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# Australian Aborigines and meteorites

**A.W.R. Bevan**[1] **and P. Bindon**[2]

[1]Department of Earth and Planetary Sciences, [2] Department of Anthropology,
Western Australian Museum, Francis Street, Perth, Western Australia 6000

**Abstract** – Numerous mythological references to meteoritic events by Aboriginal people in Australia contrast with the scant physical evidence of their interaction with meteoritic materials. Possible reasons for this are the unsuitability of some meteorites for tool making and the apparent inability of early Aborigines to work metallic materials. However, there is a strong possibility that Aborigines witnessed one or more of the several recent (< 5000 yrs BP) meteorite impact events in Australia. Evidence for Aboriginal use of meteorites and the recognition of meteoritic events is critically evaluated.

## INTRODUCTION

The ceremonial and practical significance of Australian tektites (australites) in Aboriginal life is extensively documented (Baker 1957 and references therein; Edwards 1966). However, despite abundant evidence throughout the world that many other ancient civilizations recognised, utilized and even revered meteorites (particularly meteoritic iron) (e.g., see Buchwald 1975 and references therein), there is very little physical or documentary evidence of Aboriginal acknowledgement or use of meteoritic materials. In view of the prolonged, skilful and widespread use of a variety of natural materials by Aborigines in antiquity, the apparent absence of the use of meteorites in their culture is enigmatic.

Such scant evidence that exists of possible Aboriginal recognition of meteorites in Australia is circumstantial and indirect. The purpose of this paper is two-fold: firstly, to review, critically, the available evidence of the possible recognition of meteorites by Aborigines; and secondly, to present evidence from Western Australia suggesting that there may have been some use of meteoritic materials, particularly in the Nullarbor Region.

The evidence of possible Aboriginal recognition of meteorites can be grouped into three main categories: Aboriginal description of meteoritic events and sites, transport of meteorites from their sites of fall, and utilization of meteoritic materials. Examples of these three categories are listed under the relevant State and Territory below. Those geographic localities mentioned in the text are shown in Figure 1.

## BACKGROUND

Meteorites have been found throughout Australia, although for climatic and physiographic reasons they are rarely found in tropical Australia. The history of the recovery of meteorites in Australia has been reviewed by Bevan (1992). Within the continent there are two significant areas for the recovery of meteorites: the Nullarbor Region, and the area around the Menindee Lakes of western New South Wales. These accumulations have resulted from prolonged aridity that has allowed the preservation of meteorites for thousands of years after their fall, and the large numbers that have been recovered are a direct result of their ease of recognition in those environments. Most meteorites are dark rocks and in areas like the Nullarbor they stand out as unusual against the pale indigenous limestone. Bevan (1992) has suggested that similarly dense accumulations of meteorites are likely to occur throughout the arid zone of Australia. However, recognition of these objects in most terrains is hampered by local physiography (e.g., sand dunes) and naturally dark, or 'rusty-looking' country rocks.

Three main groups of meteorites are recognised, determined by the relative amounts of metallic nickel-iron and ferro-magnesian silicates they contain. *Irons* are composed almost entirely of metal; *stones* are made predominantly of silicates (olivine, pyroxene and feldspar) similar to those occurring in terrestrial basalts, but may also contain appreciable amounts of metal; and *stony-irons* are mixtures of metal and silicates in roughly equal proportions. Stony meteorites are the most common, accounting for more than 95% of those seen to fall, whereas irons and stony-irons are rare, accounting for around 4% and 1% of meteorites seen to fall, respectively. In terms of collections, however, irons are often over-represented. For

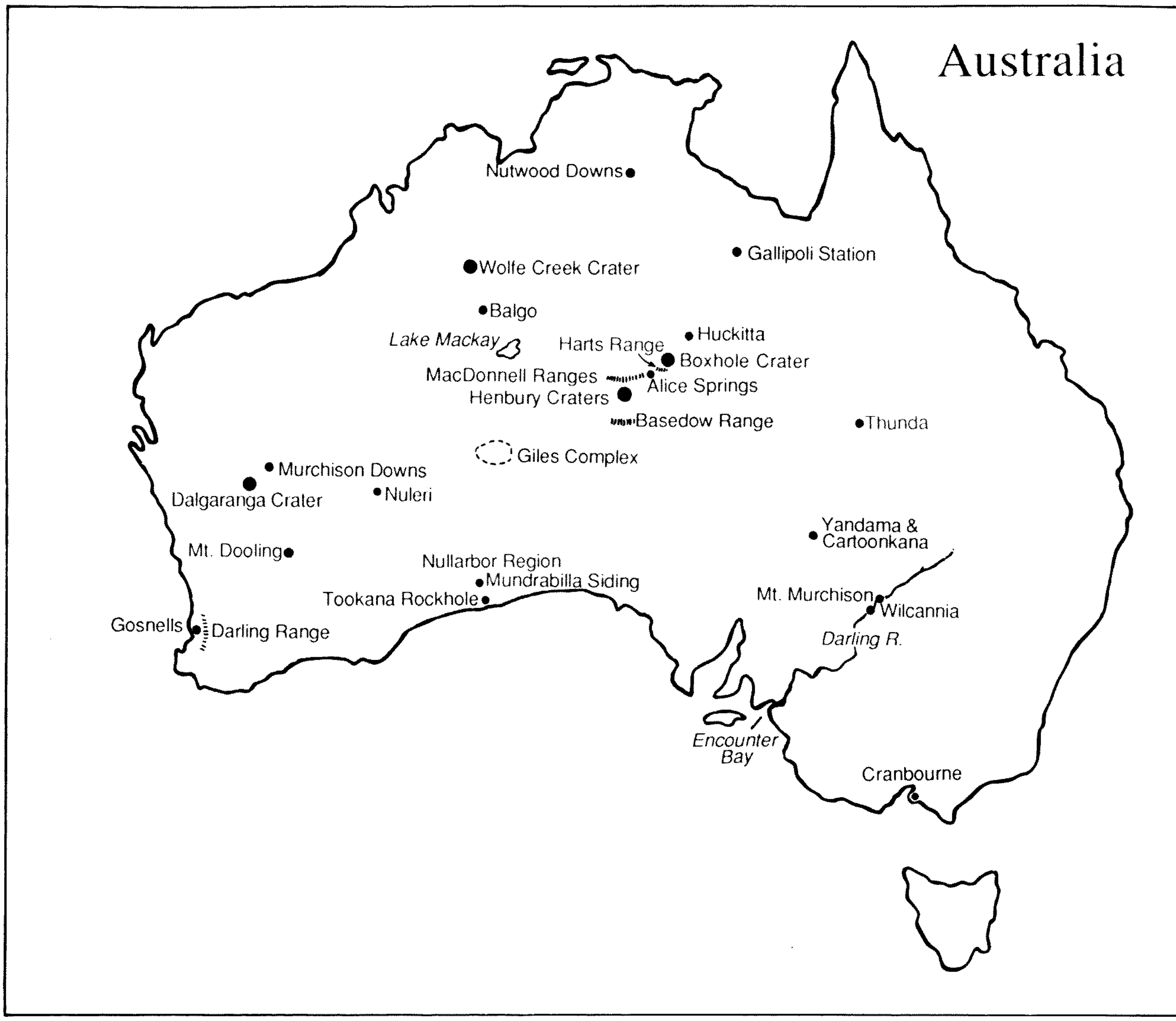


**Figure 1** Geographic locations and meteorite sites mentioned in the text.

example, of all the meteorites found in Australia, irons account for approximately 29% of the total. This is the result of human collection bias. The more exotic-looking irons are easily recognised as meteorites and, in modern times, have been preferentially collected.

In the population of meteorites from the Nullarbor Region of Australia, however, only four iron meteorites and one stony-iron meteorite are recorded. While these account for more than 90% of the mass of all meteorites recovered from the region, Bevan (1992) noted that taken by type, and as a percentage of the total population of meteorites so far recorded, the irons and stony-irons were under represented in the Nullarbor by about a factor of two compared with the modern flux of meteorites.

The low percentage of metallic meteorites in the Nullarbor population is difficult to explain. In the Nullarbor in modern times, many meteorites have been found by inexperienced personnel and it would be expected that any bias would be towards more, rather than less, iron meteorites. A complicating factor is that the Nullarbor has been periodically populated by Aboriginal people over at least the last 20,000 years (e.g., see White and O'Connell 1982), and by itinerant prospectors and rabbiters within the last 100 years. Human interference (possibly Aboriginal) with the population of meteorites from the Nullarbor, by the selective collection of irons, cannot be ruled out.

## ABORIGINAL DESCRIPTION OF METEORITIC EVENTS AND SITES

### Northern Territory

*Henbury Craters*

The best example in Australia of possible Aboriginal recognition of a meteoritic event is the group of Henbury craters (24°35'S, 133°10'E) and associated meteorites situated near the Finke River in the Northern Territory. The craters, formed by the impact of an iron meteorite, were recognised as meteoritic by Europeans in 1931 (Alderman 1932a,b). Buchwald (1975) estimates that more than 1,200 kg of iron meteorites have been recovered from the craters and surroundings, the bulk being collected before 1933 (Graham *et al.* 1985).

Measurement of the activities of the radioisotopes $Cl^{36}$ and $C^{14}$ in the Henbury meteorite by Goel and Kohman (1963) and Kohman and Goel (1963), respectively, show that the impact event occurred less than 5,000 yrs BP. It is significant that this age is well within the currently proposed time (50,000 yrs BP) of Aboriginal occupation of Australia (Roberts *et al.* 1990).

Alderman (1932a) noted that inquiries from Aborigines in the district revealed that none had any ideas as to the origin of the craters. However, in an addendum to Alderman's 1932 (a) paper, L.J. Spencer communicated a report from Mr R. Bedford of the Kyancutta Museum that a local prospector (J.M. Mitchell of Oodnadatta) asserted that local Aboriginal people described the locality as *"Chindu chinna waru chingi yabu"* which translates as *"Sun walk fire devil rock"*. This description suggests that it is quite possible that the ancestors of the people with whom Mitchell spoke witnessed the fall and impact of the Henbury meteorite. However, in contradiction to this view, Mountford (1976) recounts the southern Aranda myth of the lizard-woman, *Mulumura,* in relation to the Henbury meteorite craters. According to the myth, the largest of the Henbury craters was the camping place of a menstruating Mulumura lizard-woman. When the sand on which Mulumura was resting became saturated with blood, she picked it up and threw it away; the crater was thus created and the piles of meteoritic iron surrounding the crater represented the blood-stained earth. Mountford (1976) suggests that the myth shows that the Aborigines have no memory of the impact event that created the large crater, though qualifies his conclusion by noting that he did not obtain any myths accounting for the other craters, and that there was little doubt that other myths existed.

*Magellanic Clouds*

Mountford (1976) describes a myth of the Ngalia people of the Northern Territory concerning the Magellanic Clouds. The myth deals with two men, the *Walanari,* who ate the *kurunba* (spirit) of a dead man during the time of creation. Afterwards, the *Walanari* rose into the sky and made their camps in the Magellanic Clouds, from where they act as both helpers of the law-abiding, and punishers of evil-doers. The Ngalia believed that meteors were glowing stones thrown to Earth by the *Walanari.*

**New South Wales**

The Paakantji (Bakendji) people of western New South Wales record an ancient event that is reported to have occurred at a place along the Darling River between Wilcannia and Mount Murchison (Jones 1989). A bend in the river is called *"purli ngaangkalitji"*, meaning *"the fallen star"*. According to the legend, a group of people were camped at the location when *"they heard this rumbling noise from the sky, like thunder... and as it* [the falling star] *came down there was red streaks, and a great big ball of fire coming down... and there was smoke...."* (Jones 1989). The Paakantji account continues thus, *"and where it fell, some of them died there and some of them got burnt.... there was fire in it. The ones that weren't too badly burnt, they got away. The others died there...."*

This description of the event suggests that ancestors of the Paakantji people witnessed the fall of a large meteorite, and the account of the impact indicates a crater-forming or Tunguska-type, event. According to the legend the event was followed by a deluge. However, no evidence of an impact crater or meteoritic material occurs at the site indicated in the legend (Steel and Snow 1991: 5). It is quite possible that the site on the Darling River is where the legend was recounted, but that it was not the actual site of the recorded event.

**South Australia**

In reference to the description of the passage of a large meteor across the sky, Tindale (1974) notes that the Ramindjeri people of Encounter Bay (35°35'S, 138°45'E) visualised the event as the flight of an evil being named *"Mulda"*, who was a harbinger of sickness and blindness.

**Western Australia**

*Wolfe Creek Crater*

The Wolfe Creek meteorite crater in the Kimberley of Western Australia has been dated at 300,000 yrs BP (Shoemaker *et al.* 1990). Therefore, the formation of the crater pre-dates the known human occupation of Australia and is unlikely to have been witnessed. Wolfe Creek Crater is an example where no recognition is afforded by Aboriginal tradition of the meteoritic origin of the site. The local Djaru people call the locality *"Kandimalal"*. Their mythology speaks of two rainbow snakes, whose sinuous paths across the desert formed the nearby Sturt Creek and Wolfe Creek (Bevan and McNamara 1993). The crater represents the place where one of the snakes emerged from the ground. No mention is made in the Djaru account of the association of meteorites that occurs at the crater, and it is interesting to note that their mythology attributes the origin of the crater to events within the Earth rather than from above it.

*Locality unknown*

Artists from the Wirrimanu (Balgo) community of Western Australia have a tradition depicted in painting representing the fall of a 'star'. Brief accounts of the event are recorded and sold with the painting. The story recalls a 'star' that fell out of the sky into Lake Mackay. The story continues that 'the Rainbow snake came to this place and ate up a lot of people'. No large meteorite fall is known in the area of Lake Mackay. However, it is interesting to note that a line from Balgo projected through Lake Mackay passes close to the McDonnell Ranges and the site of the Henbury craters.

Another Kimberley people, the Wolmeri, have a myth that Venus 'the star' came to Earth and left a stone in one of the horde countries (Kaberry 1939: 12).

In the myths of the Wheelman Tribe of the south-west of Western Australia, Hassle (1934) notes that they believed that in the Milky Way *"one cluster of stars visited another and occasionally stars got lost and fell down to earth as we see them do even now"*.

## RECOGNITION OF METEORITES, AND TRANSPORT FROM THEIR SITES OF FALL

Well-documented examples of the recognition of meteorites by Aborigines are listed below. In addition, there are numerous possible examples documented of transport of meteorites in Australia by human agency (e.g., see Buchwald 1975; Graham *et al.* 1985). Many of these are fragments of the Henbury meteorite that were found considerable distances from the site of the craters, and the occurrences of which cannot be accounted for by the processes of nature. To date, no conclusive proof exists that any of these meteorites was transported by Aborigines. However, that the meteorites have been transported by human agency subsequent to their fall is not doubted. Other examples are less convincing, although circumstantial evidence suggests possible Aboriginal recognition of, and interaction with meteoritic materials.

### Northern Territory

*Henbury meteorite (fragments found at Basedow Range, Nutwood Downs and Gallipoli Station)*

One of the earliest recognised examples of human transport of a meteorite in Australia was a mass of iron meteorite weighing a few kilograms found 6.5 km from Willbia Wells along the south side of the Basedow Range in the Northern Territory. The locality lies about 85 km southwest of the Henbury craters, and the meteorite was considered by Hodge-Smith to be one of the Henbury masses that had been transported by human agency, most likely Aboriginal (letter in the Smithsonian Institution, Washington, of 1 April 1958 from R. O. Chalmers, Australian Museum, Sydney). Additional fragments of iron meteorites reportedly found at Nutwood Downs (*ca.* 15°49'S, 134°09'E) and Gallipoli Station (*ca.* 19°08'S, 137°53'E) have also been suspected to be fragments of Henbury (Buchwald 1975). Subsequent chemical analysis by Scott *et al.* (1973) and detailed metallographic examination by Buchwald (1975) has shown, beyond reasonable doubt, that the meteorites found at Basedow Range, Nutwood Downs and Gallipoli Station are all fragments of the disrupted Henbury projectile. When these were transported from the site of the craters is unknown.

Several other genuine fragments of the Henbury meteorite have recently been reported from localities as far afield as Arnhem Land in the Northern Territory, and inter-state in Queensland (Bevan *in prep.*). It has also been suggested by Buchwald (1975) that the Nuleri meteorite found in Western Australia (27°50'S, 123°52'E) may be a transported fragment of Henbury, although this has yet to be proved. Other examples of transported fragments of Henbury are held in the collections of the Northern Territory Museum in Darwin (D. Megirian *pers. comm.*).

*Huckitta meteorite (Alice Springs fragment)*

In 1924, a 1084 g fragment of a rare stony-iron meteorite type (pallasite) was found by H. Basedow on the Burt Plains (23°33'S, 133°52'E) near Alice Springs. The so-called *Alice Springs* meteorite was described by Spencer (1932a). However, in July 1937, the main mass of 1411.5 kg, of which the *Alice Springs* meteorite is evidently a transported fragment, was located at Huckitta (22°22'S, 135°46'E) surrounded by a large quantity of iron-shale representing the weathering products from the mass. (Madigan 1937, 1939; Megirian *et al.* 1987). The *Alice Springs* fragment of the Huckitta meteorite was clearly transported by human agency prior to 1924.

Evidence that transportation of the Alice Springs fragment by Aborigines may have occurred is circumstantial. Megirian *et al.* (1987) estimate a terrestrial age for the Huckitta meteorite of >18,000 yrs and the deeply weathered nature of the mass on its discovery is consistent with prolonged exposure to weathering (Madigan 1939). Madigan's (1939) account of the discovery of the meteorite by Europeans suggests that local Aboriginals were previously well aware of the existence of the mass. Madigan (1939) had recognised the meteorite from a fragment that had been removed from the mass by Mick Laughton, a part-Aborigine employed on Huckitta Station. Whereas the Europeans on the Station were ignorant of the meteoritic nature of the unusual rock, the local Aborigines held the meteorite in awe, possibly as a sacred and, therefore, fearful thing (Madigan 1939).

*Boxhole (Hart Range fragment)*

In 1944 a fragment of iron meteorite weighing 608 g was presented by Mr J.S. Foxhall to the Geological Survey of Western Australia. The meteorite was evidently discovered at a locality in the Harts Range some 60 km south of the Boxhole meteorite impact crater (22°37'S, 135°12'E). A detailed study of the *Hart Range* meteorite by De Laeter (1973) has shown that it is a fragment of the Boxhole meteorite. De Laeter (1973) concluded that it was probable that the meteorite had been transported from the crater by human agency. The age of the Boxhole crater (*c.* 5400 yrs) as determined by Kohman and Goel (1963) is similar to that of the Henbury craters although Wasson (1967) has shown that differences in the chemistry and metallurgy of the impacting meteorites prove that they are two distinct events. Nevertheless, like Henbury, the age of formation of the Boxhole crater is well within the time of Aboriginal occupation of Australia and the event may have been witnessed.

**New South Wales**

*Yandama and Cartoonkana meteorites*

A mass of stony meteorite weighing 5.8 kg was acquired by the South Australian Museum in 1914 from Mr T.F. Gill. The exact date of find is unknown. In his description, Alderman (1936) notes that the meteorite named Yandama was found at "Blacks' Camp, Big Plain, Yandama Station, NSW" (29°45'S, 141°02'E). Alderman (1936) also noted that the meteorite has a fractured surface that *"indicates the possibility of the stone, as found, having one time formed part of a considerably larger mass"*.

An additional stone weighing 290 g was also found before 1914 in the same general area as the Yandama meteorite and was named Cartoonkana (Alderman 1936). It has since been suggested by Mason (1974) on the basis of classification that the Yandama and Cartoonkana meteorites could be fragments of the same meteorite. Interestingly, the localities of both the Yandama and Cartoonkana finds lie close to an old Aboriginal camp. However, the possibility that the meteorites may have been broken from the same mass by Aborigines and then distributed cannot be substantiated.

**Western Australia**

*Mt Dooling (Gosnells fragment)*

Three masses of an unusual iron meteorite (Mount Dooling) found in Western Australia between 1909 and 1979 have been shown to belong to the same fall (De Laeter *et al.* 1972; De Laeter 1980). Two large masses weighing 31.5 kg (found 1909) and 701 kg (found 1979), respectively, were found just to the east of the Mount Manning Range (30°00'S, 119°40'E) approximately 430 km north east of Perth, whilst a third mass, weighing 1.5 kg, was found in 1960 near the Perth suburb of Gosnells on the edge of the Darling escarpment (32°05'S, 116°01'E) some 19 km south east of the city centre. De Laeter *et al.* (1972) demonstrated convincingly that the *Gosnells* meteorite was a fragment broken from the 31.5 kg mass of the Mount Dooling meteorite prior to its discovery (1909) and transported by human agency, although they concluded that it was not known when, or by whom.

The *Gosnells* meteorite fragment was found in bushland. McCall (1972) and De Laeter and Bevan (1992) suggest that transport of the *Gosnells* mass from the Mount Manning area to Perth by Aborigines is one possible explanation as to how the fragments became so widely displaced.

*Dalgaranga (Murchison Downs fragment)*

Recently, Bevan and Griffin (1994) have shown that a small metallic slug, weighing 33.5 g, found near Murchison Downs Station (26°40'S, 119°00'E) in 1925 is a transported fragment of the stony-iron meteorite that formed the Dalgaranga meteorite impact crater. The distance between the reported find-site of the Murchison Downs meteorite and the Dalgaranga crater is *ca.* 200 km. Bevan and Griffin (1994) suggest that the *Murchison Downs* fragment has been transported by human agency, and may have been transported by Aborigines.

The age of formation of the Dalgaranga crater is variably reported to be between 3000–27000 yrs BP (Shoemaker and Shoemaker 1988; Grieve 1991). Like the Henbury craters, these ages lie well within the known Aboriginal occupation of Australia and the formation of the Dalgaranga crater may have been witnessed by Aborigines. However, we have been unable to discover any references to this occurrence in Aboriginal myths.

*Mundrabilla (Tookana Rockhole fragments)*

The Mundrabilla meteorite shower, including the largest meteorite (11.5 tonnes) recovered from Australia, occurs over a large strewnfield more than 50 km long in the central Western Australian Nullarbor Plain (De Laeter 1972; De Laeter and Cleverly 1983; Bevan and Binns 1989). Some twelve large masses totalling more than 22 tonnes of this shower are in collections around the world (Graham *et al.* 1985; Bevan and Binns 1989). Additionally, thousands of smaller fragments of the same meteorite shower are known which have characteristic rounded, "knuckle-bone" shapes. On the basis of $Al^{26}$ and $Be^{10}$ activity, the age of the fall of the Mundrabilla meteorite shower is estimated by Aylmer *et al.* (1988) to be >1 Myr BP.

Most fragments of the Mundrabilla iron are found within an area straddling the Trans-Australian Railway between the townships of Forrest and Loongana. However, De Laeter and Cleverly (1983) reported the discovery in 1978, by the late Mr A.J. Carlisle, of about 100 small fragments of the Mundrabilla meteorite near *Tookana Rock Hole* (31°41'S, 128°21'E) situated 47 km NNW from Eucla on the Eyre Highway. The *Tookana Rock Hole* locality lies approximately 135 km to the SE of the main strewnfield of the Mundrabilla meteorite. De Laeter and Bevan (1992) suggest that the *Tookana Rock Hole* material had been transported from the Mundrabilla area by human agency, almost certainly Aborigines.

The heaviest specimen found at *Tookana Rock Hole* weighed 0.44 kg and the total mass of the recovered material was 3.97 kg. When the fragments were discovered, the finder reported that they were scattered over an area about 10 m in diameter. De Laeter and Cleverly (1983) concluded that the material represents the disintegration, by weathering, of a mass of around 5 kg. Moreover, De Laeter and Cleverly (1983) discount the possibility of human transport on the grounds that the state of weathering (apparently *in situ*) of the material suggests that transport must have occurred long before Europeans reached the area, and that Aborigines were not known to have used meteorites. While the observations of De Laeter and Cleverly (1983) appear to rule out transport of the meteorite by Europeans, they do not exclude the possibility of transport of the material by Aborigines in antiquity.

### Queensland

*Thunda meteorite*

A mass of iron weighing 62 kg was known before 1881 at Thunda (25°42'S, 143°3'E) near Windorah in the Diamantina district of Queensland. The mass, originally buried in the ground had been known to Aborigines for some time and covered by them with stones before its recognition by Europeans (Liversidge 1886; Spencer 1937). According to Spencer (1937), two masses of iron, the "Old Man" and the "Old Woman" were known to Aborigines on Githa Creek. In 1881, the "Old Woman" mass was taken to the Thunda Homestead about 25 km to the north of the site of discovery. The whereabouts of the "Old Man" mass are unknown. Half of the 62 kg "Old Woman" (Thunda) mass is deposited in the Natural History Museum in London.

### Victoria

*Cranbourne meteorite*

Among the earliest well-documented recoveries of meteorites in Australia were two large masses or iron weighing 3.5 and 1.5 tons found in 1854 near Cranbourne in Victoria (Walcott 1915). During the period 1854–1928, eight additional masses of the same meteorite shower were recovered from an area between Beaconsfield and Langwarrin bringing the total weight recovered to more than 10 tons. Walcott (1915) noted from reports of people who had visited the site that the largest meteorite was originally buried in the ground with a small portion protruding above it. Old colonists are reported to have recounted a time when Aborigines used to dance around the meteorite, *"beating their stone tomahawks against it, and apparently much pleased with the metallic sounds thus produced"* (Walcott 1915).

### Locality unknown

Barker (1964) refers to the recognition of a meteoritic mass by Aborigines at an unknown locality. In his words;

> *"The blacks knew of a meteorite out in the desert, knew exactly what it was, how it fell and, in spite of their scientific ignorance, could describe it correctly, leaving no shadow of doubt that it was really there. But it was serving too useful a purpose where it was, a source for myths and superstitions that could be used to the benefit of the old people. So they would not reveal its whereabouts to any whites, though they were always willing to talk about it"*

## UTILIZATION OF METEORITIC MATERIALS BY ABORIGINES

While there are numerous, well documented examples of the discovery of meteorites in modern times by Aboriginal people (e.g., see Hodge-Smith 1939; McCall and De Laeter 1965), currently, there are no known examples of the use of meteoritic materials by Aboriginal people in antiquity. Some problems arise from the confusion that exists in the non-meteoritical or non-geological literature in distinguishing genuine meteorites from tektites. For example, 'tektites' are commonly referred to by modern Aboriginal people as 'meteorites'. An example of this confusion, which is not confined to Aborigines, is well illustrated by Barker (1964);

> *"In the desert country in the west of South Australia were hundreds of little round meteorites* [sic], *about the size of a pigeon's egg. Again the blacks knew what they were and stuck rigidly to their theory but white people were inclined to disbelieve. Now scientists are satisfied that the blacks were right, and these tiny black and shiny meteorites* [sic] *called australites or, more correctly, tektites can be seen in most museums"*

## DISCUSSION

In areas such as the Nullarbor Region, the available country rock is limestone. Field evidence from this region indicates that the majority of the discarded implements to be found there were brought into the region from outside. However, the Nullarbor contains one of the world's richest accumulations of meteorites, which are easily recognised in that terrain (Bevan 1992). Irrespective of whether the indigenous Aborigines of the Nullarbor (the Mirning people) understood the extra-terrestrial nature of meteorites or attached any other significance to them, it seems inconceivable that they could have ignored this resource without investigating the potential of meteorites for practical purposes.

In terms of their practical value, although meteoritic materials are unusually dense, many meteoritic stones are weak, friable materials and are not as resilient as many terrestrial igneous and sedimentary rocks such as granites, basalts, gabbros and quartzites. For this reason, aside from their rarity, meteoritic stones would have been generally of less practical use to Aborigines in antiquity than the more abundantly available terrestrial rocks. Nevertheless, some highly crystalline stony meteorites are equally suitable as some terrestrial igneous rocks for the manufacture of implements.

Large iron meteorites cannot be moved easily, and Aborigines lacked the technology to remove small samples from compact iron meteorites that did not have natural cracks or fissures. Small iron meteorites could not be worked easily, although some, such as the abundantly available Mundrabilla irons, could have been used as throwing-stones. Because of their nickel contents (generally 5–25 wt % Ni) meteoritic iron is reasonably malleable and can be hot and cold worked. A number of examples of working of material in antiquity in other parts of the world, notably the Inuits of Greenland and the Hopewell Indians of America, are documented in the literature (see Buchwald 1975).

However, Australian Aboriginal 'use' of objects extends beyond simple mechanical useage. Odd stones, such as tektites, were often collected and used as sacred objects, charms and healing stones (Baker 1957). A similar use of meteorites is suggested by the Huckitta, Thunda and Cranbourne meteorite examples, and by the unlocated example documented by Barker (1964).

## SUMMARY AND CONCLUSIONS

Where clear recognition of meteoritic events and sites is afforded by Aboriginal legend, descriptions consistently convey a theme of awe and fear. Meteoritic masses or their impact sites, real or perceived, were to be avoided. Strehlow (D. Hugo, *pers. comm.*) notes that the Aranda of central Australia saw meteorites (meteors) as large venomous snakes called *kulaia*, with big fiery eyes. These fly through the air and fall into deep waterholes, for which reason the latter were to be avoided. However, it is interesting to note that rather than having heavenly origins, most celestial phenomena were believed by people such as the Aranda and Ngalia of central Australia, originally to have ascended into the skies from an earth-born existence (D. Hugo, *pers. comm.*). Nevertheless, the *Walanari* myth suggests that the Ngalia did indeed have knowledge of meteors and meteorites, and perhaps other astronomical objects.

It is not known whether Aborigines witnessed the actual impact of the crater-forming meteorite at the site now known as Henbury. From evidence provided by Mitchell in Alderman (1932a) that is descriptive of the kinds of phenomena expected with such a devastating event, it is possible that they did witness the impact. However, some of the mythical and legendary associations of meteorite impact structures such as Henbury are remote from descriptions of a cataclysmic event, but equate with a far milder set of occurrences (Mountford 1976). This suggests that in some cases there was no direct connection made by Aborigines between what must have been a spectacular and noisy atmospheric and terrestrial event, and the geological evidence for that event.

In relation to the Henbury craters three questions arise; did Aborigines see the impact as such a terrifying event that they decided to ignore it; were their interpretations subsequently modified by intercourse with Europeans; or did they not see it at all? In the last case it would not be surprising that they failed to attribute the craters to an extra-terrestrial origin, given that these are not common occurrences. Moreover, if Aborigines witnessed the event from a distance, which is likely considering the sparse nature of their population, then they may not have related the atmospheric and terrestrial events.

The discrepancy between Mitchell's account, reported in Alderman (1932a), of Aboriginal understanding of the Henbury craters, Alderman's (1932a) own account and the more traditional myth of the Aranda people documented by Mountford (1976) suggests that European influence may have introduced a meteoritic explanation of the event to the Aborigines that they subsequently adopted. However, a proper understanding of the mechanics of impact cratering was not generally available to meteoriticists until around 1932 (e.g., see Spencer 1932b) and was not popularly published until much later.

The Paakantji example of New South Wales (Jones 1989) seems less equivocal. The description of the phenomena is entirely consistent with that to be expected to accompany a crater-forming impact. Moreover, the legend is reportedly an ancient one handed down through many generations (Jones 1989). The location of the event remains a mystery, and the possibility that the Paakantji are describing the Henbury occurrence cannot be discounted.

In modern times, when Aborigines were introduced to metal in functional shapes like barrel hoops, or discarded horse shoes and the like, they were quick to adapt this new material to their needs (Akerman and Bindon 1984). Traditionally shaped spearheads, axes and other tools once made in stone were made from pieces of metal obtained from Europeans. Fragments of meteoritic iron, although recognisable as metal, are not generally evocative of tool shapes. Moreover traditional Aboriginal methods of working stone by flaking and grinding, are not applicable to chunks of iron. Although there is some evidence for Aboriginal selection of meteoritic iron objects as things being out of the ordinary, and that they may have been transported from their original place of fall to other locations, no substantial evidence exists of experimental working of iron meteorites by Aborigines during prehistory.

In the Nullarbor where meteorites are easily found (notably the Mundrabilla iron meteorite), grinding was the method used by Aborigines to process grass seeds into a gruel or damper. Although some edge-ground axes do occur here, most of the country rock is sedimentary or is buried at such depth beneath sand that it is generally unavailable to Aborigines. Many of the larger (1cm +) artefacts to be found in the Nullarbor are made from igneous rocks transported from other areas, notably the Giles Complex to the north, or tektites. Consequently, there was no great tradition of edge-grinding in the region. Apart from the amount of work likely to be involved with grinding or beating a chunk of meteoritic iron to the shape of an axe, there is little evidence of a tradition that would lead to this kind of labour intensive modification of a resource. However, the deficit in the number of different iron meteorites recovered from the Nullarbor may be due to human activity.

Notwithstanding, we urge archaeologists and anthropologists throughout Australia to re-examine the extensive collections of Aboriginal artefacts that exist for the possibility that they may contain rare implements and other objects made from stony meteorites.

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