

## Late Middle Pleistocene fossils, including a human patella, from the Riet River gravels, Free State, South Africa

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In August 1957, James Kitching of the Bernard Price Institute for Palaeontological Research (BPI), at the University of the Witwatersrand collected mammalian fossils and a single stone artefact from a large erosional area on the southern bank of the Riet River, Free State. The approximately 40 fossils included mandibles, dentition and postcranial remains of several species of antelope, equid and carnivore. The material was stored at the BPI in a box labelled 'fossil mammals from Riet Rivier, Reddersburg', which was recently given to us by Kitching for examination, cataloguing and inclusion in the sample of Free State Pleistocene fauna currently being collected by us. Whilst examining the material for the first time, one of us (L.R.B.) noticed a mineralized human patella among the other remains. As a result of this discovery, a collecting trip to the source locality was organized and a detailed map, prepared by Kitching in 1957, enabled us to pinpoint the place as a large erosional area of approximately 300 × 150 m on the southern bank of the Riet River (26°14'E; 29°48'S; Fig. 1). A further small sample of mammalian fossils was recovered that matches the *état physique* of the Kitching material. The rarity of good collections of Pleistocene faunas from the Free State and the near absence of Pleistocene human remains from this region (the Florisbad skull being the notable exception) adds to the importance of this find. Here we discuss both the original and the new Riet Rivier fauna, including the human patella, and draw conclusions about their ecological setting and age. For clarity, the mammalian material collected by Kitching has been labelled RRK, whilst newly collected fossils are denoted RR.

There are three distinct horizons observable in the eroded area south of the Riet River. The exposed bedrock is a greenish upper Karoo sediment from which Kitching (pers. comm.) reports the recovery of Karoo-age reptiles. Immediately overlying the Karoo rock is a grey, gravelly clay of approximately 1 m thickness that is capped in places by an approximately 1.5-m-thick reddish, gravelly clay. Both clays have numerous, scattered Middle Stone Age (MSA) artefacts eroding from all exposed areas. It is from the red and grey clays that the fossils are emerg-

ing, with most specimens originating from approximately the contact point between the grey and red horizons. Kitching reports that most of the 1957 (RRK) material was collected from a fairly confined area. Our recent investigations of the south side of the river found only one area of less than 20 m<sup>2</sup> in the clays where well-preserved fossil bone was concentrated, although isolated bone fragments were present across the entire erosional surface.

The faunal list by species (Table 1) is relatively small due to the paucity of material available. The collection is dominated by bovid specimens (29), most of which are attributable to the species *Connochaetes gnou antiquus*. Included in the collection is a mandible of the water loving species *Kobus leche*, presently confined to the Okavango Delta. One bovid specimen resembles the giant alcelaphine *Megalotragus*. Equids are represented by dental and postcranial specimens attributable to the extant species *Equus quagga* (= *burchelli*). A single suid tooth has been placed in the genus *Phacochoerus*, but since the roots are damaged we are unable to establish whether the tooth is of the *africanus* type or of the *aethiopicus* type.<sup>1</sup> The single carnivore specimen is a set of three unworn mandibular premolars set in a mandibular fragment attributable to *Hyaena brunnea*.

The single hominid specimen is a left patella (Fig. 2) catalogued as RRK-1. The specimen is roughly heart-shaped and 44.8 mm at its greatest mediolateral breadth (ML) and 42.0 mm at its greatest supero-inferior length (SI). The patella is large by comparison with a small sample of modern human patella ( $n = 25$ ) measured by us, but well within the range of variation for human dimensions (ML = 37.0–48.1 mm; SI = 34.9–46.2 mm). The anterior surface (Fig. 2a) is slightly convex and strongly marked by longitudinal stria. The superior area of attachment of the tendon of quadriceps femoris is strongly marked and the most superior part of this attachment shows that part of the tendon had ossified. This ossification has formed a strong, posteriorly inclined 'lip' of bone at the top of the specimen. On the posterior surface both the facet for the lateral femoral condyle as well as the facet for the medial femoral condyle are slightly con-

cave. The medial and lateral facets meet slightly medial to the centre-line of the specimen in a raised, smooth ridge. The distal part of the articular surface is damaged. All ossification centres are completely fused and, judging by the ossified area of attachment for quadriceps femoris, the specimen is that of a mature adult.

Numerous Middle Stone Age artefacts are scattered across the erosional area wherever there are exposed clays. They clearly originate from the red and grey clays. Whilst not in any apparent primary archaeological context, due to their frequency and pristine condition, it is our opinion that the artefacts have not been secondarily deposited into the clays.

The extinct form cf. *Megalotragus* as well as the mineralized state of the bones indicates a pre-Holocene age for the deposit. The presence of *Kobus leche* and *C. gnou antiquus* (Fig. 3) suggests an age broadly similar to that of Florisbad, probably in excess of 100 000 yr BP.<sup>2</sup> The presence of MSA implements within the clays does not seem to conflict with the faunal dating and thus it seems reasonable to estimate an age for the sediments, and thus the fauna, of between 40 000 (approximately terminal MSA) and 240 000 years before present (approximately seminal MSA), with a 'best guess' of around 100 000–200 000 BP.

Carnivore damage on the Riet River material is infrequent, with only one or two possible puncture marks observable. Several of the specimens, including specimen RR2 (*C. gnou antiquus*) show signs of porcupine gnawing and this, combined with the relatively complete nature of the fossils and the concentrated area of recovery, indicates to us that non-human agents such as porcupines and brown hyaenas were responsible for the accumulation.

The fauna clearly has an open grassland character representative of higher rainfall than today, and would fit into a typical central-southern African Florisian model.<sup>2</sup> The fossil mammals are therefore typical of other Free State Pleistocene faunal assemblages known to us as being dominated by grazing forms. The identification of *K. leche* in the Riet River fauna demonstrates the most southerly occurrence of this species and supports the suggestion of wetter conditions in the interior of southern Africa during the late Quaternary.<sup>2,3</sup>

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Fig. 1. The approximate location of the Riet River site.

Fig. 2. A, anterior view of the Riet River human patella (left) compared with a modern human patella (right); B, the corresponding posterior views. Scale in centimetres.

Fig. 3. A bivariate plot of the distal depth and distal breadth of modern and fossil *C. gnou*. The Riet River specimen falls at the lower extreme of the Florisbad fossil sample, and at the upper extreme of the modern assemblage. As *C. gnou* became smaller in time, the intermediate position of the Riet River specimen may be taken to indicate a pre-Holocene age of the Riet River assemblage.

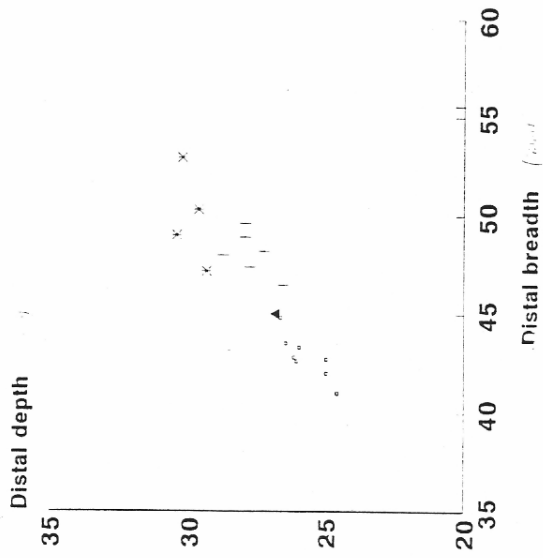
Table 1. Species list of fauna collected from the Riet River by Kitching in 1957 (RRK) and the authors (RR). The counts are minimum numbers of individuals and number of identified specimens.

|                                   | RRK  | RR  | Total |
|-----------------------------------|------|-----|-------|
| <b>Primate</b>                    |      |     |       |
| <i>Homo</i> sp.                   | 1/1  | -   | 1/1   |
| <b>Carnivora</b>                  |      |     |       |
| <i>Hyaena brunnea</i>             | 1/1  | -   | 1/1   |
| <b>Suidae</b>                     |      |     |       |
| <i>Phacochoerus</i> sp.           | -    | 1/1 | 1/1   |
| <b>Equidae</b>                    |      |     |       |
| <i>Equus quaqqa</i>               | 1/1  | 1/2 | 1/3   |
| <b>Bovidae</b>                    |      |     |       |
| <i>Connochaetes gnou antiquus</i> | 3/17 | 2/2 | 3/19  |
| cf. <i>Megalotragus</i> sp.       | -    | 1/1 | 1/1   |
| <i>Kobus leche</i>                | 1/1  | -   | 1/1   |
| Bovidae indet.                    | 2/7  | -   | 2/7   |

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# *Connochaetes* spp

## Distal metacarpal dimensions



- Modern *C. gnou*
- Florisbad fossil
- △ Modern *C. taurinus*
- \* Riet River fossil

