

## The Place of the *Australopithecinae* Among Human Fossils

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Much of the speculation concerning the origin of man today centers about the Australopithecine fossils of South Africa. Most of the literature on human paleontology in recent years has dealt with these controversial fossils. They are commonly pictured as plains-living "apes" walking erect; their brain size exceeded that of adult gorillas. Some authorities say that they were already human; others classify them as apes; a third group regards them as "neither a human ancestor nor a mere deviant ape group, but a third line of evolutionary development, independent of the two others and intermediate to them because derived from the same ancestry farther back."<sup>1</sup>

The very name "Australopithecus" is misleading. It suggests Australia rather than Africa. We are apt to confuse it also with *Africanthropus njarasensis*, discovered by Kohl-Larsen in East Africa in 1935 and described by Weinert after World War II. The "Australian" idea was introduced into the South African fossil field by Dr. Robert Broom, originally a vertebrate paleontologist, who made his first excursion into the field of human paleontology in 1923 when he described a fossil which differed from those of Bushmen and Hottentots as a new (Koranna) type. Because of its prominent supraorbital ridges he thought it was related to the Australoid primitive type.<sup>2</sup> This reference prompted Dart, who "discovered" the first fossil of the type we are to consider here a year later, to call his more primitive fossil *Australopithecus africanus* ("African southern ape"). Since 1924 portions of about 25 individuals, consisting mostly of skull parts but also of pelvic and leg bones, have been found. In this paper we shall consider the chief discoveries in sequence, various evaluations which have been made of them, and finally some tentative conclusions concerning the place of the *Australopithecinae*.

### I. The Discoveries

The first *Australopithecinae* discovery was made by a quarry worker in a "desert limestone" formation near Taungs, about 200 miles southwest of Johannesburg, in 1924. It was brought to Professor Raymond Dart of the University of Witwatersrand, Johannesburg, for identification.<sup>3</sup> The discovery proved to be the skull of an immature creature whose brain size was about 500 c.c. Dart estimated that as an adult it would have reached about 600 c.c., regarded as considerably below the lower human limit. He regarded it as a "manlike ape" representing a family intermediate between the higher apes and man but nearer the human ancestor than any fossil discovered elsewhere. When Dart's discovery was announced in England in 1925 it met scant enthusiasm. Although Sollas and Elliot Smith sup-

1. KROEBER, A. L., *Anthropology*, second edition, New York, 1948, p. 92.

2. *Yearbook of Physical Anthropology for 1948*, Volume 4, New York, pp. 42-43.

3. Several of the South African fossils were found by non-scientists; so, for that matter, were most of the important Java fossils.

ported Dart, most authorities regarded the skull as merely that of a young ape and referred to it as the Taungs Ape.

Dr. Broom of the Transvaal Museum, Pretoria, agreed with Dart and, undismayed by the criticism which Dart had received, set out to find the fossil of an adult member of this family. In 1936 he announced the discovery of such a skull, blasted out of solid "bone breccia" in another limestone quarry at Sterkfontein, about 20 miles northwest of Johannesburg. This Sterkfontein skull, that of a young adult with most of his teeth intact, also had a brain case of about 500 c.c. Broom first called it *Australopithecus transvaalensis* but later, following the finding of several other skulls and fragments of skeletons in the same area, assigned it to a new genus, *Plesianthropus transvaalensis*. He described this new genus as a "remarkably human type."

In 1938 Broom announced the discovery of a "somewhat different type of ape-man" with a "much larger brain" (650 c.c.) which had been made at Kromdraai, about two miles from Sterkfontein. This adult "third type" he classified as of still another genus and species, *Paranthropus robustus*, "robustus" because of its larger size.<sup>4</sup>

During World War II very little research was done in the South African caves, but in 1947 Dart announced the discovery of skull parts of what he believed to be an adult of the family previously found at Taungs. This fossil was found in the Makapan caves in the northern part of the Transvaal, about 200 miles from the site of the Taungs discovery. Its brain size was estimated to be 650 c.c. Dart believed that he had evidence that the creature used fire and so he called it *Australopithecus prometheus*. Jaw parts of another creature of the same type were found at the same site a year later.

Between 1948 and 1950 Broom and his assistant, J. T. Robinson, discovered skull parts of several more individuals of the *Paranthropus* type at Swartkrans, only a mile from the Sterkfontein cave. This discovery was placed in a new species, however, *Paranthropus crassidens*, "crassidens" because it was "coarse-toothed." Broom estimated the cranial capacity of this species to be over 900 c.c., thus falling well within the lower border of the human range (750 c.c.) set up by Keith in 1949. Finally, in 1949, shortly before Broom's death, Robinson found the lower jaw of what he regarded as still another type with an even larger brain at the Swartkrans site. Robinson classified this as a new genus, *Telanthropus capensis*.

## II. Evaluations of the Discoveries

In attempting to evaluate the discoveries we shall consider first the estimates of the Dart-Brown-Robinson (the "South African") school and then those made by others.

*Evaluations by the South African School.* The claims made by the South African group are rather startling. Broom described the Australopithecines as "small-brained men" who "walked on their hind feet, and used their delicate hands for the manipulation of tools and weapons." "We

4. BROOM, ROBERT, "The Fossil Ape-Men of South Africa," *Proceedings of the Pan-African Congress of 1947 on Prehistory*, New York, 1952, pp. 107-111.

have reason to believe," he says, that "they must have hunted in packs, and it seems not improbable that they had some kind of speech."<sup>5</sup> Dart is not only convinced that they made use of fire<sup>6</sup> but he believed he saw evidence of the use of a double-pronged implement to fracture baboon skulls and of some sort of weapon for fracturing the skulls of fellow Australopithecines.<sup>7</sup> Robinson claims that *Telanthropus* had already crossed over from the Australopithecine group and was a true man.<sup>8</sup> Both Broom and Robinson believe that the geological age of the fossils goes back to the Pliocene and extends upward through the lower and middle Pleistocene.<sup>9</sup>

It is suggested now that the South African and East African fossils are closely related to the *Pithecanthropus* fossils of Java. Broom and Robinson saw affinities to *Pithecanthropus* in *Telanthropus*. Robinson now sees a resemblance between a "giant size" creature, *Meganthropus africanus*, discovered in East Africa in 1939, and the Javan *Meganthropus* found by von Koenigswald in 1941. He believes that both represent a once widely distributed Australopithecine group.<sup>10</sup> If we are to believe the Dart-Broom-Robinson school the whole jig-saw puzzle of early fossil man now falls into order. They not only believe that the Australopithecines constitute the most important discoveries in the history of human paleontology but also that a rather definite link has now been established between the *Simiidae* and mankind. As Broom said, "It looks as if we have already solved the problem of the origin of man."<sup>11</sup>

*Evaluations by Others.* Time may prove that Broom was right. But it must be admitted that Broom was an enthusiast. At this point then it will be well to try to carry out the advice given by Franz Weidenreich in one of the last papers he wrote: "the Australopithecinae problem has first to be freed from all emotional interpretation and brought back to a sound objectivity."<sup>12</sup> Let us see now what some of the authorities not too closely associated with the Australopithecine discoveries have to say about them. We shall present these opinions under the following headings: (1) Culture, (2) Head, (3) Posture, (4) Geological Age.

1. *Culture.* The claim that *Australopithecus* had a culture can be disposed of rather quickly. Although the Dart-Broom-Robinson school claims that the Australopithecines spoke, no one else seems to agree. The artifact claim is based upon some marks found on baboon skulls and upon the fractures in some of the Australopithecine skulls. Evidence of the use

5. BROOM, R., *Finding The Missing Link*, London, 1950, p. 79.

6. *Ibid.*, p. 74.

7. *Yearbook of Physical Anthropology for 1948*, New York, pp. 23-24.

8. *Yearbook of Physical Anthropology for 1950*, pp. 40-41.

9. BROOM, R., *Op. cit.*, p. 78; ROBINSON, J. T., "Meganthropus, Australopithecines, and Hominids," *American Journal of Physical Anthropology*, Volume 11 (March, 1953), p. 32.

10. ROBINSON, J. T., *Op. cit.*, pp. 1-38; *Yearbook of Physical Anthropology for 1950*, pp. 27, 41. (The African *Meganthropus*, a small jaw part, was also discovered by Kohl-Larsen and named by Weinert.)

11. *Op. cit.*, p. 77.

12. "About the Morphological Character of the Australopithecinae Skull" in *Robert Broom Commemorative Volume*, Alex. L. Du Toit, ed., Special Publication of the Royal Society of South Africa, Cape Town, 1948, p. 158.

of fire is attributed to microscopic and chemical study of a few specks of carbon black on some animal bones found with *prometheus*. Although George B. Barbour of the University of Cincinnati who studied the evidence is inclined to agree,<sup>13</sup> few if any others support the South African school on these points. Pierre Teilhard De Chardin, who also visited South Africa and studied the same evidence, found no proof of fire or the use of true implements.<sup>14</sup>

2. *The Head*. Much has been written about the brain and teeth of the Australopithecines. William K. Gregory, who visited South Africa in 1938 and thereafter became one of the first Americans to emphasize the human features of the Australopithecines, says they "combined brains of only ape-like bulk with teeth of human or near-human patterns" and that the form of the dental arch was "approaching the human stage."<sup>15</sup> Weidenreich (1948), Bronowski and Long (1951), and Le Gros Clark (1952) take a similar view regarding the teeth. S. Zuckerman, however, disagrees.<sup>16</sup> Most authorities agree with Gregory (against some of the claims of the South African school) that the brains were ape-like in bulk. Weidenreich also claimed that the shape of the head was distinctly ape-like, and Ernst Mayr says the small-sized brain and the "protruding face" are simian.<sup>17</sup>

But brain-size may not be a matter of prime importance in evaluating the status of man-like fossils, if we are to judge by the discussion of this point at the International Symposium on Anthropology in New York City in 1952. William L. Straus, Jr., observed: "Some of the recently discovered Australopithecines apparently had brains of a size that carried them across Keith's Rubicon, but we know nothing of their cerebral quality. We cannot admit them to human status on brain size alone."<sup>18</sup> Kenneth P. Oakley agreed that quality was the important thing, reminding his audience that Weidenreich had likened much of the interpretation of inter-

13. "Ape Or Man?", *Yearbook of Physical Anthropology for 1949*, pp. 132-133 (Reprinted from *Ohio Journal of Science*, Vol. 49). He refers (p. 133) to a communication received from Dart reporting "evidence of a bone and horn culture" at Makapan.

14. "On the Zoological Position and the Evolutionary Significance of Australopithecines," *Transactions of The New York Academy of Sciences*, Ser. II, Vol. 14 (March, 1952), p. 209.

15. *Evolution Emerging*, New York, 1951, Volume I, p. 487. Artifacts might have been necessary for survival if the teeth were human. Wood and other perishable materials could have been used to kill animals. See George A. Bartholomew, Jr. and Joseph B. Birdsell, "Ecology and the Prehominids," *American Anthropologist*, Vol. 55 (October, 1953), p. 490.

16. In his "Taxonomy and Human Evolution," *Yearbook of Physical Anthropology for 1950*, pp. 221-271 (Reprinted from *Biological Reviews*, Vol. 25) Zuckerman appears to have contributed one of the most scholarly criticisms of the Dart-Broom-Robinson school yet to appear. It is unfortunate, however, that he attempted to belittle Gregory's evaluation of Australopithecus by referring to him as the sponsor of an alleged primate fossil tooth later identified as that of a peccary (p. 228). Gregory challenged this erroneous identification from the start as the present writer pointed out in his *Man's Unknown Ancestors*, Milwaukee, 1948, p. 17.

17. *Origin and Evolution of Man*, Cold Spring Harbor Symposia on Quantitative Biology, Cold Spring Harbor, N. Y., 1950, p. 111.

18. *An Appraisal of Anthropology Today*, edited by Sol Tax et al., Chicago, 1953, pp. 262-263.

cranial cases to phrenology. Oakley urged a new working definition for identifying fossil man: "the tool-making hominid."<sup>19</sup>

3. *Posture.* Where evidence of artifacts is lacking paleontologists seem to be paying more attention to posture as a mark of fossil man today. Such emphasis is based upon the assumption that man may have arrived "feet first." Upright posture which freed hands for making artifacts can be identified in the pelvis as well as in other skeletal parts, such as the base of the skull, it is said. Gregory believes that the Australopithecine skeletons "indicate an erect posture"<sup>20</sup>; a similar viewpoint was expressed at the Cold Spring Harbor Symposia by S. L. Washburn, W. W. Howells, Adolph Schultz, and Ernst Mayr among others.<sup>21</sup> Even E. H. Ashton and S. Zuckerman recognize this.<sup>22</sup> Yet William L. Straus, Jr., warns against including the Australopithecine in the genus *Homo* on the basis of apparent bipedalism, pointing out that "it is often quite difficult or impossible to establish the precise posture of a fossil primate."<sup>23</sup>

4. *Geological Age.* It seems to be quite generally agreed that the weakest point in the case for Australopithecus is the evidence of geological age. Broom lamented the fact that geologists had given him very little help. A. W. Rogers who made a survey of South Africa in 1925 said there was no probability of determining the age of the deposits. Lacking a geological time-table Broom proceeded to estimate time periods by other factors such as the nature of the animal life found in caves with the fossils. From this he concluded that the deposit in which the earliest fossils were found was Pliocene.<sup>24</sup> Few others, however, are willing to accept this evidence.

We shall not attempt to go into the special difficulties involved in making accurate geological estimates of the Australopithecine habitat. For one thing it is difficult to correlate the African pluvial periods with the European glaciations. Two Americans qualified to give an opinion, Charles L. Camp and George B. Barbour, visited the site recently, and although Barbour seems to be more favorable Camp points out that stratifications are not available and the faunal sequence is not yet worked out. Although Camp regards the site as Pleistocene he found it difficult to separate the Pleistocene from Recent formations.<sup>25</sup>

Little help in dating these fossils is expected from the two new methods, radio-carbon (Carbon 14) and fluorine analysis, at present. Carbon 14 dating cannot be used back beyond 35,000 years. As the deposits were

19. *Ibid.*, pp. 259, 265.

20. *Op. cit.*, p. 486.

21. *Loc. cit.*, pp. 70-83, 111. Teilhard de Chardin also agrees. *Op. cit.*, p. 209.

22. "Some Cranial Indices of Plesianthropus and Other Primates," *American Journal of Physical Anthropology*, Volume 9 (September, 1951), p. 296. W. E. Le Gros Clark agrees but says (with Ashton and Zuckerman) that the head was not balanced as it is in modern man. *A.J.P.A.*, Volume 10 (March, 1952), p. 121.

23. *An Appraisal of Anthropology Today*, p. 263.

24. *Op. cit.*, pp. 35-36.

25. The geological difficulties are described briefly in Barbour's paper, already referred to, and in the comments of Camp and Barbour during the Fourth Summer Session in Physical Anthropology (1948 *Yearbook of Physical Anthropology*, pp. 25-26), also in *Anthropology Today*, A. L. Kroeber et al., Chicago, 1953, pp. 175-180.

indurated by travertine it appears that the fluorine method will not unlock the riddle until the ages of associated specimens are available for comparison.<sup>26</sup> Although Robinson recently stated "From available faunal, geological, and archeological evidence the geological age of the Australopithecines may be fixed with reasonable certainty: the age must be no earlier than upper Pliocene and no later than lower Pleistocene,"<sup>27</sup> he cites no authority for this "reasonable certainty."

Two facts seem to stand out more prominently than any others in the recent literature on *Australopithecus*: (1) the lack of precise knowledge about the age of these fossils and (2) the importance of determining that these fossils are old enough to be "ancestors of man" before drawing any final conclusions about them.

### III. Tentative Conclusions

While it is too soon to draw final conclusions about the nature and place of the Australopithecines it should facilitate understanding if at this point we consider a few brief summations made recently by competent authorities. We shall consider here only three. The first, by William L. Straus, Jr., an anatomist, summarizes the difficulties faced in attempting to evaluate the fossils.

Their geological age is highly uncertain. The exact character of their habitat has not been established. To some students their posture remains a reasonable doubt. The phylogenetic significance of some of their morphological characters is open to different interpretations. The view has been expressed that much of the material needs to be more thoroughly studied and evaluated, particularly by comparison with statistically significant series of other primates. The meaning of the curious giant forms is quite obscure. The enthusiastic attempts to reconstruct the social life of the *Australopithecinae* have not been calculated to inspire confidence. In short, many important questions remain to be answered. The great quantity of Australopithecine material thus far uncovered, and the prospect of still more to come, betokens years of careful study.<sup>28</sup>

From the viewpoint of physical anthropology we have the tentative conclusion of M. F. Ashley Montagu:

In the present stage of our knowledge one can only point to the australopithecines and say, that while no one of them may have been directly ancestral to man, a type very like them must have been; which is to say that the manlike apes from South Africa are man's nearest present known relatives, and that there may have been one or more stages of development between a form like them and the appearance of the first man. There cannot have been, however, more than a few such intermediate stages for the australopithecines have themselves almost made the passage into the family of man, the Hominidae . . .<sup>29</sup>

26. OAKLEY, KENNETH P., "Dating Fossil Human Remains," *Anthropology Today*, pp. 49-53.

27. "Meganthropus, Australopithecines, and Hominids," *A.J.P.A.*, Volume 11 (March, 1953), p. 32.

28. "Primates," *Anthropology Today*, pp. 89-90.

29. *An Introduction to Physical Anthropology*, revised, Springfield, Ill., 1951, p. 121.

Finally we have the opinion of Pierre Teilhard de Chardin, a paleontologist, who has made a first-hand study of both the early Asiatic and South African fossils:

. . . the Australopithecines differ from all living and fossil Apes known so far, and they are strongly hominoid ('hominoid' however does not mean 'human'). In no case . . . can the Australopithecines (in contrast to the Pithecanthropines) be considered as a zoological group which, at any time, crossed the divide between Ape and Man.<sup>30</sup>

It may be relevant to add as a final observation that Teilhard de Chardin is now convinced that Africa, rather than Asia, was "the main laboratory for the zoological development and the earliest establishment of man on this planet."<sup>31</sup>

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30. *Op. cit.*, p. 209.

31. "The Idea of Fossil Man," *Anthropology Today*, p. 96. He points out that in addition to the Australopithecines this continent is also the source of the higher types of fossil Primates and a wealth of widely distributed older Paleolithic industries. In this connection it might be mentioned that the matter of the possible relationship of the Australopithecines to the lower Miocene fossil apes from Kenya (*Proconsul* and *Limnopithecus*) was considered to be beyond the scope of this paper.