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A Middle Pleistocene human tibia from Hoedjiespunt, Western Cape, South Africa

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A 200–350 KYR BP HUMAN TIBIA HAS BEEN recovered in association with craniodental remains from the Hoedjiespunt site near Saldhana Bay. The tibia is morphologically similar to other Middle Pleistocene human tibiae from Africa and Europe, indicating a substantial degree of postcranial morphological homogeneity across the western Old World at this time.

With the discovery of human dental remains in 1993,[1] the site of Hoedjiespunt (Western Cape, South Africa) joined the small but growing list of southern African Middle/Late Pleistocene sites that have produced fossil hominids. Excavations since then have recovered additional cranio-dental remains, and most of a human tibia was recovered in 1998. The hominid remains from Hoedjiespunt thus increase the sample of Middle Pleistocene human fossils at or close to the time of the emergence of modern *Homo sapiens* and the disappearance of more archaic forms, and provide additional postcranial evidence important to our understanding of human body size and shape and locomotor patterns during this important transition. We provide here a preliminary description of the specimen.

The tibia was recovered from the shelly sands[1] of a cavity fill at Hoedjiespunt during continuing excavations. The sediments and fossils from the sands were dated using a variety of methods that have consistently given results between 200 000 and 350 000 years before present (kyr BP). Foraminifera and fauna indicate a regressive sea level, possibly corresponding to the cold conditions of oxygen isotope stage 8 (303–245 kyr BP). Dental and cranial remains of a juvenile hominid were recovered from the same level.

The Hoedjiespunt specimen comprises a right human tibial diaphysis (Fig. 1). It is preserved from immediately below the tibial tuberosity to the distal metaphyseal region. Maximum preserved length of the specimen is 275 mm. The specimen is broken near mid-shaft, revealing a slightly amygdaloid shape in cross-section. The cortical bone in the exposed

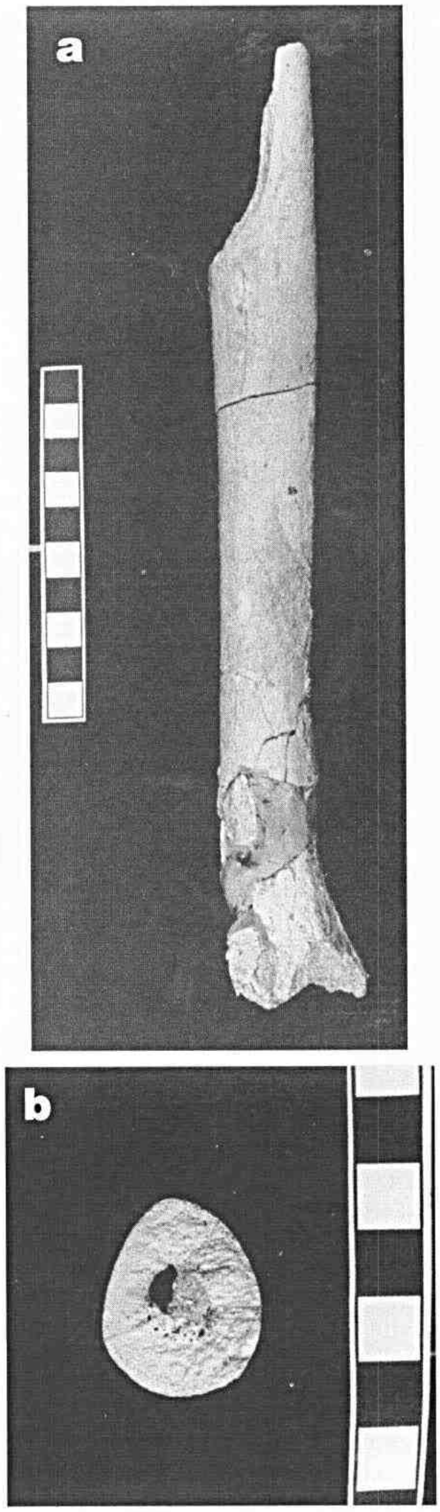

Fig. 1. a, Lateral view of the Hoedjiespunt tibia; **b**, cross-section of Hoedjiespunt tibia at the midshaft break. Viewed from distal, anterior at top. Note that the medullary cavity is partially filled with matrix. Scale bars = 1 cm.

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cross-section is remarkably thick, especially anteriorly and posteriorly. At midshaft, the ratio of cortical bone area to total cross-sectional area is 0.908, the highest value for any archaic human tibia yet described (a sample of 18 Pleistocene African, European and Indonesian archaic *Homo* tibiae provide a mean ratio of 0.792 ± 0.064, with a range from 0.655 to 0.895. Data courtesy of Erik Trinkaus, Washington University, St Louis). Much of the surface of the specimen is mildly weathered, making morphological features difficult to identify. Despite the weathering, it is clear that surface landmarks are poorly expressed and this, along with vermiculate bone in the area of the tibio-fibular ligament attachment, may indicate that this specimen is from a juvenile (possibly the same individual represented by the cranio-dental remains). Reconstructed length estimated from available morphological landmarks is more than 360 mm. Both Hartwig-Scherer's[2] and Porter's[3] equations for predicting body mass from tibial midshaft dimensions produce an estimated mass for the Hoedjiespunt individual in excess of 60 kg.

The Hoedjiespunt tibia shares with other archaic human tibiae (and is distinguished from those of modern *Homo sapiens* by a rounded anterior crest, an anterolateral surface that is convex distally and minimally concave near midshaft, rounded posteromedial and posterolateral angles, and thick cortical bone.[4] The Hoedjiespunt tibia shares with the 500 000-year-old specimen from Boxgrove (Sussex, England) the unusual feature of exhibiting a very straight anterior crest.[4] It is interesting to note that the Hoedjiespunt tibia, like the presumably Middle Pleistocene femur from Berg Aukas (Namibia), has a close morphological analogue in a European Middle Pleistocene specimen (in the case of Berg Aukas, the Italian specimen from Castel di Guido).[5]

The difficulty of assigning isolated fossil human postcranial remains to species has been highlighted recently by the discovery of the Boxgrove tibia.[4,6] In the case of both the Hoedjiespunt and Boxgrove specimens, this difficulty is exacerbated by a general paucity of diagnostic features of the tibia and by an unclear appreciation of the polarity of the traits that characterize archaic human tibiae and distinguish them from those of modern *Homo sapiens*. Thus it is not possible to establish, from currently available fossil samples, whether the morphological similarities between Hoedjiespunt and other archaic human tibiae, such as Boxgrove, represent simple isomorphic characters common to all archaic humans or apomorphic features reflecting some degree of taxonomic identity. The Boxgrove tibia has been provisionally attributed to *H.* cf. *heidelbergensis* on the basis of its archaic morphology and its approximate contemporaneity with the type specimen of that species (the mandible from Mauer).[4,6] It has also been suggested that the species *H. heidelbergensis* is represented in the African Middle Pleistocene by specimens from Kabwe, Bodo, Elandsfontein, Lake Ndutu and Eyasi.[7–9] There is nothing in the morphology of the Hoedjiespunt tibia, nor in the recovered dental remains from the site, that precludes their inclusion in *H. heidelbergensis*.

Regardless of the exact taxonomic designation, it is apparent to us that there is substantial morphological similarity, both cranially and postcranially, among European and African Middle Pleistocene humans. These similarities appear to persist over time and across distant geographical regions that represent widely different climates. We conclude that these similarities support the view of a wide distribution of *H. heidelbergensis* in the Middle Pleistocene.

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Parasites and vaccination against HIV

Sir, – Worm infestations in man are widespread in sub-Saharan Africa, where epidemics of tuberculosis (TB) and human immunodeficiency virus (HIV) infection are out of control. Human helminthiasis results in impaired T-helper cell type 1 (Th1) responses to tetanus toxoid[1] and Bacillus Calmette-Guérin (BCG) vaccination against TB.[2] It is a Th1 immunological profile that appears to be protective in diseases like TB and HIV/AIDS. Conversely, there is evidence that the T-helper cell type 2 (Th2) cytokine response, which predominates in chronic helminthic infection, might lead to increased incidences of TB and HIV/AIDS in communities or facilitate progression of these diseases in individuals.[3–7] This applies to both adults and infants.[8] Immune activation caused by worm infestation and possibly other antigens may also influence the host's response to vaccination against HIV.[3–9]

The magnitude of the potential problem involved here, should not be underestimated. Prevention of helminthic infection or mass deworming might be necessary in order to enhance the protective effect of anti-HIV vaccines in Africa. Research needs to be carried out in relation to this important matter, with collaboration taking place between clinicians, immunologists, parasitologists and virologists.

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