

THE ACHEULEAN DOWNUNDER: MODERN HUMAN ‘HANDAXES’ FROM THE BARKLY TABLELAND OF NORTHERN AUSTRALIA

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ABSTRACT

A collection of large shaped bifacial tool forms recovered from undated surface localities in the Barkly Tableland of northern Australia is described. We present our views on the manufacture and purpose of the bifaces and consider their implications for the use of handaxes as time-sensitive markers of the Acheulean.

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Keywords: Australian bifaces, Barkly Tableland, Acheulean handaxes.

INTRODUCTION

This paper considers an enigmatic series of large handaxe-like bifaces collected from surface contexts on the Barkly Tableland of northern Australia. The Barkly bifaces are intriguing within the Australian prehistoric context, owing to their rarity and lack of corroborating dating evidence. They are also of wider interest due to their typological resemblance to bifacial handaxes, and subsequent implications for our understanding of Acheulean evidence in the Palaeolithic Old World. Here, we outline briefly the history of discovery of the bifaces and describe the methods employed by Aboriginal stoneworkers to manufacture them. We present further archaeological and ethnographic evidence for the production and use of similar bifaces elsewhere on the Barkly Tableland and further afield in northern Australia. Finally, we consider the implications of the Barkly bifaces for current characterizations of Acheulean tool distributions. The bifaces are not connected to Lower Palaeolithic hominins in any way other than their production method and form; however, the resemblance to Acheulean handaxes is striking. As examples of unambiguously modern ‘handaxes’ they provide a salutary warning against the long-standing practice of attributing bifaces to hominins on typological grounds alone.

THE BRUNETTE DOWNS BIFACES

History of discovery

A small collection (n = 17) of bifacially flaked stone artefacts was recovered by AR on Brunette Downs cattle station on the Barkly Tableland, Northern Territory, in 1966 (Barkly [Rainey] 1979; Rainey 1991, 2010) (Figure 1). The Barkly Tableland comprises a vast expanse of semi-arid open grasslands and alluvial clay plains spanning approximately 100,000 km² of the northeastern part of the Northern Territory and adjacent portions of northwest Queensland (Williams 1928). The bifaces were found in surface contexts at separate locations on the 12,000 km² cattle station, most often near boreholes, or stock watering points. One chalcedony biface was recovered in association with an extensive surface scatter of flaked chalcedony artefacts, suggesting a primary reduction area or possible quarry. AR questioned several Aboriginal stockmen working on Brunette Downs about the function of the bifaces, but no information was forthcoming. The bifaces were interpreted by informants as non-cultural objects; it was explained that the chalcedony stones from which some of the bifaces were made were pieces of cloud that had fallen from the sky (Rainey 1991).

Archaeological opinions

Shortly after the discovery of the Brunette bifaces they were shown by AR to a number of eminent Australian archaeologists. One scholar, Alexander Gallus, a Hungarian archaeologist based in Australia at that time (see Gallus 1964, 1968; also Veth et al. 1998), was particularly intrigued by the implements,

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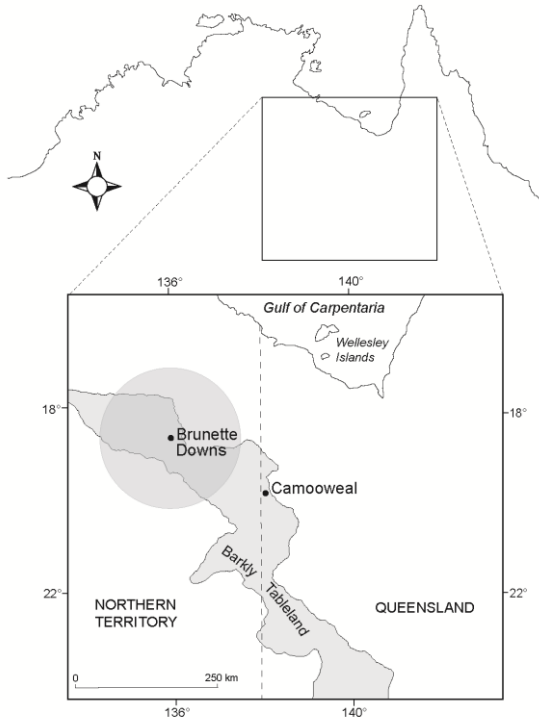


Figure 1. Map of northern Australia showing the Barkly Tableland.

and circulated them among colleagues on AR's behalf. Gallus proposed that the bifaces were, in fact, Acheulean handaxes, and that they demonstrated the presence of non-modern hominins in Australia (letter to Rainey dated 16 September 1970). This sensational (and unpublished) interpretation of the Brunette bifaces as Acheulean handaxes was, perhaps, not so outlandish as it seems now. Handaxe-like bifaces were recovered from the Baksoka River valley near the town of Pacitan in eastern Java, Indonesia, in the mid-1930s (von Koenigswald 1936). These so-called 'Pacitanian' bifaces are now generally believed to date to the Late Pleistocene or early Holocene (Bartstra 1984), but early scholars attributed them to Acheulean populations of *Homo erectus* (von Koenigswald 1956; but cf. Movius 1948), a view maintained by some Indonesian prehistorians today (e.g. Simanjuntak et al. 2010). Nonetheless, Gallus's view of the Barkly bifaces was not widely shared by his colleagues. Other archaeologists who inspected the specimens at Gallus's or AR's request either questioned their authenticity or regarded them as unground axe blanks or preforms for the manufacture of bifacial projectile points. The Barkly bifaces were eventually described only

in brief published notes in the official newsletter of the then Archaeological Society of Victoria, *The Artefact* (Rainey 1973; Barkly [Rainey] 1979), and the pages of this journal (Rainey 1991; see also Rainey 1997). Frederick McCarthy, however, reproduced photographs of the Brunette Downs bifaces in his seminal volume on Australian stone artefact typology (McCarthy 1976). McCarthy classified the Barkly bifaces as 'handaxes', but in correspondences with AR described them as 'enlarged version[s] of the biface point' (letter dated 24 June 1970; see Rainey 1991). Concerning the use of this nomenclature, it should be noted that 'handaxe' was a relatively common descriptive term employed by some early Australian typologists (other than Gallus) with reference to a range of Aboriginal stone tools. Tindale (1941), for example, used the term to refer to minimally modified rectangular blocks of stone employed in the Western Desert as makeshift tools for felling trees and opening hollow logs.

Technology

The Brunette bifaces (Figures 2-5) vary in length between 71 mm and 174 mm (Figure 6), with an average maximum linear dimension of 113.6 ± 29.5 mm. They are all invasively flaked and generally bilaterally symmetrical bifaces made on marine-banded chert ($n = 15$), known locally as 'ribbonstone', or chalcedony ($n = 2$). The presence of remnant portions of cortex on the obverse and reverse faces of five chert bifaces, and one chalcedony biface, indicates the selection in these cases of relatively flat, tabular pieces of raw material, or 'slabs', for tool reduction. It was not possible to determine the nature of the blanks used for the remaining specimens. Most bifaces exhibit relatively deep scars with prominent negative bulbs, suggesting the use of hard-hammer percussors.

The Brunette bifaces fit comfortably within the typological definition of Acheulean handaxes. They have an average flatness ratio [W/Th] of 2.2 ± 0.4 , and a slightly lower refinement index than a sample of Acheulean handaxes from Africa, the Near East, and India (Figure 7). The bifaces range in plan form from ovate/limande to elongate and pointed, with the majority (76.4%) falling into the latter

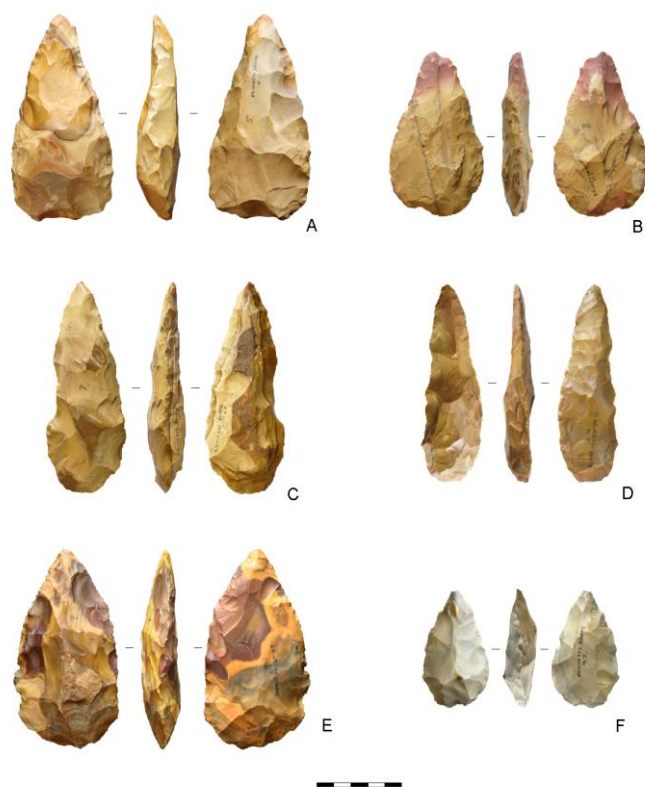


Figure 2. Bifaces from Brunette Downs Station, Northern Australia. Scale is 50 mm.

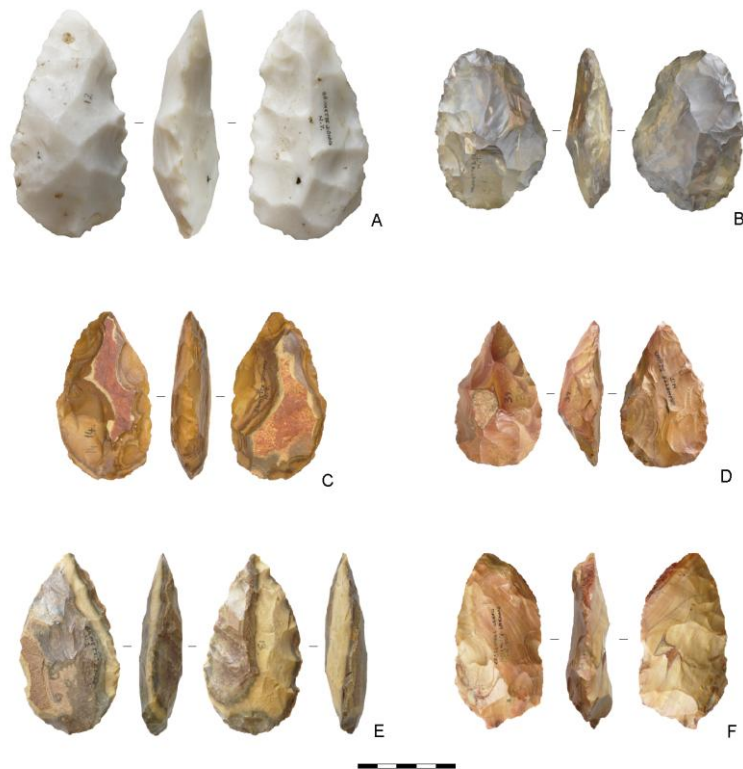


Figure 3. Bifaces from Brunette Downs Station, Northern Australia. Scale is 50 mm.



Figure 4. Large ovate bifaces from Brunette Downs Station, Northern Australia. Scale is 50 mm.

category. The average elongation (L/W) ratio of the bifaces is 1.9 (range = 1.5 to 3.2). Most of the specimens exhibit regular patterns of retouch and an acute edge extending around most or all of the outer perimeter. Two have a distinct S-twist edge profile (Figures 3E and 4A), and one of the chalcedony bifaces has denticulate-like retouch along one margin (Figure 3A). In total 14 bifaces have biconvex cross-sections, while the rest are planoconvex. On most specimens the thickness plane varies little from the butt to the tip, which probably reflects the natural morphology of the tabular pieces selected for reduction. However, six have ‘globular’ butts. Two bifaces are somewhat narrow relative to their width (thus resembling bifacial foliates) and exhibit flake scar configurations suggestive of intensive resharpening (Figure 2C-D). An incomplete Brunette biface collected by AR (not included in the above-described sample) has a large, deeply concave scar initiated from near the centre of one face, which appears to indicate the recycling of a discarded biface for the production of a flake with a highly convex bulb of percussion, consistent with tula adze manufacture (e.g. see Moore 2004). Analysis of one Brunette biface (Figure 5) indicates that the first stage of reduction involved the

‘unifacial beveling’ technique (see Moore 2003). This entailed the removal of a series of steep, non-invasive flakes from a part of the perimeter of one face, after which the piece was rotated and invasive flakes struck from the opposite face, using scars from the previous removals as platforms. Following this initial bifacial thinning phase, a series of smaller retouching flakes was removed from around the margins of the biface, especially at the butt, which was trimmed on one face. The other bifaces exhibit this same, two-staged reduction process: early thinning and contouring using the unifacial beveling technique, followed by final trimming of the margins.

Function

The function of the Brunette bifaces is unclear. It seems reasonable to assume, however, that the artefacts are purposefully shaped bifacial tools. The objects somewhat resemble bifacially flaked axe blanks, which are common on surface sites (especially quarried outcrops) in the region and in northern Australia date to as early as ~35 Ka (Geneste et al. 2010). Edge-ground axes in Australia, however, are almost exclusively manufactured on tough volcanic rocks like basalt and diorite,

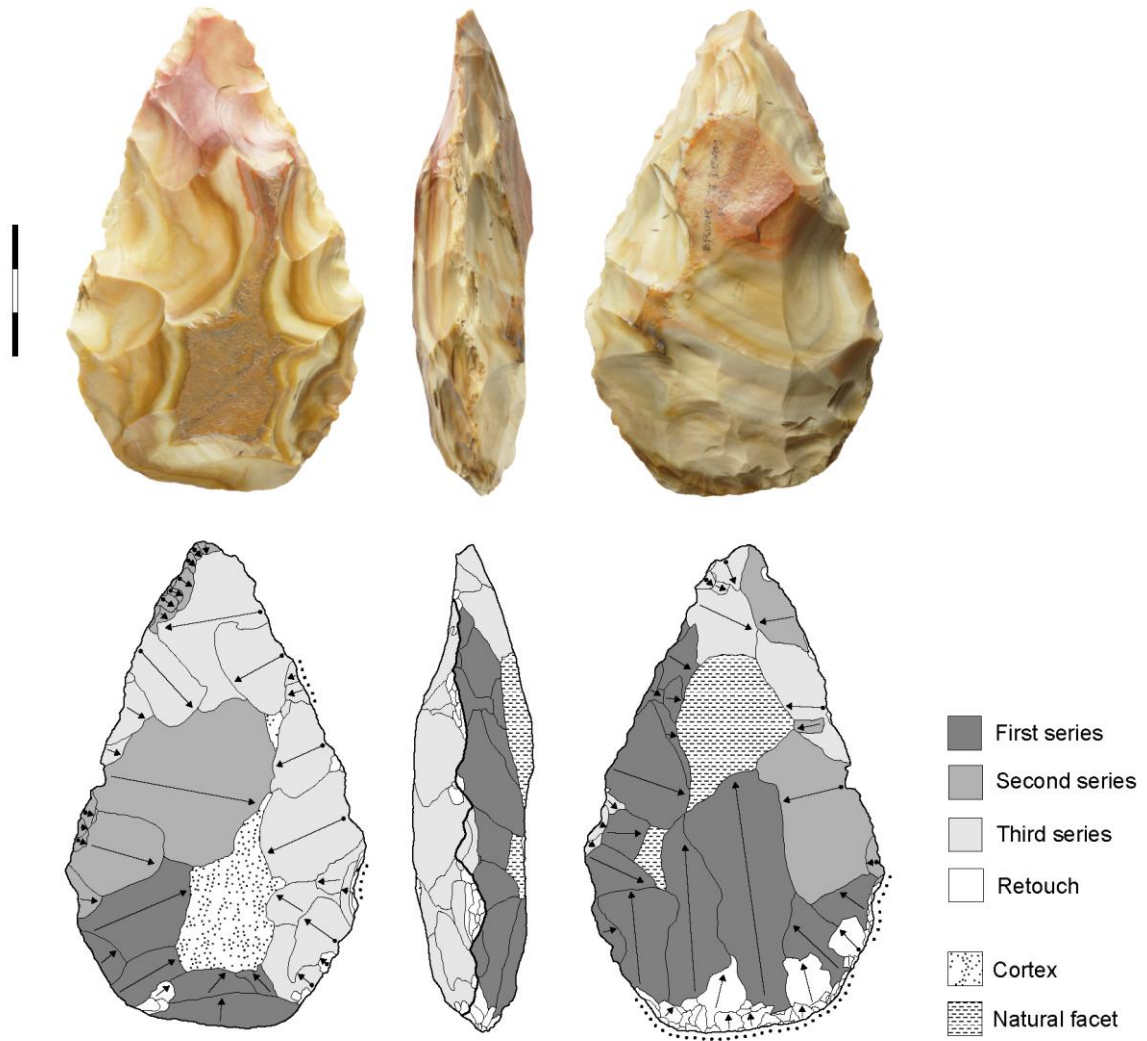


Figure 5. Technological analysis of Brunette Downs biface. Scale is 50 mm.

not siliceous stones (Dickson 1981). It is also difficult to interpret the Brunette specimens as bifacial cores, such as have been reported elsewhere in the Barkly Tableland (Moore 2003). The generally elongate and symmetrical plan forms and non-invasive retouch around the margins of most specimens would seem to reflect careful trimming of the edges, apparently to shape them into specific tool designs. However, the problem of inferring intent from the patterned forms of retouched artefacts is acknowledged (e.g. Davidson 2002; Davidson & Noble 1993). Interestingly, three of the four ovate bifaces (Figure 4) are considerably larger than the rest of the predominately elongate specimens. This could suggest that large ovates represent an early stage in the reduction of blanks into smaller pointed forms. However, a comparison of the length and thickness of bifaces manufactured

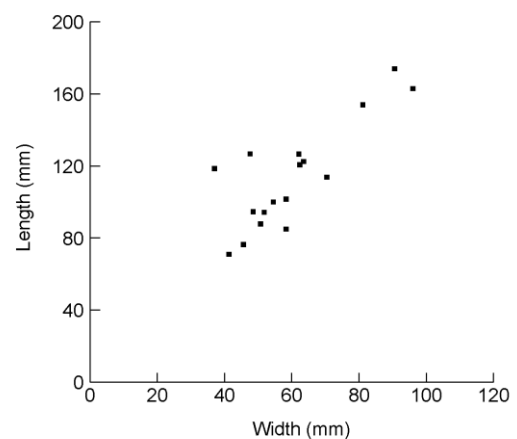


Figure 6. Dimensions of the Brunette Downs bifaces ($n = 17$).

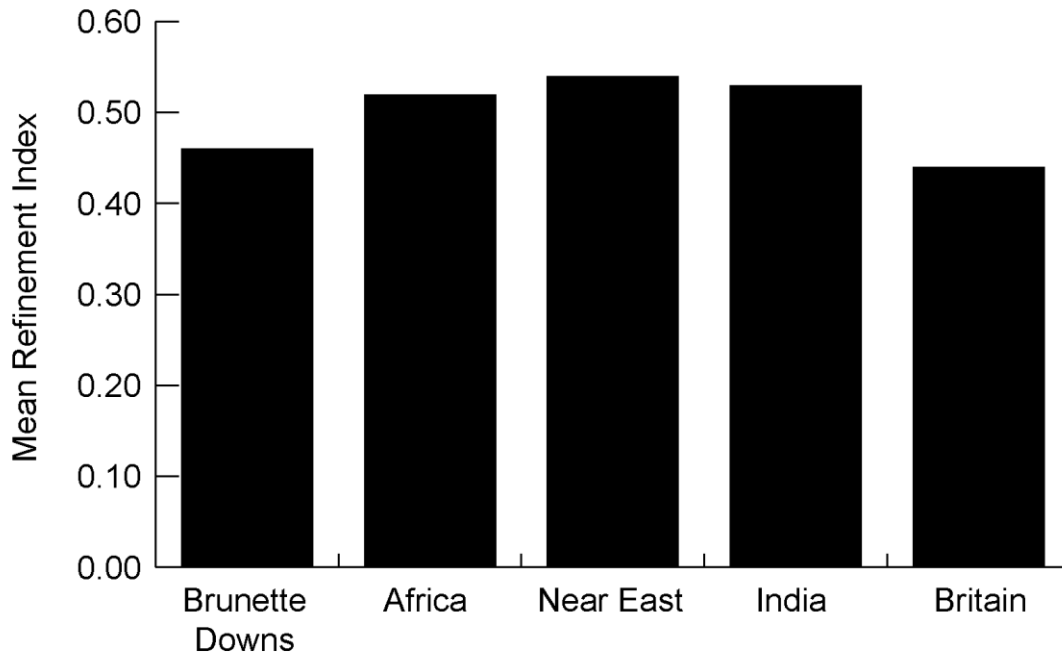


Figure 7. Mean refinement values of Brunette bifaces ($n = 17$) and Acheulean bifaces. Biface refinement is defined as the thickness:width ratio. Acheulean data are from Petraglia & Shipton (2008). African sites and sample sizes: Kariandusi ($n = 35$), Olduvai Bed II ($n = 17$), Olorgesailie DE89A ($n = 60$), Olorgesailie FB ($n = 15$), Olorgesailie H9AM ($n = 10$), Olorgesailie I3 ($n = 57$); Near East: Azraq Lion Spring ($n = 42$), Wadi Fatima ($n = 15$); India: Anagwadi ($n = 15$), Fatehpur V ($n = 11$), Gulbal II ($n = 12$), Hunsgi II ($n = 18$), Hunsgi V ($n = 45$), Mudnur VIII ($n = 9$), Tegghalli II ($n = 9$), Yediyapur I ($n = 10$), Yediyapur IV ($n = 11$), Yediyapur VI ($n = 21$); Britain: High Lodge ($n = 63$).

on slabs with those made on unknown blank types does not support this reduction model, with the data distributions indicating a discontinuity in the dimensions of large and small slab-based bifaces (Figure 8). A more likely scenario, therefore, is that the same general bifacial reduction strategy was applied to blanks of different sizes (see also Moore 2003). The size-based patterning in morphology could reflect functional and/or stylistic distinctions between large ovate and smaller elongate bifaces.

It is also unlikely that the Barkly bifaces are early stage preforms for the manufacture of hafted projectile points. Small bifaces interpreted as spearpoints are common as surface finds on Brunette Downs, and AR collected a number of such specimens in the 1960s (Figure 9). These artefacts comprise leaf-shaped bilaterally symmetrical points made on fine-grained siliceous stones, predominately banded marine chert, but also including chalcedony, jasper, and quartzite. Scar attributes on the points suggest that they were manufactured by freehand hard-hammer

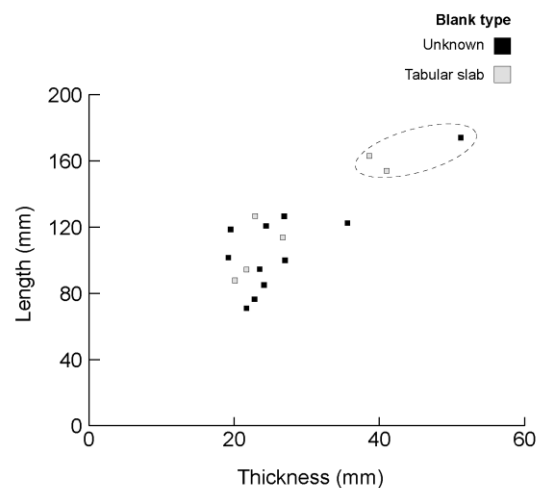


Figure 8. Comparison of the length and thickness of Brunette Downs bifaces ($n = 17$). The three longest and thickest bifaces (within the dotted line), two of which were clearly made on slabs, are ovate in plan form; the rest of the bifaces, with one exception, are elongate and pointed.

percussion, and there is no clear evidence for the use of soft-hammer percussion or pressure-flaking. The points were often invasively

retouched on one or both faces, erasing diagnostic characteristics of the original blanks. However, remnant ventral features on several specimens suggest that points may often have been made on small flakes (Figure 9C-E). This would seem to rule out the possibility that the large chert bifaces, which appear to have been made predominately, if not exclusively, on tabular nodules or flattish cobbles, are simply blanks for the production of small bifacial points.

Raw material factors offer further insights. Further east on the Barkly Tableland, one of us (AB) recovered a small chert bifacial point that had been manufactured on a tabular nodule, as indicated by the presence of cortex on both faces (Brumm 2001; Moore 2003, Figure 6A).

However, the nodule on which this point was made could not have measured more than about 5-7 mm in maximum thickness. A similar bifacial point from the same region was also clearly manufactured on a thin (<10 mm thick) tabular nodule rather than a flake blank (Moore 2003). This suggests that, while some projectile points in the Barkly Tableland region may have been made on tabular stone pieces, the packages selected were probably much smaller and thinner than those used to make the larger elongate and ovate bifaces. The latter implements, therefore, were made on different-sized stone packages and are unlikely to form a continuum with hafted bifacial projectile points. In sum, the Barkly bifaces appear to represent typologically and technologically distinct tool forms.

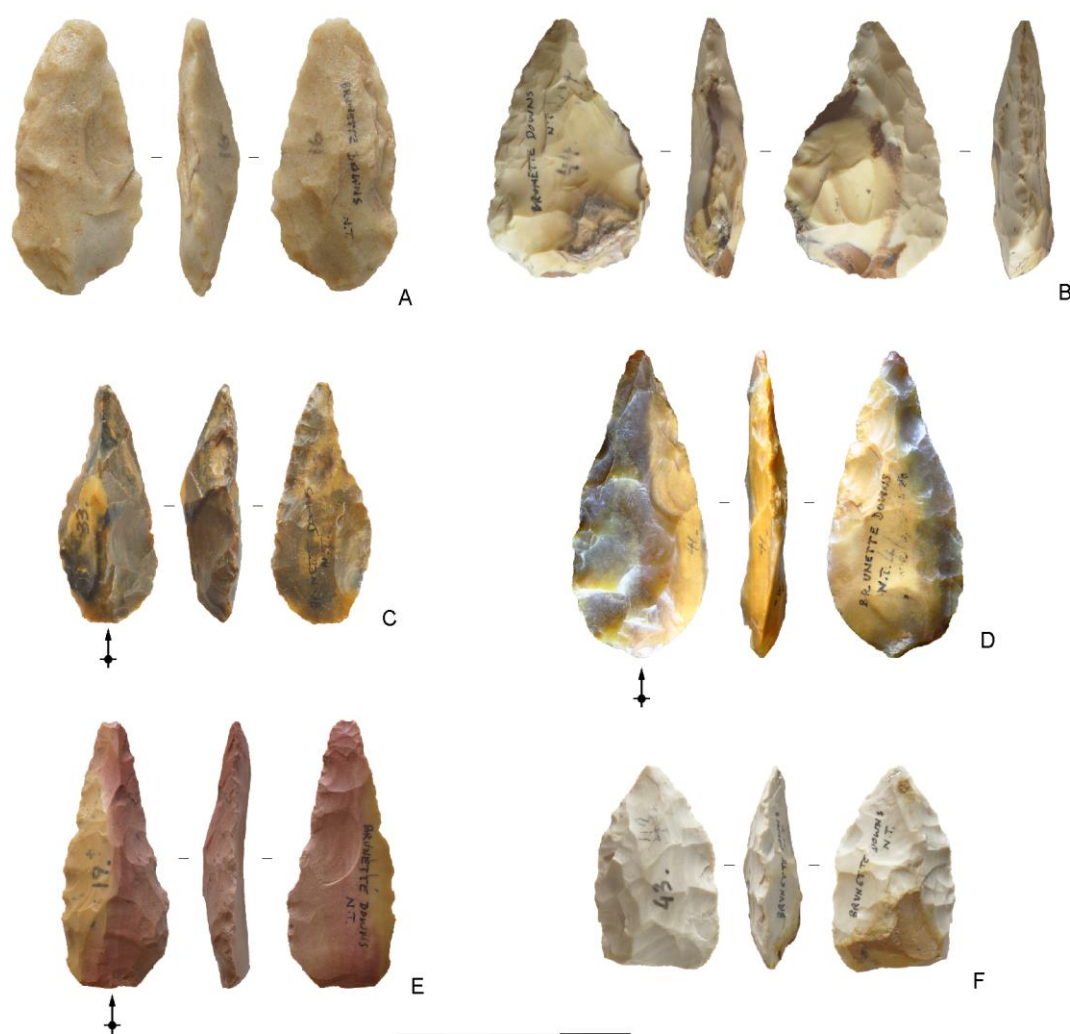


Figure 9. Small bifacial points from Brunette Downs. The points were apparently hafted as projectiles. C-E are made on flakes. Scale is 50 mm.

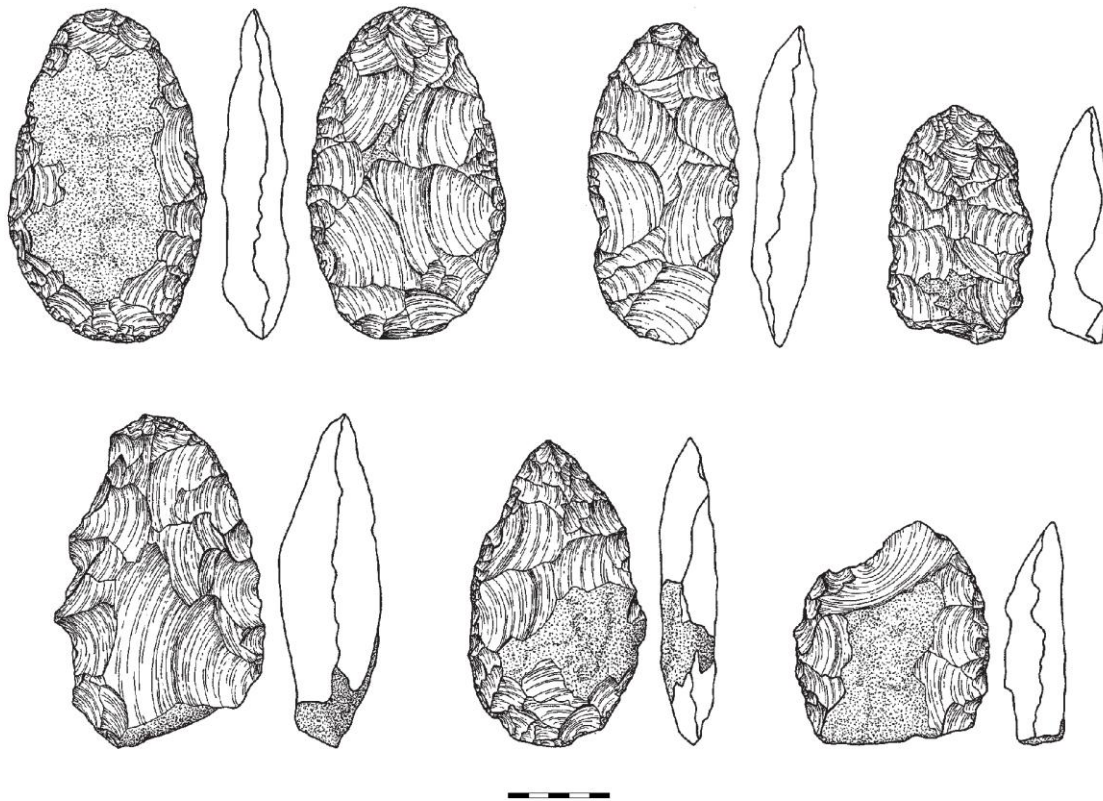


Figure 10. Chert bifaces from Camooweal, northwest Queensland (after Moore 2003). Scale is 50 mm.

BIFACES FROM CAMOOWEAL IN THE BARKLY TABLELAND

An assemblage of large handaxe-like bifaces resembling those from Brunette Downs was recovered from undated surface contexts and turbated sub-surface deposits further east on the Barkly Tableland, across the border in northwest Queensland, near the town of Camooweal (Moore 2003) (Figure 1). These bifaces ($n = 8$) were made on tabular pieces of banded marine chert (ribbonstone) and are very similar both morphologically and technologically to the Brunette Downs specimens (Figure 10). As with the Brunette bifaces, local Aboriginal knowledge of the manufacture or use of the Camooweal bifaces was limited (AB, pers. obs. 2001). However, one informant involved in the fieldwork, an Alyawara elder from the Northern Territory, recalled asking older people about them in his youth, and was informed that the bifaces were used for digging yams and as hafted fighting implements (Moore 2003). Residue and use-wear analyses of three of the Camooweal bifaces concluded that they were used for processing starchy plants (Cooper & Nugent

2009). Adhering residues (i.e. hair, collagen fibrils, and possible red blood cells) on a fourth specimen imply a possible butchery function (Moore 2003).

Moore's (2003) analysis of the Camooweal bifaces suggests the items were reduced following the same two-staged knapping process evident in the Brunette assemblage: that of initial hard-hammer bifacial thinning and contouring, followed by final edge-trimming, in both cases also using a hard-hammer percussor. The first stage involved the removal of invasive thinning flakes from both faces around the perimeter of slabs. A common bifacial knapping technique used by the Camooweal knappers, as with the Brunette bifaces, was unifacial beveling. However, some of the Camooweal bifaces exhibit scar configurations created by the knapper continually switching between faces following each blow (i.e. alternate flaking). This produced distinctive wavy bifacial edges on a number of implements but was less frequently employed than unifacial beveling. The final stage of reduction involved non-invasively retouching the margins of bifaces, in particular

towards the pointed ends of the tools, although some were retouched around the entire perimeter. This edge-trimming process was presumably done to shape and regularize the morphology of the biface. None of the Camooweal bifaces appears to have been resharpened. Interestingly, however, one biface collected at Nowranie Creek some 5 km east of Camooweal has a distinctive tula-like edge worked across one end, and appears to have been recycled for use as an adze (M. Moore, pers. comm., 2010).

ETHNOGRAPHIC EVIDENCE FOR BIFACE MANUFACTURE IN AUSTRALIA

There is some ethnographic evidence, albeit limited, for biface production and use outside the Barkly Tableland in northern Australia. The anthropologist Norman Tindale (1949, 1962, 1977) recorded Aboriginal people in the Wellesley Islands of the Gulf of Carpentaria using large bifaces knapped from cobbles and blocks of quartzitic rock. The bifacial implements, known as *mariwa* on Mornington Island and *tjilangand* on nearby Bentinck Island, were used by both men and women as ‘picks’ for harvesting oysters and as general purpose cutting, chopping and digging tools (Figure 11). One of the principal functions was as woodworking tools for fashioning hardwood digging sticks. They were also employed to dig holes and chop through roots and other obstructions when searching underground for

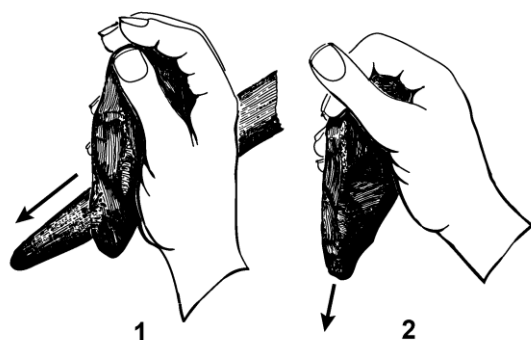


Figure 11: Methods of gripping and using *mariwa* bifaces, Mornington Island. (1) Sharpening the tips of digging sticks which had first been fire-hardened; (2) digging holes in the ground for extracting yams and tubers. Modified after Tindale (1949).

yams and tubers. Tindale observed that when in use for cutting or digging the thick butt-end of the biface was gripped in one hand and the tip oriented towards, rather than away from, the body. A small collection of bifaces ($n = 5$) from Mornington Island has an average length of 117.6 mm (Tindale 1949). They are generally elongate (average L/W ratio = 2.1) and somewhat almond-shaped in plan form, and quite thick (average thickness = 42.6 mm) relative to their width (average width = 55.8 mm). Although describing the Wellesley Islands bifaces as crude, Tindale noted the morphological resemblance to Acheulean handaxes: ‘At first glance, when held at the most convincing angle, a stone pick appears not unlike a rough *coup-de-poing*, although it is usually more elongated and far thicker in section than in normal hand axes from the Old World’ (Tindale 1949:161).

Tindale (1977) also documented a man from Bentinck Island making bifaces in the early 1960s. Unfortunately, however, published descriptions of the knapping procedure offer little detail. The tools were apparently knapped on both faces by direct freehand percussion using a beach cobble as a hammerstone. Interestingly, they were kept stable during the delivery of blows by supporting them both with the non-dominant hand and the sole of one foot.

DISCUSSION AND CONCLUSION

The discovery in the Barkly Tableland of a series of large bifaces bearing a close resemblance to handaxes has implications for current views of the typological distinctiveness of Acheulean bifacial tools. Large cutting tools, especially handaxes, cleavers and picks, appear in the African record around 1.76 Ma (Lepre et al. 2011), and are associated by many archaeologists with the emergence of advanced cognitive capabilities in hominins (Gowlett 2009; Mithen 2003; Wynn 1995). Handaxes, in particular, are generally believed to exhibit morphological features that distinguish them from bifaces made later in time (Otte 2003; Saville 1993, 1997). Thus, it is a common practice of archaeologists in Africa and western Eurasia to classify bifaces found outside stratified contexts as Acheulean based on typology alone. To a significant extent the geographical range of Acheulean hominins and

the subsequent delineation of ‘non-handaxe’ zones (i.e. East and Southeast Asia, beyond the ‘Movius Line’) is defined on just such evidence (Brumm & Moore in press).

For example, hundreds of Acheulean sites have been reported from the Indian subcontinent (Petraglia 2006), but ‘approximately two dozen have been excavated and even fewer have been dated’ (Chauhan 2009:62; but see Haslam et al. 2011; Pappu et al. 2011). Similarly, bifaces have been collected in prolific numbers from sites in South Africa and the Eastern Sahara (Egypt and Sudan), Syria, Jordan and other parts of the Arabian Peninsula, but most are from surface contexts of unknown age and association (Dennell 2009; Hill 2001; Klein 2000; Kuman et al. 2005; Rollefson 1984). This same approach of ascribing surface bifaces to the Acheulean on typological grounds occurs in many other regions. For example, a total of nine Acheulean bifaces have been recovered from the only stratified Acheulean site in Turkey (Slimak et al. 2008), despite a significant number of surface finds from the region. In other countries, such as Iran (Biglari & Shidrang 2006), Turkmenistan (Vishnyatsky 1989), Afghanistan (Davis & Dupree 1977) and elsewhere in central Asia (Vishnyatsky 1999), Acheulean sequences are defined almost entirely from surface collections or subsurface deposits with questionable chronological integrity (see Dennell 2009 for review). In some areas, bifaces identified as handaxes occur in surface distributions in direct association with demonstrably modern bifacial tools, such as at Neolithic axe quarries (e.g. Barkai et al. 2006). Nonetheless, it is presumed that typological assessments allow for the reliable discrimination between handaxes and bifaces made by modern human cultures.

To the best of our knowledge Acheulean hominins did not reach Australia – nor, for that matter, Southeast Asia, where handaxe-like bifaces are common as surface finds (Brumm & Moore in press). Thus, the manufacture of bifacial ‘handaxes’ in this region is clearly an example of technological convergence (Noble & Davidson 1996:199). This is not a surprising observation. Bifaces that are essentially typologically identical to Acheulean handaxes appear at multiple points in the prehistoric

record and, as noted above, the ethnographic period (Johansen & Stapert 1995; Otte 2003; Stapert 1981). This is due in part to the constraints of stone reduction. As Brumm & Moore (in press) point out:

The process of reducing a stone to the thin bifacial forms often made by modern humans requires a progression through earlier flaking stages. Products of these earlier stages can be identical to Acheulean bifacial tool types...and interruption of the process resulted in their discard into the archaeological record. Virtually any technology in which tools or cores were produced by bifacial flaking could result in the discard of objects resembling handaxes.

There is a long history of scholars mistakenly attributing bifaces left by modern human cultures to the Acheulean. For instance, artefacts from surface scatters on gravel-covered terraces in Green River Valley, Wyoming—once interpreted as Acheulean handaxes—are ‘actually bifacial blanks or preforms for points or other bifacial tools’ (Ebert 1992:78). In the early years of prehistoric studies in Europe it was also common for preforms of bifacial tools dating to the late Middle and Upper Palaeolithic, Mesolithic, Neolithic and Early Bronze Age to be erroneously identified as Acheulean (Stapert 1981; see also Adams 1999; Saville 1997). As Johansen & Stapert (1995:1) remark: ‘In the Netherlands and elsewhere, rough-outs of Neolithic axes have repeatedly been interpreted as handaxes...In Denmark, preforms of bifacial tools such as daggers, spearheads and sickles may resemble Palaeolithic handaxes’.

Detailed morphometric analyses of bifaces from stratified and well-dated Middle Pleistocene localities may provide a basis for inferring shape-based differences between Acheulean handaxes and other bifacial tool forms. For example, a recent analysis of allometric patterns in Acheulean and Mousterian of Acheulean Tradition (MTA) assemblages implies that these chronologically unrelated bifaces, ‘despite superficial overall similarities in shape, exhibit different morphometric patterns in maintenance and reduction’ (Iovita & McPherron 2011:69). However, establishing empirically verifiable criteria for distinguishing between handaxes and other kinds of large bifaces will require careful analytical work and is unlikely to rely

on typological assessments as standalone evidence. At any rate, it seems fair to assume that most archaeologists tend to employ a more intuitive approach to inferring the age and association of stray finds of bifaces. In some cases, the mere presence of bifacially worked items in surface assemblages is seen as sufficient grounds for assigning these materials to the Acheulean. It is in these circumstances that the modern human 'handaxes' from the Barkly Tableland should sound an important cautionary note.

ACKNOWLEDGMENTS

This paper resulted from a fortuitous meeting in 2009 at Franks House between AR, who found the Brunette bifaces nearly half a century ago, and AB, who knew of their existence and had recorded similar bifaces on the Barkly Tableland. Hannah Fluck, in light of this meeting, suggested that we contribute the present paper. We thank Mark Moore and Cassandra Venn for information about the Camooweal bifaces, and Richard Fullagar for general discussions on Australian stone tools. Nick Ashton is kindly thanked for his hospitality at Franks House.

REFERENCES

- Adams, B. 1999. Lower, Middle or Upper Palaeolithic? A classification analysis of the Bársony House hand axes from the North Carpathian basin. *Lithic Technology* 24 (1): 7–25.
- Barkai, R., Gopher, A. and LaPorta, P. C. 2006. Middle Pleistocene landscape of extraction: quarry and workshop complexes in northern Israel. In N. Goren-Inbar and G. Sharon (eds) *Axe Age: Acheulian Tool-making From Quarry to Discard*: 7–44. Equinox, London.
- Barkly, A. 1979. Bifaces in the Barkly Tableland. *The Artefact* 4: 85–94.
- Bartstra, G.-J. 1984. Dating the Pacitanian: some thoughts. *Courier Forschungsinstitut Senckenberg* 69: 253–258.
- Biglari, F. and Shidrang, S. 2006. The Lower Paleolithic occupation of Iran. *Near Eastern Archaeology* 69 (3/4): 160–168.
- Brumm, A. 2001. Cultural heritage survey and assessment of the proposed Gulf Communities fibre optic cable route, near Camooweal, northwest Queensland. *Report to Network Design and Construction, Brisbane*. ARCHAEO Cultural Heritage Services, Brisbane.
- Brumm, A. and Moore, M. W. in press. Biface distributions and the Movius Line: a Southeast Asian perspective. *Australian Archaeology*.
- Chauhan, P. R. 2009. The Lower Paleolithic of the Indian subcontinent. *Evolutionary Anthropology* 18: 62–78.
- Cooper, J. L. and Nugent, S. J., 2009. Tools on the surface: residue and use-wear analyses of stone artefacts from Camooweal, northwest Queensland. In M. Haslam, G. Robertson, A. Crowther, S. Nugent and L. Kirkwood (eds) *Archaeological Science Under a Microscope: Studies in Residue and Ancient DNA Analysis in Honour of Thomas H. Loy*: 207–226. ANU E-Press, Canberra.
- Davidson, I. 2002. The finished artefact fallacy: Acheulean hand-axes and language origins. In A. Wray (ed.) *The Transition to Language*: 180–203. Oxford University Press, Oxford.
- Davidson, I. and Noble, W. 1993. Tools and language in human evolution. In K.R. Gibson and T. Ingold (eds) *Tools, Language and Cognition in Human Evolution*: 363–388. Cambridge University Press, Cambridge.
- Davis, R.S. and Dupree, L. 1977. Prehistoric survey in central Afghanistan. *Journal of Field Archaeology* 4 (2): 139–148.
- Dennell, R. 2009. *The Palaeolithic Settlement of Asia*. Cambridge University Press, Cambridge.
- Dickson, F. P. 1981. *Australian Stone Hatchets: A Study in Design and Dynamics*. Academic Press, Sydney.
- Ebert, J. I. 1992. *Distributional Archaeology*. University of New Mexico Press, Albuquerque.
- Gallus, A. 1964. Two Australian stratigraphic sequences. *Current Anthropology* 5(2): 127.
- Gallus, A. 1968. Excavations at Koonalda Cave, South Australia. *Current Anthropology* 9(4): 324–325.
- Geneste, J.-M., David, B., Plisson, H., Clarkson, C., Delannoy, J.-J., Petchey, F. and Whear, R. 2010. Earliest evidence for ground-edge axes: 35,400±410 cal BP from Jawoyn Country, Arnhem Land. *Australian Archaeology* 71: 66–69.
- Haslam, M., Roberts, R. G., Shipton, C., Pal, J. N., Fenwick, J. L., Ditchfield, P., Boivin, N., Dubey, A. K., Gupta, M. C. and Petraglia, M. 2011. Late Acheulean hominins at the

- Marine Isotope Stage 6/5e transition in north-central India. *Quaternary Research* 75(3): 670–682.
- Hill, C. L. 2001. Geologic contexts of the Acheulian (Middle Pleistocene) in the Eastern Sahara. *Geoarchaeology* 16 (1): 65–94.
- Iovita, R. and McPherron, S.P. 2011. The handaxe reloaded: a morphometric reassessment of Acheulian and Middle Palaeolithic handaxes. *Journal of Human Evolution* 61(1): 61–74.
- Johansen, L. and Stapert, D. 1995. Handaxes from Denmark: Neandertal tools or ‘vicious flints’? *Palaeohistoria* 37: 1–22.
- Klein, R. G. 2000. The Earlier Stone Age of southern Africa. *South African Archaeological Bulletin* 55: 107–122.
- Koenigswald, G. H. R. von 1936. Early Palaeolithic stone implements from Java. *Bulletin of the Raffles Museum Singapore* 1: 52–60.
- Koenigswald, G. H. R. von 1956. *Meeting Prehistoric Man*. Thames and Hudson, London.
- Kuman, K., Le Baron, J.C. and Gibbon, R.J. 2005. Earlier stone age archaeology of the Vhembe-Dongola National Park (South Africa) and vicinity. *Quaternary International* 129: 23–32.
- Lepre, C. J., Roche, H., Kent, D. V., Harmand, S., Quinn, R. L., Brugal, J-P., Texier, P-J., Lenoble A., and Feibel, C.S. 2011. An earlier origin for the Acheulian. *Nature* 477: 82–85.
- McCarthy, F. D. 1976. *Australian Aboriginal Stone Implements, Including Bone, Shell and Teeth Implements*. Australian Museum, Sydney.
- Moore, M. W. 2003. Australian Aboriginal biface reduction techniques on the Georgina River, Camooweal, Queensland. *Australian Archaeology* 56: 22–34.
- Moore, M. W. 2004. The tula adze: manufacture and purpose. *Antiquity* 78 (299): 61–73.
- Movius, Jr., H. L. 1948. The Lower Palaeolithic cultures of Southern and Eastern Asia. *Transactions of the American Philosophical Society* 38(4): 329–420.
- Noble, W. and Davidson, I. 1996. *Human Evolution, Language and Mind: A Psychological and Archaeological Inquiry*. Cambridge University Press, Cambridge.
- Otte, M. 2003. The pitfalls of using bifaces as cultural markers. In M. Soressi and H. L. Dibble (eds) *Multiple Approaches to the Study of Bifacial Technologies*: 183–192. University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia.
- Pappu, S., Gunnell, Y., Akhilesh, K., Braucher, R., Taieb, M., Demory F. and Thouveny, N. 2011. Early Pleistocene presence of Acheulian hominins in south India. *Science* 331(1596): 1596–1599.
- Petraglia, M. D. 2006. The Indian Acheulian in global perspective. In N. Goren-Inbar and G. Sharon (eds) *Axe Age: Acheulian Tool-making From Quarry to Discard*: 389–414. Equinox, London.
- Petraglia, M. D. and Shipton, C. 2008. Large cutting tool variation west and east of the Movius Line. *Journal of Human Evolution* 55 (6): 962–966.
- Rainey, A. 1973. The percussion element in Kimberley point manufacture, and suggested origins. *The Artefact* 31: 1–10.
- Rainey, A. 1991. Some Australian bifaces. *Lithics: The Journal of the Lithic Studies Society* 12: 32–36.
- Rainey, A. C. 1997. An artist at work. *Lithics: The Journal of the Lithic Studies Society* 17: 15–18.
- Rainey, A. 2010. *A Way of Life*. Austin and Macauley, London.
- Rollefson, G. O. 1984. A Middle Acheulian surface site from Wadi Uweinid, eastern Jordan. *Paléorient* 10 (1): 127–133.
- Simanjuntak, T., Sémah, F. and Gaillard, C. 2010. The palaeolithic in Indonesia: nature and chronology. *Quaternary International* 223/224: 418–421.
- Slimak, L., Kuhn, S. L., Roche, H., Mouralis, D., Buitenhuis, H., Balkan-Atli, N. Binder, D., Kuzucuoğlu, C. and Guillou, H. 2008. Kaletepe Deresi 3 (Turkey): archaeological evidence for early human settlement in Central Anatolia. *Journal of Human Evolution* 54: 99–111.
- Stapert, D. 1981. Hand-axes in southern Limburg (the Netherlands) — how old? In F.H.G. Engelen (ed.) *Third International Symposium on Flint, Maastricht 1979*: 107–113. Nederlandse Geologische Vereniging, Heerlen.

- Tindale, N. B. 1941. The hand axe used in the Western Desert of Australia. *Mankind* 3: 37–41.
- Tindale, N. B. 1949. Large biface implements from Mornington Island, Queensland and from southwestern Australia. *Records of the South Australian Museum* 9: 157–166.
- Tindale, N. B. 1962. Geographical knowledge of the Kaiadilt people of Bentinck Island, Queensland. *Journal of the South Australian Museum* 14 (2): 259–296.
- Tindale, N. B. 1977. Further report on the Kaiadilt people of Bentinck Island, Gulf of Carpentaria, Queensland. In J. Allen, J. Golson and R. Jones (eds) *Sunda and Sahul: Prehistoric Studies in Southeast Asia, Melanesia and Australia*: 247–273. Academic Press, New York.
- Veth, P., Hiscock, P., O'Connor, S. and Spriggs, M. 1998. Gallus on the crossroads: diffusionist models for Asian artefact 'traditions' in Australia and the last hurrah for cultural evolutionism. *The Artefact* 21: 14–18.
- Vishnyatsky, L. B. 1989. The discovery of Palaeolithic handaxes in western Turkmenia: a preliminary report. *Paléorient* 15 (2): 95–98.
- Vishnyatsky, L. B. 1999. The Paleolithic of Central Asia. *Journal of World Prehistory* 13 (1): 69–122.
- Williams, W. W. 1928. The Barkly Tableland of North Australia. *The Geographical Journal* 71 (1): 61–73.