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THE 'AUSTRALOPITHECINE' COBBLE FROM MAKAPANSGAT, SOUTH AFRICA*

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ABSTRACT

The results of a microscopic study of a jasperite cobble excavated from Pliocene fossiliferous breccia in a South African cave are reported. The cobble bears various prominent markings giving it the distinctive appearance of a face, and it is thought to have been carried into the cave by australopithecines. These markings are conclusively identified as being attributable to erosion processes. Numerous other traces on the cobble's surface provide evidence of its long history.

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Introduction

Makapansgat is one of two early archaeological sites in the Makapan Valley of Northern Province (formerly Transvaal), South Africa (Fig. 1), which have been described as the "foundation of the South African prehistoric sequence" (Mason 1962:71). The Makapansgat jasperite cobble was excavated by Eitzman in 1925 from the level 3 pink stony bone breccia (Partridge's Member 4; see Oakley 1981:205) of the Limeworks site which also contained australopithecine remains. Eitzman (1958) showed the cobble to Raymond A. Dart during the late 1920s, suggesting that australopithecines had recognised a face in its prominent surface markings. But Dart, whose 1924 discovery of the first *Australopithecus* (the Taung infant) had received a very cool reception in the discipline, apparently took no interest in it at the time.

Several decades later, however, he recalled this exotic find and speculated about its significance (Dart 1959). Upon re-examining it in the early 1970s he noticed that, depending on how it is held and lit, several 'faces' can be seen, resembling australopithecines rather than humans (Dart 1974). The object has been briefly discussed by Oakley (1981) and featured in two British television programs, and was thus presented as the oldest apparent 'art find' known to us. Bahn examined it in 1996 and reported its history since its excavation (Bahn 1997). Nevertheless, for 72 years the cobble was not analysed in detail (Dart 1959; Oakley 1981; Bednarik 1996).

In view of my long-standing interest in questions of art origins (Bednarik 1994) it was inevitable that I would examine the Makapansgat stone, and I travelled to South Africa in April 1997 for this purpose. In recent years the possibility has been raised that the various distinctive surface markings on the cobble may have been emphasised,

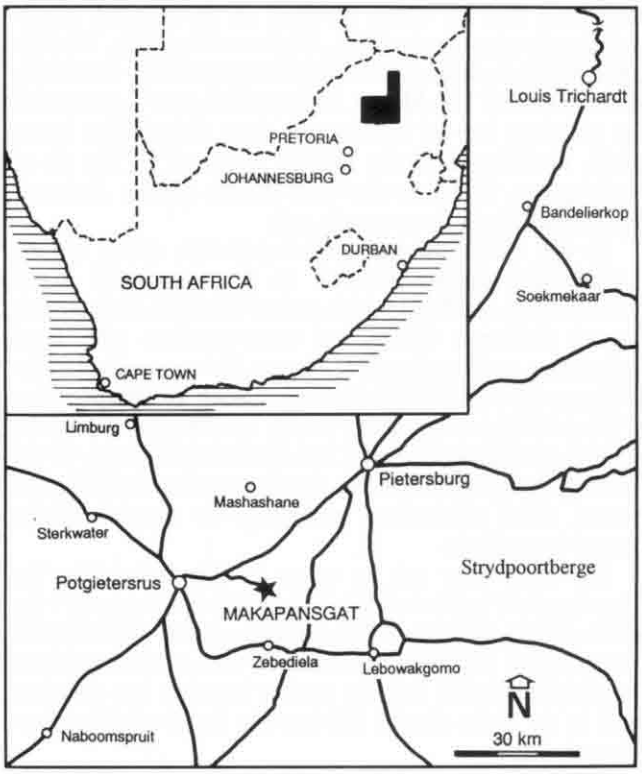

Fig. 1. Location of Makapansgat.

Fig. 2. The Makapansgat jasperite cobble (Scale in 100 mm intervals).

or even entirely made, by australopithecines (cf. Bahn 1997). I set myself the task of examining this possibility, and of reconstructing the object's history from its surviving surface aspects. This paper describes my findings.

Description

The Makapansgat cobble is 83,3 mm long, 69,5 mm wide and 38,4 mm thick, of an overall well-rounded, symmetrical and somewhat flattened shape. It weighs about 260 g and consists of a reddish-brown jasperite (also described as a 'banded ironstone') of locally variable composition. It is crisscrossed by a network of numerous greyish-green quartz veins that range in thickness from 0,2 to 1,0 mm. This stone bears a surprising similarity to that of a jasperite Pleistocene quarry I discovered recently on the Indonesian island of Roti, i.e. also on one of the Gondwanaland plates. An early erosion phase has given rise to several grooves and depressions where less resistant inclusions have been worn away. The most prominent of these are three major depressions, located centrally and symmetrically on one of the two flattened surfaces (Fig. 2). Their striking appearance and distinctive arrangement strongly convey the impression of a face, and although this may not be the orientation in which *Australopithecus* would have viewed the cobble (Dart 1974), for the purpose of description I will call these three features here the 'eyes' and 'mouth' of the cobble. Previously the object has been described as a pebble but that is technically incorrect as the terms pebble and cobble have distinctive granulometric meanings.

The presence of quartz veins has contributed significantly to the formation of these three features. The 'eyes' are separated by two vertical veins, whereas the 'mouth' is bordered above, below and to the left by a bulge of slightly darker and more resistant stone, with quartz veins crossing vertically through the depression. Both the 'eyes' and the 'mouth' were formed entirely through the erosion of less resistant material, traces of which remain in these depressions. The left hand 'eye' is 3,5 mm deep, the one on the right 4,4 mm, while the maximum depth of the 'mouth' is 3,4 mm. All depressions contain deeper, vesicle-like holes and crevices, most of which are filled with mineral grains tightly wedged into them. It is clear that these sand grains, nearly all of clear quartz, must have been forced into these tiny recesses by considerable pressure, indicating that at this stage the cobble was buried under sediment. One recess, located below the 'mouth', contains not only such quartz grains, but also fine-grained sediment cemented by silica. This illustrates the type of sandstone conglomerate in which the cobble was embedded during part of the Tertiary.

However, before it became part of a conglomerate deposit, the object experienced extensive wear, consistent with transport in a high-energy environment. For instance, there is a flake scar to the right of the 'eyes', 24 mm long and 18 mm wide, formed by the removal of a distinctive step-flake that indicates either direct impact or a free fall. Much of the stone's surface is covered by smaller remnants of impact damage, whose traces are particularly prominent on the more curved sectors of the surface (e.g. around the 'chin'). The edges of these scars are without exception heavily worn by battering and kinetic rounding.

All of this extensive impact damage is evenly water-worn, with typical wane-widths being in the order of 150 to 180 µm ('wane' is the rounding along the edge of a formerly angular object, e.g. a fractured crystal, caused by wear or erosion). Of interest is the relative water wear on the jasperite versus the silica veins. While the veins are usually prominent in concave surfaces, they have typically retreated to slightly below the surrounding rock matrix on any convex aspects. This seems to indicate that mechanical wear affected the silica veins more than the jasperite, while the situation is reversed relative to chemical solution. Thus the overall surface relief of the cobble is effectively the result of an interplay between various erosion processes.

Of particular interest are the many quartz grains tightly packed into small recesses, mainly in and near the 'eyes' and 'mouth'. A total of thirty-five such grains were examined: four in the right-hand 'eye', thirteen in the left-hand 'eye', two between the 'eyes' and sixteen in the 'mouth'. The presence of several more sand grains was also noted, including a few on the 'back' of the cobble. The size of most of the grains could not be measured effectively because of the way they are lodged in their respective recesses, but they seem to be generally in the order of 0,3 to 0,7 mm. All the quartz grains are of similarly opaque and 'frosted' surface condition. However, a group of five grains packed into one of two groups in the left-hand 'eye' exhibits distinctive polishing on protruding aspects of individual grains, indicating that they experienced wear through a very fine sediment, presumably in a fluvial setting.

Recent Markings and Damage

The surficial damage in the form of striations and micro-pitting, most prominent on protruding or convex aspects of the cobble, may well date from the same period as this relatively recent fluvial wear. Striations are mostly straight, but slightly curved examples do occur. Roughly sub-parallel concentrations are prominent, but are accompanied by nearby striae of different directions. In a major concentration of striations, such as in an area to the left of the left-hand 'eye', effectively all directions are represented, even where a favoured orientation is clearly evident. The striations are generally very short, most being under 1 mm long, and in the area mentioned they range from 20 to 80 µm in width. In section these abrasions are usually broad, flat-bottomed, quite shallow and worn. Above the right-hand 'eye' they are only 20 to 30 µm wide, usually only 2 or 3 µm deep, again showing a dominant orientation.

The mostly circular micro-pits also occurring on these striated surfaces range in diameter mostly from about 60 µm to slightly more than 100 µm. They are as worn as the striations and could conceivably be the result of crushing of sand grains under some pressure. This damage may relate to the preceding sedimentation phase, or may be contemporary with the abrasion documented in the striae.

One of the described quartz grains lodged in small recesses has been damaged *in situ*. Measuring 270 µm, it is located left of the left-hand rim of the left-hand 'eye'. The remaining ridge of this sand grain bears a negative conchoidal fracture scar, 70 µm wide and 95 µm long, as well as some less pronounced impact scars (Fig. 3). Whereas these surfaces are clearly corroded and presumably predate the cobble's deposition in the cave of Makapansgat, they certainly lack the distinctive 'frosted' surface condition of the unmodified quartz grain. It is proposed that this damage postdates all other surface modification on this object, with the exception of the obvious post-excavation traces.

The ridge formed between the grain's original surface and the fracture scars forms an angle of approximately 90°, and the surfaces have experienced solution resulting in the

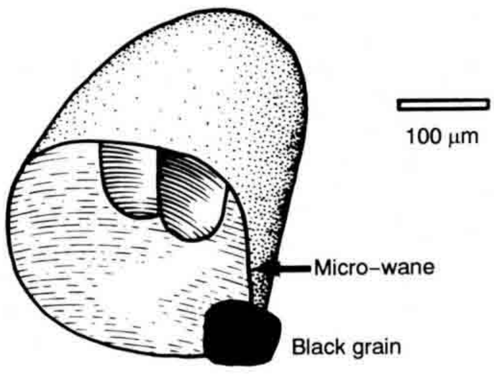

Fig. 3. Detail showing microscopic fracture scars and location of micro-wane on a quartz grain embedded near the left 'eye' of the Makapansgat cobble (Scale in 100 mm intervals).

formation of a typical micro-wane of 4 to 6 µm wane-width (Bednarik 1992).

Finally, there are several types of microscopic surface traces of post-excavation origins. Among them are the remains of two casting attempts, each consisting of waxy substances. One of them is of pinkish colour and occurs especially in minor surface depressions on the lower part of the 'face'. The other group of such residues is of a greenish-grey wax-like substance. Textile fibres of various types adhere to many parts of the surface, as do paper fibres. There is also ample evidence of modern human handling, in the form of deposits of lipids and similar substances. In two locations on the surface of the cobble, microscopic traces of metal indicate where metal instruments were applied, presumably to test the degree of hardness of the jasperite.

Interpretation

The above details provide adequate evidence for major events and processes that have shaped the Makapansgat cobble. Its major component, a heterogeneous jasperite, experienced cracking and filling with silica, which provided the stone with a very distinctive petrological signature in the distant geological past. The cobble itself was formed under conditions of high kinetic energy. Fluvial transport in conditions of moderate kinetic force then obliterated most of the many flake scars caused during this phase, resulting in the present shape of the cobble. At that stage, the object came to rest in a poorly sorted sediment consisting of a large range of grain sizes: well-sorted quartz sand, silt-grade sediment, and the occasional pebble to cobble-size grain. After being buried under considerable deposits of further sediments, this stratum became a facies of silicified conglomerate.

During the late Tertiary period, perhaps already in the Pliocene, the cobble eroded out of this lithological context, and once again became the subject of fluvial action. This time, however, it was in a slow-flowing stream or river, or perhaps a flood channel lacking large grain sizes. Occasionally the cobble would turn in its position, while smaller debris were transported past, and nearly all traces of the former sandstone matrix were now obliterated from the cobble's various recesses. Towards the end of this process, one of the remaining sand grains embedded in its surface acquired some microscopic flake scars, perhaps through pressure rather than impact. It is not clear whether this occurred before it came to rest on a sandbank or in the channel of an intermittent stream, or subsequently. What we can say with certainty is that the amount of microerosion experienced after this microscopic damage is equivalent to a period of only about 600 years of atmospheric exposure at low to average rainfall (cf. Bednarik 1992).

Whatever the case, it appears that the cobble was then picked up from where it had come to rest, and carried for a considerable distance (see below) into a dolomite cave in the Makapan Valley. It was deposited there at a time during which remains of *Australopithecus africanus* also came to be in the cave, between two and three million years ago (but probably close to the greater figure: McFadden *et al.* 1979). Together with the remains of the australopithecines and many other species, it was once again subjected to a sedimentation process, this time resulting in a fossiliferous limestone breccia.

In 1925 it was excavated from this deposit, and during much of this century it was handled and examined by various people. Casts were taken of the cobble on at least two occasions and its hardness was tested with metal implements. It was stored on or otherwise came into contact with a variety of surfaces or substances, many of which can still be documented from a microscopic study of the surface. However, in all these years it suffered no actual damage, which is not a common condition of archaeological specimens from the early twentieth century. No doubt it was always well stored, and its relative hardness facilitated this good state of preservation.

This examination has shown conclusively that the distinctive surface markings, the three principal recesses and the various grooves on both sides of the object, definitely bear no trace of intentional modification. All these features are entirely the result of the presence of pre-existing structures in the rock's fabric and of the processes of erosion that selectively exposed them. In fact most of these features existed even before the cobble became embedded in a siliceous conglomerate, no doubt well before the Pliocene. The only feature on the entire surface of the cobble that could even remotely be due to anthropic action is the one fractured quartz grain described. But even this aspect pre-dates the presumed australopithecine transport into the Makapansgat Cave by several centuries, and was almost certainly caused by some taphonomic agent.

Discussion

This brings us to the main issue relating to the Makapansgat cobble. According to Dart, the nearest known source of such stone is 32 km from the site, although B. Maguire (in Oakley 1981) suggested that it could have come from a banded ironstone outcropping 4,8 km NNE of the Limeworks site. However, the cobble clearly originates from a siliceous conglomerate and its initial (Precambrian) provenance cannot be established. Since the cave contained no water-transported sediments that could have entered from some higher-lying locality, the cobble could have been introduced only artifically. It is much too large to have been in the gut of some bird, and since it occurs in a late Pliocene deposit, it is not likely to have been transported by humans (unless humans already existed in the region at the time in question, of which we have no indication at present). The most parsimonious conclusion is that it was carried into the cave by the australopithecines whose remains occur in the same deposit. While there may not be adequate proof that they inhabited the cave (their remains could have been deposited by carnivores), the discovery of a 'complete' skeleton, presumably australopithecine, has been reported by Eitzman (1958:182). This is likely to have been deposited, but the individual may have died *in situ*.

While the cobble is of superb material from which to make stone implements, we have no clear evidence that australopithecines made lithic tools, nor does the object show any trace of impact from the time interval before it became embedded in the cave breccia. It was clearly not used as a tool, as far as we can tell; it was simply a manuport. The cobble has most unusual visual qualities. Its red colour alone would be striking in almost any environment but more particularly so in combination with its distinctive shape. Oakley (1981) emphasised the role of red colour for hominids. But it does not seem likely that it would have been picked up and carried for some considerable distance just for these properties and by far the most conspicuous aspects of this object are its menacing 'eyes' as well as several other, very prominent markings, all of which underline the iconographic properties and make it resemble a face.

Before discounting the possibility that *Australopithecus africanus* possessed the ability to perceive such iconographic features we would do well to remember that the visual concept of 'eyes', especially staring 'eyes', is strongly established in the perceptive systems of numerous species, including birds and insects. An example is the defensive markings on the wings of butterflies and other species. It is perfectly possible that extant pongids would detect the significance of a pair of staring eyes on a head-like shape, and even if that were not the case, we need to appreciate that australopithecines may well be perceived as being some distance between modern pongids and humans, in terms of their cognitive faculties. Australopithecines walked fully erect, as we know from the seventy tracks at Laetoli in northern Tanzania which are even older than the Makapansgat fossiliferous deposit (Leakey 1981).

Not only are the markings on the cobble far too striking not to have been noticed by the australopithecines, if they did *not* notice them we would have to explain why they carried this object for some distance and then left it at a probable occupation site. The only argument against this explanation is that we do not know what the perceptive and cognitive capabilities of australopithecines were. But it is precisely for this reason that we should not presume to know that they were incapable of perceiving a 'face' in this cobble. If they were not curious, inquisitive creatures with a penchant for cognitive stimulation, how could they possibly have developed the behaviour patterns that led to those facilitating human evolution? It is, in my view, essential to expect australopithecine behaviour to be significantly more complex, in a cultural and cognitive sense, than that of any extant non-human primate. A subsequent species, *Homo erectus*, not only produced palaeoart but also crossed the open sea to colonise new lands, reaching Flores at least 700 000 years ago (Sondaar *et al.* 1994; Bednarik 1997); used colouring pigments and collected fossils and crystals and hominids eventually modified 'proto-sculpture' objects (such as the Berekhat Ram pebble) to emphasise their iconographic properties (Bednarik 1994; Marshack 1997). It seems perfectly reasonable to expect more rudimentary recognition of such properties in a preceding species, particularly as this would seem to be the only logical way to account for the presence of this cobble in the Makapansgat breccia.

Conclusions

The visual properties of the Makapansgat cobble are so striking that some commentators have found it hard to believe that it is simply a natural product. That, however, is precisely what it is: it bears no trace of any artificial modification. Having examined vast numbers of silica nodules and other natural phenomena of often fantastic shapes, I confess that I have never seen a natural stone object with such remarkable visual properties. The symmetry of the 'eyes', in particular, especially in relation to the head-like shape of the stone, is impossible to overlook, and this feature has an almost menacing quality. I concur with Eitzman, Dart and Oakley that the object was collected by australopithecines for its visual qualities, and that its iconographic properties were recognised by these creatures. As Dart has pointed out, the face most readily perceived in the object by modern humans resembles human features, which could not have been recognised as such by australopithecines. However, when the stone is turned over, it presents a face resembling the reconstruction of an australopithecine face, wearing a friendly if somewhat mischievous grin (Fig. 4). Perhaps this was the orientation *Australopithecus* would have preferred, although I feel that the staring eyes are far more prominent, and in combination with the striking colour led to the object being picked up.

Fig. 4. The Makapansgat cobble in the orientation showing features of an australopithecine 'face'.

The present analysis of the cobble has shown that all surface traces found on it date from its long and chequered geological history. It is thus best described as a manuport of 2,5 to 3 million years ago. At the present time it is the only Pliocene object of its kind reported in the world, and it is therefore justifiable to describe it as the earliest 'palaeoart' object (in the broadest sense of the word) we have found to date. Other palaeoart manuports are considerably more recent, beginning at about 800 ka or more recent, in both southern Africa and India (Bednarik 1994). Thus the probability of discovering any similar evidence is not very encouraging, and particularly in view of the immense taphonomic odds it should be recognised that this was a most fortunate find. It is not only unique at present, it may remain so for a long time to come.

Acknowledgments

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References

Bahn, P.G. 1997. Facing up to the earliest art. Paper presented to Symposium 3 of the Congreso Internacional de Arte Rupestre, Cochabamba, 2 April 1997.

Bednarik, R.G. 1992. A new method to date petroglyphs. Archaeometry 34:279-291.

Bednarik, R.G. 1994. Art origins. Anthropos 89:169-180.

Bednarik, R.G. 1996. The Makapansgat pebble. The Artefact 19:107.

Bednarik, R.G. 1997. The initial peopling of Wallacea and Sahul. Anthropos 92:355-367.

Dart, R.A. 1959. How human were the South African man-apes? South African Panorama 4(11):18-21.

Dart, R.A. 1974. The water-worn australopithecine pebble of many faces from Makapansgat. South African Journal of Science 70:167-169.

Eitzman, W.I. 1958. Reminiscences of Makapansgat Limeworks and its bone-breccial layers. South African Journal of Science 54:177-182.

Leakey, M.D. 1981. Tracks and tools. Philosophical Transactions of the Royal Society of London B292:95-102.

McFadden, P.L., Brock, A. & Partridge, T.C. 1979. Palaeomagnetism and the age of the Makapansgat hominid site. Earth Planetary Science Letters 44:373-382.

Marshack, A. 1997. The Berekhat Ram figurine: a late Acheulian carving from the Middle East. Antiquity 71:327-337.

Mason, R. 1962. Prehistory of the Transvaal. Johannesburg: Witwatersrand University Press.

Oakley, K.P. 1981. Emergence of higher thought, 3.0 - 0.2 Ma B.P. Philosophical Transactions of the Royal Society of London B292:205-211.

Sondaar, P.Y., Van den Bergh, G.D, Mubroto, B., Aziz, F., de Vos, J. & Batu, U.L. 1994. Middle Pleistocene faunal turnover and colonization of Flores (Indonesia) by *Homo erectus*. Comptes Rendus de l'Académie des Sciences Paris 319:1255-1262.