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Brief Communication: Gladysvale: First Early Hominid Site Discovered in South Africa Since 1948

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ABSTRACT We report here the discovery of fossil hominid teeth at Gladysvale, near Johannesburg in the southern Transvaal. This find makes the site the seventh in South Africa to yield australopithecine remains and the first new early hominid-bearing locality to be found in this region since 1948. Apart from the hominid specimens, our excavations at Gladysvale have added appreciably to the abundant Plio-Pleistocene fauna previously recorded from the cave deposit. The fauna indicates that savanna conditions prevailed during deposition of at least part of the fill. Preliminary faunal dating gives an age of deposition of between c1.7 and c2.5 mya.

The Gladysvale fossil site is located approximately 13 km east of the Sterkfontein, Kromdraai, and Swartkrans hominid-bearing deposits and is situated within the bounds of the John Nash Nature Reserve, on the farm Uitkomst, 499 JQ, in the Krugersdorp District of South Africa (25° 54' S; 27° 45' E). The site comprises both in situ fossiliferous cave fill and mined breccias from a three chambered system of caves which have developed in the chert-rich dolomitic limestone of the Eccles Formation of the Chunniespoort Group (Martini and Keyser, 1989).

The hominid specimens comprise two almost perfectly preserved isolated tooth germs. They were recovered from breccia dumps resulting from now discontinued lime mining operations and from earlier palaeontological work. The first specimen, labeled GVH-1 (Fig. 1a–c), was recovered by M. Erasmus on April 5, 1992 and is a left P 3 with an estimated one quarter of root development completed (c4.2 mm mesially). The tooth is high-crowned (buccal height 9.1 mm, lingual height 9.5 mm). The crown shows the typical "australopithecine bulge," being buccolingually expanded (BL = 12.6 mm) in relation to its mesiodistal diameter (MD = 9.9 mm). As with some specimens of *Australopithecus africanus* from Sterkfontein, the buccolingual diameter of GVH-1 is appreciably greater at the cervical enamel line (12.2 mm) than at the occlusal margin (7.4 mm) (Robinson, 1956). The crown is bicuspid but there is also a buccodistal accessory cuspule. The main buccal cusp is well developed and the lingual cusp is only slightly lower in height. The lingual cusp is situated approximately on, or just mesial to, the buccolingual center line of the crown as is typically found in the premolars of australopithecines (Robinson, 1956). The talon area is enlarged mesiodistally (talon length = 3.7 mm) and is marked by the presence of five small cuspules along the distal occlusal margin.

The buccal face possesses well defined though short buccal grooves, but the distal buccal groove is the more strongly developed. The lingual face is somewhat flattened and does not possess any distinguishing features. There is a marked developmental depression on the mesial face just below the enamel line. The buccal half of the

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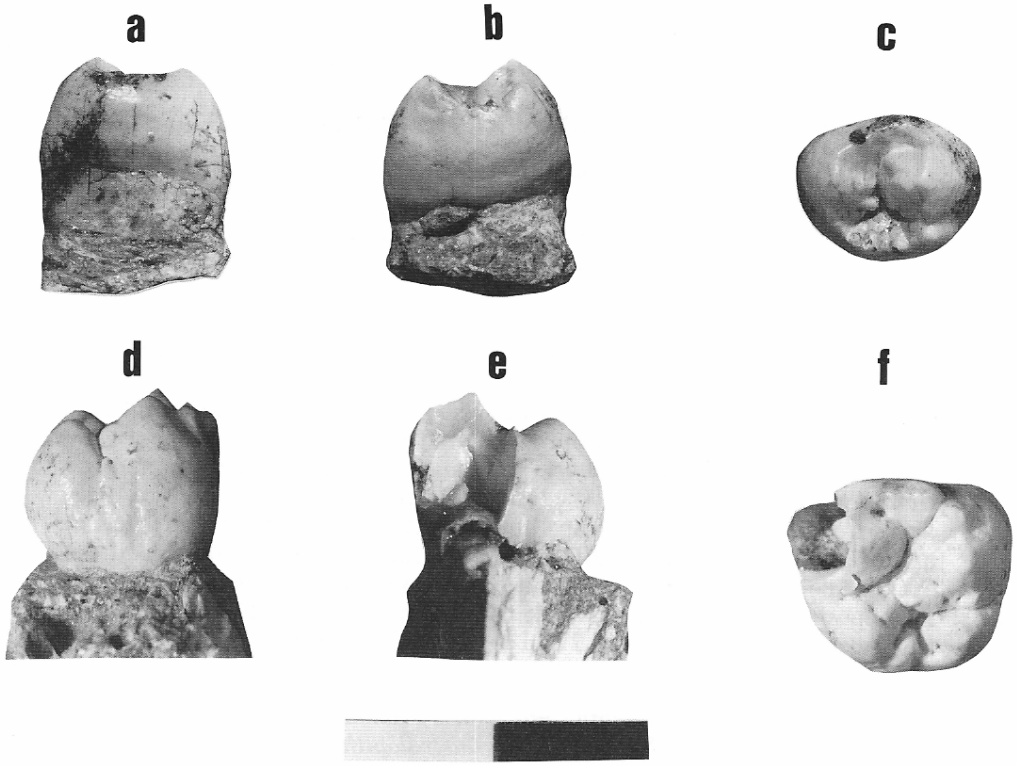

Fig. 1. a) Mesial, b) distal, c) occlusal views of GVH-1 left maxillary permanent third premolar, and d) buccal, e) lingual, f) occlusal views of GVH-2 right maxillary permanent second molar germ. Scale is in centimetres.

mesial face is slightly protuberant, but not to the extent seen in specimens of *Australopithecus (Paranthropus) robustus* (Robinson, 1956).

Viewed by X-rays and CT scans the enamel is thick, averaging 2.2 mm over the occlusal region. Horizontal CT sections through the root system indicate that the specimen was probably developing double roots, one mesially and one distally.

The second hominid specimen, GVH-2, is a right M^2 germ which was recovered by J. DeBeer on April 12, 1992 (Fig. 1d–f). A small amount of root (c1.5 mm) has formed below the lingual face; crown formation may therefore be considered as nearly complete. A mesiobuccal quadrant of the crown is missing, the lost region comprising most of the paracone and approximately one-half of the buccal face. This damage probably occurred when the original block of breccia was mined. As with GVH-1, this tooth is high-crowned having heights of 11.7 mm (protocone), 9.8 mm (hypocone), 9.2 mm (metacone), and 9.6 mm (paracone, as preserved). A small distostyle is present on the distal marginal ridge. The distal trigone crest is deeply incised.

On the buccal face the buccal grooves are poorly developed. A raised zone of enamel along the cervical enamel line terminates mesially in a large pit just distal to the point of breakage. On the mesial face there is a well-developed mesial groove. A well-developed lingual groove terminates abruptly about halfway to the enamel line. A Carabelli complex is present, visible as a groove on the protocone which ends in a small mesiolingual depression. There are few distinguishing features on the distal face. The

raised enamel zone near the cervical enamel line on the buccal face continues around on to the distal face to terminate on the enamel line above the distostyle. The mesiodistal diameter is 14.3 mm. The buccolingual diameter as measured is 14.7 mm, which an estimated original diameter of c14.9 mm. Enamel thickness of the occlusal surface, measured at the break is 2.65 mm, but is as thin as 1.3 mm in places when estimated from CT scans. Enamel thickness averages c2.0 mm.

While GVH-2 appears to be higher crowned than a sample of M^2s of *A. africanus* from Sterkfontein and Makapansgat, its cusps do not possess the characteristic "puffy" appearance of those of robust australopithecine molars.

The teeth were recovered from different blocks of breccia, but since both teeth are at approximately the developmental stage of a 7- to 8-year-old modern human child (Bass, 1987), it is possible that they stem from a single individual. The specimens are somewhat more developed than the same unerupted teeth of the Taung Child.

After careful comparison of the Gladysvale specimens with large collections of fossil hominid dental remains and casts at the University of the Witwatersrand and the Transvaal Museum, we feel that the morphologies of the teeth more closely ally them to *A. africanus* than to the robust australopithecines, or to early *Homo*. At this stage we are content to label the specimens as *Australopithecus* cf. *africanus*.

When more complete craniodental material is recovered, the systematic affinities of the Gladysvale hominids may become more apparent.

Some 27 taxa have previously been identified among fauna collected largely from the dumps at Gladysvale over the past 65 years (Broom and Schepers, 1946; Cooke, 1963, 1978; Tobias, 1972; Freedman, 1957). When to the published faunal lists are added a further 47 taxa identified from the dumps and in situ during the course of current excavations, the check-list of 74 species reveals an extensive general fauna and the most diverse bovid fauna recovered from any single South African cave (authors' work, and D.M. Avery, I. Plug, V. Watson, J.K. McKee, J. Kieser, personal communications) (Table 1). Bovids, equids, and carnivores are common, but surprisingly, non-human primate fossils are extremely rare, unlike most other South African australopithecine deposits (Brain, 1981). Four species of Cercopithecidae have been identified, but the specimens consist primarily of isolated teeth or single more complete specimens. Of the bovids collected to date, the majority are grazers, only the occasional browser having been recovered. These bovids are found along with considerable numbers of equid fossils mainly of the species *Equus capensis,* and this association may indicate that the environment surrounding Gladysvale was largely savanna during deposition periods. Large carnivores are not uncommon comprising approximately 7% of the total fauna. The most common carnivores recovered are specimens of *Dinofelis sp.* and *Pachycrocute bellax* (Kieser and Berger, in preparation). In addition to these specimens an approximately 60% complete skeleton of an extinct wolf-sized dog (*Canis* sp.) has been recovered from the decalcified deposits (Kieser and Berger, in preparation).

The fauna from Gladysvale is predominantly Plio-Pleistocene in age. The presence of some key indicator species such as *Makapania* cf. *broomi, Hippotragus broomi, Potamochoeroides* cf. *shawi, P.* cf. *izodi,* and *Australopithecus cf. africanus* indicates that some deposits at Gladysvale may be contemporaneous with the Sterkfontein Member 4 of the Makapansgat Member 3 deposits and are thus possibly in excess of 2.5 mya (Cooke, 1963, 1978; Vrba, 1985; Brain, 1981; Delson, 1988). Other species, such as *Pachycrocuta bellax, Dinofelis* cf. *piveteaui,* and numerous Late Pliocene species of bovids, suggest that possibly younger deposits may be found at the site, yet nothing recovered suggests the existence of deposits younger than those of Kromdraai A (1.7 mya) (Vrba, 1985; Delson, 1988). Whether there is a single ancient deposit in the time range of 1.7–2.5 mya or two or more ancient deposits of variable age within the Gladysvale system will only be established during the course of continuing excavations. The only specimens which are positively associated with the hominid fossils are isolated teeth of bovids,

TABLE 1. Combined faunal list of Gladysvale

- Primates
  - Cercopithecidae
    - *Cercopithecoides williamsi*
    - *Papio* cf. *izodi*
    - *Papio* cf. *robinsoni*
    - *Theropithecus oswaldi*
  - Hominidae
    - *Australopithecus* cf. *africanus*
- Insectivora
  - Soricidae
    - *Crocidura* cf. *bicolor*
    - *Suncus infinitesimus*
    - *Suncus* sp.
    - *Myosorex robinsoni*
  - Macroscelididae
    - *Elephantulus* sp.
- Rodentia
  - Hystricidae
    - *Hystrix africaeaustralis*
  - Bathyergidae
    - *Cryptomys robertsi*
  - Cricetidae
    - *Proodontomys* sp.
    - *Stenodontomys* sp.
    - *Mystromys* cf. *albicaudatus*
    - *Mystromys hausleitneri*
  - Gerbillidae
    - *Tatera* sp.
  - Dendromuridae
    - *Dendromus* spp.
    - *Steatomys* sp.
  - Muridae
    - *Lemniscomys* sp.
    - *Dasymys* sp. nov.
    - *Grammomys* sp.
    - *Mus* sp.
    - *Mastomys* sp.
    - *Aethomys* sp.
    - *Thallomys debruyni*
  - Otomyidae
    - *Palaeotomys gracilis*
- Perissodactyla
  - Equidae
    - *Equus* cf. *burchelli*
    - *Equus capensis*
    - *Hipparion* sp.
  - Rhinocerotidae
    - *Diceros bicornis*
- Proboscidea
  - Elephantidae
    - *Elephas* sp.
- Hydracoidea
  - Procavidae
    - *Procavia antiqua*
    - *Procavia transvaalensis*
- Carnivora
  - Hyaenidae
    - *Pachycrocuta bellax*
    - *Crocuta crocuta* cf. *ultra*
  - Canidae
    - *Canis* cf. *terblanchi*
    - *Canis* sp.
  - Felidae
    - *Panthera* cf. *leo*
    - *Panthera* cf. *pardus*
    - *Dinofelis* cf. *piveteaui*
    - *Dinofelis* sp.
- Artiodactyla
  - Suidae
    - *Potamochoeroides* cf. *shawi*
    - *Kolpochoerus* cf. *paiceae*
    - *Phacochoerus* cf. *antiquus*
    - *Potamochoerus porcus*
  - Bovidae
    - *Syncerus caffer*
    - *Pelarovis* sp.
    - *Alcelaphus* sp.
    - *Alcelaphus buselaphas*
    - *Conochaetes taurinus*
    - *Conochaetes* cf. *gnou*
    - *Hippotragus broomi*
    - *Hippotragus equinus*
    - *Tragelaphus angasi*
    - *Taurotragus oryx*
    - *Tragelaphus strepsiceros*
    - *Makapania broomi*
    - *Damaliscus lunatus*
    - *Damaliscus dorcas*
    - *Damaliscus* cf. *pygargus*
    - *Damaliscus* sp.
    - *Oreotragus major*
    - *Oreotragus* cf. *oreotragus*
    - *Redunca* cf. *darti*
    - *Redunca fulvorufula*
    - *Redunce* cf. *arundinum*
    - *Pelea capreolus*
    - *Gazella wellsi*
    - *Aepyceros* cf. *melampus*
    - *Antidorcas* cf. *marsupialis*
    - *Antidorcas bondi*
    - *Kobus leche*
    - *Megalotragus* sp.

including those of *Syncerus caffer, Alcelaphus sp.,* and *Redunca sp.* More detailed discussions of age of the Gladysvale site and the associated fauna may be found in Berger (1993).

The recovery of early hominid remains from Gladysvale in April 1992, marks the first discovery of a new early man site in southern Africa since Robert Broom discovered the remains of *Australopithecus (Paranthropus) robustus* at Swartkrans in November 1948 (Broom, 1949). Gladysvale now becomes the seventh site south of the Zambezi River to yield the remains of early hominids.

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