear blade trade item, Kimberley. (U.W.A. Anthropology Museum Coll.)  
 (e) Edge-ground flaked point, ground for use unhafted, as a tool to produce narrow grooves in wooden artefacts. Old Cherrabun Station. (WAM B4297)

Edge-ground stone adze blades vary considerably in both size and shape. Large examples may be difficult to distinguish from small edge-ground hatchet blades (e.g. McCarthy *et al.* 1946: 55). Some, in terms of their length and width fall into the acceptable range of hatchet heads. However as the adze blades are relatively thin and light in relation to their size, it seems unlikely that they were used as hatchets. future morpho-metrical studies and examination of edge wear will probably clarify the dividing line between large edge-ground adze blades and small hatchet blades.

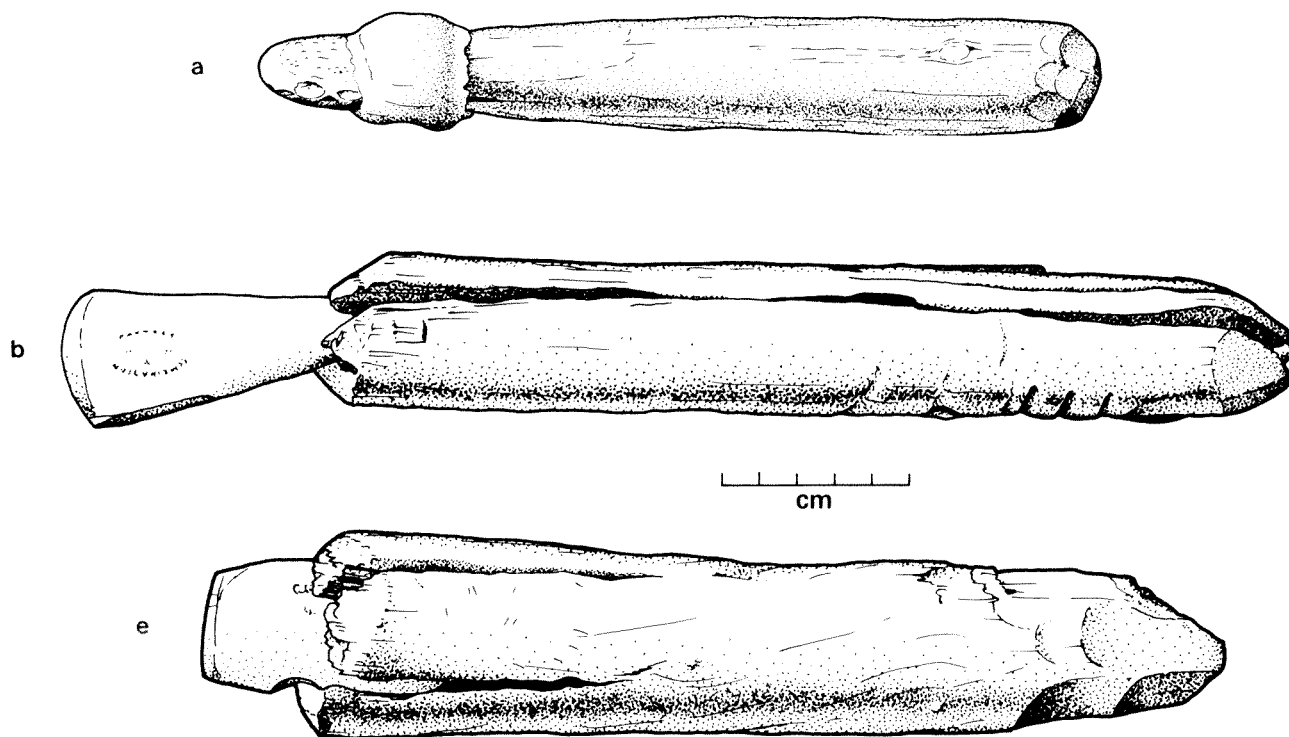
Throughout their known geographical range edge-ground adze blades were mostly made of flakes of tough, medium grained, crystalline, indurated or volcanic rocks, lacking planes of easy fracture and similar to those from which edge-ground hatchets are manufactured (Dickson 1972). The Kimberley examples are made on a variety of materials including ultra-mafics, hornfels, dolerite, silicified tuffs and occasionally silicified schists. Edge-grinding may take place directly on suitable otherwise unmodified pebbles or primary flakes, or on





**Figure 6**

- (a) Tula flaked stone adze blade hafted on wooden handle with *Triodia* sp. resin. Made by Wirili Tjabangari in 1981. Christmas Creek Station. (U.W.A. Anthropology Museum Coll.)
- (b) Shear blade section hafted as an adze using copper wire and *Triodia* sp. resin. Made by Tjantjanu (Jimmy) Tjambitjin, Balgo. (U.W.A. Anthropology Museum Coll.)
- (c) Metal bladed adze, the blade forged and ground from a section of metal file. Made by Wiminytji, Balgo, 1981. (U.W.A. Anthropology Museum Coll.)
- (d) Face and side views of a section of car-spring, with one end forged and filed to conform to the blade shape of composite adzes. Made by David Downs, Fitzroy Crossing 1982. (WAM A23561)



**Figure 7** (a) Edge-ground stone adze, made by Paddy Roe (Nyikina speaking man) Broome in 1981. (U.W.A. Anthropology Museum Coll.)

(b) Metal bladed 'nayi' adze. Blade made from section of hand-shear blade. Wide splits in the handle have been used with a wooden fire-saw to produce fire. Collected in 1961 from Christmas Creek Station. (WAM A13810)

(c) Metal bladed 'nayi' adze collected in 1931. Blade made from section of hand-shear blade. As with example (b) the blade has been removed and re-hafted when the split widened and released its grip on the blade. Northern part of Canning Stock Route. (WAM 9741).

flakes that have been trimmed by secondary percussion flaking. Pieces which have been trimmed by pressure flaking also occur rarely. Kimberley edge-ground adze blades have insufficient mass for pecking or hammer-dressing blows to have taken effect and consequently this method of stone reduction was not used to shape these artefacts. Akerman has noted the modification of a bifacially flaked point to produce an edge-ground tool (1979: 81ff) although this seems to have been an unusual case (Figure 5e). The use of flakes from the blade of an edge-ground hatchet retaining one ground facet from that artefact has been noted. Such flakes could have broken accidentally from the edge of the hatchet blade during heavy chopping or they may result from re-trimming a previously damaged hatchet blade prior to re-grinding the edge.

Typical Kimberley examples of edge-ground adzes have one of the narrower flake margins bifacially ground to form the typical smooth, sharp and slightly curved cutting edge. As we have mentioned, the ratio of modified edge to unmodified edge varies considerably and rare disc-like examples ground on all edges do occur. Very few are ground all over.

We have not yet collected sufficient metrical data to establish a more specific formal 'type' for this artefact. However, the tools already examined fall into two groups: the more common pattern (Figures 2b and 5a, b) used for adzing, and elongated examples with narrow ground edges presumably used for engraving (Akerman and Bindon: in prep.) (Figure 5e).

### **Edge-ground Shell Adzes**

Edge-ground segments of a robust shell were hafted for use as adzes and knives in Dampierland (Akerman 1975a: 18) (Figure 4). This is an area devoid of stone outcrops which could provide raw material for edge-ground artefacts. No archaeological excavation has taken place in this area so it is not yet possible to determine whether these multi-purpose artefacts replaced an adze with a stone blade or whether in fact their use extends far back in time. From the large number of shell blades occurring on surface artefact scatters in Dampierland we can assume that this composite tool occupied a significant place in the material culture of the tribal groups living there. However, the artefact is relatively easy to manufacture and the shell element, being less durable than stone, probably needed frequent replacement. Both these factors may explain the relatively greater numbers of shell blades as compared to stone blades seen on surface sites in their respective distribution areas.

### **Hafting**

As we have mentioned, some of the larger examples of edge-ground adze blades (length > 6 cm) may have been used without hafting but most are too small to have been used in this way. Examples as small as 1.5 cm in width and less than 1 cm in length at right angles to the ground edge have been seen. The specimens we have examined from the Kimberley show scraper/adzing wear at right angles to the blade (Figure 5a), very different to that kind of use-wear which is roughly parallel to the sharpened edge, as is usually seen on knife flakes. This is in accord with the ethnographic data we have collected for those tools. Use-wear of the kind we have noticed may not be found on all the south-eastern Australian examples.

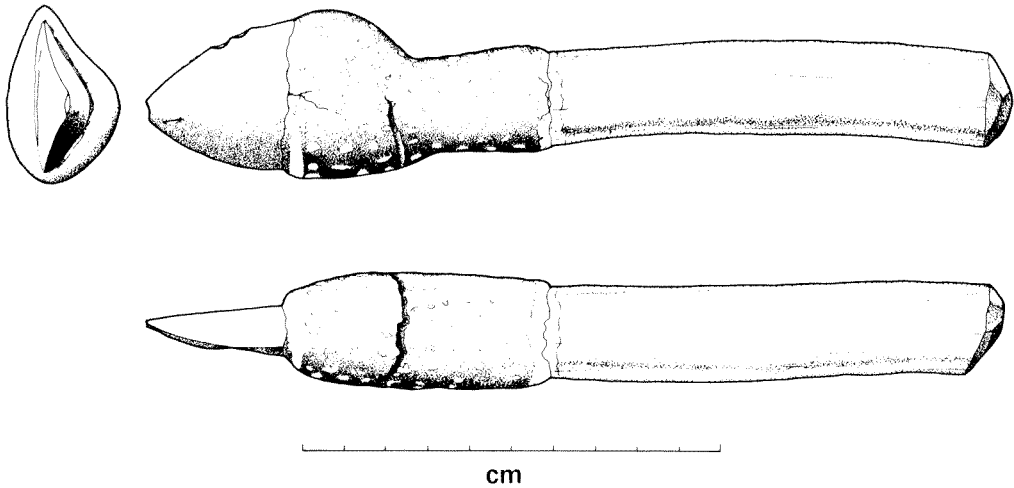
In the Kimberley area, edge-ground adze blades were hafted to a short (14-25 cm) stout piece of green Bauhinia wood (*Lysiphyllum cunninghamii*). This wood was chosen because it is very elastic and is said to grip the stone element without splitting back during use. A split a few centimeter long is made in the end of this haft. Both sides of the split are then pared down so that the end section of the haft is roughly oval, the split forming the long axis. The prepared stone blade was forced into the split without prior fitting of the stone or further adjustment to the haft. The joint was then bound tightly with sinew obtained from either kangaroo or emu. After drying this lashing was usually but not always covered with *Triodia* resin (Figure 7a). In an emergency, the stone could be adequately hafted by jamming it into a split stick with neither sinew or resin strengthening. The resin seal provides some support but more importantly is to protect the sinew from chafing whilst in use. Very small stone elements were hafted directly to a shaft with *Triodia* resin usually without prior splitting. This hafting method is not exclusive to edge-ground stone blades but is also the standard method of hafting flaked stone adzes. Akerman (1975a) describes a similar split stick method for hafting shell adzes.

In the south Kimberley, as elsewhere, the tula adze flake was hafted on either a special curved wooden haft, on a throwing stick, or further south in the desert on the proximal end of the spearthrower (Tindale 1965). Hafting involved embedding the trimmed adze flake in a prepared lump of *Triodia* resin moulded on to the end of the handle (Figure 6a). Although recorded from the desert margin to the south, adze hafts with a stone mounted in both ends have not been seen close to the Fitzroy River (Davidson and McCarthy 1957: 396).

In south-eastern Australia stone blades and chips were hafted to short sticks with plant exudates and bindings. Some of these are illustrated by Brough-Smyth (1978, *I*: 379 & 380 figs. 199 & 200) and Etheridge (1891: plate vi) amongst others. We illustrate in Figure 8, one of two similarly hafted stone implements collected from Kununurra in 1974 and said to be used as a knife, a chopper or chisel (C.E. Dortch, pers. comm. 1982). For these functions, the tool could be held in either one or two hands. Known as *binbalang* by the Miriwung peoples of the east Kimberley this type of artefact can duplicate some of the functions of the edge-ground stone adze from further west. An unmodified pointed cortical flake struck from a rounded river pebble forms the stone element of the *binbalang*. This is attached directly to the wooden handle with *Triodia* resin. Numerous cortical flakes which could be hafted to produce this tool can be found in surface scatters of artefacts adjacent to the Ord River. Apart from this occurrence, the distribution of these artefacts has not yet been established. Perhaps some were hafted in split sticks in the method described in this paper although the museum specimens which we have examined were hafted without the split handle.

### **Metal Counterparts to the Stone Adzes**

Stone bladed woodworking tools have now been replaced by implements with metal blades. Near Balgo in 1982 we observed a large trimmed stone flake being used to smooth a spear shaft but this is an uncommon occurrence. Aboriginal woodworkers now utilize a suite of metal tools which include hatchets, chisels, gouges, rasps and files as well as adzes. The wooden handles of these metal bladed adzes follow closely the shape of those which had



**Figure 8** Three views of a hafted stone implement, known as *Binbalang*. Collected in Kununurra in 1974. (WAM A22748).

stone blades. One metal bladed adze currently used in the Kimberley follows the pattern already described for the tula where the blade is gum hafted to a wooden handle. The metal bladed example is made of a short (c. 8-10 cm) section of hand-shears blade (Figure 5c and d), a portion of a flat file or the metal blade of a carpenter's chisel hafted to a length of curved wood. Except for a widening of the area to which the blade will be attached, this wooden haft is identical to that which was made to accept a stone adze. The metal is attached to a suitably prepared platform on the wooden haft by binding with light wire – mostly copper wire from electrical power lines – or twine or sinew. This binding is usually reinforced with a blob of *Triodia* resin (Figure 6b). Occasionally a curved vehicle spring or a similarly shaped strip of metal about 45 cm long is made into an adze of this form by simply filing a cutting edge on one or both ends (Figure 6c). Obviously a blade of such length needs no wooden haft although sometimes a hand grip of twine and *Triodia* resin or a strip of rag is provided. Such adzes when sharpened at both ends are the only double-ended adzes found in the Fitzroy River area.

The hafted edge-ground stone adze and its shell-bladed coastal relative have been replaced by a section of shear blade or similar piece of metal of about the same thickness. In this case, a roughly oval shaped piece of metal between 12 and 15 cm long is mounted in a wooden handle about 20 cm long. Hafting is accomplished by driving the metal blade into the end of the short stout haft of *Beauhinia* wood (Figure 7b). No other lashings or adhesives are used to hold the blade in the split formed in the handle during this process, although occasionally a strip of rag may be wrapped around the junction of blade and haft to make a more comfortable grip when the tool is being used. In order to tighten the hafting, the metal blades are removed and driven into the haft again at right angles to the original split (Figure 7c and d). This adze type is known as *nayi* (Walmatjeri).

A short metal adze, related to the *nayi* adze is sometimes seen along the Fitzroy River. Sections of suitable metal about 20 cm long with one end sharpened, were used unhafted as adzes for fashioning softwood artefacts much as the stone example mentioned previously and shown in Figure 3a, was used. Occasionally the metal adzes were provided with a grip of rag or twine (Figure 3b and c) and some with battered ends, were used as true driven chisels (Figure 3b).

Sections of metal suitable for the manufacture of blades for all three adze forms are included in gift exchange between trading partners in Kimberley and adjacent communities. The most important trade routes in the south Kimberley run roughly parallel to the Fitzroy River with trade goods moving both east and west (Akerman 1979: 24). The bulk of the shear blade sections appear to originate in the west and south-west Kimberley where for several decades the pastoral industry was based on sheep.

### Distribution

Concentrations of edge-ground stone adze blades are found in two parts of the continent; in New South Wales and the adjacent parts of northern Victoria and south-west Queensland, (e.g. McCarthy 1946: 53; Mitchell 1949: 84) and also in the Kimberley Region of Western Australia to which we will pay closer attention later. The edge-ground hatchet is a common artefact in both these areas, and in fact the known distributions of edge-ground hatchets and edge-ground adzes overlap, but hatchets are found much more widely.

Flaked adze forms like the *tula* and *clouera* exist alongside the edge-ground variety in both the Kimberley and south-east Australia (see for example Davidson and McCarthy 1957: 396). The adzes which occur in the south-east and centre of Australia have been adequately discussed in detail by ethnographers and archaeologists alike (e.g. Spencer and Gillen 1904; McCarthy *et al.* 1946). Forms and distribution patterns of flaked adzes in the north-west of the continent are less well known, (but see Dortch (1977) for a review of their occurrence in the east Kimberley). The distribution maps (Figure 1) show the known extent of stone and metal adzes based on either the *tula* or edge-ground adze predecessor. In the extreme north-west Kimberley, adzes are rarely represented in the archaeological record, and there is no reference to them in literature concerning the contact or immediate post contact material culture suite of this part of the region although other scraping tools are mentioned. Akerman has pointed out elsewhere (1979a: 245) the differences in the wooden artefact industries throughout the Kimberley which at least in part explain this omission from the stone industries.

This adzeless trend in the north continues into the present. Contemporary woodworkers tend to use steel hatchets, rasps, knives and modern chisels (not as adzes) in making shields, coolamons and spearthrowers. On the Dampierland Peninsula, woodworkers who have had nearly a century of contact with pearling and boat building industries (mainly luggers and dinghies) also tend to use a European suite of tools rather than adze forms based on traditional shell prototypes. *Tulas*, which are semi-discoidal flakes with varying amounts of re-trimming on the dorsal surface of the distal end and designed for hafting, are found mainly south of a line extending from Thangoo Station on the west coast to near Yeeda

Station on the Fitzroy River, to Halls Creek and thence north-easterly into the Northern Territory. Occasional specimens are seen north of this line but these are rare and there is no evidence that tula adzes occupied an important place in the artefact suite in the central and north Kimberley Plateau. Flaked non-tula adzes occur alongside the tulas. They include the burren adze (semi-discoidal flake with re-trimming on the lateral margins of the dorsal surface) and the somewhat enigmatic 'adze point' (Davidson 1935: 160-162) which lacks the tiny step flake scars on the ventral surface characteristic of other flaked adzes throughout Australia.

The general locus of the edge-ground stone adze in the Kimberley region appears to be confined to the Fitzroy River Basin and the coast to the north and south of the mouth of this river, but a few specimens occur outside this area. Our main data comes from that territory formerly held by the Nyikina speaking peoples (the middle reaches of the Fitzroy River) where the edge-ground adzes are found in conjunction with both edge-ground hatchets and tula adze flakes. On the Dampierland Peninsula, and the coast south of Broome they are found in conjunction with edge-ground baler shell adzes and knives (Akerman 1975a: 93-104 and 1975b: 16-19). Edge-ground adzes and knives are extremely rare in surface sites in the Tjaru tribal area (the open plains to the east and south-east of Halls Creek) and further eastwards. The more common artefacts on these sites include edge-ground hatchets, flaked adzes and the remnants of these, called 'slugs' which are discarded after continued resharpening renders them too small to be effective.

### Conclusion

Whilst the few excavations of living sites in the west Kimberley failed to establish any temporal sequence for the full range of flaked and edge-ground adze types in the area (Blundell 1975), Dortch established the presence of adze flakes in his early Ord valley stone industry dated back to about 17,000 years ago (Dortch 1977: 109).

Examination of eroding surface sites throughout the region has revealed few edge-ground adzes occurring on sites where flaked adzes are common. Where edge-ground adzes are common, flaked adzes are rare. This suggests that the two adze types occupied a similar place in the woodworking tool kit, but over what period of time this situation existed remains to be seen. However, as the edge-ground chisels are made from rock types also used to manufacture edge-ground hatchets, the possibility exists that the smaller tools may have been made along with the latter implements. Edge-ground hatchets have been recovered from Pleistocene deposits in the Kimberley region and nearby Arnhem Land (Dortch 1977 and C. Schrire 1982).

The occurrence in adjacent areas of the edge-ground shell adze from the Dampierland Peninsula and the edge-ground stone adze of the lower Fitzroy Basin, which were both hafted in a similar fashion, suggests a close relationship between the two forms. Figure 1b shows very clearly the overlap between these two types and the metal bladed *nayī* adze. We conclude that these congruent distributions are more than coincidental and that they reflect the formal similarity between this metal bladed adze and those with edge-ground stone or shell blades.

Our observation of the present geographical occurrence of the metal bladed adze which replaced the stick hafted tula adze, indicates that the distribution has narrowed from that of its stone bladed counterpart. This is partly due to the centralisation of population, initially to stations and later to larger settlements, and partly to the heavy influence of European woodworking tools and skills. We believe that the distribution pattern that emerges demonstrates a conservatism in material culture which allowed the adoption and continuation of two distinct adze forms in the southern Kimberley.

### Acknowledgements

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