

An Alternative Interpretation of *Australopithecus afarensis* Fossil Material

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ABSTRACT. Hominoid fossils from Hadar, in Ethiopia and Laetoli, in Tanzania, and dated from the late Pliocene, were described as a new species of hominid, "*Australopithecus afarensis*," JOHANSON, WHITE and COPPENS, 1978. A comparative morphological analysis of the lectotype and several paralectotypes reveal that that two taxa were synthesized and that "*Australopithecus afarensis*" represents a hominid and a pongid. The hominid is relatively unspecialized, and the pongid is remarkably similar to *Dryopithecus* (*Sivapithecus*) *sivalensis* (LYDEKKER), 1879. The pongid is the first anthropoid ape recorded from the late Pliocene in Africa.

INTRODUCTION

A new species of hominid, "*Australopithecus afarensis*," was recently described from Ethiopia and Tanzania. It was based on many unassociated fossils of jaws and teeth recovered from several surface sites near Hadar, in Ethiopia and a much smaller sample from Laetoli, in Tanzania (JOHANSON & WHITE, 1979). The fossils were dated at about 3.8-2.6 m.y.a., approximately contemporary with or slightly older than *A. africanus* (TOBIAS, 1980).

The taxonomic status of "*Australopithecus afarensis*" has been controversial from the time it was first announced. Scientists are divided mainly into two camps; those that think it is heterogeneous, representing a late form of *Ramapithecus* LEWIS, 1934, or an australopithecine and a *Homo* (LEAKEY, 1981); and those that defend its homogeneity as a single species of australopithecine (JOHANSON & WHITE, 1979; JOHANSON, TAIEB & COPPENS, 1982). TOBIAS (1980) finds very few distinctive features in "*A. afarensis*" and regards it as conspecific with *A. africanus*, but that it represents two new geographical subspecies, *A. africanus afarensis* (= *tanzaniensis*) TOBIAS, 1978, and *A. africanus aethiopicus* TOBIAS, 1980. MCHENRY and CORRUCINI (1980) found that the metrically defined morphological pattern of the mandible and dentition of "*A. afarensis*" differs from the later australopithecines in numerous features. GRIBBIN and CHERFAS (1981) think "*A. afarensis*" is incontrovertible evidence of an upright ape, *Australopithecus africanus*.

While the primitive features of the genus *Australopithecus* show a superficial degree of intermediate status between humans and apes in the proportions of the skull, the advanced features of its jaws and dentition indicate a close relationship to the Hominidae. There is no evidence of a close affinity to the Pongidae. The authors of "*A. afarensis*" have attempted to add to the genus *Australopithecus* a whole suite of primitive features not found in hominids, leaving the criteria for separating the occiput, jaws and dentition of the Hominidae and Pongidae virtually indistinguishable.

Although primitive apes are known from the late Miocene and early Pliocene in Africa, no

fossil apes have been recorded during the period from seven to three million years ago (JOLLY, 1978). It is also within this time period that hominid evolution is least well known.

The aim of this study is to reassess the taxonomic status of "*Australopithecus afarensis*" by a detailed comparative morphological analysis.

MATERIAL AND METHODS

Since there is little disagreement regarding the hominid status of the partial skeleton A.L. 288-1, this study is concerned mainly with the lectotype L.H.-4 (a mandible with the incisors, left canine and left third premolar missing), the paralectotype L.H.-2 (a juvenile mandible with mixed dentition, partly damaged), both from Laetoli in Tanzania; and the paralectotypes A.L. 333-45 (an occiput partly crushed), A.L. 200-1a (a palate with complete dentition), A.L. 199-1 (a hemipalate with the incisors missing), and A.L. 400-1a (a mandible with the right central incisor missing), all from Hadar in Ethiopia.

The lectotype and paralectotype L.H.-2 were described in great detail and figured by LEAKEY et al. (1976) and WHITE (1977). Descriptions of the other paralectotypes were published together with dental measurements, photographs and drawings to scale (JOHANSON & TAIEB, 1976; JOHANSON & WHITE, 1979; JOHANSON & EDEY, 1981; JOHANSON, TAIEB & COPPENS, 1982; KIMBEL, JOHANSON & COPPENS, 1982; WHITE & JOHANSON, 1982), and dental measurements of *A. africanus* by COON (1962) and TOBIAS (1980). Casts of the paralectotypes from Hadar and of *Australopithecus* from South and East Africa, along with human and ape skulls were examined at the American Museum of Natural History, New York, and the Smithsonian Institution, Washington, D.C.

Two methods are used in the determination of the "*afarensis*" material listed above. The first is to compare the relevant morphological pattern of each specimen with the corresponding pattern of diagnostic characters and type of attrition that distinguish the families Pongidae and Hominidae. The criteria used are mostly those of LE GROS CLARK (1949, 1955, 1958, 1959). The second method is to analyze the anatomical occlusion by superimposing a tracing of the upper dentition on the lower.

CRITERIA

Since the criteria of LE GROS CLARK are very well known, only a few are listed here.

CRANIUM

The diagnostic character that differentiates the skull of *Australopithecus* from an ape is that modification which is related to the adoption of a habitual erect posture. The forward location of the foramen magnum and occipital condyles is related to this upright posture. LE GROS CLARK (1959) also emphasized the restricted extent of the nuchal area as a particularly distinctive character of the Hominidae, and said "it is related to the erect posture in which the skull is more balanced on the vertebral column, and the neck muscles for counter balancing the weight of the front of the skull are functionally less important than in a pongid and are reduced." In *Australopithecus* the nuchal crest is low, as in *Homo*, and erect bipedalism is in an advanced stage. In pongids the nuchal crest is high, and they are only semi-erect and not habitually bipedal.