MAN'S ANCESTORS: AN INTRODUCTION TO PRIMATE AND HUMAN EVOLUTION. By Ian Tattersall. 64 pp., figures, bibliography, index. John Murray Publishers, London. 1970. $4.75 (paper).

Tattersall has written a very useful textbook for an introductory course dealing, in part, with primate and human evolution. The book is not thorough enough to be the only text in a course dealing primarily with the fossil record, but could be used along with a book like Guide to Fossil Man (Day), or with a reader for this purpose. As it is, a number of different courses could be constructed using it along with another text. For instance, used with The Meaning of Evolution (Simpson), a course could deal with evolution theory and its application to fossils. Man's Ancestors makes an excellent supplement to Origin of Man (Buettner-Janusch) in a general introductory course.

The book includes many photographs published for the first time, such as occlusal views of *Oligopithecus* (fig. 7.8) and *Aegyptopithecus* (fig. 7.5). Indeed, the Oligocene and Miocene primate sections are the strongest, as one might expect. The book becomes progressively weaker as one approaches the present.

Tattersall promises us: "I have not tried for the sake of simplification to present any clear-cut schemes where none exist." However, this is not always the case. The Fayum is the only Old World primate-yielding Oligocene site. As such, I believe there has been a tendency to trace all higher primate lineages to this single homogeneous tropical forest area! Consequently, *Apidium* is thought to be ancestral to *Oreopithecus* because of the centroconid cusp on the lower molars, in spite of the presence of a M_3 from Maboko in East Africa with a centroconid cusp. This East African site has savanna fauna, and it is unlikely that the African specimen bore much resemblance to the isolated Italian swamp-ape. *Parapithecus* is given as a possible ancestor of cercopithecoid monkeys because of the "waisted" midpoint of the lower molars. However, *Parapithecus* has three premolars. Should it be ancestral to the cercopithecoid monkeys, the loss of the third premolar would necessarily be independent and parallel in the hominoid and cercopithecoid lineages. While this is not impossible, it seems less likely than the possibility that the molar constriction is a parallelism. *Aeolopithecus* is suggested as a possible gibbon ancestor. However, in many respects it makes as good an ancestor of dryopithecines as does *Aegyptopithecus*. The third molars of *Aeolopithecus* are diminutive. On the other hand, the "V" shape of the mandible, with large laterally flaring canines and crowded incisor roots, make it resemble some of the earliest Miocene dryopithecines such as Rusinga 394 (formerly "Kenyapithecus africanus"), or SGR 1, the *Dryopithecus major* mandible. In sum, the relations of these Oligocene primates with later taxa may not be as clear as Tattersall suggests.

In discussing the Miocene primates, he suggests that *D. nyanzae* is ancestral to *D. major* and *D. africanus*, which, in turn, gave rise to gorillas and chimpanzees. This is a very important suggestion because if true, it means that hominids arose about 18 million years ago, since both DNA hybridization and albumin immunological distance measurements show hominids are equally related to chimpanzees and gorillas. However, he gives no supportive data, indicates no supportive arguments, and if anything confuses the entire issue by using the Moroto palate to represent *D. major*, although this specimen is dated considerably later than the other dryopithecines (14 million years) and judging by the expanded anterior dentition, represents an entirely different adaptation than the Rusinga *D. major* specimens.

The discussion of *Ramapithecus* as "the earliest hominid" reviews many of the current arguments. However, some of his statements lend more confusion than clarification to this very important point. For instance, the canine of the Fort Ternan specimen is *not* "relatively reduced . . . even compared to the smallest ape." Rather, it is about the same size, relative to the molars, as the canine of female gorillas. That the premolars of the maxillae are homomorphic is irrelevent since, as he points out elsewhere (p. 24), heteromorphism refers only to mandibulae. Actually, there is now a mandible that goes with the Fort Ternan maxilla. The premolars are present, and they are *heteromorphic*! If *Ramapithecus* is a hominid, it is for none of the reasons given above. Of course, the expanded occlusal surfaces of the molars, and the closely packed teeth, are very *Australopithecus*-like, but these features also characterize *Gigantopithecus*. Again, the picture is not as clear as one might have hoped.

The chapter dealing with the australopithecines themselves is quite complete, discussing some of the new specimens and emphasizing the continuous transition between the australopithecines and *Homo erectus*. Aside from a few mistakes (the almost complete vertebral column, pelvis, and femur come from Sterkfontein, some *A. africanus* specimens such as MLD 1 show evidence of having had a sagittal crest, robust australopithecine anterior teeth are not particularly small, etc.), I question two of his inferences. First, he suggests relatively longer arms in gracile australopithecines than in *Homo sapiens*, stating: "the Sterkfontein humerus is as big as that of a modern man, and belonging to a much smaller animal implies that the arms of *A. africanus* were relatively more robust that those of *H. sapiens*, and that the two species may have differed in their body proportions." However, the humerus (STS 7) comes from a different individual than the vertebral column from which the body size estimate is based (STS 14). The STS 14 femur gives a calculated height *smaller* than all but one other specimen (STS 65) at the site, while the mandible associated with the humerus (STS 7) is *larger* than all but one other (STS 36). It is little wonder that the humerus from STS 7 seems too large for the body size of STS 14! Second, he suggests that because the average australopithecine age at death is about 18, if reproduction began at 13 most australopithecine children would have neither parent alive by maturity. This reasoning ignores the high child mortality which lowers the average lifespan. Actually, of those who survive to 13, almost 70% go on to reach the age of 20, and close to 20% live to 30. Consequently, most children would have at least one parent through maturity, and about 20% of the children could have known their grandparents, if such kinship relations were recognized.

Unfortunately, the Middle and Late Pleistocene sections treat the fossil material in a much more general fashion. This trend is almost exponential, terminating with the statement: "All human fossils younger than about 30,000 years are fully modern in every particular." Surely human evolution did not end 30,000 years ago!

In spite of these problems, I highly recommend the book. It is one of the best available for introductory courses. I have used the book in such a course and find that while numerous points raised by it, and concepts used in it, have to be further explained, the discussions are lively, and the class maintains a high level of interest.

MILFORD H. WOLPOFF
University of Michigan