

AUSTRALITES. PART 2: EARLY ABORIGINAL PERCEPTION AND USE

Philip A. Clarke

17 Duke St, Beulah Park, South Australia 5067, Australia.

Email: Philip@anthropac.com.au

Abstract: This paper reviews the Indigenous perception and use of australites as recorded in the Australian ethnographic literature. Aboriginal people perceived australites as having power derived from their Creation ancestors. There are accounts of australites being ritual objects used for healing, rain-making, hunting, sorcery and conveying messages. There are also descriptions of Aboriginal people using australites as raw material for tool-making, as their glass-like properties enabled specialised microlith tools to be made from them.

Keywords: tektites, Aboriginal Australians, Creation ancestors, ritual objects, tool-making

1 INTRODUCTION

During the nineteenth century Australian tektites, known as australites, were chiefly seen by scholars as obsidians of volcanic origin. For scientists, a problem was that many of the areas where they were found on the surface did not have a volcanic history. This lack of connection between australites and the geological areas of their distribution led to the conclusion that they must have been widely distributed by humans, and to some extent by the large birds that they hunted (Clarke, 2018b; McColl, 2017). Scholars studying the distribution of australites implicated the actions of Indigenous people living in Australia prior to the arrival of British colonists in the late-eighteenth century. Supporting this suggestion was the fact that australites were often found in places, such as old campsites and water-holes, that Europeans perceived to be associated with Aboriginal people.

Australite-researcher George Baker (1957: 1) summarised the anthropological significance of australites in Australia, which

... are sometimes encountered, among other types of stones, on the sites of ancient aboriginal camps, and are distinctive in being remarkable, black glassy objects, mostly possessing relatively regular shapes. Many of them were treasured by certain aboriginal tribes ... as medicine-stones, death-pointers, punishment-stones, hunting-stones, sacred-stones, magic-stones, amulets or charm-stones, throwing-stones, rainmaking-stones, message-stones, and a few were used as small implements. It has also been suggested they were earlier used as barter-stones.

In the twentieth century, scientists believed that australites were meteoric glass produced by a lunar strike, but more recently they have been recognised as material produced by a meteorite strike somewhere in Southeast Asia about 793,000 years ago (Lei and Wei, 2000; McColl, 2017). Australites were therefore present in the Australian landscape long before the arrival of the ancestors of modern-day Aboriginal people.

This paper is the second instalment of a two-

part study that aims to explore the relationships that Australia's Indigenous people had with australites. The first-part considered the Indigenous involvement in the discovery and finding of australites (Clarke, 2018b). The focus of this paper is to explore Indigenous cultural perspectives on the origin of this category of tektite and document their use in material culture as ritual items and artefacts.

1.1 Ethnographic Sources

Those Europeans who compiled records pertaining to the Aboriginal perception and use of australites included explorers, settlers, colonists, scientists, geologists, mineralogists and anthropologists. While there is some useful cultural data available on australites for analysis, there are major biases with it. For many areas we must chiefly rely upon anecdotal accounts from settlers and colonial officials of the late-eighteenth and early-nineteenth centuries who were able to compile information from Aboriginal people as survivors of the first wave of European settlement. The spatial coverage of Aboriginal records across Australia is such that there are good records available for parts of the tropical and arid zones, but major gaps for most of the temperate zone, and particularly for Tasmania. For localities mentioned in the text see Figure 1.

For accounts of Indigenous beliefs and customs for many areas of Australia we must chiefly rely upon anecdotal accounts from those Europeans who were in contact with Aboriginal people who could remember a time before British settlement. The settlers and colonial officials who had ethnological interests in australites included James Dawson (1806–1900) in southwest Victoria, William D. Campbell (1849–1938) in the Goldfields of Western Australia, Ethel Hassell (1857–1933) in southwest Western Australia, George (Poddy) Aiston (1879–1943) in eastern Central Australia, and Anthony G. Bolam (1894–1966) on the Nullarbor Plain. Early geologists and mineralogists who documented Indigenous beliefs concerning australites were Ralph Tate

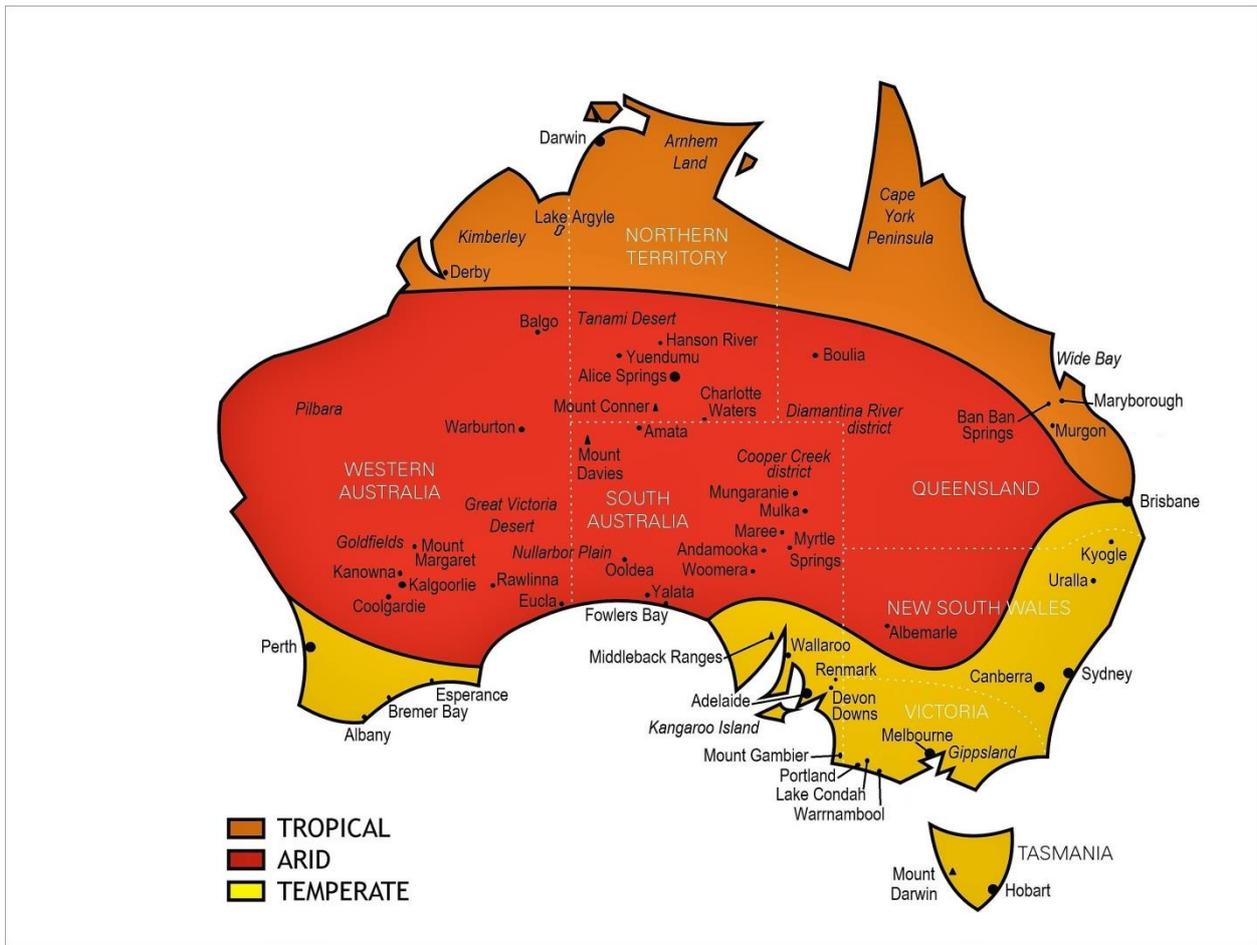


Figure 1: Australian localities and regions mentioned in the text.

(1840–1901; Figure 2), Edward J. Dunn (1844–1937), Walter Howchin (1845–1937) and Herbert Basedow (1881–1933).

Anthropologists who compiled records pertaining to the Aboriginal perception and use of australites were Lorimer Fison (1832–1907) and Alfred W. Howitt (1830–1908; Figure 3) across southeastern Australia, John Mathew (1849–1929) and Lindsey P. Winterbotham (1887–1960) in south-east Queensland, Frank J. Gillen (1855–1912) and W. Baldwin Spencer (1869–1927) in eastern Central Australia, and Daisy M. Bates (1859–1951; Figure 4) along the Nullarbor Plain.

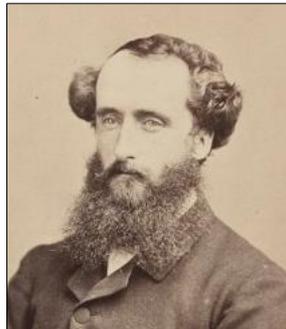
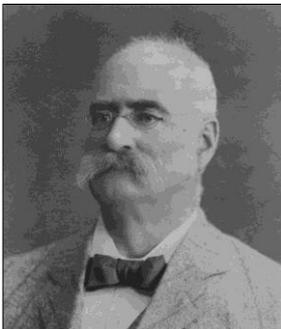
Figure 2 (left): Ralph Tate (https://en.wikipedia.org/wiki/Ralph_Tate#/media/File:Prof._Ralph_Tate_FGS_FLS.jpg).Figure 3 (right): Alfred William Howitt (adapted from https://en.wikipedia.org/wiki/Alfred_William_Howitt#/media/File:Alfred_William_Howitt_circa_1861.jpg).Figure 4: Daisy Bates ([https://en.wikipedia.org/wiki/Daisy_Bates_\(author\)#/media/File:Daisy_Bates_2.jpeg](https://en.wikipedia.org/wiki/Daisy_Bates_(author)#/media/File:Daisy_Bates_2.jpeg)).



Figure 5 (left, upper): George Baker (after Gill and Segnit, 1976: 519).

Figure 6 (right): Norman B. Tindale (centre), with some other staff from the Anthropology Division at the South Australian Museum in 1985 (courtesy: South Australian Museum Archives) [Editorial Note: Third from left in this photograph is a youthful Philip Clarke, the author of this paper.]

Figure 7 (left, lower): Charles Fenner (courtesy: Ballarat School of Mines Museum).

The field interests of Adolphus P. Elkin (1891–1979) were widespread across the continent. In the case of Herbert Basedow, who is mentioned above with the geologists, he was often considered to be an anthropologist and had also trained in medicine.

Museum-based scholars have been prominent in both the collection and research of Indigenous relationships to australites. At the Australian Museum in Sydney was archaeologist Frederick D. McCarthy (1905–1997), who documented Aboriginal material culture across the country and provided published overviews of artefacts and art (Kahn, 1993). Geologist George Baker (1908–1975; Figure 5) was a well-published australite researcher who worked on collections held in the National Museum of Victoria¹ (Gill and Segnit, 1976). The work of Baker (1957) is particularly significant for this present paper as he wrote a detailed account of the Indigenous uses of australites and provided a list of Aboriginal names for them, referenced to the ‘tribes’ as documented by Norman B. Tindale (1940) at the South Australian Museum. Another prolific scholar was geochemist William (Bill) H. Cleverly (1917–1997), and he was an honorary researcher at the Western Australian Museum (Bevan, 1999).

At the South Australian Museum, the ethnologist Norman B. Tindale (1900–1993; Figure 6) recorded Aboriginal traditions across Australia

during a career that spanned much of the twentieth century (Jones, 1995). He was a member of several fieldtrips that were organised with a brief that included searching for australites. For instance, australites were collected by him in 1935 when he accompanied cinematographer E.O. Stocker on an expedition to the Warburton Ranges of central Western Australia (Tindale, 1935a), and then in 1964 when he was with geologist David W.P. Corbett and natural historian Hans Mincham from the Museum on a trip to Myrtle Springs in the Flinders Ranges of northern South Australia (Anon., 1964; Corbett, 1967; Tindale, 1961–1965, 1964–1965). When traveling, Tindale also inspected private australite collections (Tindale, 1964–1965; 1966).² By chance he came across australites in the field, at places such as Lake Victoria in western New South Wales (Tindale, 1964–1965) and at Moorook Lake near Loxton in South Australia (Tindale, 1964–1969). Also at the South Australian Museum was Charles Fenner (1884–1955; Figure 7), who prior to 1946 when he became an honorary researcher at the Museum to study australites, was a former Director of Education in South Australia (Fenner, 1954; 2006).

Archaeologists from museums have conducted research into the use of australites for artefact-making. A contemporary of Tindale who was connected with the South Australian Museum was geologist James (Jim) E. Johnson (1917–1983), who had a research interest in aus-

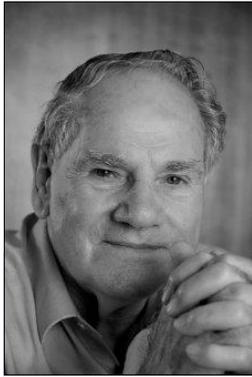


Figure 8: Dr Robert Edwards in 2009, photographed by John Elliott (<https://www.portrait.gov.au/portraits/2010.1/robert-edwards/>).

tralites, as well as in archaeology. Other archaeologists/anthropologists who worked on Aboriginal use of australites were Robert (Bob) Edwards (b. 1930; Figure 8) and Kim Akerman (Figure 9), who is still an active researcher.

2 ANCESTOR OBJECTS

The perceived power of australites was derived from their connection to ancestors who went up to the Skyworld after the Creation. It was a widely held Aboriginal belief that it was in the Skyworld that the ancestors, often seen as celestial bodies, created the weather for the Earth and still had an influence over living people (Clarke, 2009; 2014; 2015; Tindale, 1983). There was broad agreement between Aboriginal people and Europeans concerning the origin of australites:

The aborigines tell us these stones fell from the sky, and are (what our American friends would call) "good medicine," in which they agree with the majority of modern geologists. (INO., 1924: 5).

On the Nullarbor Plain, the railway station master A.G. Bolam (1930: 63) described the 'sky-stones' that were found on the Nullarbor Plain and in the sand dunes at Ooldea:

The blacks call them "Nulu,"³ and barter them with neighbouring tribes as magic stones. They believe that the australite reached the earth from some extra-terrestrial region, and possess some magic power.

2.1 Creation Narratives

There is a recorded account of a Creation myth that involves the origin of the australites. During

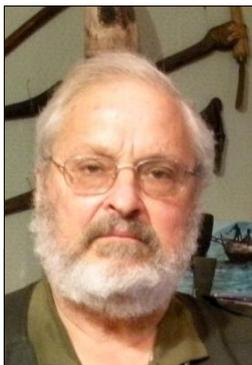


Figure 9: Adjunct Professor Kim Akerman (<https://www.Kimberleyfoundation.org.au/events/kft-lecture.perth-wed-23-sept-kim-akerman/>).

a South Australian Museum fieldtrip to the North West of South Australia in 1963, Tindale was at Mount Davies in the Tomkinson Ranges and noted in his journal:

According to [Aboriginal patrol officer] MacDougall's story the Njinggar or Ice men⁴ made a black hail of australites fall from the sky to kill ring necked parrot [*patilpa*, *Barnardius zonarius*] men as punishment for killing all the *waro* or wallabies [*waru*, black-footed rock wallaby, *Petrogale lateralis*]. (Tindale, 1963: 177, 179).

There may have been some syncretism of beliefs occurring in the australite mythology as recorded by Tindale, because in his same journal he noted that his Aboriginal informant, Tommy Dodd, stated: "White people say they [australites] fell from the sky." (Tindale, 1963: 178). Prior to the writing of Tindale's record above, Mountford had written about Ninya (= Njinggar) the "Ice Men", who were said by Anangu Pitjantjatjara Yankunytjatjara people of Central Australia to be spirit beings who lived under two salt lakes north of Mount Conner in the southern Northern Territory in

... huge underground caverns, whose ice-covered walls are continuously swept by howling, wintry blasts; a frightful place ... (Mountford, 1948 [1981: 77]).

There was no mention of australites in Mountford's account, but he did go on to record that "... the Ninya can only be seen by medicine men ..." and could influence the weather, as the "... piercing winds that accompany them are responsible for the cold of winter" (ibid.).

During a fieldtrip to Woomera in western South Australia in 1965, Tindale again interviewed Walter (Wally) MacDougall about australites and recorded a truncated version of the australite myth involving ringneck parrots and rock wallabies, that omitted Njinggar the Ice Men. He said:

MacDougall found that the Mt. Davies aborigines called these australites *ko:di* and not *japu*.⁵ In their myth the *waro* or rock wallaby quarrelled with the ring-necked parrots who were killing many *waro* without cause. A *waro* being caused black hail to fall and this killed all the ring-neck parrots while the *waro* hid safely in their rock shelters. (Tindale, 1964–1965: 683).

There is another myth narrative from the 1960s that Bob Verburgt—who was then working as Superintendent at Amata for the Department of Aboriginal Affairs—recorded when out on a trip with Aboriginal men near Mount Davies. It was on this same trip that the green gemstone known as chrysoprase was discovered,⁶ and the mythological account of its creation is similar to that of the ringneck parrot given above, but without any mention of the Ice Men, rock wallabies

or australites. Verburgt (1999: 53) said:

The old men who were with me told an interesting story as to how the green stone came to be. In the Dreamtime they said the green parrots [i.e. ringnecks] used to come to the area to drink from the rock-holes in the early morning and later afternoon. They would come in their thousands, swooping and squawking before settling down to drink. One day a fearful storm came up with strong winds, thunder and lightning. This frightened the parrots and they took to the air in panic. They were circling around the hills as a burst of hail thudded into the ground. The hail was so large that it knocked most of the green parrots onto the ground, transforming them into stone.

The association of australites and emus (Figure 10) is culturally important to Aboriginal people in the north east of South Australia. Here, the Diyari (Dieri) people of Cooper Creek had traditions concerning australites being associated with the Emu Ancestor, and as such were described as *warukati-undru*, that meant “pertaining to emus” (N.B. Tindale, pers. comm. [Baker, 1957: 3, 21]). The act of the emu losing their eyes was said to have occurred during the Creation period. Frederick McCarthy (1965: 17) from the Australian Museum in Sydney said:

After lighting a ring of fires around a waterhole, the hunters threw “emu’s eyes” (australites or tektites of meteoric origin) at the birds to confuse them and cause them to run into the water, where they were easily killed. The australites were believed to be the eyes of ancestral emus which lost them while searching for food, but imbued them with a magical control over the living birds.

Emus are major Creation ancestors across much of Australia (Clarke, 2016; Maddock, 1975; McCarthy, 1965; Spencer and Gillen, 1927). In Aboriginal tradition it is the presence of the ancestor’s power that is imparted into objects, such as the flanged button-shaped australites known as ‘emu-eyes’, which can be accessed by knowledgeable people who are healers and sorcerers (Baker, 1957).

2.2 Charms and Sorcery Objects

Aboriginal people possessed a variety of objects as ritual tools, relying on the ancestral powers they could access through the use of them (Hassell, 1936; Howitt, 1904; McCarthy, 1976; McCourt, 1975; Mountford, 1960; Petri, 2014; Roth, 1903). It is not possible to separate ritual objects just used for healing from those used for purposes such as to entice and enthrall wild birds or animals, to create weather or for making sorcery. The same object could be used by its owner for all such things. Shiny and transparent materials, particularly transparent quartz, were seen as powerful, and after Europeans arrived

pieces of bottle glass were similarly used (Howitt, 1904). Objects that showed a prism were associated with the rainbow, which was the manifestation of Rainbow Serpents that were believed to live in certain waterholes on Earth and in the Skyworld (Radcliffe-Brown, 1926). Because of their unusual shape and shiny glassy interior australites often were also used ritually.

Stones that are unusual in colour and shape are often found scattered on the surface of former Aboriginal camps. In 1934 Howchin remarked:

Among the relics picked up on the sites of old camps are such objects as might be called “pretty” stones – not adapted for chipping into shape as tools, but had evidently been carr-



Figure 10: The head of an emu. The emu (*Dromaius novae-hollandiae*) is an indigenous flightless bird of Australia. The black iris in the eye of the emu was widely associated with the more frequently found central cores of australites (photograph: P.A. Clarke private collection).

ied about by the natives for some reason or other. Thus in the old camping grounds near Adelaide, such objects as “saffron-quartz” (false topaz), clear quartz crystals with pyramids, stones weathered into peculiar shapes, or stones variously striped in colours, etc., have been picked up, which no doubt meant something in the life of those who carried them. To be able to see through a hard stone, as in clear quartz, would greatly impress the native, and he would immediately attach some potent influence to this unusual object. It might bring rain, or make game plentiful, a charm against a witch doctor, or a corrective to the effects of a pointed bone. (Howchin, 1934: 78).

This section describes the use of australites as charms. It is divided into large geographical regions (see Figure 1) for a discussion of the rel-

evant cultural traditions. These regions are not ethnographically autonomous, as groups from the Western Desert culture are widely spread across the arid zone. There are many areas in Australia for which there are no records concerning the relationships that local Indigenous people may have had with australites, even though these objects were present in the landscape. In particular, it is claimed that there are no known ethnographic records of australite use in Tasmania (Scott and Scott, 1934).

2.2.1 Southwest of Western Australia

Analysis of the ethnographic record for this region indicates that australites were used for healing and sorcery. Tate (Anonymous, pers. comm. [Tate, 1879: lxxi]) reported that his correspondent from Salt Creek, King George Sound at Albany in southern Western Australia, had written:

The black stones are very rare, and much prized by the natives, who believe the possessor bears almost a charmed life, and is able also to cure sick people of any complaint they may be afflicted with, as also to bewitch their enemies, or any one with whom they have a grievance, tormenting them with all kinds of diseases and finally destroying life itself.

Rainmaking was another perceived function of certain australites. In 1894 Howchin (cited in Anon., 1894: 7) claimed that "... these bombs [australites] are frequently carried by the natives as charms and for the purpose of causing rain" The Wheelman people of the Bremer Bay district of southwest Western Australia used a variety of stone as ritual objects classed as *booliyah*, and it was observed by colonist/anthropologist Ethel Hassell (1936: 705) that "Any stone which differed from those about was immediately accepted as a magic stone." In the case of australites, their different appearance to the majority of other local stones would have potentially added to their appeal. Here, Hassell (1936: 706) recorded the use of 'rain stones', which were hard and like green glass, and:

These stones were not common, only about a half dozen having been seen in this tribe, and were greatly prized as rain stones. When the transcontinental railway line was built [between Adelaide and Perth], some of these curious stones were found on the Nullarbor Plain. No one seems to know what they are but it has been suggested that they are a kind of cosmic glass which may have fallen as meteorites. Since these plains are limestone in formation and non-volcanic, these stones have been a puzzle much discussed by scientists.

There is a 'charm' in a museum ethnographic collection that is a naturally broken piece of a large hollow australite found near Scadden north of Esperance in southwest Western Au-

stralia.⁷ This particular object was documented as a "... magical stone – an eye ... [that was] found by a Wudjari Tr. Aboriginal c.10 yrs ago [c.1919]." In a Western Australian newspaper (Anon., 1900: 5) it was reported concerning australites that "Australian aboriginals call them wappair stones, and attribute remedial properties to them, binding them on any affected part."

2.2.2 Central Western Australia

A former missionary at Kalgoorlie in the Northern Goldfields reported that

... the aborigines believed that the black stones (australites) fall from the sky, and that only an occasional one enters a man, who then becomes ill or "possessed" ... (A.G. Mathews, pers. comm. [W.H. Cleverly, pers. comm., Baker, 1957: 3]).

At Coolgardie to the southwest, it was claimed concerning australites that

... these buttons are collected by the aborigines and used as charms by pressing them on the part of the body which is suffering pain. (Twelvetrees and Petterd, 1897: 42).

Australites were also recorded being used as charms to heal the sick at Kanowna in the same region (F.D. McCarthy, pers. comm. [Baker, 1957: 4]).

Among the Western Desert people at Warburton Ranges in central Western Australia, as well as at Ooldea in western South Australia, the 'witch doctors' used the 'faith-healing procedure' to extract australites by sucking them from the bodies of people suffering from sickness and pain, such as brought on by 'devil possession' (A.G. Mathews, pers. comm. [Baker, 1957: 5]). In relation to 'message-stones', it was recorded that:

Two australites from Mt. Margaret, Western Australia, now lodged in the Australian Museum, Sydney (Reg. Nos. 23531-2), were regarded by the natives of that district as being of great value in the transmission of messages. They were carried about in the beards of medicine men; this gave them a power, supposedly exuded through the navel, to receive and transmit messages long distances ... (F.D. McCarthy, pers. comm. [Baker, 1957: 7]).

There are australites among a collection of 'magic stones' (*mabbins*, 'emu-stones') that are held in the Western Australian Museum (Baker, 1957: 5, 19). These possibly included the 'map-pain stones' (obsidian bombs) collected by William D. Campbell from the Kalgoorlie area (Rhodes, 2018: 66). E.S. Simpson, who was a mineralogist at the Geological Survey in Western Australia, published a paper in 1902 based on his examination of the Campbell Collection (Simpson, 1902), which was formerly access-

ioned into the Western Australian Museum collection in 1958 (Rhodes, 2018). Other items from Campbell may have been procured by the British Museum of Natural History in London, as they reputedly had a box of "... obsidian bombs, called by the natives 'mappain' and work applied to the stomach as medicine." (Fenner, 1939: 16), although their provenance was not recorded. In 1901, when Campbell had put his collection of 600 australites on display in Kalgoorlie township, a local newspaper reported that

The Australian aboriginals call them mappain stones, and attribute remedial properties to them, binding them on any affected part. (Campbell, 1901: 23).

The names of *mabbin* and *mappain* given for Campbell's australites appear to be orthographic variations of the term 'moppins', which was used by members of a pastoralist family in the Northern Goldfields during the late-twentieth century, and it was thought to be derived from

... an Aboriginal word, probably a variant of corruption of "mappin", meaning "emu stones", a word used by Aborigines for australites in Western Australia ... (Cleverly, 1995: 173–174).

Environmentalist Vincent Serventy described being shown an australite by an elderly Aboriginal man at the Warburton Aboriginal Mission in 1956. He recalled:

First he looked about very carefully to make sure no children were watching. Then he slightly uncapped his hand and showed me what it contained. 'Mappan,' he whispered. I looked suitably impressed as I knew this meant a magic stone, useful for a variety of purposes. It was almost the equivalent of a doctor's black bag which has a curative value merely by belief. Mappan stones were the same. Sick people thought that a wise man could cure them by using such a stone. ... The stone was a tektite or Australite as they are often called. (Serventy, 1972: 28).

Indigenous australite names that are variously written as *mabbin*, *mappain*, *mappan*, *mappin* and *moppin* are all cognates of the *maban/mabanba* terms that are recorded as the ritual objects of healers along the western coast of Western Australia, in the Kimberley and the Western Desert cultural regions (Akerman, pers. comm.; Elkin, 1977; Mountford, 1976). Across these regions, ritual objects such as small decorated pearl shells, quartz crystals and australites were all considered to be *maban*, and the name also extended to the healer. It is likely that most of these objects were perceived as having originated in the Skyworld or being associated with spirits, such as the Rainbow Serpent, which resided there.

When the archaeologist/anthropologist Scott Cane (2002) worked on a native title claim for the

Spinifex People in the Great Victoria Desert in Western Australia he noted that the 'medicine men' were called *marpan*, which would appear to be related to word to *maban* mentioned above. He observed that

Spinifex People are superstitious and rely on a range of magic items and charms. These are generally acquired from the bush and may take the form of attractively shaped or coloured rocks and crystals, such as tektites, as well as modern items, such as polished haematite, carved wood and coloured plastics. People with reputed magical and healing skills will also carry a secret cache of 'magic stones' consisting of a range of materials, but these are never seen. (Cane, 2002: 214).

The wide use of essentially the same word, *maban*, across language boundaries is probably due the fact that these 'magic stones' were extensively traded. Trade networks between the Kimberley and the Goldfields regions, and into the Western Desert, involved an exchange of a wide range of artefacts, and included ceremonial and ritual items (Akerman, 1995). In a study of contemporary healers in the south Kimberley, archaeologist/anthropologist Kim Akerman (1979: 24) noted that

The doctors to whom I spoke obtained their powers either through dreams, or by obtaining *maban* (tektites, shell, etc.) from acknowledged living doctors.

2.2.3 Western Desert

In the early-twentieth century Daisy Bates collected from Aboriginal people on the Nullarbor Plain an 'obsidianite' that was carried in a 'nest' of emu feathers and used for healing.⁸ Across Western Australia and in western South Australia, Bates found numerous specimens of 'skystones' in the possession of sorcerers, which they reportedly referred to as 'eyes'. She explained that

One stone in particular was almost the exact shape of an eyeball, and rather resembled onyx, in that it had an "eye rim" of white, forming a perfect ring round a small whitish spot in the centre of the "eyeball." The owner called the object *kooroo* (eye),⁹ and cured or killed with its aid, the *kooroo* either extracting the magic from a sick member of the group, or projecting fatal eye-magic into an enemy group. (There are two widely distributed names for "eye" in aboriginal dialects, "mel" (eye)¹⁰ being mainly a coastal word, while "kooroo" (eye) ranged over a great central area from the heads of the Ashburton, Gascoyne, and Murchison Rivers in West Australia to the Mann, Petermann, Musgrave, and Everard Ranges of Central Australia, and probably further east. The specimen in possession of the Laverton (West Australia) native sorcerer may have been originally found on or within the north-

ern edge of the West Australian portion of the Great Nullarbor Plain in (about) lat. 29 degrees 10 min., long. 126 degrees 30 min., or on the clay pans, salt lakes, or plains areas further north or east. (Bates, 1924: 11).

Bates found 'skystones' in the possession of individuals among Aboriginal groups in south-east Western Australia at Eucla, and in western South Australia at Head of Bight, Fowlers Bay and Ooldea.¹¹ Allowing for differences in spelling orthography, the name she gave for this category of object was the same later recorded by Bolam, as mentioned above. Bates (1924: 11) noted:

Nooloo or nyooloo [*nulu*] was the only name given to those interesting objects of magic, this term being used throughout the area mentioned. Quaintly shaped specimens were always supposed to contain good or evil magic, and were valuable as such, and as objects of special barter between friendly groups.

In the coastal parts of western South Australia and the adjacent part of Western Australia, it was observed that those australites that had a peculiar shape were more likely to be used as 'magic stones' and bartered, particularly the "... slightly-curved club-shaped nyooloo ..." (ibid.). A *kooroo* that Bates purchased from a sorcerer from the 'Lica Totem group' was highly polished, caused she believed by years of handling. All australites were believed to have come from the Skyworld and to be still coming down. Bates (ibid.) recorded that Aboriginal people

... not only believed that the obsidianites [australites] came from "the sky," but they also believed that when a burndila (meteor) came down from some constellation known to them as the home (heaven) of certain dead groups, many dhalgain (new) nyooloo would be found on the beena (swamp), undiri, or arruga (plain) of such group, even though the "thunder" sound of the meteor as it struck the ground came from "far away" (warn-ma).¹²

The combination of the cultural and physical properties of the australites were such that they could be used as precision ritual tools. Baker (1959: 190) recorded that:

Occasional larger, plate-like pieces of oval outline, were used in the religious rite of circumcision, and were sometimes used in the operation of sub-incision. One from the Nullarbor Plain bears the aboriginal name of "nyooloo", but the name is not given.

From their fieldwork at Ooldea on the edge of the Nullarbor Plain with Western Desert people during the early 1940s, the Berndts published an account of how a 'native doctor' or *kinkin* (*ma:banbaa* or *nanggaringgu*) used a *ma:ban* object, which was usually a shell disc that he

had received when initiated as a healer. They recorded:

Brought before a patient he [the *kinkin*] assumes a special attitude, scrutinises him and decides on the measure to be taken. The *ma:ban* (a quartz crystal or australite may be used with equal efficacy) is pressed to the afflicted part of the patient, and it is said that it passes through that part of the body and comes out the other side bringing with it all the badness that was causing the pain. The blood is then sucked out and complete cure is imminent. (Berndt and Berndt, 1943: 56).

The Indigenous use of names for australites that translated to 'emu-eyes' appears to have been restricted to groups living in the western and central parts of Australia (Scott and Scott, 1934). In the Western Desert region, it was an Aboriginal belief that australites had some ritual power over emus. Baker (1959: 190) noted that:

Mr. H.R. Balfour of Toorak, Victoria, who made enquiries among the natives of the Woomera region of Central Australia about the reason for their use of the term "emu-stones," informs me that these aborigines wrap up australites in balls of emu feathers which are then thrown in the direction of flocks of emus. The particular natural inquisitiveness with which the emu is especially endowed, results in a close approach to these objects for near inspection and extraction of the contained australites. While absorbed in their investigations, the emus are speared by the aborigines.

Basedow was a South Australian who had geological training and as Chief Medical Officer and Chief Protector of Aborigines in the Northern Territory he worked extensively with Aboriginal people across Central Australia. He believed that Aboriginal people and emus were both enlarging the spatial range of australites:

Their universal distribution has, no doubt, been assisted by the agency of the native and the emu (in the form of "gizzard stones"). The natives call obsidian bombs *Pandolla* and *Kaleya korru*, the latter meaning "emu eye." They are collected by the medicine men of the tribes, and applied in the healing of sickness. (Basedow, 1905: 89).¹³

Among the Western Desert peoples of Central Australia, the australite was the main object used for healing (Mountford, 1976). For contemporary Ngaanyatjarra, Pitjantjatjara and Yankunytjatjara peoples of the NPY Lands, the word *mapanpa* means "*ngangkari* [healer] sacred tools" (K. Peters, pers. comm. 2018; NPY Women's Council, 2003: 35, 47, 49, 55, 81). A recognised *ngangkari*, Andy Tijlari, described the *mapanpa* arriving at special camps where all the healers are gathered. He explained that

They have a lot to talk about, as you can imagine. Meanwhile the *mapanpa* are hitting

the ground with small explosions, 'boom, boom, boom'. The *ngangkuri* dash around collecting up the objects: *kanti* are sharp stone blades; *kuti* are black shiny round tektites; and *tarka* are slivers of bone. Each *ngangkuri* gathers up the pieces he or she wants. These pieces become the *ngangkari's* own private property. (A. Tjilari [NPY Women's Council, 2003: 34]).

The *maban* term appears to relate specifically to ritual power as a property, rather than to a specific object. In the NPY Lands another *ngangkari*, senior man Nakul Dawson, said:

I don't know how to take a person's temperature with a thermometer. I only know about *mapanpa* or special sacred tools. *Mapanpa* can look like small pieces of bone. They are kept in water or inside the hand. They are kept inside the hand and help to locate *punu* or little pieces of wood that get lodged in people's bodies. (N. Dawson [NPY Women's Council, 2003: 55]).

In 1940 C.P. Mountford conducted fieldwork among the Anangu Pitjantjatjara Yankunytjatjara people of Central Australia, who were part of the Western Desert culture, and he found that australite charms were an important part of their material culture. He said that his informant, "Old Tjalerina, the chief actor in the Wild Turkey ceremony, had always wanted to be a medicine-man ...", but could not reach his goal because of a severe health issue (Mountford, 1981: 54). Tjalerina claimed that

... he had once been a "little bit doctor," able to see the night-dwelling spirits (the spirits off the dead)", but with sickness during the drought had lost this power to "see". (Mountford, 1976: 563).

Mountford (1981: 54) also recorded that

When he [Tjalerina] had recovered he had given one 'doctor' many spears to rejuvenate him, but without success. From another he had purchased an australite (an obsidian button of meteoric origin) which, the second doctor man had assured Tjalerina, would make him an even bigger 'black-fella doctor' than before, if he succeeded in pushing the australite into his solar plexus. The poor chap had tried to do that repeatedly, but in vain. In fact Tjalerina said his skin became so tender that he decided the extra power he would have gained was not worth the pain and trouble involved.

Mountford was given the australite spoken of by Tjalerina, which gave him the opportunity to enquiry about its significance. The object was said to have "... contained many *kungara kurans* (medicine men's spirits)." (Mountford, 1976: 563). He wrote that:

I learned from Tjalerina that australites are the special property of their *nungari* [*ngangkuri*]¹⁴ (medicine-men), just as quartz crystals are the stock-in-trade of the aboriginal

doctors of the southern tribes. Those meteoric stones have many functions in the hands of the *nungari*. They will restore his failing powers if inserted into his body, and act as a watchdog over his property when he is absent. They will also tell him the direction of an enemy, and assist him when performing healing rites on his fellow tribesmen. (Mountford, 1981: 55).

Australites were part of a category of ritual objects that were said to be kept inside the body of senior men. Bates (1947: 111) recorded that the *jeemarri*, which were circumcision knives made from hard dark flint, "... come from the stomachs of the old men ..." and were widely traded. In the case of Tjalerina, he believed that if he had succeeded in inserting the australite *maban* into his body, then

... he would have had a number of *kurans* – his own and those contained in the Australite. He would then have hoped that one dark night his *kurans*, transforming themselves into *maralis* [spirit body] ... would have taken him on many adventures, perhaps even visiting Watak-jarana, the land of the medicine men ... (Mountford, 1976: 563).¹⁵

Evidence from Tindale, recorded during a South Australian Museum fieldtrip to the North West of South Australia in 1963, is that large australites in particular were treated as having important ritual functions. He noted that his Aboriginal informant:

Old Charlie offered me a piece of red ochre and produced three australites which he claimed to have found at Mt. Davies. One was an unusually large dumb bell shaped one. In discussions about *ko:ti*¹⁶ or australites after we returned to Mt. Davies I learned that the word *ko:ti* really meant doctor. They were "doctor" stones. White people say they fell from the sky. (Tindale, 1963: 177).

Tindale (ibid.) had another Aboriginal informant on the 1963 trip describe the use of an australite flake for the circumcision and cutting of the tongue rituals. Tongue cutting using a sharp stone was also described by Carl Strehlow among the Western Arrernte for making a 'Magic Doctor' (C. Strehlow, 1907 [cited Petri, 2014: 51]). For australites, Tindale (1963: 177) noted in his journal:

Tommy Dodd says that at Charlotte Waters large ones are found; these are split and the flakes used in making young men. In making a "doctor" man a flake of *ko:ti* stone is used to cut the tongue of the Law doctor whose blood is then sucked from the tongue. This practice is said to be general in Pitjantjatjara [Pitjantjatjara] territory & east to Charlotte Waters.

Tindale recorded Dodd's knowledge of where australites come from and further details concerning their use in the subincision and making

'doctors' rituals. He noted that

According to Tommy Dodd "*ko:ti* really means 'doctor' and is applied to australites because they are "doctor business". White people say they fell from the sky. At Charlotte Waters they get big ones and split them to make knives for making young men, especially in whistle cocking [subincision]. In making a doctor man they cut the tongue with a sliver of *ko:ti* and suck the blood. Similar practices come right through to Mt Davies. (Tindale, 1963: 178).

In 1964 Johnson published the results of a stone tool survey of Aboriginal campsites in the North West of South Australia and he noted that the Pitjantjatjara people referred to australites as *koordi* (Johnson, 1964: 177), which is a spelling variation of the same word, *ko:ti*, as recorded by Tindale above. The 'o.' character as written by Tindale was spoken as an 'oo' sound and is often written as 'uu' in more recent orthographic systems for the Aboriginal languages of Central Australia (see Monaghan, 2009: 234; Tindale, 1935b: 264). The meaning of *kuuti* is "... black shiny round tektites of celestial origin." (NPY Women's Council, 2003: 11), which is another acceptable spelling variation for the same word.

In 1965 John Greenway was on a fieldtrip to Eucla on the Western Australian side of the Nullarbor Plain with Tindale and Yankunytjatjara (Jangkundjara) man Freddy Windlass. In his account of this trip he recorded the Pitjantjatjara names for australites as *mapunpa* and *ku:ti*, although apparently Windlass just called them 'meteorites' (Greenway, 1973: 142). These Indigenous terms appear to relate to *maban* and *ko:ti* (*koordi*, *ku:ti*, *kuti*). The reference of *maban* (*mabanba*, *marpan*) to a healer's ritual object has already been discussed above. In the case of *ko:ti* (*kuuti*), this is possibly a secular term that relates to *kuti-kuti*, which is recorded as meaning 'revolving' in the Pitjantjatjara/Yankunytjatjara language (Goddard, 1992: 48). Similarly, in the neighbouring Ngaanyatjarra/ Ngaatjatjarra language which is spoken to the west, *kurti-kurti* means "... rolling over and over, rolling down ..." (Glass and Hackett, 2003: 105). This is a different explanation to Tindale's claim that *ko:ti* translates as 'doctor'.

2.2.4 Northern Central Australia

In 1909 missionary Carl Strehlow produced an Arrernte dictionary for people living in the Macdonnell Ranges in Central Australia, within which was recorded *ngankara* as 'zauberdoctor, zauberstine', that translates as 'medicine man' and 'magic stones' (Strehlow, 1909 [2018: 286]). Although the stones are not described by him, they could have included australites. In 1931 the Adelaide-based zoologist T. Harvey Johnson was on a Board for Anthropological Research

expedition to Central Australia when he collected an australite 'charm' at Cockatoo Creek, which is near Yuendumu in the Tanami Desert to the northwest of Alice Springs.¹⁷ Here, Edwards described australites as being still in use as charms during the mid-1960s. He noted that

While at Yuendumu Settlement – situated in the north-west of Central Australia – during August 1965, the writer [Edwards] was told of an incident showing the present day persistence of the aboriginal custom of using australites to cure sickness. The informant was an intelligent aboriginal, 20 years of age, who stated that recently when lying sick in his shelter, he was visited by an elderly woman. From a small bag she reverently took out a number of australites, rubbed them with fat and placed them in rows across his chest. During these procedures she chanted aboriginal songs which apparently were an essential part of the treatment. The next morning his condition was much improved. (Edwards, 1966: 243–244).

The morphology of the individual australite was a determining factor in whether or not it was used as a charm. A researcher noted that

Professor [Baldwin] Spencer tells me that he never saw them worn by the natives of Charlotte Waters, where they occur plentifully, and that no notice of them whatever was taken ... (Walcott, 1898: 43).

In spite of this, some decades later Harold L. Sheard collected a set of three australite charms, described as 'obsidian bombs', from Charlotte Waters.¹⁸ It is possible that in some areas where australites were relatively common, only the oddly shaped or especially large examples were considered special by local Aboriginal people. For instance, Spencer's partner Gillen remarked that among the Central Australian australites, "Some stones of special shape are used for magic purposes by natives" (F.J. Gillen, 1901 [cited Mulvaney et al., 1997: 313]). He collected a set of 'obsidianites' in a 'nest' of emu feathers from Kaytetye (Kaitish) people at Hanson River in Central Australia.¹⁹

In the Warlpiri language spoken by people of the Tanami Desert area northwest of Alice Springs, *pirilyi-ngarnu* means 'charcoal-eater', and it is a general term for either emu or bustard that refers to their habit of swallowing pieces of charcoal for their gizzard stones (M. Laughren, pers. comm.). And in this language, *pirilyi-pirilyi* refers to the pupil of the eye, which is black, like charcoal (*pirilyi*). The charcoal-eating habits of emus were also remarked upon by Arrernte people (Roheim, 1974: 169). The Warlpiri perceive a mythological connection between the Emu ancestor and the production of charcoal for making black paint (Anderson and Dussart, 1988). Similarly, the Wagaya people in the Bark-

ly Tablelands of northern Central Australia have a tradition of the Emu and Charcoal Dreaming being associated with a specific black 'war paint' mine (Rankine, 2000: 26). The symbolism of the gizzard, with its hoard of 'sacred' stones, is also significant. It is recorded that Warlpiri men regarded the contents of the gizzard removed from an emu or bustard that they had killed as 'good medicine' (Rhodes, 2018: 69). The blackness of australites, which are sometimes found in emu and bustard gizzards, makes them symbolically analogous to charcoal.

Among the Djaru of the southern Kimberley and the desert people at Balgo to the immediate south in the Great Sandy Desert, *maban* refers to magic power and the *maban-jarra* are literally the people (healers) who possessed this power (R. Graham, pers. comm.). Similarly, among the Mardudjara of Jigalong on the western edge of the Great Sandy Desert, for the *mabarn* [*maban*] healers the "... magical stone or shell objects they are said to carry in their stomachs ..." are also called *mabarn* (R. Tonkinson, 1978: 107). At Jigalong it was noted for the *mabarn* healers that

Apart from the small objects of stone, shell or wood that they are said to keep within their bodies and which are sources of their power, the *mabarn* have no curing paraphernalia. (M. Tonkinson, 1982: 233).

In the Warlpiri language of northern Central Australia, stones that are psychically put inside someone to make them sick or to kill them are *yarda*,²⁰ and *maparnpa* refers to both the power to detect and extract them from the body and to healers (also *karrpiri*, *ngangkari*, *ngangkayi*) who possess the power (M. Laughren, pers. comm.). These definitions of *maban* (*maparnpa*) as ritual power are consistent with Western Desert traditions.

2.2.5 Eastern Central Australia

The senior men of the Diamantina River people carried australites known as *ooga* ('emu eyes') as charms, to which they credited the power of night vision (Duncan-Kemp, 1933: 72). In Diyari (Dieri) language spoken in the neighbouring Cooper Creek area australites were known as *warukati milki-tandra*, meaning 'emu eyeball', and were regarded as representative of the *mura-mura*²¹ (Fry, 1937: 201). To the south the Wadikali people at Lake Frome referred to them as *mindjimindjilpara*, meaning "... eyes that look at you like a man staring hard ..." (N.B. Tindale, pers. comm. [Baker, 1957: 3, 21; Fenner, 1954: 8]). At Stuart Creek Station near Marree in South Australia, a koonkie ('tribal witch doctor') was said to have removed an australite from the breast of a patient, who later died (Mr Canham, pers. comm. [Tate, 1879: lxxi]). A set of 'obsid-

ianite charms" was collected from Albemarle Station in western New South Wales during the late-nineteenth century.²²

It is recorded that australites were used ritually in the northeast of South Australia for hunting emus. For instance, in the Aboriginal Ethnographic Collection of the South Australian Museum there are two sets of four 'emu eyes' collected by Ted Vogelsang. The first set was collected at Mulka; and the second came from Mungaranie and was described as "... emu eye Mura-mura [ancestor] stones ..." that had been obtained from an elderly Diyari (Dieri) man named Dintibana.²³ In the same region, a Diyari man known as Old Piltibunna described the use of 'obsidian bombs', or australites, as charms for blinding game during an emu drive (Horne and Aiston, 1924: 135). Aiston claimed that "As a great favour Piltibunna gave me a nest containing three emu eyes, so now I can catch emus whenever I like." (Horne and Aiston, 1924: 60). It was recorded that

Obsidian bombs were called *warroo getti milki* (emu eyes), and were supposed to be eyes that the emu had lost when walking about looking for food. These when found were smeared with fat and red ochre and were stored in a net bag full of emu feathers, kept together by being wrapped around with hair rope. (Horne and Aiston, 1924: 135).

By an account from writer Charles Barrett, Aboriginal hunters threw australites that were still contained within a 'nest', which probably made their recovery easier. He explained:

... they believe that the small rounded objects, which they carry in a "nest" of feathers, have the power of making emus blind. It is no trouble at all to get emus if only you possess a nest of "emu eyes." The blacks throw among emus that have come to drink one of the feather nests containing two or three australites. The birds are supposed to become blinded and run into the water. Aborigines have strong faith in the power of "emu eyes" and are reluctant to part with them. (Barrett, 1938: 42).

In the northeast of South Australia region, 'obsidian bombs' were also treated as 'lucky stones' or 'charm stones' (Baker, 1957: 7), and were believed to be the product of lightning, and therefore were called 'lightning stones' (Horne and Aiston, 1924: 136). It was perceived that the power from the heavens could be placed in objects here on Earth. Similarly, a newspaper writer claimed that an Aboriginal myth, probably from the Australian east coast, "... states that the gum in the hearts of wattle trees [*Acacia* species] is made by shooting stars lodging there and breaking into bits." (Anonymous, 1904). For Aboriginal people on the east coast of Australia, sightings of meteors were associated with fire

and linked to the waratah (*Telopea speciosissima*), which has a red flower (Haynes, 2009: 11).

2.2.6 Southeast Queensland

The australite distribution map drawn by Baker (1957: Figure 1) had the northern limit on the eastern coast side at about 250 kilometres north from where Fenner (1934: Figure 3) had placed it, which was at Kyogle in northeast New South Wales. This means that much of southeast Queensland is now considered to be within the strewn field. However, it is not known whether this area was within the actual distribution zone for australites, as they could have reached the latter region through trade.

It was within southeast Queensland that Reverend John Mathew (1928: 527) recorded the Aboriginal use of

... animated stones ... that are kept in a medicine man's private dilly [bag], wrapped around carefully with much string, and perhaps moss, that are highly efficacious.

He said that there were three main types: a white quartz pebble which the Kabi Kabi people in the Maryborough district called *nganpai*; a red stone; and a black 'obsidianite'. In the case of the black 'animated stone', which from its description as an obsidian suggests that it was generally an australite, Mathew (ibid.) said that he had one in his possession which was

... about 1in. to 1 1/8in. [2.54 to 2.76 cms] long, 3/4in. [1.91 cms] wide at widest and 1/2in. [1.27 cms] thick at thickest part, tapering to the ends.

In terms of their use he stated that:

The doctor will apply one of them to a painful spot and remove the cause. They are at the same time deadly in their effects to the uninformed. When not carried, they are hung up on a tree near at hand, and none but the owner will dare handle them. Once when I ventured near to inspect, the camp shouted out in alarm, "Don't touch, don't touch." (ibid.).

The Kabi Kabi called these obsidianite stones *mullu* ('black') and *minkom*, while people from the neighbouring Gooreng Gooreng (Gurang) at Wide Bay and Wakka Wakka groups in the Murgon district just knew them as *minkom* (Anon., 1912: 4; J. Mathew, pers. comm. [Dunn, 1912: 14]; Mathew, 1910: 112–113; 1928: 527; Petri, 2014: 78). As with most powerful objects, the animated stones could be used for both healing and sorcery. Mathew said:

A sorcerer was believed to have a number of these stones in his inside. He certainly carried one or more in his dilly-bag. When a man felt an acute, sudden pain, he believed that it was caused by a "mullu" being thrown at him by an enemy. They had a curative,

as well as a lethal application. (J. Mathew, pers. comm. [Dunn, 1912: 14]).²⁴

There are other records from southeast Queensland of what appear to have been australites. Winterbotham recorded that 'native medicine men' in southeast Queensland obtained black stones known as *mingom* (*minkom*) by diving into waterholes associated with the Rainbow Snake (L.P. Winterbotham, pers. comm. [Baker, 1957: 6]). During the current author's fieldwork in the region during 2016–2017, it was found to be part of local Aboriginal oral history that a *mingom* was a powerful stone that could make rain, and that certain of the waterholes, such as at Ban Ban Springs, were associated with a Rainbow Serpent/Eel (Hawkins and Wein, n.d.: 4–7, 10–11). In the vocabulary of the Wakka Wakka language spoken in southeast Queensland, a linguist listed *mingom* as "... bad stones in the body (causing disease) ..." (Holmer, 1983: 78).

2.2.7 Victoria

Australites had similar medicinal uses in Victoria. In southwest Victoria colonist James Dawson (1881: 59) described Indigenous healers making toothache leave the body of their patient with

... a black stone, about the size of a walnut, called karriitch. Stones of his kind are found in the old mounds [middens] on the banks of the Mount Emu Creek, near Darlington. The natives believe that when these stones are thrown into the stream at a distance from their residence, they will return to the place where they were found; and as they are considered an infallible remedy for toothache, they are carefully preserved.

In southwest Victoria these same stones were used to give enemies toothaches by throwing them in the direction of their territory, and a tree where many of the stones were found was avoided. Dawson (1881: 59–60) also said that:

Stones of a similar description are found in the sand hills on the sea coast, and are put into a long bag made of rushes, which is fastened round the cheek. The doctor always carries these stones in his wallet, and lends them to sick people without fee or reward.

Dunn noted that "I have been told by the [Lake] Condah natives that these stones are applied by the sorcerer to the human body to remove pain." (Dunn, 1912: 14). Since the personal effects of a deceased person were often buried with the body, it is possible that australites as charms have also been buried some metres beneath the surface, a fact that needs to be taken into account when determining the likely age and origin of these stones (Baker, 1957). In this region the private collector L.R.

Kurtze made a large collection of australites, which were placed in his own local museum at Portland (Anon., 1932b). There was also reputedly a fine collection in the nearby Warrnambool Museum (Anon., 1909).

Colonist/scholar Edward M. Curr described Aboriginal sorcery practices in the Gippsland region of Victoria, and in particular the use on an object that other researchers later identified as an australite (Dunn, 1912; Petri, 2014). Curr (1887, Volume 3: 547) said:

The mode of proceeding was to obtain possession of something which had belonged to the person whose death was desired, such as some of his hair, or excrement, or food; or to touch him with an egg-shaped piece of stone which was called bulk, and was thought to be possessed of magic powers.

Alfred W. Howitt gave Robert Brough Smyth an example of a *bulk* object that he had obtained

... from an old man in Gippsland ... [and was] believed by the natives to possess extraordinary powers, and held in great estimation by the sorcerers. (Smyth, 1878, Volume 1: 386).

It was described as 4 inches (10.16 cms) in length and 2.5 inches (6.35 cms) in breadth, and weighed 27.5 ounces (0.78 kg), which Baker (1957) suggested was excessively large and therefore probably was not an australite. It remains, though, that the Indigenous category of *bulk* would still have included australites.

In 1880 Fison and Howitt published a more detailed account of how the *bulk* was gained by a Ganai (their Kurnai) man of the Gippsland through the agency of a dream. Howitt claimed that:

A Kurnai [Ganai] told me that, when gathering wild cattle for a settler near the Mitchell River, he dreamed one night that two "Mrarts" ["medicine men"] were standing by his fire. They were about to speak to him, or he to them (I now forget which), when he woke. They had vanished, but on looking at the spot where they had stood he perceived a "Bulk," which he kept and valued much. (Fison and Howitt, 1880: 247).

Howitt then described the ritual uses of the *bulk*:

Every individual, although doubtful of his own magic powers, has no doubt about the possible powers of any other person. If the individual himself fails, he supposes that he is "not strong enough." There is scarcely a Kurnai [Ganai] of those who are not Christianized who does not carry about with him a bulk – a rounded, generally black, pebble. It is supposed to be of general magic power. For instance, if buried together with the excreta of any person, that person receives the

magic "bulk" in his intestines and dies. The touch of it is supposed to be highly injurious to any one but the owner. I have seen girls or women greatly terrified when I have offered to place one of these bulk in their hands. (Fison and Howitt, 1880: 251).

Howitt went on to describe the power contained with the *bulk*, which they linked to the light of a fire. He claimed that

It is believed that a bulk has the power of motion. For instance, during the writing of this essay, Tankowillun told me that he and Tulburn had, the evening before, seen a bulk, in the shape of a bright spark of fire, cross the roof of a house and disappear on the other side. Also that they ran round to catch it, but it had vanished. (Fison and Howitt, 1880: 251).

In 1887 Howitt published an account of "Australian medicine men", within which he described the use of quartz as well as the *bulk*:

Of all magical substances the crystal of clear and translucent quartz holds the first rank in the estimation of the Australian aborigines. Yet in the central clans of the Kurnai [Ganai] tribe the black stone called *bulk* is more regarded, and as far as this particular community is concerned, it is only among the Brataua Kurnai [Brataulung] and the eastern Krauatun Kurnai [Krauatungalung], who adjoin the Kulin and Murring tribes respectively, that the quartz crystal is held in dread esteem. (Howitt, 1887: 26).

3 AUSTRALITES AND TOOL-MAKING

For Aboriginal people, the glassy properties of australites made them desirable for tool-making (e.g. see Figure 11). In 1894 geologist Walter Howchin showed members of the Royal Society of South Australia an "... obsidian bomb which had been shaped into a cutting instrument by the aboriginals." (Anon., 1894: 7). Then in 1909 he exhibited a large obsidianite from Kangaroo Island and observed that elsewhere "... the aborigines are often found with obsidianites in their possession, which they use as charms and sometimes chip them into the form of scrapers." (Howchin, 1909: 349).²⁵ Mr Johns, a curator at the Warrnambool Museum, reportedly claimed that in the southwest of Victoria, australites were carried as amulets and were sometimes broken up to form splinters used to barb spears (Archibald [cited Walcott, 1898]). It has been argued that references to 'volcanic glass' being used for making weapons, such as for barbs of the *wurokiigil* spear in southwest Victoria (Dawson, 1881: 87), are actually references to the use of "... either australite glass, or else had been confused with a special type of fragmented tachylyte ..." (Baker, 1957: 10). Archaeologist Stanley R. Mitchell (1949: 93) noted that australites

... consist of a black glass of complex miner-

al composition, have a conchoidal fracture, and in thin flakes are translucent; they are also known as obsidianites and in their physical characteristics closely resemble obsidian. Occasionally microliths, points and micro-scrapers were made from them by the Australian aborigines.

Tindale (1964–1969) appeared to be unaware of the breadth of evidence for Aboriginal use of australites to make tools, as he believed that no Aboriginal people living prior to his proposed 'Pirrian' and 'Mudukian' cultures could have used australite glass to make implements, putting the earliest date at about 4,000 years B.P. Based on his Devon Downs excavation on the banks of the Murray River in South Australia, Tindale proposed a chronological sequence of Aboriginal culture, with the Pirrian period named after a style of stone point and the Mudukian period taking its name from a type of bone point (Tindale, 1957; 1959; 1968). Tindale (1974: 85) fine-tuned the dating, but later said that



Figure 10: An australite core found by the author at an Aboriginal campsite on Middleback Station, northern Eyre Peninsula, in 1980. Left: Edge-on view. Right: underside, showing flaked edge (P.A. Clarke private collection).

What little obsidian found was from areas where a shower of glassy meteorites had fallen during the past five or six thousand years. The pieces, seldom larger than 2 inches (5 cm.) in diameter and known as *australites*, were used by the peoples of the Pirrian and the succeeding Mudukian culture phase, who were microlith implement users.

The acceptance of Tindale's linking of australite use in tool-making with his proposed Pirrian/Mudukian cultures supported the theory that the australite shower occurred sometime in the Holocene, between 5,000 and 2,000 years B.P. (Baker, 1957). In 1964 Tindale had accompanied his geologist colleague at the South Australian Museum, David W. P. Corbett, to Myrtle Springs in the Flinders Ranges of northern South Australia (Tindale, 1961–1965; 1964–1965). Based on the data associated with the 175 australites they obtained, Corbett determined that the fall of the australites had occurred some 4,000 to 5,000 years B.P., although it was said that this was based on "Limited stratigraphic and archaeological evidence ..." (Corbett, 1967: 561). The last-mentioned evidence he relied upon was Tindale's sequencing of Aborig-

inal cultures from the Murray River in South Australia (Tindale, 1957), along with the stratigraphic findings of Gill (1965) and Baker (1956; 1960; 1963) from southwest Victoria. Modern archaeology no longer supports the idea of classifying cultures due to supposedly unique elements of their material culture, as Tindale had done above (Mulvaney and Kamminga, 1999). Given the rejection of Tindale's model, Corbett's dating of the australite fall is unreliable.

From examples drawn from the collections of several museums, Baker (1957) has provided a detailed description of a wide variety of Aboriginal tools from south-eastern Australia that were made from australites, which I will not repeat in full here. According to him, many of these australites recovered from the field have signs of wear, both through the natural processes of weathering and by other means. Baker (1959: 184) observed that:

A few of the australites could possibly have been abraded and cracked during utilization by large native birds as gizzard-stones, and some show "carry polish" attributed to constant handling by aborigines in the practise of their customs and rites. One or two from the Port Campbell district of Victoria, were accidentally fractured by cart wheels or horses' hooves, such specimens having been found on old roads last used in 1933. Others from sundry parts of Australia, have been deliberately fractured by aboriginal man in the manufacture of stone weapons and implements ...

Using the South Australian Museum archaeological collections, Edwards (1966) conducted a survey of australite specimens obtained from known Aboriginal campsites in South Australia.²⁶ From his sample of 443 specimens he found that they were from four distinct categories: 130 complete specimens possibly used as charms (29%); 161 fractured specimens without trimming (36%); 56 trimmed pieces, but still of indefinite shape (13%); and 96 implements that had secondary trimming and were similar to stone microliths (22%). Edwards suggested that the use of australite glass was favoured because of its property of readily breaking with a clear fracture that is distinctly conchoidal. Limiting factors for the use of this material were its lack of structural strength, and its relatively small size in comparison to most other stone sources such as porcellanite, agate and jasper. Edwards (1966: 246) concluded that "Australites obviously held a very minor place as a suitable material for implements, but nevertheless, a number of interesting examples have been found."

In 1973 archaeologist and anthropologist Kim Akerman obtained a collection of 385 australites that had been offered for sale by a gem dealer in Kalgoorlie (Akerman, 1975).²⁷ They had been collected from near Rawlinna Siding on the Trans-



Figure 11: A collection of australites with flaked edges from Rawlinna Siding, Goldfields, Western Australia (K. Akerman, private collection, no. 972).

Australian Railway line at a site that was probably both a campsite and a tool-making place, and in close proximity to a gnamma hole. The result of Akerman's analysis of the Rawlinna collection was that all of the 385 items were Aboriginal artefacts: 295 struck flakes (77%), 60 utilised flakes (16%), 17 backed flakes (4%), 12 micro-adzes (3%) and 1 micro-burin (<1%). He compared this with other collections held by the Western Australian School Mines in Kalgoorlie, which were from areas such as northeast of Wiluna in central Western Australia, the vicinity of Kalgoorlie and on both sides of the Trans Australian Railway line (Akerman, 1996: Map 1). There were similar tool types in these additional collections, although it is possible that their numbers for each category may have been the result of selective collecting. In 1973 Akerman documented the finding of a worked australite among other stone tools at Lake Hope west of Norseman in southern Western Australia (see Figure 11).

In summary, Akerman's study indicates that in certain areas of Western Australia, australites were well suited as a source of material for making small implements. Akerman was involved with the finding of other australites, such as specimen from Jidirr near Balgo in northern Western Australia that had been originally found by

Aboriginal man Richard Tax, and passed on to the Western Australian Museum (Megirian and Mason, 1996). Akerman later found artefacts made from australites in the northern Tanami Desert region of the Northern Territory (*ibid.*).

In the absence of major sources of volcanic glass in Aboriginal Australia, outside the volcanic plains of southwest of Victoria, australites were a source of small flakes that were the sharpest of cutting tools (Cotterell and Kamminga, 1987), albeit with limitations on their use, as outlined by Edwards (1966). The use of australites as tools appears to have had a discontinuous range within the documented strewn field, but it was particularly noted as an aspect of the Aboriginal material culture in southern Australia (Mulvaney and Kamminga, 1999). Edwards observed that:

The main australite implement finds in South Australia extend over a region between the River Murray and the Peterborough-Broken Hill railway line ... where good quality stone for implements is practically non-existent and usually obtained by trade. In the Lake Torrens and Lake Eyre regions, abundant supplies of suitable stone are readily available. Australite specimens collected from campsites in such areas are generally intact and untrimmed and were possibly used by the aboriginal in his practice of "magic" ... It may

be that the availability of stone for implements influenced the use of australite glass. (Edwards, 1966: 248).

In support of Edwards' statement about the distribution of australite use there is a collection of thumbnail scrapers made from this material that were recovered from Oakvale Station north of Renmark in South Australia at a campsite that had been used by the Nanya people in the late-nineteenth century.²⁸ Australite researchers engaged in fieldwork during the early-1970s in Western Australia have largely confirmed Edward's view about high australite use in areas with poor sources of tool-making stone:

Our own experience confirms this; we found aborigine-worked australites common only on the Nullarbor Plain and on Earaheedy Station, areas where the silicified rocks preferred for implements are totally lacking. (Chalmers et al., 1976: 15).

Australites in the form of flaked cores and flakes have been regularly located at former campsites, which are often near water sources such as soaks, gnamma holes, rock holes, pools and swamps (Akerman, 1975; Cleverly, 1988; 1991; 1994; Cleverly and Cleverly, 1985; Johnson, 1963; 1964; Rowland, 2014). Johnson (1963; 1964) surveyed Aboriginal campsites in the North West of South Australia, and several places where australites were found had Aboriginal names. At least some of the australites he found appear to have been in use shortly after European settlement, as they were contained within a mixture of stone and exotic material at a campsite at Lake Wilson. This was also the case at an Aboriginal campsite on coastal dunes near Wallaroo on Yorke Peninsula in South Australia, where

Australites and australite microliths are found, as well as odd coins, one an 1818 shilling, musket balls and claypipe stems. (Johnson, 1963: 67).

For australites in collections, the dull patina on fractured surfaces provides an indication that they were made by Aboriginal tool-makers, rather than the result of recent collectors testing to see if they were glassy inside (Akerman, 1975). Since only relatively small stone tools can be made from them, there is some misunderstanding of their likely function. Akerman described australites as chiefly blades for Western Desert adzes and as wood engravers. This is supported by the documentation of an australite 'engraver' collected by James E. Johnson in 1960 from Pitjantjatjara people at Wingelina in central Western Australia.²⁹

In the Aboriginal collections of the Western Australian Museum there is an australite fragment from Red Hill near Perth in Western Australia that is labelled as a "Chip of australite worked and used as a knife by an aboriginal."

(Baker, 1957: 14). At the National Museum of Victoria, curator Aldo Massola is said to have identified a flaked australite found by Cleverly in the Kalgoorlie area as a 'circumcision knife' (Baker, 1957: 14).³⁰ It is not clear how such an object could be identified as a surface find, which led Akerman (1975: 117) to observe that

Those artifacts made of australite that have been recognised, invariably seem to be classed as circumcision knives, as assumption that reflects more on the romantic nature of the finder than on the possible range of use that the flake may have been subjected to.³¹

Aboriginal use of australites to make tools was regarded as an impediment by geologists who were searching for large complete examples of them in the field (Baker, 1967). For instance, it was stated that

Australites from near Hughes on the Nullarbor Plain include numerous flakes but no large specimens because of destructive use by Aborigines. (Cleverly, 1991: 371).

It was suggested that "... the survival of larger australites may be dependent upon a lack of Aboriginal interest in them as raw materials." (Cleverly, 1991: 380). There is some evidence to suggest that large australites were highly attractive for making tools. In 1963 on a South Australian Museum fieldtrip, Tindale and his zoologist companion Peter Aitken collected a flaked tool at Malupiti at Mount Davies in the Tomkinson Ranges in north-western South Australia, which had been made from a large australite.³²

Overall, in spite of Aboriginal tool-makers having a preference for large australites, the amount of their past use for this purpose does not appear to have significantly reduced their numbers in the field. A Western Australian study of the destruction of australites by early Aboriginal people though tool-making concluded that

... from a consideration of the forms of flaked australites, it is estimated that less than 1% of australites have been used destructively by Aborigines. This level of destruction can have no significant effect upon the australite distribution pattern. (Cleverly and Cleverly, 1985: 1).

In addition to the fabrication of stone tools from australites, there is some evidence to suggest that their use as charms may also have resulted in some physical change to them. In 1978 it was reported that on display in the Geological and Mining Museum in Sydney there was a large elongated boat-shaped australite that had been acquired in 1916 from Mr W.T. Brown from Central Australia (Cleverly and Scrymgour, 1978). The label claimed it had been used by Aboriginal people as a 'medicine stone', and upon inspection by geologists it was

remarked that

... there is some support for it in the artificial abrasion of the specimen, apparently accomplished by rubbing it back and forth parallel to the length so that slight ridges remain between adjoining facets. (Cleverley and Scrymgeour, 1978: 328).

4 DISCUSSION AND CONCLUDING REMARKS

It is a major temptation for European scholars to take a celestial or environmental event from a Creation myth narrative, such as the 'black hail' example from MacDougall above, and treat it as a factual account of something that had happen in the past. Tindale (1938) often portrayed myth as memory, for cataclysmic events such as meteorite strikes (Hamacher and Norris, 2009) and volcanic eruptions. For instance, in the case of the latter he proposed that the ancestor's campfires mentioned in the Eagle-hawk and Crow myth narrative of the Mount Gambier area in South Australia were symbolic of the volcanic vents, and that this was a memory passed down through Aboriginal tradition of an actual volcanic eruption, commencing at 4,710 B.P. and with the last minor recurrence being 1,410 years B.P. (Tindale, 1959; 1974). If Tindale was correct, this would mean that the myth had been orally passed down, largely intact, some 188 generations to the present,³³ which if so is a remarkable achievement. Superficially this proposal appears to be well meaning by acknowledging that elements of Aboriginal myth are equivalent to historical fact, but unfortunately it does lock Aboriginal tradition into what Europeans have in the past considered to be its 'primitive' form.

Tindale's approach of treating myth as memory is in line with the highly controversial statement from his contemporary Adelaide-based researcher, the anthropologist and linguist Theodor G.H. Strehlow. In his ethnography, *Aranda Traditions*, Strehlow (1947: 6) argued that:

It is almost certain that native myths had ceased to be invented many centuries ago. The chants, the legends, and the ceremonies which we record today mark the consummation of the creative efforts of a distant, long-past age. The present-day natives are on the whole merely the painstaking, uninspired preservers of a great and interesting inheritance. They live almost entirely on the traditions of their forefathers. They are in many ways, not so much a primitive as a decadent race.

In contrast to Strehlow's statement above, modern anthropology considers that Aboriginal culture and tradition is, and has always been, changing in response to the shifting social and physical environments (Kolig, 1984; Sutton, 1995). In a review of *Aranda Traditions*, a senior anthropologist remarked that while Strehlow

had produced an important ethnography, he had nonetheless suffered from a

... lack of understanding of the dynamic quality of Central Australian culture, which even today continues to exert itself forcefully in areas further north where aboriginal culture is still intact ... (Davidson, 1950: 85).

My own opinion is that while accepting that the content and structure of myths conveys important information down the generations, as part of a living culture they are constantly being augmented and altered in line with their changing situations (Clarke, 1995; 1996; 2018).

The above example provided by Tindale of the australites being portrayed by desert people as 'black hail' illustrates the point that Indigenous people are able to explain the origin of environmental phenomena that existed long before the arrival of their biological ancestors according to their own world view and with reference to their Creation traditions. In some parts of Australia, quartz crystals were also believed to have come from the Skyworld as 'hail' (Radcliffe-Brown, 1926: 22). In relation to the origin of australites, Tindale believed that they fell no more than 5,000 years B.P.—not the 793,000 years B.P. that scientists have more recently calculated (Lei and Wee, 2000).

The recording of an Aboriginal myth narrative concerning a fall of australites by Tindale demonstrates how easy it would be to assume that the ancestors of modern Aboriginal people witnessed a past geological/celestial event and recorded it in their traditions, particularly when it was assumed to have taken place since their arrival on the Australian continent. In the case of the 'black hail', the ability and creativity of Indigenous people in explaining phenomena in their environment must be acknowledged, without assuming that it was a perspective that could only have been handed down through the millennia. Recent studies have demonstrated that early Aboriginal experience and knowledge of their environment, which scholars today term Indigenous Biocultural Knowledge or Traditional Ecological Knowledge, is dynamic with redundant information quickly replaced with new experiences and knowledge that hunter-gatherers have gained (Cahir et al., 2018).

Stone, both raw and fabricated into tools, was a major element of the trade conducted across Aboriginal Australia and as such had symbolic importance in forming connections between widely separated peoples (Brumm, 2010; McBryde, 1978; McCarthy, 1939a; 1939b). Trade may explain the presence of australites in areas where they were naturally rare or absent. For instance, in the far north of Western Australia, archaeologist Charles E. Dortch found six australites in pre-European rock shelter occupa-

tion sites within the area that is now largely inundated by Lake Argyle in the Ord Valley (Cleverly and Dortch, 1975). Five of these specimens were flaked artefacts. It was reasoned that their presence was possibly due to late Pleistocene trade with people from the south where australites are more plentiful. Lake Argyle lies on the extreme edge of what is generally considered to be the extent of the australite strewn field (McColl, 2017). In contrast to australites, true meteorites do not appear to have been utilised at all in the Aboriginal material culture (Bevan and Bindon, 1996).

It has been suggested that in Aboriginal Australia charms made from australites were part of the trade cycle (Cleverly, 1976). Edwards (1966: 248) stated that:

The australites in use at Yuendumu in Central Australia were said by the aboriginals to have come from a great distance and were possibly transported by them from the Musgrave Park or Mount Davies-Lake Wilson areas where numerous specimens have been recovered. The dispersal of australites from their original strewn-fields can be attributed to many agencies. There is insufficient evidence to indicate whether their use by the aboriginals had any significant effect on their distribution.

Individuals in possession of australites were capable of taking them long distances, and therefore north of the Kyogle-Derby line (Fenner, 1934) and outside of their natural distribution (McColl, 2017). For instance, it was recorded by australite researchers doing fieldwork in the 1970s that

Some years ago the owner of Marion Downs, a station 35 miles south of Bouila [sic. Boulia] in northwest Queensland (23° 20', 139° 40'), reported that an aboriginal there had a large round australite core, chipped at the edges; he stated that he had carried it for long distances over many years and obviously treasured it. (Chalmers et al., 1976: 15).

Due to major cultural changes occurring over the millennia within Aboriginal Australia, which are reflected in the archaeology (Lourandos, 1997), it cannot be assumed that Aboriginal use of australites has remained the same throughout time. Therefore, apart from the spatial differences with the Indigenous use of australites as tools, there are possibly temporal aspects to their use. It has been suggested that the use of australites collected on the Nullarbor Plain from about 10,000 B.P. may have been due to an expansion of foraging ranges due to a more benign climate, rather because of a sudden appearance of the material (Smith, 2013).

From the available evidence, it appears that while australites were possibly widely traded across Aboriginal Australia, particularly as

charms, it is unlikely that this had occurred in sufficient numbers to have obscured the distribution of the strewn field. The use of australite glass to make artefacts was probably restricted to those areas where they occurred that also had a deficiency of good local stone for making tools. In spite of their usefulness in this regard, australites were not generally classed with 'rocks', as were the various cherts that were used for making stone tools. That these small, glassy, emu eye-like objects were not thought of as such, but considered as *maban* despite their usefulness as scrapers, is significant. Aboriginal people did not see the tektites land, but nevertheless they perceived their presence in the landscape as special. The australites, as a category of object, were utilised for both the magical and the mundane—being too good to give up use as a scraper.

5 NOTES

1. The current name of the National Museum of Victoria is Museum Victoria.
2. The collections included the following, all from South Australia: Barry Lindner from the Yalata area; Mrs W.B. MacDougall from the Mount Davies area; and Bob Verburgt from the Coober Pedy area.
3. In the Pitjantjatjara/Yankunytjatjara language *ngulu* (= *nulu* ?) means "... warily, cautiously, wanting to avoid something bad happening." (Goddard, 1992: 88–89).
4. In the Pitjantjatjara/Yankunytjatjara language, *nyinninga* (= *njinggar*) means "ice, frost" and "... frost season, cold time of the year, winter." (Goddard, 1992: 97). Tindale (1974: 71) translated *njenga* to mean "snow" in this language.
5. In the Pitjantjatjara/Yankunytjatjara language, *kuti-kuti* (= *ko:di* ?) means "revolving" (Goddard, 1992: 48). Also, in the Pitjantjatjara/Yankunytjatjara language the term *tjapu* (*japu*) refers to "small. Especially used of living things that are small because they are young." (Goddard, 1992: 146–147).
6. Greenway (1973) provided an account of Bob Verburgt's attempts at getting the Department of Aboriginal Affairs to support the mining of chrysoprase at Mount Davies. In the early 2000s I noticed that chrysoprase was still being intermittently mined near Pipalyatjara in the northwest corner of the Anangu Pitjantjara Yankunytjatjara Lands in South Australia.
7. A27532, received circa 1929 from Mr E.J. McCarthy at Scadden via N.B. Tindale (South Australian Museum Aboriginal Ethnographic Collection).
8. A1362, early-twentieth century (South Australian Museum Aboriginal Ethnographic Collection). Other australite 'charms' in the Mus-

- eum collected by Bates include A1357 and A1363.
9. In Western Desert languages, such as Pitjantjatjara/Yankunytjatjara, *kuru* (*kooroo*) is “eye” (Goddard, 1992: 46).
 10. In the Wirangu language of the West Coast of South Australia, *mil* (*mel*) is “eye” (Miller et al., 2010: 57).
 11. There is a collection of ten australites (A32509) that D.M. Bates collected at Ooldea, South Australia (South Australian Museum Aboriginal Ethnographic Collection).
 12. In the Pitjantjatjara/Yankunytjatjara language, *wanma* (*warn-ma*) means “far away”, “... not close, at a distance.” (Goddard, 1992: 185).
 13. In Western Desert languages, such as Pitjantjatjara/Yankunytjatjara, *kalaya* (*Kaleya*) is “emu” and as we have seen (Note 9) *kuru* (*korru*) is “eye” (Goddard, 1992: 27, 46). Tindale (pers. comm. [Baker, 1957: 19, 20]) suggested that *pandolla* could mean “... pertaining to limestone places”, as *parnda* and *parndala* mean “limestone”.
 14. For a contemporary perspective of the *ngangkuri* refer to NPY Women’s Council (2003).
 15. Note that Mountford has Anglicised the spelling of the Aboriginal names by putting a ‘s’ on the end of the words to denote a plural. The term, *marali*, means “spirit body” (NPY Women’s Council, 2003: 60).
 16. The term *ko:ti* appears to be a variation of Tindale’s writing of *ko:di*.
 17. A27197 (South Australian Museum Aboriginal Ethnographic Collection). Refer to Jones (1987) for details of the Board for Anthropological Research Expeditions.
 18. A16038, early-twentieth century (South Australian Museum Aboriginal Ethnographic Collection).
 19. A3776, early-twentieth century (South Australian Museum Aboriginal Ethnographic Collection).
 20. The term *yarda* is possibly a cognatic term to *yarida*, meaning a ‘magic object’ (Berndt, 1987: 20), in the Ngadjuri language of the mid-north of South Australia (R. Graham, pers. comm.).
 21. In the Diyari (Dieri) language of northeast South Australia the *muramura* (mooramooraa) were the ‘ancestors’ (Horne and Aiston, 1924: 110; Howitt, 1904: 475).
 22. A6043, received from L. Hole (South Australian Museum Aboriginal Ethnographic Collection).
 23. A16601, Mulka, Cooper Creek, South Australia, early-twentieth century; A16619, Mungaranie, South Australia, early-twentieth century (South Australian Museum Aboriginal Ethnographic Collection). Other collections from this region in the Museum from the same period are A14351, ‘obsidian charms’, Cooper Creek, J. Reuther; A21087, comprised of 7 australite ‘charms’ from Uruwalina, 25 miles (40 kms) northeast of Cooper Creek, northeast South Australia, collected by Dr A.M. Morgan.
 24. This information was repeated in “Magic Stones. Aboriginal Superstitions.” (*Ballarat Star*, 28 October 1912, p. 2).
 25. Baker (1957) misinterpreted Howchin’s statement to mean that Aboriginal people on Kangaroo Island had used the australites as charms and scrapers.
 26. The South Australian Museum examples of Aboriginal implements made from australites cited by Edwards (1966: Figure 1) included the following: 37 implements found by Mr and Mrs K. Treloar on Waiwera Station, South Australia; numerous specimens collected by J.E. Johnson from Yorke Peninsula, South Australia and from the North West of SA (see Hale, 1956; Johnson, 1963, 1964); 81 complete australite implements and 9 fractured pieces found by M. Mudie on Arcoona Station, South Australia; and various australite implements found by Edwards at 11 localities in northeast South Australia. Edwards also inspected private australite collections, that were owned by the following persons: Mr and Mrs R.D.J. Weathersbee; Dr G. Gregory; Brian Sawers, Andrew Bailey and B. O’Connell.
 27. According to Akerman (1966), the australite collection had been made in a relatively short time by Mr Norman Irons and his family.
 28. A14333-14346, received from F.W. Gilbert, 3 January 1929 (South Australian Museum Aboriginal Ethnographic Collection). According to Baker (1957) there is collection of australite artefacts from this location obtained from Mr F.A. Cudmore in the Geological Collection of the University of Melbourne.
 29. A52758, 27 January 1960 (South Australian Museum Aboriginal Ethnographic Collection).
 30. Registered as 49299 (Museum of Victoria).
 31. The observation is consistent with my own, having several times during fieldwork heard contemporary Western Desert people refer to small stone flakes found on the ground at Aboriginal sites as probably circumcision knives, referred to as *djimeri* (= *jeemarri*, Bates, 1947: 111), in spite of the fact that they appeared to be simple microliths.
 32. A54805, 17 November 1963 (South Australian Museum Aboriginal Ethnographic Collection). Refer to Tindale (1963: 177–178, 187). From the same broad region, the Museum has A14351, an ‘obsidian charm’ from the waterhole Opparinna in the western Musgrave Ranges, collected by Williams in the early-

twentieth century.

33. The estimated number of generations is based on an average of 25 years of age for each parent. Note that the Eaglehawk and Crow mythology and its tracks extend much further than the Mount Gambier area, and also that knowledge of it appears to have been subjected to movement in the historical period (Clarke, 2016; 2018).

6 ACKNOWLEDGMENTS

Important comments on the drafts of this paper were received from Kim Akerman, Rob Graham, Mary Laughren and Donald H. McColl. I would like to thank Duane Hamacher who suggested that australites were worthy of investigation from a cultural perspective.

7 REFERENCES

- Akerman, K., 1973. Further evidence of the manufacture and use of ground-edged axes in south Western Australia. *Western Australian Naturalist*, 12(5), 107–111.
- Akerman, K., 1975. The use of australites for the production of implements in the western desert of Western Australia. *University of Queensland. Occasional Papers in Anthropology*, 4, 117–123.
- Akerman, K., 1979. Contemporary Aboriginal healers in the south Kimberley. *Oceania*, 50(1), 23–30.
- Akerman, K., 1995. Tradition and change in aspects of contemporary Australian Aboriginal religious objects. In Anderson, C. (ed.), *Politics of the Secret*. Sydney, Oceania Monographs. Pp.43–50.
- Anderson, C., and Dussart, F., 1988. Dreamings in acrylic: Western Desert art. In Sutton, P. (ed.) *Dreamings: The Art of Aboriginal Australia*. Melbourne, Penguin Books. Pp. 89–142.
- Anon., 1857. Royal Society of Tasmania. *Courier* [newspaper], 13 January, page 2.
- Anon., 1893. Royal Society of South Australia. *South Australian Register* [newspaper], 6 December, page 3.
- Anon., 1894. Royal Society of South Australia. *South Australian Register*, 5 December, page 7.
- Anon., 1898. Reviews. Royal Society of Tasmania. Papers and Proceedings, 1897. *Mercury* [newspaper], 12 April, page 4.
- Anon., 1900. Obsidian bombs. *Kalgoorlie Miner* [newspaper], 22 December, page 5.
- Anon., 1901. To correspondents. *Chronicle* [newspaper], 28 September, page 26.
- Anon., 1904. Aboriginal mythology. *The Newsletter. An Australian Paper for Australian People*, 2 January, page 16.
- Anon., 1908. Editorial. *Argus* [newspaper], 20 August, page 4.
- Anon., 1909. Notes & answers. Answers to correspondents. *Australasian*, 24 July, page 37.
- Anon., 1910. Meteorites and obsidian. *Observer* [newspaper], 23 April, page 10.
- Anon., 1912. "Magic stones". Aboriginal superstitions. *Bendigo Advertiser* [newspaper], 29 October, page 4.
- Anon., 1915. Border notes. *Border Watch* [newspaper], 31 March, page 4.
- Anon., 1918. Across Australia. The new railway line. *Dungog Chronicle: Durham & Gloucester Advertiser* [newspaper], 7 May, page 3.
- Anon., 1921. W. A. exhibits. Minerals and curios. A unique collection. *Kalgoorlie Miner*, 14 November, page 1.
- Anon., 1924. Open-air yarns. Emu eyes. *Mail* [newspaper], 29 November, page 2.
- Anon., 1931. Sky-stones. Visitors from space. Composition of meteorites. *Daily Mercury* [newspaper], 9 February, page 3.
- Anon., 1932a. General news items. Tasmania. Shooting star deposits. *Mercury*, 19 January, page 5.
- Anon., 1932b. Portland's museum. *Portland Guardian* [newspaper], 14 April, page 3.
- Anon., 1935. Australites found at McKenzie Springs. *Horsham Times* [newspaper], 8 March, page 2.
- Anon., 1938. Scientists examine relics. May solve riddle of desert camp. *News* [newspaper], 8 September, page 9.
- Anon., 1942. The collection, which was purchased by the museum, contains 7,000 specimens. *Mail*, 17 October, page 9.
- Anon., 1964. Search for australites. *Mail*, 29 August (clipping in Tindale, 1961–1965, 1095).
- Anon., 1966. Gemstone localities. *Australian Women's Weekly* magazine, 21 December, page 13.
- Baker, G., 1936. Tektites from Sherbrook River district. *Proceedings of the Royal Society of Victoria*, 49(2), 165–177.
- Baker, G., 1940. Some australites structures and their origin. *Mineral Magazine*, 25, 487–494.
- Baker, G., 1944. Flanges of australites (tektites). *Memoirs of the National Museum of Victoria*, 14(1), 7–22.
- Baker, G., 1946. Some unusual shapes and features of australites (tektites). *Memoirs of the National Museum of Victoria*, 14(2), 47–51.
- Baker, G., 1955. Australites from Harrow, Victoria. *Mineral Magazine*, 30, 596–603.
- Baker, G., 1956. Nirranda strewfield australites, south east of Warrnambool, western Victoria. *Memoirs of the National Museum of Victoria*, 20, 59–172.
- Baker, G., 1957. The role of australites in Aboriginal customs. *Memoirs of the National Museum of Victoria*, 22(8), 1–23.
- Baker, G., 1958. The role of aerodynamical phenomena in shaping and sculpturing Australian tektites. *American Journal of Science*, 256, 369–383.
- Baker, G., 1959. Tektites. *Memoirs of the National Museum of Victoria*, 23, 5–313.
- Baker, G., 1960. Origin of the tektites. *Nature*, 185 (4709), 291–294.
- Baker, G., 1963c. Form and sculpture in tektites. In O'Keefe, J.A. (ed.), *Tektites*. Chicago, University of Chicago.
- Baker, G., 1967. Structures of well preserved australites buttons from Port Campbell, Victoria, Australia. *Meteoritics*, 3, 179–217.
- Baker, G., 1968a. Australites from Princetown, Victoria. *Memoirs of the National Museum of Victoria*, 28, 23–37.
- Baker, G., 1968b. Australites from NNE. of Morgan, South Australia. *Memoirs of the National Museum of Victoria*, 28, 39–76.
- Baker, G., 1969. Five large australites from Victoria, Australia and their relationship to other large forms. *Memoirs of the National Museum of Victoria*, 29, 53–64.

- Baker, G., 1972. Largest australite from Victoria, Australia. *Memoirs of the National Museum of Victoria*, 33, 125–130.
- Baker, G., 1973. Australites from the Murray-Darling confluence region, Australia. *Memoirs of the National Museum of Victoria*, 34, 199–208.
- Barrett, C., 1938. Mystery of the australites. *Weekly Times* [newspaper], 16 April, page 42.
- Basedow, H., 1905. Geological report on the country traversed by the South Australian Government North-west Prospecting Expedition, 1903. *Transactions of the Royal Society of South Australia*, 29, 57–102.
- Bates, D.M., 1924. Sky stones. *Sydney Morning Herald* [newspaper], 16 August, page 11
- Bates, D.M., 1947. *The Passing of the Aborigines. Second edition.* London, John Murray.
- Bentley, F., 1928. The stage. Hard-boiled Herman. *Sun* [newspaper], 15 April, page 36.
- Berndt, R.M., 1987. Panaramittee magic. *Records of the South Australian Museum*, 20, 15–28.
- Berndt, R.M., and Berndt, C.H., 1943. A preliminary report of field work in the Ooldea region, western South Australia. *Oceania*, 14(1), 30–66.
- Bevan, A.W.R., and Bindon, P., 1996. Australian Aborigines and meteorites. *Records of the Western Australian Museum*, 18, 19–101.
- Bolam, A.G., 1930. *The Trans-Australian Wonderland. Seventh Edition.* Melbourne, Barker & Company.
- Brumm, A., 2010. 'The falling sky': symbolic and cosmological associations of the Mt William greenstone axe quarry, central Victoria, Australia. *Cambridge Archaeological Journal*, 20(2), 179–196.
- Campbell, W.D., 1901. Obsidian bombs. *Kalgoorlie Western Argus* [newspaper], 1 January, page 23.
- Cane, S., 2002. *Pila Ngura. The Spinifex People.* Fremantle Arts Centre Press, Fremantle.
- Clarke, P.A., 1995. Myth as history: the Ngurunderi mythology of the Lower Murray, South Australia. *Records of the South Australian Museum*, 28(2), 143–157.
- Clarke, P.A., 1996. Adelaide as an Aboriginal landscape. In Chapman, V., and Read, P. (eds.), *Terrible Hard Biscuits. A Reader in Aboriginal History.* Sydney, Journal of Aboriginal History; Allen & Unwin. Pp.69–93.
- Clarke, P.A., 2009. Australian Aboriginal ethno-meteorology and seasonal calendars. *History & Anthropology*, 20(2), 79–106.
- Clarke, P.A., 2014. The Aboriginal Australian cosmic landscape. Part 1: The ethnobotany of the Skyworld. *Journal of Astronomical History and Heritage*, 17(3), 307–335.
- Clarke, P.A., 2015. The Aboriginal Australian cosmic landscape. Part 2: plant connections with the Skyworld. *Journal of Astronomical History and Heritage*, 18(1), 23–37.
- Clarke, P.A., 2016. Birds as totemic beings and creators in the Lower Murray, South Australia. *Journal of Ethnobiology*, 36(2), 277–293.
- Clarke, P.A., 2018a. Totemic life. In Cahir, F., Clark, I.D., and Clarke, P.A. (eds.), *The Indigenous Bio-cultural Knowledge of Southeastern Australia.* Melbourne, CSIRO Publishing. Pp. 1–18.
- Clarke, P.A., 2018b. Australites. Part 1: Aboriginal involvement in their discovery. *Journal of Astronomical History and Heritage*, 21, 115–133.
- Cleverly, W.H., 1976. Some aspects of australite distribution pattern in Western Australia. *Records of the Western Australian Museum*, 4(3), 217–239.
- Cleverly, W.H., 1988. Australites from Mount Remarkable Station and adjoining parts of Yerilla Station, Western Australia. *Records of the Western Australian Museum*, 14(2), 225–235.
- Cleverly, W.H., 1991. Australites from three localities in south-western Australia. *Records of the Western Australian Museum*, 15(2), 371–381.
- Cleverly, W.H., 1994. Australites from Gindalbi and Menangina pastoral stations, Western Australia. *Records of the Western Australian Museum*, 16(4), 475–483.
- Cleverly, W.H., 1995. Australites from Earraheedy Station, Western Australia with notes on australites from the nearby Glenayle Station. *Records of the Western Australian Museum*, 17, 169–175.
- Cleverly, W.H., and Cleverly, E.I. 1985. Destruction of australites by Aborigines in part of the Eastern Goldfields, Western Australia. *Journal of the Royal Society of Western Australia*, 68(1), 1–8.
- Cleverly, W.H., and Dortch, C.E., 1975. Australites in archaeological sites in the Ord Valley, W.A. *Search*, 6, 242–243.
- Cleverly, W.H., and Scrymgour, J.M., 1978. Australites of mass greater than 100 grams from South Australia and adjoining states. *Records of the South Australian Museum*, 17(20), 321–330.
- Corbett, D.W.P., 1967. Australites from Myrtle Springs Station, South Australia. *Records of the South Australian Museum*, 15(3), 561–574.
- Cotterell, B., and Kamminga, J., 1987. The formation of flakes. *American Antiquity*, 52, 675–708.
- Curr, E.M., 1887. Gippsland. In Curr, E.M. (ed.), *The Australian Race: its Origin, Languages, Customs, Place of Landing in Australia, and the Routes by Which it Spread Itself Over That Continent. Volume 3.* Melbourne, John Ferres. Pp. 543–549.
- Davidson, D.S., 1950. Book review of *Aranda Traditions* by T.G.H. Strehlow. *American Anthropologist*, 52(1), 85.
- Dawson, J., 1881. *Australian Aborigines. The Languages and Customs of Several Tribes of Aborigines in the Western District of Victoria, Australia.* Melbourne, George Robertson.
- Duncan-Kemp, A.M., 1933. *Our Sandhill Country.* Sydney, Angus & Robertson.
- Dunn, E.J., 1912. *Bulletins of the Geological Survey of Victoria. No.27. Australites.* Melbourne, Albert J. Mullett.
- Edwards, R., 1966. Australites used for Aboriginal implements in South Australia. *Records of the South Australian Museum*, 15(2), 243–250.
- Elkin, A.P., 1977. *Aboriginal Men of High Degree.* Second edition. St Lucia, Qld, University of Queensland Press.
- Fenner, C., 1933. *Bunyips and Billabongs: an Australian Out of Doors.* Sydney, Angus & Robertson.
- Fenner, C., 1934. Australites, part I. Classification of the W.H.C. Shaw collection. *Transactions of the Royal Society of South Australia*, 58, 62–79.
- Fenner, C., 1935. Australites, part II. Numbers, forms, distribution and origin. *Transactions of the Royal Society of South Australia*, 59, 125–140.
- Fenner, C., 1938a. Australites, part III. A contribution to the problem of the origin of tektites. *Transactions of the Royal Society of South Australia*, 62(2), 192–

- 216.
- Fenner, C., 1938b. Australites; a unique shower of glass meteorites. *Minerals Magazine*, 25(161), 82–85.
- Fenner, C., 1939. Blackfellows' buttons, the remarkable glass meteorites of Australia. *The Sky – Magazine of Cosmic News*, 3(VIII), 16–17, 27.
- Fenner, C., 1940. Australites, part IV. The John Kennett collection, with notes on Darwin glass, bediasites etc. *Transactions of the Royal Society of South Australia*, 64, 305–324.
- Fenner, C., 1949. Australites, Part V. Tektites in the South Australian Museum, with some notes on theories of origin. *Transactions of the Royal Society of South Australia*, 73(1), 7–21.
- Fenner, C., 1954. Stones may have been heads of comets, New light on Australites. *Advertiser* [newspaper], 9 January, page 8.
- Fenner, C., 1955. Australites, Part VI. Some notes on unusually large australites. *Transactions of the Royal Society of South Australia*, 78, 88–91.
- Fenner, F., 2006. *Nature, Nurture and Chance. The Lives of Frank and Charles Fenner*. Canberra, ANU E Press.
- Fison, L., and Howitt, A.W., 1880. *Kamilaroi and Kurnai. Group-marriage and Relationship, and Marriage by Elopement. Drawn Chiefly from the Usage of the Australia Aborigines. Also the Kurnai Tribe. Their Customs in Peace and War*. Melbourne, George Robertson.
- Fry, H.K., 1937. Dieri legends. *Folklore*, 48, 187–206.
- Gill, E.D., 1965. Quaternary geology, radiocarbon datings, and the age of the australites. *Geological Society of America, Special Paper*, 84, 415–432.
- Glass, A., and Hackett, D., 2003. *Ngaanyatjarra & Ngaatjatjarra to English Dictionary*. Alice Springs, NT, IAD Press.
- Goddard, C., 1992. *Pitjantjatjara/Yankunytjatjara to English Dictionary*. Alice Springs, NT, Institute for Aboriginal Development.
- Greenway, J., 1973. *Down Among the Wild Men. A Narrative Journal of Fifteen Years Pursuing the Old Stone Aborigines of Australia's Western Desert*. Melbourne, Hutchinson of Australia.
- Hale, H.M., 1956. *The First Hundred Years of the South Australian Museum 1856 – 1956*. Adelaide, South Australian Museum.
- Hamacher, D.W., and Norris, R.P., 2009. Australian Aboriginal geomorphology: eyewitness accounts of cosmic impacts? *Archaeoastronomy. The Journal of Astronomy in Culture*, 22, 1–51.
- Hassell, E., 1936. Notes on the ethnology of the Wheelman tribe of South-western Australia. *Anthropos*, 31, 706–707.
- Hawkins, M., and Wein, J., n.d. *Wakka Wakka Jinda. Dreamtime Stories*. Brisbane, Jinda Wakka Wakka Corporation.
- Holmer, N.M., 1983. *Linguistic Survey of South-eastern Queensland*. Canberra, Department of Linguistics, Australian National University.
- Horne, G., and Aiston, G., 1924. *Savage Life in Central Australia*. London, Macmillan.
- Howchin, W., 1909. The annual meeting, October 5, 1909. *Transactions & Proceedings of the Royal Society of South Australia*, 33, 348–349.
- Howchin, W., 1934. *The Stone Implements of the Adelaide Tribe of Aborigines Now Extinct*. Adelaide, Gillingham & Co.
- Howitt, A. W., 1887. On Australian medicine men; or, doctors and wizards of some Australian tribes. *Journal of the Anthropological Institute of Great Britain & Ireland*, 16, 23–59.
- Howitt, A.W., 1904. *Native Tribes of South-East Australia*. London, Macmillan.
- INO., 1924. An idle woman's diary. *Newcastle Morning Herald & Miner's Advocate* [newspaper], 22 August, page 5.
- Johnson, J.E., 1963. Observations on some Aboriginal campsites in South Australia and adjoining states, Part I. *Mankind*, 6(2), 64–79.
- Johnson, J.E., 1964. Observations on some Aboriginal campsites in South Australia and adjoining states, Part II. *Mankind*, 6(4), 154–181.
- Johnston, T.H., 1943. Aboriginal names and utilization of the fauna in the Eyrean region. *Transactions of the Royal Society of South Australia*, 67(2), 244–311.
- Jones, P.G., 1987. South Australian anthropological history: The Board for Anthropological Research and its early expeditions. *Records of the South Australian Museum*, 20, 71–92.
- Jones, P.G., 1995. Obituary: Norman B. Tindale, 12 October 1900–19 November 1993. *Records of the South Australian Museum*, 28(2), 159–176.
- Kahn, K., 1993. Frederick David McCarthy: a bibliography. *Records of the Australian Museum, Supplement*, 17, 1–5.
- Kolig, E., 1984. The mobility of Aboriginal religion. In Charlesworth, M., Morphy, H., Bell, D., and Maddock, K. (eds.), *Religion in Aboriginal Australia: an Anthology*. St Lucia, Qld, University of Queensland Press. Pp. 391–416.
- Lee, M., and Wei, K. 2000. Australasian microtektites in the South China Sea and the West Philippine Sea: implications for age, size, and location of the impact crater. *Meteoritics & Planetary Science*, 35, 1151–1155.
- Lourandos, H. 1997. *Continent of Hunter-gatherers, New Perspectives in Australian Prehistory*. Cambridge, Cambridge University Press.
- Maddock, K., 1975. The emu anomaly. In Hiatt, L.R. (ed.), *Australian Aboriginal Mythology*. Canberra, Australian Institute of Aboriginal Studies. Pp. 102–122.
- Mathew, J., 1910. *Two Representative Tribes of Queensland With an Inquiry Concerning the Origin of the Australian Race*. London, T. Fisher Unwin.
- Mathew, J., 1928. The religious cults of the Australian Aborigines. in A.G. Maitland (ed.), *Report of the Eighteenth Meeting of the Australasian Association for the Advancement of Science. Western Australian Meeting, Perth, August 1926*. Perth, Government Printer. Pp.524–540.
- McBryde, I. 1978. Wil-im-ee moor-ring: or, where do axes come from? In Specht, J., and White, P.J. (eds.), *Trade and Exchange in Oceania and Australia*. Sydney, Sydney University Press. Pp. 354–382.
- McCarthy, F.D., 1939a. 'Trade' in aboriginal Australia and 'trade' relationships with Torres Strait, New Guinea and Malaya. *Oceania*, 9, 405–438.
- McCarthy, F.D., 1939b. 'Trade' in aboriginal Australia and 'trade' relationships with Torres Strait, New Guinea and Malaya (continued). *Oceania*, 10, 80–104, 171–195.
- McCarthy, F.D., 1958. 'Material culture' in the entry

- 'Aborigines'. *Australian Encyclopaedia*, 1, 3–99. Sydney, Grolier Society of Australia Ltd.
- McCarthy, F.D., 1965. The emu and the Aborigines. *Australian Natural History*, March 1965, 16–21.
- McCarthy, F.D., 1976. *Australian Aboriginal Stone Implements. Including Bone, Shell and Tooth Implements. Second Edition*. Sydney, Australian Museum Trust.
- McCull, D., 2017. *Australia's Little Space Travellers. The Flight Shaped Tektites of Australia*. Cham (Switzerland), Springer.
- McCourt, T., 1975. *Aboriginal Artefacts*. Adelaide, Rigby.
- Megirian, D., and Mason, B. 1996. Australites from the northern Tanami of the Northern Territory. *The Beagle, Records of the Museums & Art Galleries of the Northern Territory*, 13, 39–44.
- Miller, G., Hercus, L.A., Monaghan, P., and Naessan, P., 2010. *A Dictionary of the Wirangu Language of the Far West Coast of South Australia*. Ceduna, Tjutjunaku Worka Tjuta; Adelaide, University of Adelaide.
- Mitchell, S.R., 1949. *Stone Age Craftsmen*. Melbourne, Tait Book Co.
- Monaghan, P., 2009. Aboriginal names of places in southern South Australia. In Koch, H., and Hercus, L., (eds.) *Naming and Re-naming the Australian Landscape*. Canberra, ANU E Press and Aboriginal History. Pp. 225–250.
- Mountford, C.P., 1960. Phallic objects of the Australian Aborigines. *Man*, 60, 81.
- Mountford, C.P., 1976. *Nomads of the Australian Desert*. Adelaide, Rigby.
- Mountford, C.P., 1981. *Brown Men and Red Sand. Journeys in Wild Australia. Revised edition*. Sydney, Angus & Robertson.
- Mulvaney, J., and Kamminga, J., 1999. *Prehistory of Australia*. Sydney, Allen & Unwin.
- Mulvaney, J., Morphy, H., and Petch, A., 1997. 'My Dear Spencer'. *The Letters of F.J. Gillen to Baldwin Spencer*. Melbourne, Hyland House.
- NPY Women's Council, 2003. *Ngangkari Work – Anangu Way. Traditional Healers of Central Australia*. Alice Springs, Ngaanyatjarra Pitjantjatjara Yankunytjatjara Women's Council Aboriginal Corporation.
- Petri, H., 2014. *The Australian Medicine Man*. Translated by Campbell, I., and edited by Akerman, K. Perth, Hesperian Press.
- Radcliffe-Brown, A.R., 1926. The rainbow-serpent myth of Australia. *Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 56, 19–25.
- Rankine, P.D., 2000. *Illiwaroo Singin' Up That Country. Some Recordings of Wagaya Stories and Significant Sites*. Rockhampton, Qld, Central Queensland University.
- Rhodes, J., 2018. *Cage of Ghosts*. NSW, Darkwood.
- Roheim, G., 1974. *Children of the Desert. The Western Tribes of Central Australia*. New York, Basic Books.
- Roth, W. E. 1903. *Superstition, Magic, and Medicine. North Queensland Ethnography: Bulletin No.5*. Brisbane, George Arthur Vaughan, Government Printer.
- Rowland, B., 2014. An investigation of the use of australites (tektites) at Olympic Dam, South Australia. *Journal of the Anthropological Society of South Australia*, 38, 136–154.
- Scott, H.H., and Scott, E.O.G., 1934. Nature and science. Curator's notes. Blackfellow buttons. *Examiner* [newspaper], 23 January, page 10.
- Serventy, V., 1973. *Desert Walkabout*. Sydney, Collins.
- Simpson, E.S., 1902. Obsidianites. *Bulletin of the Geological Survey of Western Australia*, 6, 79–85.
- Smith, M., 2013. *The Archaeology of Australia's Deserts*. Cambridge, Cambridge University Press.
- Spencer, W.B., 1928. *Wanderings in Wild Australia*. London, Macmillan.
- Spencer, W.B., and Gillen, F.J., 1912. *Across Australia*. Cambridge, Cambridge University Press.
- Spencer, W.B., and Gillen, F.J., 1927. *The Arunta. A Study of a Stone Age People*. Macmillan, London.
- Strehlow, C., 1909 [2018]. *Carl Strehlow's 1909 Comparative Heritage Dictionary. An Aranda, German, Loritja and Dieri to English Dictionary with Introductory Essays*. Canberra, ANU Press.
- Strehlow, T.G.H. 1947. *Aranda Traditions*. Melbourne, Melbourne University Press.
- Sutton, P., 1988. Myth as history, history as myth. in Keen (ed) *Being Black. Aboriginal Cultures in "Settled" Australia*. Canberra, Aboriginal studies Press. Pp. 251–268.
- Tate, R., 1879. Anniversary address of the president. *Transactions & Proceedings of the Royal Society of South Australia*, 2, xxxix–lxxv.
- Tindale, N.B., 1935a. *Anthropological Expedition to Warburton Range, Western Australia by Norman B. Tindale July – September 1935. Journal. AA338/1/14*. Adelaide, South Australian Museum Archives.
- Tindale, N.B., 1935b. Legend of Waijungari, Jaralde tribe, Lake Alexandrina, South Australia, and the phonetic system employed in its transcription. *Records of the South Australian Museum*, 5(3), 261–274.
- Tindale, N.B., 1938. Prupe and Koromarang, a legend of theTanganekald, Cooring, South Australia. *Transactions of the Royal Society of South Australia*, 62(1), 18–24.
- Tindale, N.B., 1940. Results of the Harvard-Adelaide Universities Anthropological Expedition, 1938–1939. Distribution of Australian Aboriginal tribes: a field survey. *Transactions of the Royal Society of South Australia*, 64(1), 140–231.
- Tindale, N.B., 1957. Culture succession in south eastern Australia from Late Pleistocene to the present. *Records of the South Australian Museum*, 13(1), 1–49.
- Tindale, N.B., 1959. Ecology of primitive Aboriginal man in Australia. In Keast, A. (ed.) *Biography and Ecology in Australia*. The Hague, Springer. Pp. 36–51
- Tindale, N.B., 1961–1965. *Journal on Campsites and Stone Implements of the Australian Aborigines; and Others; Notes Etc. Volume 4. AA338/1/40/2*. Adelaide, South Australian Museum Archives.
- Tindale, N.B., 1963. *Journal of Visit to the Rawlinson Range Area in the Great Western Desert by Norman B. Tindale. AA338/1/26*. Adelaide, South Australian Museum Archives.
- Tindale, N.B., 1964–1965. *Entomology and General Field Trips by Norman B. Tindale. AA338/1/43/3*. Adelaide, South Australian Museum Archives.
- Tindale, N.B., 1964–1969. *Kurlge, Blackwood, South Australia. Journal Principally Entomological and Gen-*

- eral. AA338/1/48/2. Adelaide, South Australian Museum Archives.
- Tindale, N.B., 1966. *Journal of Visit to the North West of South Australia in February 1966 by Norman B. Tindale*. AA338/1/22/2. Adelaide, South Australian Museum Archives.
- Tindale, N.B., 1968. Nomenclature of archaeological cultures and associated implements in Australia. *Records of the South Australian Museum*, 15(4), 615–640.
- Tindale, N. B., 1974. *Aboriginal Tribes of Australia: Their Terrain, Environmental Controls, Distribution, Limits, and Proper Names*. Canberra, Australian National University Press.
- Tindale, N.B., 1983. Celestial lore of some Australian tribes. *Archaeoastronomy*, 12–13, 358–379.
- Tonkinson, M., 1982. The mabarn and the hospital: the selection of treatment in a remote Aboriginal community. In Reid, J. (ed.), *Body, Land and Spirit. Health and Healing in Aboriginal Society*. Pp.225–241
- Tonkinson, R., 1978. *The Mardudjara Aborigines. Living the Dream in Australia's Desert*. New York, Holt, Rinehart & Winston.
- Twelvetrees, W.H., and Petterd, W.F., 1897. On the occurrence of obsidian "buttons" in Tasmania. *Papers & Proceedings of the Royal Society of Tasmania*, 2, 39–46.
- Verburgt, B., 1999. *They Called Me Tjampu-Tjilpi (Old Left Hand)*. Perth, Hesperian Press.
- Walcott, R.H., 1898. The occurrence of so-called obsidian bombs in Australia. *Proceedings of the Royal Society of Victoria*, 11(1), 39–73.



Dr Philip A. Clarke has an academic background in biology, geography and anthropology. He started working on the Aboriginal ethnographical collections at the South Australian Museum in 1982, where his initial research interests were chiefly focused on Aboriginal use of plants as foods, medicines and materials for making artefacts. This eventually expanded to Aboriginal perception and use of the land, with a particular focus on the cultural geography of southern Australia. During 1998–2000, Dr Clarke's major task was curating the Australian Aboriginal Cultures Gallery Project at the South Australian Museum. Since permanently leaving the Museum in late 2011, Dr Clarke has worked in private practice as a consultant anthropologist. He took up a half time Senior Research Fellowship at Griffith University from February 2012 to February 2013, in order to study Indigenous adaptation to climate change in south-eastern Australia. In February 2013 he was appointed to an Adjunct Senior Research Fellowship by Griffith University, and in April 2015 by the Federation University. In December 2015 he became an Honorary Research Associate (Anthropology) at the South Australian Museum. He continues to do consultancies for government agencies, corporations and Aboriginal organisations.