RESEARCH ARTICLE

Stone assemblages from the surroundings of Tennant Creek (Northern Territory, Australia) Part II. Macrolithic and edge-ground tools

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Abstract

A large part of the Australian collection of the Hungarian Museum of Ethnography in Budapest, 766 stone artefacts altogether, was donated in November 1977 by László Pintér, a Hungarian citizen who had immigrated from his hometown Tata to Sydney. The stone artefacts have been processed by the author. The results of the processing are presented in two parts. This first part contains the description of the 731 flaked stone artefacts, while the planned second part will describe 15, partly macrolithic, partly edge-ground artefacts. Twenty artefacts will not be described. Most of these are grinding, polishing and smoothing stones with macroscopically undefined functions, for which only a formal description would be possible. In addition to the descriptions of the finds, the papers include detailed descriptions of specific Australian stone tools, based on the available archaeological and ethnographic literature. For the first part of the study, see Péntek (2021)

Keywords

Australia, Northern Territory, macrolithic and edge-ground tools, Warramunga and Walbiri tribes, Museum of Ethnography in Budapest

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"*Sometimes you gotta run before you can walk.*"
~ Tony Stark (Iron Man)

1. Introduction

In the previous paper, the flaked stone assemblage of the Hungarian Museum of Ethnography from Pintér's collection has been reviewed. In this paper, the 15 grinding, polishing and smoothing stone tools from the same collection will be described. These tools have macroscopically undefined functions, for that very reason, only a formal description would be possible. The likely most complete ethnographic record of the northern tribes of Central Australia, especially the Warumungu people is in the works of Spencer & Gillen (1904; 1912, 364–439) can be found. There are relatively much comparative data on these types of tools.

2. Australian macrolithic tools

The study of Valoch (1979, 144–149) also contains a type list of 19 groups for macrolithic tools based on morphological and technological criteria. Large unifacial and bifacial coroid implements are well known in Australia. McCarthy and colleagues (1967[1946], 13) gave a general definition of the *uniface coroids*, which are "*irregular pebbles, nodules or lumps of stone trimmed or untrimmed all round the margin, and the lower face is usually of cortex.*" Norman B. Tindale (1937; 1957; McCarthy 1943b) named a stone industry on Kangaroo Island (South Australia) "Kartan", after the name given to the island by the Aboriginals. The Kartan industry consists almost exclusively of large core tools, unifacially flaked pebble tools and hammerstones (see, for example, Lampert 1980; 1981a; 1981b). The tools are heavy, averaging around 900 grams. Some of the heavy tools were described and represented earlier by Tindale and Brian G. Maegraith (1931) from the Hawk's Nest site on Kangaroo Island. Among them, there are large-sized trimmed flakes (see, for example, 1931, 280, Figs. 6-7) and core-like implements as well (1931, 282, Fig. 9). Concerning the trimmed flakes, it was uncertain in what manner these expedient tools were employed, however, it seemed likely that they were general cutting tools.

As an analogy, Tindale and Maegraith (1931, 286–287, Figs. 10–11), referred to a tool "*The árapia of the people of the Iliaura tribe* [or Alyawara; other synonyms are listed in Tindale 1974, 226 with numerous ethnographic references)]*, Central Australia, which is a similar implement, functions as a hand-chopper or cleaver, and is used without any handle, in the rough trimming of wood, and in the removal of bark from gum trees.*" McCarthy and colleagues (1967[1946], 13) considered that "*The uniface pebble implements form a specialized sub-group. These comprise the semi-uniface kinds which are trimmed either at one end, end and lateral margin, or end and both lateral margins, and the uniface or* Sumatra-*type. Their uses appear to have been chopping and scraping, although some bear signs of percussion on the edges and sometimes the surfaces. The Sumatra-type (Fig. 21) is trimmed all over its upper surface, which is generally convex, and the margins show signs of use at various points*." (see also McCarthy 1941a) The uniface pebble implements occur chiefly in the eastern and coastal parts of south-eastern Australia, as far west as Kangaroo Island. On the other hand, in Queensland, at Point Cartwright, similar heavy tools appear to be present ("Sumatra implements", Jackson 1939, 290–293, Figs. 1–3) as well.

McCarthy and colleagues (1967[1946], 15) defined the *bifacial coroids* as follows:

"*Biface coroids are nodules, pebbles or lumps of stone either partly or wholly trimmed on both surfaces. The partly trimmed examples are conveniently termed semi-bifaces. The larger examples are apparently hand-axes and choppers, but there are scraping and cutting implements, or edges used for these purposes, on implements among the bifaces coroids of both small and large size. Cleavers may also occur, but have not yet been specifically determined. Many biface coroids are blanks and rejects prepared during the making of edge-ground axe-heads and adze-heads. In shape specimens in this subgroup vary from ovate to discoidal, cordiform to rectangular, and irregular forms common. An interesting series of flint biface coroids (Fig. 24) occurs in the Mt. Gambier district of South Australia (McCarthy, 1940, A, Mitchell, 1943) which have been termed Buandik bifaces by Campbell (1934), the name Buandik being that of a tribe in whose territory the implements are found. The term is appropriate and should be retained.*"

The well-stratified "Gambieran" assemblage at the Koongina Cave in Lower Southeast of South Australia confirmed that the Gambieran industry is Late Pleistocene/Early Holocene in age (Bird & Frankel 2001; Frankel 1986; 1989).

It was McCarthy (1941a; 1941b) who first drew attention to the possible Hoabinhian parallel concerning the South Australian macrolithic tools. Based on the paper of Madeleine Colani (1927), the Hoabinhian is divided into three sub-stages; the Hoabinhian I contains flaked implements only, rather large and crude (Matthews 1964, 1). According to the interpretation of McCarthy, Hoabinhian I consists of two hand axes: the *sumatra* (Sumatra-type, Sumatra implement, Sumatralith; see above) is a pebble chipped on one surface only, and the *karta* (the index fossil of the above-mentioned Kartan industry) is a split pebble chipped on the crust surface only. In Hoabinhian II the pebble hand axes are prepared on both surfaces, and the majority of them have a ground-edge blade. McCarthy suggested that sites in New South Wales, such as Yamba Head and Crescent Head contain Hoabinhian collections.

J. M. Matthews (1964; 1968) investigated the Hoabinhian affinities of some South Australian collections. Among the examined collections, there were two samples of Kartan collections, one from the Kangaroo Island, the other from the Wakefield River; pebble tools from Yamba Head and the Seelands rock shelter (in the Clarence Valley, west of Grafton; McBryde 1962). Additionally, a sample from the Sai Yok site in Thailand was taken. The samples were compared in terms of various parameters, such as maximum length, breadth, thickness, weight and length/breadth index. The most obtuse angle presented by the cutting edge was measured as well. An observation was made of the nature of the junction between the upper and lower faces of the artefacts, whether either or both were flaked or cortex covered. The comparison concluded that the Kangaroo Island sample is distinct from the others; the pebble tools of the north coast sites of Yamba Head and Seelands showed closer affinities to the distant Hoabinhian site of Sai Yok. Matthews also exposed the problems of Colani's typology. He aimed to determine if Colani's Hoabinhian types could be defined as clusters of constantly recurring morphometric attributes and cortex amount and distribution. The classification of Colani had been found unsatisfactory and Matthews found that Hoabinhian types did not exist; instead, Hoabinhian artefacts reflect a continuous range of shapes and sizes. Chester Gorman (1970) listed the main attributes used to link several sites from North Vietnam to Sumatra under the general term Hoabinhian. Among these attributes, Gorman mentioned core tools ("Sumatraliths") made by complete flaking on one side of a pebble. The radiocarbon dates, obtained by Gorman (1970, 99, Table 2) at Spirit Cave (Northwest Thailand) place Hoabinhian levels between 12,000 and 8,000 BP. However, since the excavation of Gorman, there are several more recently gained radiocarbon dates, indicating a much older age of the Hoabinhian (see, for example, Ji et al 2015; Moser 2012, 8–9; Yi et al. 2008).

Isabel McBryde (1976), working on Seelands (mid-north coast of New South Wales) industries, also found elements that seemed to be features of the Hoabinhian industries. These are the association of the unifacial pebble tools with edge-ground tools; the association with bifacially flaked pebble tools and the presence of truncated pebble tools. In Southeast Asia, there are references also to bifaces hand-axes (see, for example, Matthews 1964) and oval-shaped tools, which are similar to Valoch's macrolithic types *7* and *8*.

Although the Hoabinhian industry claimed firstly the attention of McCarthy (1941a) because in his opinion it was the earliest known link between Australia, Malaysia and Southeast Asia, in other parts of Australia, macrolithic tools, especially pebble tools seem to be discussed only rarely in connection with the Hoabinhian industry. In his paper, Valoch (1979, 155) stated that if the hypothesis of a direct Hoabinhian tradition in Australia will be rejected, it must be presumed that the Australian pebble tools developed independently and convergently from older roots of similar technology. Valoch mentioned also that concerning the spread of Hoabinhian in Indonesia, the transfer of a stimulus from this region seems fairly likely.

Sandra Bowdler (1994, 91), in her retrospective review on the Hoabinhian in Australia, alluded to the occurrence of "pebble edge tools" in New Guinea highlands, which had been excavated at least from three rock shelters in this region and dated to ca. 10,000 BP (Bulmer 1964, 256–258; Bulmer & Bulmer 1964, 59, 67; Bulmer 1975; White 1972). As regards Australia, she wrote: "*In Australia itself, it would appear that no pebble edge tools are known from the arid interior, the Northern Territory, North Queensland, or New South Wales west of the mountains, from either stratified or unstratified locations.*" Concerning the peculiar distribution of Hoabinhian artefacts in Australia (in the southeast, and possibly southwest) she wrote: "*It does not seem to be the case that they represent some sort of earlier 'stratum' of occupation later overlain other cultural manifestations, as they have not been found in any archaeological context of any age at all in northern Australia.*" Bowdler claimed that the morphometrical and technological similarities between Pleistocene artefacts from Australia and mainland Southeast Asia may indicate a diffusion of technology or activities requiring a certain kind of technology across Southeast Asia and Australia during the Pleistocene (Marwick 2008, 10).

3. Australian edge-ground implements

According to the classification of McCarthy and colleagues (1967 [1946], 44), the major sub-groups of edge-ground implements are the axe-heads, adze heads, scraper knives, chisels and alien forms. Most of these implements are coroids, which were made on pebbles, raw material nodules or lumps; others were made from knapped, flaked pieces. It is quite problematic to distinguish the sharp boundaries between the different types. Therefore, the classification included the edge-ground, semi-ground or polished, and the fully grounded or polished implements should any or all of them occur in any type. From a technological point of view, the axe heads show great diversity. Many of those "*show signs of battering and percussion on their lateral margins, on the butt, and on the upper and lower surfaces; the butt end especially exhibits frequent use as a hammerstone, and on the surfaces percussive pits due to anvil use are frequently observed on these implements.*"

Based on the numerous cited ethnographic literature, the axe heads (sometimes referred to as axes, tomahawks or hatchets) were widespread throughout the Australian continent. (see, for example, Basedow 1925, 362–363; Horne & Aiston 1924, 99–100, Fig. 75; Spencer 1922, 75–76, 83–86, Plate 15, Figs. 157–158; Spencer & Gillen 1899, 588–590; Tylor 1895).

Spencer and Gillen (1899, 588–590), among the native tribes of Central Australia, identified and described two different types of stone axes or hatchets. In the assemblage from Tennant Creek, there are three undamaged specimens, which are from a morphological point of view very similar to the first type, which "*has the form of a flattened, usually oval, pebble of diorite, one edge of which is rounded and ground down, the pebble is then fixed into a wooden handle. This form is known by the name of Illupa, and is, or was made by the Arunta, Kaitish, Warramunga* (emphasis by the authors of this paper)*, and other tribes living to the* *north.*" Spencer and Gillen described the method of fixing the axe into the handle and gave some measures as well. The dimensions of a hafted example are "*the total length of the stone is 12 cm, the width 9 cm, and the greatest thickness 2.2 cm.*" Two unmounted ground stones measure in greatest length 18 and 14 cm, in width 8.5 and 11.4 cm, and thickness 4 and 3.5 cm respectively.

Spencer and Gillen (1912, 368–370, Figs. 208–210) also described the manufacturing process of the ground stone axes among the Warramunga people. They referred to the fact that the ground axes were much less common than flaked implements. The cause was that suitable raw material for making ground axes is only found in relatively few spots in Central Australia. At the same time, quartzite - which can be easily flaked and chipped, but not grounded – is very widely distributed.

From the relevant archaeological papers on the different aspects of edge-ground implements, here is a non-exhaustive list. The papers of Tugby (1958), Dickson (1976; 1980), and Dibden (1996) deal with the technology, design and manufacturing of groundstone tools. Brzezicki (2015) devoted his unpublished thesis to the linkage between artefact morphology, hafting and tool function. Dubreuil *et al.* (2015) discussed the issue of the use-wear study of ground stone tools. Some authors deal with the spatial occurrences of groundstone tools (Davidson 1938; Corkill 2005; Ulm *et al.* 2005; Attenbrow *et al.* 2012). As regards the pattern of trade and exchange, Turpin (1983) dealt with the social and economic significance of the movement of stone edge-ground hatchets in Australia; Walker (2016) made also non-destructive X-ray Fluorescence (pXRF) analysis to determine the provenance of the used raw materials of 242 hatchets found in southeast South Australia. Geneste *et al.* (2010; 2012) reported the evidence of the earliest securely dated fragment ground edge to implement in the world from Nawarla Gabarnmang, Arnhem Land. Hiscock *et al.* (2016) reviewed the world's earliest ground-edge axe fragment from the Carpenter Gap in the Kimberley region of Western Australia.

Since groundstone tools are an ill-defined group of archaeological artefacts, reflecting a variety of functions, the paper of Rosenberg *et al.* (2016) deserves special attention, which dealt not only with the possible area of usage and function of these artefacts but with the perspectives of the future research.

4. Raw material utilisation

The used raw materials of the assemblage containing altogether nine macrolithic and six edge-ground implements can be classified as follows.

4.1. Raw material class 1 (RMC-1A and RMC-1B)

This class contains igneous rocks (volcanites).

A) Intrusive (or *plutonic*) igneous rocks are formed by slow and gradual cooling and crystallisation of minerals from magma inside the Earth, i.e. deeper below the surface. Among the most common intrusive igneous rocks, there are the *diorites* from the intermediate group and the *gabbro* from the mafic group (Haldar & Tišljar 2014, 94, 104–120, (Chapter 4 Igneous Rocks)).

B) *Extrusive* igneous rocks are formed at the crust's surface as a result of the partial melting of rocks within the mantle and crust. The molten rocks, with or without suspended crystals and gas bubbles, erupt outside the crust due to lower density and spread as lava. The rocks cool and solidify very quickly and are fine-grained in general. The most common extrusive igneous rocks are rhyolite and dacite (felsic; rocks, which are rich in elements that form feldspar and quartz), *andesite* and trachyte (intermediate), *basalt* and diabase (mafic; rocks, dominated by silicates rich in magnesium and ferric oxides, giving the rocks their characteristic dark colour) and spilite (plagioclase-rich rocks occur in changes and albitization of basalt) (Haldar & Tišljar 2014, 94, 116–120, (Chapter 4 Igneous Rocks)).

4.2. Raw material class 2 (RMC-2)

This class contains several clastic (detrital and mechanical) sediments and sedimentary rocks, which are composed of particles, grains and fragments that resulted from physical and chemical weathering. Macroscopically, without having a good deal of experience, the different types are hardly distinguishable. *Shales* are thinly laminated fine-grained pelite (clayey fine-grained clastic sediment or sedimentary rock) clastic rock composed predominantly of siliciclastic materials. Shales can be grouped as clay and mud shale based on the mutual shares of particles of (clay and powder). *Mudstones* (or poorly lithified *argillites*) are, unlike the shale, homogeneous, solid lithified rocks that contain a mixture of particles (clays and powder. *Sandstones* are divided into two main groups that are based on the relative content of grain sizes of sand and mud matrix. Pure sandstones or arenites are classified into various types according to the proportion of the major components of quartz, feldspar and rock fragments (Haldar & Tišljar 2014, 145–162 (Chapter 5 Sedimentary Rocks)).

As regards the raw material utilisation of the assemblage, among the nine macrolithic tools the raw materials of the RMC-1 raw material class have a clear dominance. Four specimens were made of fine-grained gabbro (RMC-1A); two specimens were made of gabbro (RMC-1A); one was made of diorite (RMC-1A) and one of each was made of andesite and porphyritic andesite (RMC-1B). And similarly, the RMC-1 raw material class dominates also among the six edge-ground implements. Each of the two specimens was made of fine-grained gabbro (RMC-1A) and fine-grained andesite (RMC-1A). A single specimen was made of fine-grained sandstone (RMC-2) and there is a single specimen, which was made of mudstone (RMC-2).

5. Description of the assemblage

5.1. The macrolithic tools

In Fig. 1, there is a large-sized tool, made on an approximately circular flake or a raw material piece with a bi-convex cross-section. It has a supposed "base" of 76 × 25 mm size, but no bulb is visible. On both faces, there are reddish iron oxide deposits. On the lower face, some thinning detachment along the perimeter can be seen. On the upper face, there are traces of several centripetal removals. Except for the "base", the entire rim of the instrument is rather roughly, bifacially elaborated. The raw material is fine-grained gabbro (RMC-1A). The dimensions are 124.6 × 126.4 × 43.8 mm. The weight is 902.0 g.

In Fig. 2, there is a large-sized tool, made on an approximately circular flake or a raw material piece with a plano-convex cross-section. On the upper face, a reddish iron oxide deposit is visible. On the lower face, there is a large thinning removal; no bulb is visible. The upper face is unworked. The entire rim is bifacially elaborated. The raw material is fine-grained gabbro (RMC-1A). The dimensions are 122.6 × 118.7 × 40.1 mm. The weight is 740.0 g.

In Fig. 3, there is a large-sized tool, made on an approximately circular flake or a raw material piece with an asymmetric bi-convex cross-section. On the upper face, a reddish iron oxide deposit is visible. On the lower face, along the perimeter, there are sporadic thinning removals; no bulb is visible. On the upper face, there are some centripetal removals. The entire rim is roughly, bifacially elaborated. The raw material is coarse-grained diorite (RMC-1A). The dimensions are 126.3 × 112.9 × 48.1 mm. The weight is 904.0 g.

In Fig. 4, there is a large-sized tool, made on an elongated ellipsoid flake with a plano-convex/ bi-convex cross-section. On the greater part of the eroded upper face and the lower face, reddish iron oxide deposits are visible. The left side of the tool has an irregular form. The lower face is unworked and no bulb is visible. Except for one removal on the left side, the upper face is also unworked. The entire rim is roughly made, with short removals directly, and unifacially elaborated. The raw material is fine-grained gabbro (RMC-1A). The dimensions are 130.5 × 113.9 × 47.2 mm. The weight is 978.0 g.

In Fig. 5, there is a large-sized tool, made on an approximately circular pebble with a bi-convex cross-section. On the upper face, a reddish iron oxide deposit is visible. Both faces are unworked. The entire rim is roughly, bifacially elaborated. The raw material is fine-grained gabbro (RMC-1A). The dimensions are 96.8 × 90.2 × 31.7 mm. The weight is 416.0 g.

In Fig. 6, there is a large-sized tool, made on a flake of irregular form and plano-convex cross-section. On the upper face, along the edge, a reddish iron oxide deposit is visible. The lower face is unworked; the bulb is flat and diffuse. The butt of the flake is 80 × 16.6 mm. The upper face is partly the eroded outer surface and there are some rather fresh, unpatinated removals.

The distal end is unifacially elaborated with steeped retouch creating an approximately 50 mm long working edge. The raw material is porphyritic andesite (RMC-2). The dimensions are 96.2 × 97.3 × 38.7 mm. The weight is 457.0 g.

In Fig. 7, there is a large-sized tool, made on a pebble of ovaloid form and plano-convex/asymmetrical bi-convex cross-section. On both faces are reddish iron oxide deposits visible. On one end, there is a straight-lined unifacially elaborated 57.5 mm long working edge.

The heavily eroded faces are unworked. The lateral edges are roughly, bifacially elaborated with short removals. The raw material is very fine-grained andesite (RMC-2). The dimensions are 112.5 × 89.1 × 43.6 mm. The weight is 627.0 g.

In Fig. 11: 2, there is a large-sized unworked tabular raw material piece of irregular form and asymmetrical plano-convex cross-section. On the convex face, a reddish iron oxide deposit is visible. The

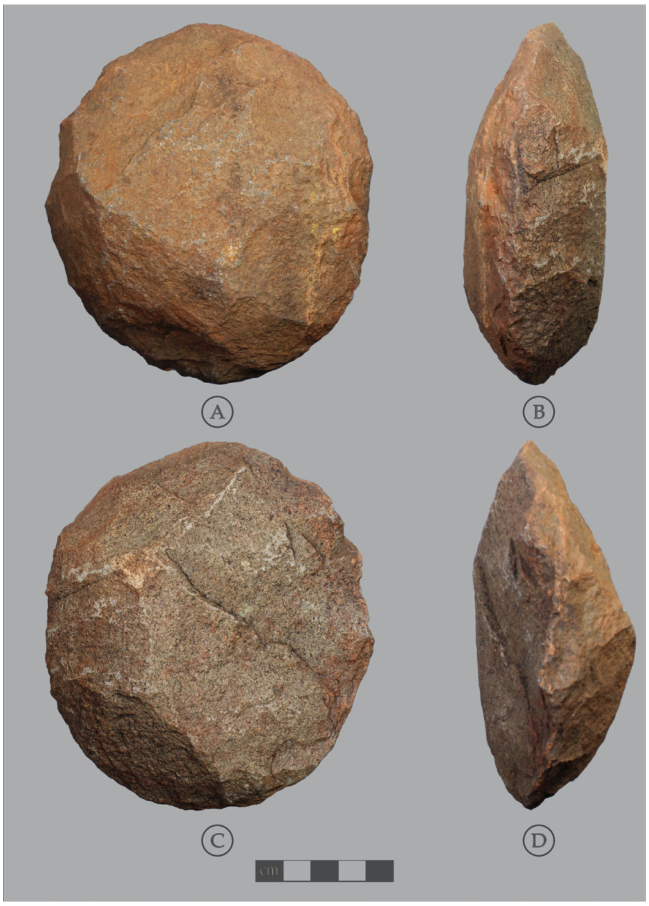

Figure 1 (upper left)**.** Macrolithic tool. **Figure 2** (upper right). Macrolithic tool. **Figure 3** (lower left) Macrolithic tool. **Figure 4** (lower right) Macrolithic tool. Figures: Attila Péntek, by courtesy of the Ethnographic Museum in Budapest, Hungary.

raw material is gabbro (RMC-1A). The dimensions are 106.7 × 71.6 × 44.3 mm. The weight is 435.0 g.

There is a large-sized ovaloid raw material piece with an asymmetrical plano-convex cross-section. On both faces reddish iron oxide deposits are visible. The heavily eroded faces are unworked. Along the rim, there are some rough, indefinite, uncertain removals. The raw material is gabbro (RMC-1A). The dimensions are 124.0 × 91.8 × 38.5 mm. The weight is 618.0 g.

5.2. The edge-ground implements

In Fig. 8, there is a single bevelled axe made on a large-sized pebble of ovaloid form with an elliptical (lenticular) cross-section. The 62.6 mm long working edge (cutting and/or splitting edge) is slightly curved and in side-view, it is aligned with the longitudinal axis. The extension of the polished surface is asymmetrical; its width on the upper face is 28.0-35.0 mm, and on the lower face it is about 23.0 mm. On the working edge, no traces of working activity (chips or pittings) are observable. On the heavily worn butt of the axe, on an area of about 37.5 × 19.0 mm, there are traces of intensive battering/hammering activity. On the entire surface of the tool, there are several signs of weather-beaten mechanical damage (mostly small breakages). The raw material is fine-grained gabbro (RMC-1A). The dimensions are 108.5 × 86.9 × 37.4 mm. The weight is 560.0 g.

In Fig. 9, there is a single bevelled axe made on a large-sized pebble of irregular form and wedge-like cross-section. The 60.7 mm long working edge (cutting and/or splitting edge) is straight-lined and in side-view, it is asymmetrical to the longitudinal axis. Its lower corner and the lower edge of the axe are damaged. The width of the working edge on the upper face is about 25.0 mm and on the lower face between 19.0 and 39.0 mm. On the working edge, no traces of working activity (chips or pittings) are observable. On the butt of the axe, on a circular sector area of about 41.5 × 26.5 mm, there are traces of intensive battering/hammering activity. On the entire surface of the tool, there are several signs of weathered mechanical damage (mostly small breakages). The raw material is fine-grained andesite (RMC-1B). The dimensions are 90.8 × 76.0 × 43.8 mm. The weight is 414.0 g.

In Fig. 10: 1, there is the supposed working edge of an axe made on a large-sized pebble of likely sub-circular form and bi-convex cross-section. The butt of the axe was broken long ago, the breakage surface is patinated. On the edge, there are some rough, indefinite removals. Due to intensive working activity, the edge is broken. The heavily weather-beaten faces of the tool are unworked and bear the signs of weathered mechanical damages (mostly small breakages). The raw material is mudstone (RMC-2). The dimensions are 92.7 × 49.2 × 31.8 mm. The weight is 209.0 g.

In Fig. 10: 2, there is the working edge of an axe made on a large-sized pebble with a bi-convex cross-section. The butt of the axe was broken long ago, the breakage surface is patinated. The 59.0 mm long working edge (cutting and/or splitting edge) is straight-lined and in side-view, it is slightly asymmetrical to the longitudinal axis. On the upper face, the lower part of the working edge is damaged. The width of the working edge on the upper face is between 20.0 and 26.0 mm, and on the lower face between 30.0 and 32.0 mm. On the working edge, there are no signs of working activity (chips or pittings). On the surface of the tool, there are several signs of weathered mechanical damage (mostly small breakages). The raw material is fine-grained andesite (RMC-1B). The dimensions are 85.9 × 69.3 × 39.6 mm. The weight is 340.0 g.

In Fig. 11: 1, there is a scraping tool made on a flat flake of irregular form. The upper face of the tool is the patinated outer surface of the raw material; it is covered with a reddish iron oxide deposit. Along the entire edge, rough-and-ready abrupt elaboration is observable. The raw material is fine-grained sandstone (RMC-2). The dimensions are 73.6 × 113.7 × 18.5 mm. The weight is 201.0 g.

And lastly, there is a 57 mm long, curved edge fragment of a cutting and/or splitting tool. The edge fragment has no signs of working activity. The raw material is fine-grained gabbro (RMC-1A). The dimensions are 58.3 × 28.8 × 16.7 mm. The weight is 28.2 g.

6. Discussion and conclusions

In connection with the archaeological evaluation of the assemblage, we can refer primarily to the doctoral thesis of Kenneth J. Mulvaney (1997). The thesis concerned the nature of the production and distribution of prehistoric sandstone artefacts, primarily with those implements used in the milling of seed, produced at the Helen Springs sandstone quarry site named *Kurutiti.* The quarry is situated within the Ashburton Range, on the edge of the Barkly Tablelands, within the Northern Territory, at a distance of 150 km (*ca.* 93.2 mi) from Tennant Creek. Besides a very rich, varied flaked stone assemblage, many bifaces and edge-ground axes, hammerstones and other pebble artefacts were found as well. The

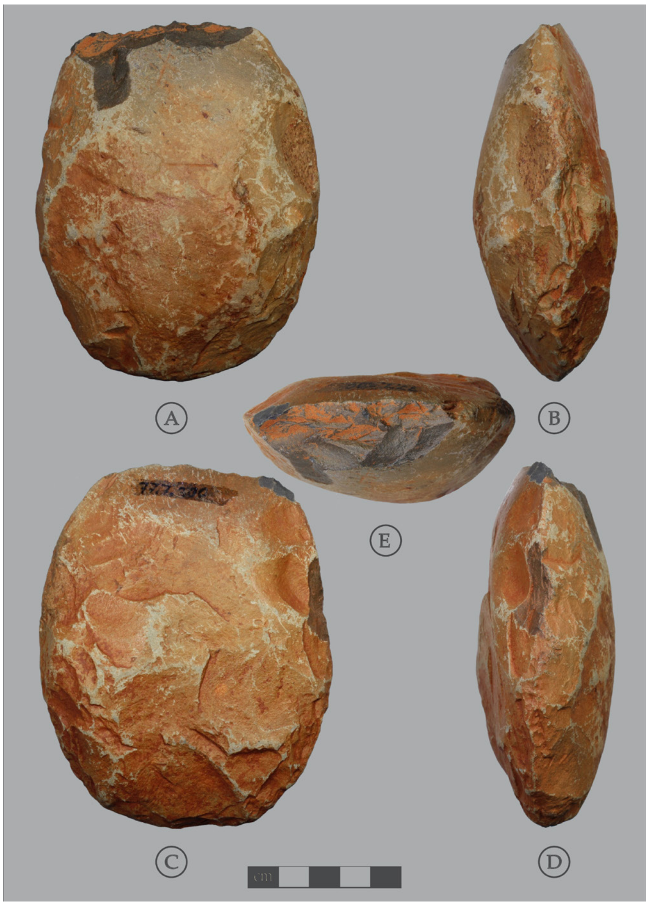

Figure 5 (upper left)**.** Macrolithic tool. **Figure 6** (upper right). Macrolithic tool. **Figure 7** (lower left) Macrolithic tool. **Figure 8** (lower right) Edge-ground tool. Figures: Attila Péntek, by courtesy of the Ethnographic Museum in Budapest, Hungary.

Figure 9 (left)**.** Edge-ground tool. **Figure 10** (right). Edge-ground tool. Figures: Attila Péntek, by courtesy of the Ethnographic Museum in Budapest, Hungary.

15 axes, recorded at *Kurutiti*, were made either of a basaltic rock or dolerite, which are likely to be locally derived and associated with the Lower Cambrian Volcanics that outcrop within the Ashburton Range (Randal & Brown 1969, 11). [Concerning the Pintér's collection, especially as regards the raw material class RMC-1B, it is necessary to be mentioned that the Helen Springs Volcanics have been mapped on the Tennant Creek Sheet area to the south (Ivanac 1954).] In the production of the bifaces and edge-ground axes at *Kurutiti*, large flakes and naturally fractured pieces of stone were utilised. Mulvaney (1997, 101) underlined the fact that "*There is no evidence of hammer-dressing of their flaked surface prior to grinding, as described for the manufacturing process employed by the Warumungu (Spencer and Gillen 1904: 656-659)*." He also noted that the use of relatively unmodified artefacts is in contrast to axes recorded on sites in adjacent areas (see, for example, Smith 1986). Those referenced implements exhibited better symmetry and a greater extent of grinding surface.

Tibbett (2003), dealt with the hammer-dressed stone hatchets in the Lake Eyre Basin. He stated that in the northern regions of the Lake Eyre Basin, there are lower percentages of hammer-dressed stone hatchets compared with the southern regions. In the south of the Lake Eyre Basin, the hammer dressing technique appears to effectively reduce the thickness of the stone hatchet, allowing the resharpening without a marked increase to the edge angles. When working with medium and fine-grained rock (*e.g.* sandstone, basalt or dolerite), the hammer-dressing technique is relatively common as a method of preparing the surface of artefacts to eliminate irregularities.

Spencer & Gillen (1904, 657–658) described the application of this method related to the production of ground edge axes, used by the Warumungu, camped near the Tennant Creek Telegraph Station:

" *…there follows the tedious operation of levelling the surface. For this purpose the operator takes a small rounded pebble of quartzite, and hour after hour, for a day or two in succession, he will patiently hammer away or rather tap at the rough surface, each stroke removing a fragment of the stone, until the whole surface is covered over with minute dents and all of the irregularities are smoothed down. In a well-made axe this operation is performed so thoroughly that all traces of the first made, rough flaking are removed.*

…

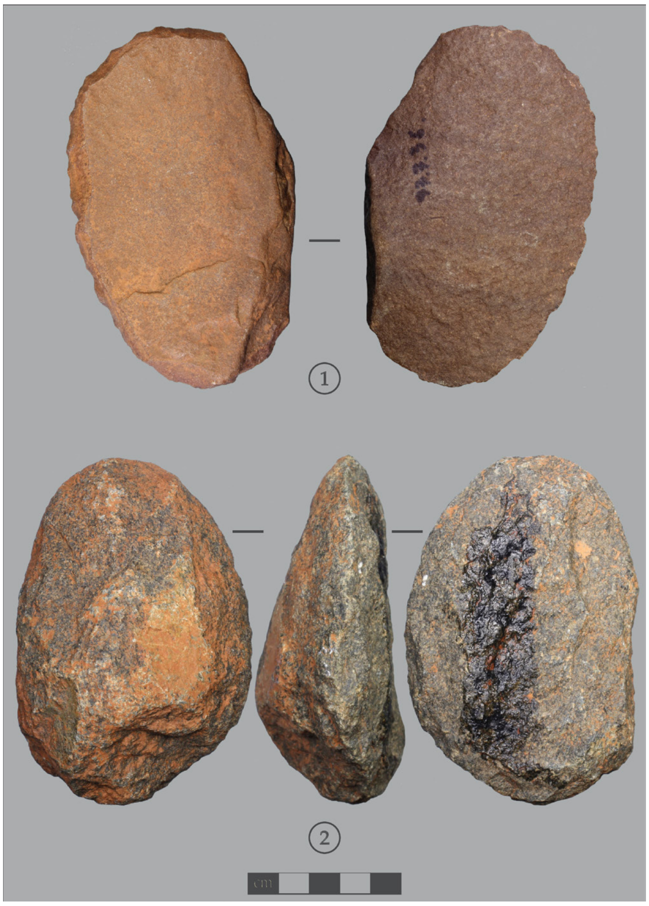

Figure 11. Top: scraping tool, bottom: unworked tabular raw material (gabbro)..Figures: Attila Péntek, by courtesy of the Ethnographic Museum in Budapest, Hungary.

When the hammering operation is completed to the satisfaction of the maker there follows the grinding-down process. For this purpose one of the ordinary flat blocks of sandstone used for grinding ochre or grass seed is used."

Spencer & Gillen (1904, 656) mentioned also the fact that ground axes were much less common than flaked implements because the raw material suitable for making them is only found in relatively few spots in the central area of Australia. Without a more precise indication, the authors mentioned the existence of a special diorite supplying quarry in the Macdonnell Ranges, where the making of ground axes was practically ceased. The range is a 644 km (400 mi) long series of mountains in Central Australia (in south-central Northern Territory), a series of bare quartzite and sandstone parallel ridges running to the east and west of Alice Springs. In any case, the quarry referred to was situated at a distance of a couple of hundred kilometres from Tennant Creek, so the raw material probably got there through exchange and barter. On the other hand, Ivanac (1954, 25) mentioned that to the southeast of Tennant Creek, in the Rising Sun gold mining area, granodiorite was mapped. This is a coarse-grained intrusive rock, in composition, it is an intermediate between diorite and granite.

In summary, concerning the above-described assemblage consisting of macrolithic tools and edge-ground implements, the following can be said. There is sufficient ethnographic and archaeological evidence of their occurrence in the area. However, no specific assessment can be made without raw material analyses for possible provenance, use-wear and geochemical analyses for utilisation function. Given that these tools have been produced for many thousands of years using the same or similar manufacturing techniques and used for a wide variety of tasks, it is not possible to determine the age of the examined tools either.

Statements

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