Rock engravings and the Later Stone Age, northern Cape Province, South Africa: a multidisciplinary study

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Dating of rock engravings, and their palaeoecological interpretation, remain difficult in open-air contexts due to a lack of direct associations, even when artefacts are present locally. Differences of patination relative to rock surface (reflecting silicification and ferromanganese concentration) are frequently helpful in relative age assessment (Denninger 1971, 1975; Cervicek 1973), but are complicated by local contrasts in lithology and exposure. Systematic stylistic or technological variability, with occasional superpositioning, are also useful (Goodwin 1936; van Riet Lowe 1955), but techniques vary from one region to another and commonly overlap temporally (Fock 1969, 1973). Direct isotopic dating has so far only been successful for painted stones found within specific archaeological strata of a number of cave sites in southern Africa; these include Glen Elliot, Robberg (Guanogat Cave), Matjes River Shelter, Klasies River Mouth (Shelter 5), Boomplaas Cave and, above all, Apollo 11 Cave in Southwest Africa, where prehistoric art is dated between 18 500 and 28 500 b.p. (Wendt 1976). Nonetheless, the rock engravings remain essentially undated. Since paintings are rare in the semiarid interior of southern Africa, where engravings are commonplace, this persistent problem is one of considerable urgency.

It remains to be explored to what degree rock art clusters can be interpreted by broader contextual studies. Within the framework of a long-term, multidisciplinary study of prehistoric settlement patterning and ecology in the northern Cape Province and western Orange Free State, attention was focused on the three richest rock engraving sites in South Africa: Klipfontein (58 km WNW of Kimberley), Kinderdam (40 km NE of Vryburg), and Driekops Eiland (60 km WSW of Kimberley).

DRIEKOPS EILAND

Known since 1873 (Stow 1877), engravings at Driekops Eiland are incised on 1 ha of glacially-scoured andesite now exposed in the Riet River bed. The animal and schematic representations here are as patinated as the bedrock, with some obviously younger items, barely patinated, just exposed by fresh erosion of bed load sediments; this, together with a heavily patinated inscription of 1916 below high-water mark, and a completely fresh inscription of 1876 above it, indicates that patination is primarily a function of water immersion.

A few engravings are heavily waterworn on ridges exposed to flood-level abrasion, while others in more sheltered localities retain their original depth of line. Significantly, in one case of superpositioning, a geometric design was distinctly less abraded than a naturalistic antelope representation. This example is representative of many sites where schematics are, on the whole, less weathered or abraded than the bulk of adjacent animal engravings.

Particularly informative at Driekops Eiland is the distribution of engravings with respect to the various active and non-functional alluvial bodies of the Riet River. Relatively young schematic representations occur from well below the low-water mark to a maximum of 2 m above it, at the main site, and to 1.5 m above it, at secondary sites 1–2 km downstream; in part, the schematics are found under at least 50 cm of recent or subrecent bed load. The naturalistic animal representations have a far more limited distribution. They are only found at the main site, where they occur on less than 25% of surface covered by schematics, being never found near or below the low-water mark.

In other words, the river bed was higher and far more extensively covered with sediment at the time the naturalistic engravings were rendered; much or most of this episode must have coincided with the second phase of aggradation related to the late Holocene Riverton Formation (Member Vb), represented in the Riet Valley by a +5 floodplain level. The only abundant artefacts of Holocene age on the river banks pertain to the Smithfield Industry; these are found as occupation floors (and burials) on (or cut into) a lateral, colluvial equivalent of the slightly older Riverton Member Va. Floodplain pedocarbonates related to Riverton Member V in the upper Riet drainage near Fauresmith gave a radiocarbon age of 2665 ± 65 b.p. (Butzer *et al.* 1973). The terminal phases of the +5 m floodplain in the Riet system can be no younger than 1300 b.p., judging by other, better-dated sequences in the lower Vaal Basin (unpublished data).

Our contextual studies consequently show that the naturalistic animals of Fock's 'Middle' style (also van Riet Lowe's 'Series 3' and Goodwin's 'Phase 6') at Driekops Eiland are older than 1300 b.p. and probably coincided with intensive, local Smithfield settlement. The schematic engravings are generally younger than 1300 b.p. and argue for a river bed as low as that of the present, coeval with a low water table and reduced peak discharge of the Riet. Two generations of schematics are present, the older comprising a wide range of heavily patinated geometric designs, the younger a limited range of generally fresh, poor-quality 'imitations'. Archaeological and historical records verify San, Kora, and Tswana herders in the immediate area during the early nineteenth century (see Humphreys 1972). One of these groups, presumably the pastoral San, made the youngest schematics during the last four or five centuries.

Two engraving techniques are not represented at Driekops Eiland. One of these utilizes a combination of outline and silhouette to produce a striking three-dimensional effect. This category appears to be of intermediate age and at other sites is only found on suitable rock surfaces located above the floodplain of early Member V of the Riverton Formation, a unit now dated *c.* 4500–3000 b.p. (unpublished data). The absence of this category of engravings at Driekops Eiland could be explained by the lack of any rock outcrops at this time, when the local floodplain was at ±10 m (Riverton Member Va). Coeval settlement along the Riet is verified by a Smithfield assemblage found *in situ* midway in a colluvial deposit grading into this floodplain.

The second engraving technique not represented at Driekops Eiland is characterized by very fine, incised lines ('hairlines'). In all cases of superpositioning at various sites,

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hairlines are always older than other techniques. So far no hairlines have been located in informative geo-archaeological contexts.

KLIPFONTEIN (BUSHMAN'S FOUNTAIN)

At Klipfontein, 4567 engravings are found on 2567 low andesite rocks scattered over 9 ha of hillside around two permanent waterholes (Fock 1978).

Three waterworn, engraved rocks, in the first-order valley linking the waterholes to a small depression or vlei (now artificially dammed), are 75 cm above the floor of the inactive, water-scoured channel. These rocks have only 0.5 mm patina on faces exposed to potential flood surges, compared with over 3 mm for rocks outside the channel. The channel-rock engravings include a range of naturalistic animals, mainly in combination outline-and-silhouette technique, all in the 'Middle' style and some reminiscent of three-dimensional rendering; these engravings are unusually faint since fluvial abrasion has eliminated at least 75% of original line depth. The 'Middle' style therefore, in part, predates a long subsequent period of greatly augmented fluvial activity sufficient to wear down general rock patina by 2 mm or more.

Geomorphic context at Klipfontein is provided by: (1) two defunct, undermined spring-heads at 1 and 2 m respectively above the upper water-hole; (2) striking ferromanganese watermarks at 20 ± 5 cm above the high 1974 level of the vlei, indicating a formerly substantial pond; and (3) fossil calcareous sands, silts, and clays under the vlei, consisting of 50 cm younger, unconsolidated materials (three generations, the basal unit dated at least 6280 ± 115 b.p.), possibly but not demonstrably coeval with the + 20 cm water mark; and an older, compact sediment (minimum age 20 500 ± 900 b.p.). Two, Late Pleistocene and Holocene pollen spectra from the vlei both indicate a much expanded bush and thorn thicket, dominated by *Tarchonanthus*, with scattered wild olive and acacia. This suggests vegetation similar to that now found north of the Vaal River.

The contextual evidence therefore argues for at least some 'Middle'-style engravings prior to or penecontemporaneous with a major wet interval, no later than Riverton Member Va but perhaps even prior to 7000 b.p.

The possiblity of an early Holocene age is also raised by the presence of a detailed, fully-pecked engraving of what appears to be the extinct antelope *Damaliscus niro*, a relative of the modern blesbok. Although such an identification cannot be made with absolute certainty from rock art, C.K. Brain and E.S. Vrba (personal communication) agree that it is highly likely. Unfortunately, the time of extinction of this Middle to Upper Pleistocene form is uncertain. Horn cores and even casings of *Damaliscus* cf. *niro* Hopwood without archaeological provenence were found in Wonderwerk Cave, near Kuruman (Malan & Wells 1943; Wells 1967), increasing the probability of this form among the Klipfontein engravings, without, however, adding temporal precision.

KINDERDAM

At Kinderdam there are 1859 identified engravings (1297 of animals) across 2 ha of a conspicuous mound (koppie) of andesite rocks rising 10 m above a sandy plain (G.J. Fock, in preparation). Although most engravings are well patinated, there has been little rock disintegration except for local block splitting. However, the eastern third of the koppie has coarser-grained andesites, with abundant amygdular inclusions, and there are few engravings other than human figures on the resulting thick and deteriorating oxidation rinds or rough and pitted crystalline surfaces. It appears that this area has lost as much as 30 cm of weathering mantle by post-Pleistocene soil erosion, implying that many of the human figures may be younger than the majority of the animal representations. Elsewhere, protracted chemical weathering has enlarged gentle swales on level rocks into large, saucer-shaped depressions some of which can hold up to 300 litres of water after rains. The highest ratio of schematics is found around these depressions, confirming a general relationship between schematic engravings and river beds, springs, and the other sources of water.

EVALUATION

There is little demonstrable and dated settlement in the study area between the terminal Pleistocene and shortly before 4000 b.p., when settlement began adjacent to river valleys and plains (Middle Orange, Sampson 1974: 331; Alexandersfontein, unpublished data). This is compatible with Deacon's (1974) brief review of then available radiocarbon dates, which suggested an absence of prehistoric settlement in the semiarid interior of South Africa *c.* 9500–4600 b.p. Such a hiatus is apparent at Dikbosch Shelter, on the Gaap Escarpment, where level III is dated 13 510 ± 210 b.p. and level II 3090 ± 60 b.p. (Humphreys 1974). Although evidence for Early Holocene settlement remains enigmatically sparse, any lacunae in prehistoric occupance were considerably shorter than suggested by Deacon (1974). Settlement at Wonderwerk Cave can now be dated at *c.* 12 200 to 10 000 b.p. and again 6000 ± 55 b.p. In the Alexandersfontein Basin several sites indicate settlement between 15 000 and 10 800 b.p. (Benfontein, Mauritsfontein) and again after 3400 b.p. (Mauritsfontein, Uitzigt) (unpublished data). At Voigts Post, near Petrusburg, pre-Smithfield settlement appears to be dated 6350 ± 75 b.p. (Vogel, J.C., personal communication, while elsewhere in the Orange Free State, there was a major occupation at Rose Cottage Cave 6850 ± 45 b.p. (Beaumont & Vogel 1932) as well as somewhat earlier.

The persistent lacunae consequently appear to be between 10 000 and 7000 b.p. and again between 5500 and 4000 b.p. How do these phases compare with the palaeoenvironmental history of the region? The spring cycles of the Gaap Escarpment and the Alexandersfontein Basin, as well as the expanded, marshier floodplain habitats of the Vaal and many of its tributaries, indicate greater moisture at the very end of the Pleistocene until about 6800 b.p., followed by dry conditions until 4600 b.p., with later rainfall maxima identified *c.* 3200–2500 b.p. and 2250–1300 b.p., followed by a relatively dry climate (Butzer *et al.* 1978). In other words, common and widespread Late Stone Age settlement since the fourth millenium b.p. corresponded with good ecological perquisites.

Comparing our dating strictures with the regional settlement history, the bulk of the naturalistic animals and more generally the 'Middle' style engravings would date between 4000 and 2400 b.p. The 'Middle' style may well have persisted locally until 1300 b.p. On the other hand, the schematic phase, while almost certainly beginning a little earlier, dates primarily to the period of drier conditions after 1300 b.p. Finally, the oldest, hairline engravings may be related to the earliest phases of Smithfield settlement; they may equally well be substantially older, i.e. from the seventh millenium or even earlier than 10 000 b.p.

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